Determinants of MFIs Group Loan Repayment Performance: A Case of Dedebit Credit and Saving Institution, Mekelle, Ethiopia

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Abstract
Group loan repayment rate of Debub and Semien sub branch of DECSI microfinance institution in the city of Mekelle has decreased considerably from year to year and averaged around 43 percent default rate per year of the total loans dispersed for consecutive five years (2009 to 2013). Therefore, this study is an attempt to identify factors influencing the loan repayment performance of group borrowers. Primary data was collected from a sample respondents (selected by using simple random sampling technique) through questionnaire and unstructured interview. The study has applied explanatory type of research, i.e., binary logistic regression model to analyze the factors influencing group loan repayment performance. Peer-monitoring, screening, peer-pressure, social ties, loan officer visit to the group, and other sources of credit were found to have statistically significant effect on the group loan repayment performance. Thus, to improve the group loan repayment performance, DECSI should consider those statistically significant explanatory variables and take corrective actions accordingly.
Keywords: Binary Logit, DECSI, Determinant Factors, Ethiopia, Group Loan, Mekelle, MFIs, MSEs.

1.   INTRODUCTION

In many developing economies majority of the people live in great poverty. Lack of having access to external finance is one of the reasons why many people in developing economies remain stuck in poverty. Usually, the poor have no access to loans from the formal banking system because the poor in general cannot meet the collateral requirements stipulated by the banks and the inherently high cost to banks to assess the risk type of potential borrowers (screening), to ensure that the loan, once made, is utilized productively (monitoring) and to ensure the repayment of loans if borrowers are unwilling to do so (enforcement) may all contribute to the exclusion of the poor from the credit market. Recently, however, the poor in both rural and urban areas of these economies have succeeded in gaining increased access to loans. An important contribution to make this possible is made by so-called group lending programs (Al-Azzam & Sudipta, 2007).

Joint liability group lending was the original model of Grameen Bank, and it is one that some micro financing organizations still offer (Gine & Kalran, 2008). During the past few years group lending programs have been introduced in many developing economies (Hermes, Lensink, & Mehrteab, 2005).

Under joint liability group lending, borrowers come together to take out individual loans for which they are jointly responsible. In group lending, if one member cannot meet his or her repayment obligation, other members must bear the repayment of the defaulter otherwise all borrowers in the group will be responsible and denied future access to loans from the program. Therefore, group lending mechanism creates incentives for individual group members to screen out risky borrowers, monitor each other's' actions and enforce repayment (Al-Azzam, Hill, & Sarangi, 2008). Joint liability group lending mechanism tackles three major problems which affect the repayment performance of the self-help groups (SHGs) problem of adverse selection, i.e., to ascertain what kind of a risk the potential borrower is (Charlotte & Lodewijk, 2003). Problem of moral hazards, i.e., it makes sure of proper utilization of loan so that a borrower is in a position to repay within the due date, and problem of enforcement, i.e., pressure mechanism is operative on willful defaulters (Verhelle & Berlage, 2003).

Micro finance Institutions (MFIs) have two major lending methodologies; group and individual lending. Group lending involves lending to a group of borrowers who are jointly liable for a loan. However, individual lending often requires collateral that the poor borrower can pledge; the value of the collateral and the loan size may not be closely related. 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 (Huppi & Feder, 1990). There are also two modalities of group lending. One , a lender may provide funds to a group or a collective entity such as a cooperative or a village bank which then disburses the loan to individual members according to agreed criteria. In such a case, the group is jointly liable for the entire amount of the loan. Second, funds may be lend to members individually who are organized in groups , in which case the group jointly guarantees all loans or simply provides information about individual participants (Huppi & Feder, 1990).

The National Bank of Ethiopia (NBE) supervises MFIs in Ethiopia. The Ethiopian government has laid down a regulatory framework for the establishment of MFIs by issuing proclamation No. 40/1996 that provides for the licensing and supervision of MFIs. Since the issuance of this proclamation in July 1996, today, there are 31 MFIs registered with the National Bank of Ethiopia serving clients (Ebisa, Getachew, & Fikadu, 2013). Dedebit Credit and Savings Institution (DECSI) is one of those micro finance institutions (MFIs) in Ethiopia, which is inaugurated in Tigray region. By considering the criteria that the poor were denied by conventional banks, i.e., the difficulty to secure traditional collateral, DECSI designed group (groups of 3-7 members) based loans by taking lessons from the Grameen Bank.

MIFs such as DECSI are facing financial constraints to sustain loan provision to the poor due to problems in loan repayment performance. Thus, this study was conducted to examine the factors that determine the performance of group loan repayment of DECSI, Mekelle - Tigray.

2.   LITERATURE REVIEW

Micro finance refers to the provision of financial services to low-income clients, including consumers and the self-employed (Ledgerwood, 2000). The word microfinance refers to small-scale financial services primary credit and savings provided to people who operate small enterprises, provide services, fish farm or herd, and to other individuals or groups at local level of developing countries both rural and urban areas (Robinson, 2001).

Degene (2001) also described microfinance based on its main characteristics: its directing of the poor, promoting small business, building capacity of the poor, extending small loans without collaterals, combining credit with savings, and charging commercial interest rates.

Generally the term microfinance refers to the provision of financial services to low-income clients; however some microfinance organizations also provide insurance and payments. In addition to financial intermediation, many microfinance institutions provide social intermediation services such as group formation, development of self-confidence, and training in financial knowledge and management capabilities among members of a group. Furthermore, microfinance is not simply banking; it is a development tool as well and as such, its activities also involve provision of small loans, typically for working capital; informal evaluation of borrowers and their investments; collateral substitute, such as group collateral or compulsory savings, secured savings products (Ledgerwood, 1999).

Based on the above concept of micro financing, it is clear that the primary objective of microfinance institutions (MFIs) is to provide financial (credit and saving) and non-financial social intermediation services (such as group formation, development of self-confidence, training in financial knowledge, and management capabilities among members of a group) to the poor in order to release financial constraints and help alleviate poverty.

Group lending is an innovation that makes it possible, where the poor borrowers act as guaranties each other by the joint liability. While exploiting the local knowledge that has members on each other, group lending solved several problems of asymmetry of information between borrowers and creditors (Bassem, 2008).

Since 1970s, group lending programs have been promoted in many developing countries (Zeller, 1996).In group lending programs screening, monitoring and enforcing repayments problems are solved by providing loans to an individual borrower, who is a member of a borrowing group. The group of borrowers is made responsible for the repayment of the loan: all group members are jointly liable. Non-repayment by the group also means that all borrowers in the group will be denied future access to loans from the program.

The principle of joint-liability creates an incentive mechanism in which each group member has an interest in screening and monitoring the other members, and to enforce repayment if necessary, since the non-repayment of one of the other members will be costly for her/him and, additionally, may cut off access to loans in the future. Thus, individual borrowers are stimulated to select credible members to group with, to monitor the other members' activities once the loan is received, and to enforce repayment in case a group member fails to pay her/his obligations (Ghatak, 1999).

In this case, joint liability lending microfinance institutions can lessen the three major problems facing formal credit institutions in lending to the poor. These problems are: (a) to ascertain what kind of a risk the potential borrower is (the problem of adverse selection), (b) to make sure she/he will utilize the loan once made, properly, so that she/he will be able to repay it (the problem of moral hazard) and (c) to find methods to force the borrower to repay the loan if she/he is reluctant to do so (the enforcement problem). By utilizing the information advantages of members belonging to the same community and their potential to exert pressure on borrowers,

borrowing groups under a joint-liability contract are in a better position than formal banking institutions to address these problems (Ghatak, 1999).

Joint-liability, therefore, reduces the costs of screening, monitoring and enforcement of repayments for the creditor. Several theoretical papers have shown the positive contribution of joint-liability programs to reducing screening, monitoring and enforcement costs. Stiglitz (1990) and Varian (1990) have presented models in which peer monitoring within groups reduces moral hazard behavior of individual group members. Group lending programs delegate costly monitoring activities to group members, reducing the costs of lending, which may be translated into lower interest rates the borrowers' have to pay and/or larger loan contracts.

Regarding to the group loan repayment performance, several studies have been conducted in many countries by different authors. Thus, the following sections present the empirical studies and their findings with respect to the relationship between repayment and screening, monitoring and enforcement activities within groups, and on factors of individual/borrower characteristics.

2.1.   REVIEW OF THE RELATED EMPIRICAL LITERATURE IN OTHER COUNTRIES

Wenner (1995) studied on the determinants of repayment of groups. He used data of 25 groups from Foundation for International Community Assistance (FINCA), a group-based program in Costa Rica. His analysis indicated that repayment performance of groups improve when groups have written (formal) rules stating how members should behave. This variable indirectly measures screening, monitoring and enforcement activities that take place within the groups. The variable location indicated that if groups are located in remote areas this reduces their possibilities to have access to alternative sources of credit, which stimulates them to ensure group repayment as much as possible in order to have future access to loans.

Matin (1997) examined repayment performance of Grameen Bank borrowers: The Unzipped State. By using data of 246 borrowers from Grameen Bank, he verified the effect of education, landholding, length of membership in years, other source of loans on delinquency. He has found that education and landholding have negative effect on delinquency; whereas length of membership and other credit sources have positive effect on delinquency.

Matin (1998), by using data of 246 borrowers from the Grameen Bank, Bangladesh, also found that members who have other credit sources and who have land use above some threshold level have a higher probability of showing repayment problems. These outcomes may indicate that since these borrowers have other credit opportunities or that they have accumulated substantial assets, they have less interest having future access to loans from the program, which may reduce their screening, monitoring and enforcement activities. This result confirms to the results of Wenner (1995) and Sharma and Zeller (1997) that is if borrowers are more credit rationed and if groups are located in remote areas, these reduces their possibilities to have access to alternative sources of credit, which stimulates them to ensure group repayment as much as possible in order to have future access to loans.

Sharma and Zeller (1997) used data of 128 groups from four group-based lending programs in Bangladesh to study the determinants of repayment. They used a number of variables that may measure screening, monitoring and enforcement activities within groups. They found that repayment problems increase when there are more relatives in the same group. This supports the theory that when people know each other very well and have close social ties, they may be less eager to pressure for repayment (Conning, 2000; Wydick, 1999).

Zeller (1998) has analyzed the repayment performance of six group-based lending programs in Madagascar based on detailed information from 146 groups. He examined measures of social ties between group members and found that groups with stronger ties show higher repayment rates. This supports the assumption that group members with stronger ties have more information about each other and are, therefore, better able to screen, monitor and enforce.

However, this finding is against the findings of Conning (2000), Wydick (1999) and Sharma and Zeller (1997) that is repayment problem increase when there are close social ties and more relatives in the same groups, respectively. Furthermore, he found that groups with internal rules and regulations prove better repayment rates; this finding is conformed to the finding reported by Wenner (1995).

According to Wydick (1999), who used data of 137 groups from Foundation for the Integrated Development of Socioeconomic Programmers (FUNDAP), a group-based lending program in Guatemala. He used lists of variables measuring screening, monitoring and enforcement within groups. He found that the average distance between group members negatively influences repayment performance. Monitoring becomes more difficult if the distance between members increases, whereas the knowledge one member has of the weekly sales of other members is positively related to repayment performance.

Godquin (2002) has tested the explanatory power of social ties, group homogeneity, social intermediation, dynamic incentives and loan characteristics (loan size and loan duration) on group's repayment performance. He used 1629 loan observations of borrowers from the Grameen Bank, Bangladesh Rural

Advancement Committee (BRAC), and Bangladesh Rural Development Board (BRDB) from Bangladesh. Two repayment measures were used: repayment on time with a grace period of three months was used in the whole sample and repayment on time was used in the split sample (one regression by MFI). He found that the effect of social ties within group members on repayment is negative. Group homogeneity in terms of sex showed a positive impact whereas homogeneity in terms of education showed a negative effect on repayment performance. Social intermediation (non-financial services) on repayment performance like access to basic literacy had a negative impact on the repayment of the Grameen borrowers while access to health services proved to have a positive impact on repayment performance. Dynamic incentives have positive impact of on the repayment behavior of the borrowers as credit rationing has a positive significant impact on the repayment performance. The size of the loan portfolio showed significant negative impact on repayment performance; this could be explained by a fall in the manager's time allocated to each group as the loan portfolio increases. The number of weeks the borrower had to wait before receiving his loan had no significant impact on repayment performance.

Habteab, Lensink, and Hermes (2004) conducted a study on determinants of repayment performance of group-based lending program evidence from Eritrea. By using sample of 102 self-help group (SHG) members, they have analyzed whether peer monitoring and social ties mitigate the incidence of repayment problems among group members in two group-based lending programs operating in Eritrea. Their results showed that the variables measuring regular group members' peer monitoring and social ties are found to be statistically insignificant. At the same time, theoretical models on group-based lending emphasized the point that peer screening, monitoring and enforcement activities taking place in groups is performed by all group members. The findings in the case of the Eritrean programs provided results that are in contrast with the existing theoretical models on group-based lending.

Matta (2004) have examined the determinants of group loan repayment in Dominica Republic by using data of 135 members selected randomly from four branches. He tested the effect of group size, information symmetry, social ties, peer pressure, and group solidarity on group loan repayment performance and he has found that loan repayment was increased by smaller group size, peer pressure and group solidarity, and groups composed of family members.

Hermes et al. (2005) examined adverse selection and moral hazard in group-based lending evidence from Eritrea. They have investigated whether peer monitoring and social ties reduce the occurrence of moral hazard in the setting of two group-based lending programs in Eritrea. Their results indicated that regular contact and a short physical distance between the group leader and the other members helps to reduce misuse of loans by individual group members. Moreover, if the group leader knows the other group members before the group is formed and if he has never changed groups, this reduces the probability of moral hazard within the group.

According to   Kono (2006), group lending is a good enforcement scheme for achieving high repayment rates as evidenced from framed field experiments in Vietnam. They conducted field experiments in Vietnam to capture the role of joint liability, monitoring, cross-reporting, social sanctions, communication and group formation in borrowers repayment behavior. They found that joint liability contracts cause serious free-riding problems, inducing strategic default and lowering repayment rates.

Al-Azzam and Sarangi (2007) analyzed repayment performance in group lending, evidence from Jordan. They used data from a survey of 160 borrowing groups of the micro fund for women in Jordan. They tested the effect of screening, peer monitoring, group pressure, and social ties on borrowing groups' repayment behavior. The study found that delinquency is reduced by screening, peer monitoring, group pressure, and social ties.

Christian and Robert (2007) carried a study by using repayment dada to test across models of joint liability lending. They used survey data from 262 joint liability groups of the Bank for Agriculture and Agricultural Cooperatives (BAAC) and from 2880 households of the same villages. Their study reported that repayment is affected negatively by the joint liability rate and social ties, and positively by the strength of local sanctions and correlated returns.

Bassem (2008) investigated the determinants of successful group loan repayment in Tunisia. He analyzed the internal and external delinquency of a self-designed survey of 286 groups of credit. The results of the estimation showed that repayment is influenced positively by internal rule of conduct, same business, knowledge of other members of the group before formation, peer pressure, self-selection, sex, education, and non-financial services. However, the homogeneity, and the marital status are among the main factors acting negatively on the repayment. He also concluded that the tie with the loan officer positively affects the repayment performance of credit groups.

Groups that were formed using a self-selection process show a better repayment performance. Finally, the results indicated that if borrowers are more credit rationed, this increases repayment performance. This result can be taken as evidence for the fact that group members have more incentives to screen, monitor and enforce if they have no alternative credit sources (Sharma & Zeller, 1997).

Feroze, Chauhan, Malhotra, and Kadian (2011) have made a study on factors influencing group

repayment performance in Haryana. By using data of 120 groups from the state of Haryana, they found that peer monitoring, group size, and female percentage have positive influence, whereas homogeneity and loan amount have negative influence on the repayment performance of the groups.

Kangogo, Lagat, and Ithinji (2013) have researched the influence of social capital dimensions on household participation in micro-credit groups and loan repayment performance in Uasin Gishu County, Kenya. Based on a sample of 174 households, their results on group loan repayment performance revealed that experience in group borrowing, number of visits by loan officer, peer pressure, meeting attendance index and heterogeneity index positively and significantly influenced loan repayment performance while gender, household size, distance to the nearest financial institution and density of membership were significant but negatively influenced household loan repayment performance.

From the above empirical review, most of the studies in countries other than Ethiopia reported that screening, monitoring and enforcement activities among group members significantly and positively influence the loan repayment performance of groups. However, one study reported that regular group members' peer monitoring and social ties are found to have statistically insignificant effect on group loan repayment performance.

2.2.   REVIEW OF THE RELATED EMPIRICAL LITERATURE IN ETHIOPIA

Abreham (2002) has researched loan repayment and its determinants in small scale enterprises financing in Ethiopia: a case of private borrowers around Zeway area. Sample of 102 clients were randomly selected. He showed that loan diversion is found to be one of the major determinants adversely affecting the loan recovery rate; borrowers who have other alternative income source were found to show better loan repayment record; business experience in related economic activity and education were found to be significant and positive while repayment period and sex were negatively associated with loan repayment rate; borrowers who have extensive experience in related activity and educated ones show better repayment record while male borrowers and projects with long repayment period show poor repayment record; and borrowers who involved in agricultural sector were found to be relatively defaulters as compared with other sectors.

Jemal (2003) did his study on microfinance and loan repayment performance: a case study of the Oromia credit and savings share company (OCSSCO) in Kuyu. Using sample size of 203, his results revealed that loan diversion was found to be one of the important and significant factors influencing loan repayment performance negatively, i.e., it increases default risk significantly; suitability of repayment period was found to reduce the probability of diverting loan to nonproductive uses that ultimately lead to reduced recovery rate; loan size was found to undermine the repayment performance; and factors like income, value of livestock, availability of other sources of credit and being female were found to enhance the probability of repayment.

Micha'el (2006) has done a study on micro-finance repayment problems in the informal sector in Addis Ababa. A sample size of 225 clients was randomly selected. His result indicated that better repayment performance is strongly and directly associated with educational level of the borrower; insufficiency of the loan granted and unplanned engagements in the business activity do also reduce repayment performance; and government owned and not-for-profit non-government microfinance institutions were found out to face relatively larger non-repayment due to credit attitude of borrowers towards the loan, as if it were grant, instead of a liability at the time of difficulty.

Fikirte (2011) under took a study on determinants of loan repayment performance: a case study in the Addis Credit and Saving Institution, Addis Ababa, Ethiopia. Based on a sample of 200 randomly selected clients, she analyzed the socio-economic factors that influence loan repayment. A total of twelve explanatory variables were included in the regression. Out of these, six variables were found to be significant for the probability of being defaulter. Age and five business types (baltina and petty market, kiosk and shop, services providing, weaving and tailoring, and urban agriculture), sex, and business experience of the respondents were found to be significant determinants of loan repayment performance.

Tnsue (2011) has analyzed determinants of loan repayment in microfinance institution: the case of DECSI QUIHA sub branch. A cross-sectional data were collected from randomly selected 140 (87.7% response rate) sample borrowers and key informant interview was held in the study area. His analysis showed that age, educational status, full disbursement of loan requested by borrowers, supervisory visit, and income from the loan activities financed by DECSI were significant factors that enhance the probability of loan repayment, while violation of loan agreement, distance of the borrowers dwelling from the lending agency, sex, occupation and number of dependents with borrowers were found to significantly increase loan default.

Based on the above review, it can be concluded that most of the empirical studies done in other countries (other than Ethiopia) reported that screening, monitoring, and enforcement activities among group members improves the repayment performance of groups. Whereas, most of the empirical studies made in Ethiopia focus on factors of individual/borrower characteristics.

Accordingly, education, income, loan supervision, suitability of repayment period, business experience

in related economic activity, and age have significant and positively determine the loan repayment performance. However, unplanned engagements in the business activity, loan diversion, loan amount, and number of dependents with borrowers have significantly and negatively determine the loan repayment performance. Moreover, the number of weeks the borrower had to wait before receiving loan and the variables measuring regular group members' peer monitoring and social ties were found insignificant in terms of loan repayment performance.

2.3. CONCEPTUAL FRAMEWORK

Figure 1.Conceptual Framework
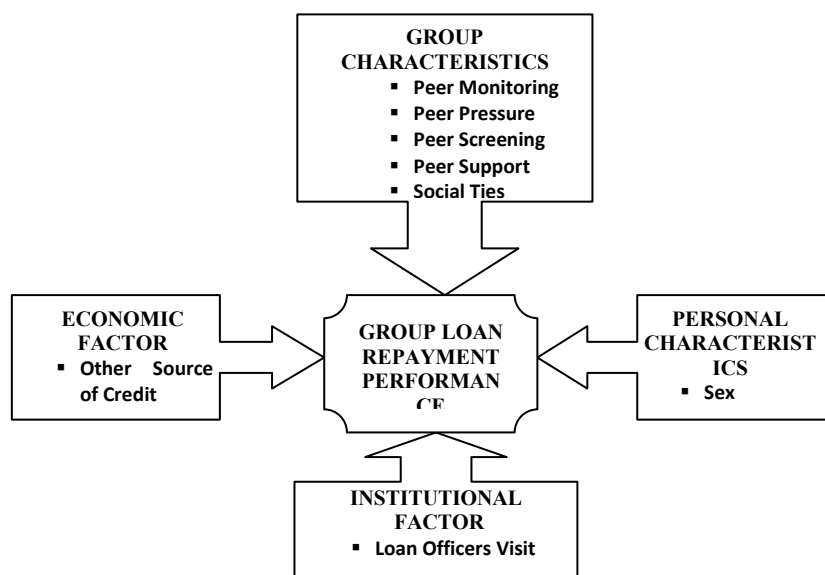
Source: Adopted from Al-Azzam and Sudipta (2007), Kangogo et al. (2013), and Mawire (2012).

Figure 1 above presents a conceptual framework of the relationship between the group loan repayment performance (dependent variable) and the factors influencing group loan repayment performance (independent variables). Group loan repayment performance (1, 0) = f [**group characteristics** (i.e., peer-monitoring, peer-pressure, peer screening, peer support, and social ties); **personal characteristics** (sex); **economic factor** (other source of credit); and **institutional factor** (loan officers visit)].Where 1 = if the loan was fully repaid within the specified period of the loan contract, otherwise 0.

3.   STATEMENT OF THE PROBLEM

Table 1 and Table 2 below present the preliminary data collected that shows the repayment performance for consecutive five years (2009-2013) of DECSI, Mekelle for two sub-branches.

Table 1: Summary of Loan Repayment Performance in DECSI South Sub Branch

Year	Loan Disbursed	Loan Collected	Loan Defaulted	Default Rate in %
2009	8,484,070.89	6,675,315.23	1,808,755.66	21
2010	9,663,664.59	7,098,997.91	2,564,666.68	27
2011	4,219,778.03	2,000,589.68	2,219,188.35	53
2012	3,872,388.63	1,253,000.00	2,619,388.63	68
2013	4,623,862.25	2,006,184.54	2,617,677.71	57

Source: DECSI (2014)

Table 1 above illustrates group borrowers of South Sub Branch DECSI repayment performance. The default rate has been increasing for the subsequent four years, i.e., 2009, 2010, 2011, and 2012 with default rate of 21%, 27%, 53%, and 68%, respectively and 57% for year 2013.

Table 2: Summary of Loan Repayment Performance in DECSI North Sub Branch

Year	Loan Disbursed	Loan Collected	Loan Defaulted	Default Rate in %
2009	7,831,517.26	6,499,473.21	1,332,044.05	17
2010	7,283,394.87	5,840,361.11	1,443,033.76	20
2011	3,384,093.09	1,788,464.24	1,595,628.85	47
2012	3,024,245.33	1,284,316.08	1,739,929.25	58
2013	2,981,135.80	1,292,927.55	1,688,208.25	57

Source: DECSI (2014)

Table 2 above shows group borrowers of North Sub Branch DECSI's loan repayment performance. The default rate is increasing for the subsequent four years, i.e., 2009, 2010, 2011, and 2012 with default rate of 17%, 20%, 47%, and 58%, respectively and 57% for the last 2013 year.

Based on the above Table 1 and Table 2, the two sub branches of DECSI group loan repayment performance is decreasing form time to time that can badly affect its financial sustainability of DECSI microfinance institution. This leads to increase in the overall annual default rate that is higher than the rate that the National Bank of Ethiopia (NBE) set for all financial institutions, i.e., <5 percent (or >95 percent expected to be collected).

According to Samuel (2012), a series of defaults could lead to liquidity problem in the MFIs and would consequently limit the ability of the MFIs to extend credit/loan to other applicants. Thus, based on the above default problem existed on DECSI, it is worthy to conduct empirical investigation on factors influencing group loan repayment performance in order to examine what factors influence group repayment performance for DECSI so that the findings can be used to employ its credit programs for the better by considering the impact of a number of different variables which concerns group repayment performance such as group characteristics, personal characteristics, institutional factors and economic factors.

4.   OBJECTIVES OF THE STUDY

The objective of the study was to identify and examine factors influencing group loan repayment performance of Dedebit Credit and Savings Institution (DECSI), Mekelle - Tigray.

5.   MATERIALS AND RESEARCH METHODOLOGY

This section presents description of the study area and an outline on how the research was carried out, that is the data type and source, sampling design, data collection instruments, data processing and analysis techniques, and hypothesis and definition of variables influencing group loan repayment performance.

5.1. DESCRIPTION OF THE STUDY AREA

The Federal Democratic Republic of Ethiopia (FDRE) is administratively divided into nine national regional states and two administrative councils. The Tigray National Regional State (TNRS) is one of the nine National Regional States. The city of Mekelle was established in the 1870s, and selected as Ethiopia's capital by Emperor Yohannes. Previously, it had been the site of several small settlements. The city's strategic location in a large valley in the Ethiopian highlands placed it at the crossroads of the ancient salt trade in the Afar region to the east, and within easy access of the Red Sea, 200 km to the northeast (Cannon, 2009).

Mekelle is the sixth largest city in Ethiopia and the capital of Tigray State. It is located approximately 780 km from the capital, Addis Ababa, in the Ethiopian highlands. Mekelle city enjoys a mild highland climate with an average temperature of 25°C. The rainy season in Mekelle city is from June to September, while the dry season is from October to May. The average annual rainfall is approximately 579mm (KPMG International, 2010).

According to the 2007 census, the population of Mekelle was 215,546 of which 51.3 were Women. The 2013 census population, assuming a 5.4 percent growth rated, is projected to reach around 300, 000 The city also has an airport, the Alula Aba Nega international Airport, which offers several daily flights to Addis Ababa and other locations in Ethiopia. It also has cargo cold-storage facilities that should be very useful for perishable export cargo (Millennium Cities Initiative [MCI], 2011).

The study was carried out in the city of Mekelle, five sub-cities in the two sub branches of urban group borrowers of Dedebit Credit and Savings Institution (DECSI): Ayder, Semien, Hadnet, Adi-Haqi and Kedamay Weyane.

5.2.   RESEARCH METHODOLOGY

This section deals with research approach, data type and source, sampling design, data collection instruments, and data processing and analysis techniques.

5.2.1.   RESEARCH APPROACH

For a similar study, Abreham (2002), Fikirte (2011), Habteab et al. (2004), and Kangogo et al. (2013) have

applied explanatory approach; and Mawire (2012), Micha'el (2006), Tnsue (2011), and Zelalem, Hassen, and Jema (2013) have applied both descriptive and explanatory research approach. Therefore, this study has applied descriptive approach for the qualitative data collected through an interview and an explanatory approach for the quantitative data collected through questionnaire.

5.2.2. SAMPLING DESIGN

According to a similar empirical studies, Abreham (2002) and Tnsue (2011) adopted simple random sampling; Michael (2006) two-stage cluster simple random sampling; Fikirte (2011) a stratified sampling technique; and Habteab et al. (2004) a multi-stage sampling method.

This study was conducted in DECSI, Mekelle, Tigray region. A two-stage sampling procedure was adopted for the study. The first stage was the selection of sample sub cities of the two sub branches of DECSI. Two sub cities from branch 1(Semien) and three sub cities from branch 2 (Debub) were selected. The second stage was the selection of sample respondents from the selected sub cities. Finally, a sample size of 87groups (i.e., 49 female and 38 male group borrowers) proportional to the group numbers in each sub cities, were randomly selected from the list of clients that was provided by Mekelle sub–branch office of DECSI.

A simple random sample (SRS) of borrowing groups was produced by a scheme which ensures that each sub cities have an equal probability of being chosen as the sample for the desired sample size of 87.

There were 680 (i.e., 388 female and 292 male group borrowers) borrowing groups in DECSI, Mekelle. Two sub branches provide regular (group) loan to the five sub cities of the city of Mekelle. The total sample size of borrowing groups was 87 out of 680 borrowing groups (population) based on the following formula.

In order to get adequate and representative sample of respondents, the sample size was determined by using the formula of Yemane (1967). The reason for using this sampling method was that the sizes of the borrowing groups are known. Among the several method of sample size determinations to determine the required sample size is at 90% confidence level and level of Precision = +10%,this means that , if a 90% confidence level is selected , 90 out of 100 samples have the true population value within the range of +10%, precision (sampling error).

$$n = \frac{N}{1+N(e)^2} = \frac{680}{1+680(.10)^2} = 87 \quad \text{................. (1)}$$

Where, n = sample size; N = population size (targeted population) = 680 groups; e = sampling error/level of precision = 10%. Based on the above formula, the total sample size of borrowing groups was 87 (Table 3).

Table 3: Determination of Sample Size

(a) Sub Branch	(b) Sub Cities	(c) Number of Groups (Population)	(d) Female	(e) Male	(f) (d*87)/680	(g) (e*87)/680	(h) = f+g (Total Sample Size)
North	Ayder	113	64	49	8	6	14
	Semien	183	105	78	14	10	24
South	Hadnet	101	58	43	7	6	13
	Ad-Haki	54	31	23	4	3	7
	K/ Weyane	229	130	99	16	13	29
Total		**680**	**388**	**292**	**49**	**38**	**87**

Source: DECSI (2014).

In summary, the study was made by using simple random sampling because it is considered the simplest, most convenient and bias free selection method. It enables every member of the population to have an equal and independent chance of being selected proportionately as respondents. The study considered 12.8% (i.e., 87/680*100%) sample size of the target population chosen from each of the group whereby the target population was divided into sub cities. This ensured that all the sub cities within the study area were included in the study.

5.2.3. DATA TYPE AND SOURCE

For a similar study Abreham (2002), Habteab et al. (2004), and Mawire (2012) have used both primary and secondary data, and cross sectional type; and Micha'el (2006) and Jemal (2003) have used primary data and cross sectional type.

Therefore, this study has collected primary data comprising of both qualitative and quantitative data. Qualitative data was collected through unstructured interview and the quantitative data was collected through questionnaire from loan officers and borrowers of DECSI, respectively.

5.2.4. DATA COLLECTION INSTRUMENTS

As per a similar study, Nathan and Alfred (2009) have employed semi structured questionnaire; Kangogo et al.

(2013) structured questionnaire; and Tnsue (2011) a structured questionnaire and unstructured interview.

The aim of this research was to assess factors influencing group loan repayment performance in the DECSI, Mekelle. Thus, in order to answer the research questions, primary data was used. The primary data was collected through questionnaire and unstructured interview. The questionnaire written in English was translated to the local language, Tigrigna, for convenience to the respondents. The questionnaire was also pre-tested to evaluate for consistency, clarity, avoiding duplication, and to estimate the time requirement during data collection. On the basis of these comments, the questionnaire was modified.

Accordingly, questions were asked about group characteristics (i.e., the existence of peer-monitoring, peer- pressure, peer screening, peer support, social ties); personal characteristics (i.e., sex of borrowers); economic factor (i.e., availability of other source of credit); and institutional factor (i.e., loan officer visits). An interview was made with selected loan officers (five loan officers) and sub-branch managers (two sub-branch managers). The primary data collection was carried out between April 2014 - May 2014. From the total 87 questionnaires distributed, only 83 that is 95% (response rate) were collected.

5.2.5.   DATA PROCESSING AND ANALYSIS TECHNIQUES

For a similar study, Jemal (2003) has applied descriptive statistics, T-test and Chi-square test statistics and probit model; and Kangogo et al. (2013), Habteab et al. (2004), Fikirte (2011), and Bassem (2008) have applied a logit model.

In this study both descriptive and inferential statistics was applied. Accordingly, the collected data was edited, coded, classified and tabulated after carefully checked for completeness and consistency in order to make them ready for analysis by using STATA. This was followed by analysis and interpretation of findings.

DESCRIPTIVE STATISTICS

Descriptive statistics was applied to present the characteristics of sample respondents and describe the data from interview.

BINARY LOGISTIC REGRESSION MODEL

Loan repayment is a non-continuous dependent variable (i.e., defaulter/non-defaulter) that does not satisfy the key assumptions in the linear regression analysis. To examine the factors affecting the loan repayment performance, discrete choice model should be used. The most widely used and appropriate qualitative response models are the logit and probit models (Verbeek, 2008). Thus, the logit regression model was employed for its mathematical simplicity, in order to examine the factors affecting the loan repayment performance.

Thus, a binary logistic regression model was applied to analyze the factors influencing group loan repayment performance and their marginal effect on loan repayment performance; where the loan repayment performance is the dependent variable and the empirical based factors related to group characteristics, personal characteristics, economic, and institutional factors were considered as independent variables. The value of this dependent variable is valued as 1and 0; 1 stands for a group paid all installments on time until the survey took place, otherwise 0.

5.2.6.   HYPOTHESES AND DEFINITION OF VARIABLES FOR FACTORS INFLUENCING GROUP   LOAN REPAYMENT PERFORMANCE

Based on the empirical literature reviewed, the explanatory variables selected for this study were broadly categorized under economic, institutional, personal and group characteristics factors. A brief explanation of the explanatory variables selected for this study and their likely influence on group loan repayment performance are presented below.

5.2.6.1. DEPENDENT VARIABLE

The dependent variable for the logistic regression model is defined as loan repayment performance valued as 1and 0; 1 stands for a group paid all installments on time until the survey took place, otherwise 0. Here defaulters are those group borrowers with minimum default for 91-180 days past due (DECSI, 2014).

5.2.6.2. INDEPENDENT VARIABLES

The independent variables used in this study were based on the reviewed empirical literature. The hypothesis for the factors and their priori effect are explained below.

I. GROUP CHARACTERISTICS

The group characteristic is composed of factors related to peer monitoring, social ties, screening variables, group pressure, and peer support/group solidarity.

Peer Monitoring

The following four dummy variables are used as proxy for peer monitoring to measure whether monitoring may take place within groups and they are expected to have a positive effect in group loan repayment performance (Habteab et al., 2004).

X_1: **If group members know the monthly sales of the other group members, then have a positive effect on the repayment performance.**

X_2: **If group members know for what purpose the other members have used the loan, and then have a positive effect on the repayment performance.**

X_3: **The existences of rules and regulation on how to run the group have a positive effect on the repayment performance.**

X_4: **The existence of group members regularly visits other group members have a positive effect on the repayment performance.**

Social Ties

The following three dummy variables are used as proxy for social ties to measure whether social ties may take place within groups. All three variables contain information about the extent to which individuals within a group are related to each other. The first two variables are expected to have a positive effect on group loan repayment performance and the third one negative effect on group loan repayment performance (Al-Azzam & Sudipta 2007; Habteab et al., 2004).

$X5$: **The existences of group members born in the same area have a positive effect on the loan repayment performance.**

$X6$: **If group members knew the other group members before the group was formed, then have a positive effect on the repayment performance.**

$X7$: **If group members have ever been a member of another group, then have a negative effect on the repayment performance.**

Screening Variable

The following two dummy variables are used as proxy for screening to measure whether screening may take place within groups and they are expected to have a positive effect in group loan repayment performance (Al-Azzam & Sudipta, 2007).

$X8$: **If a group has ever rejected a borrower who would like to join the group, then have a positive effect on the loan repayment performance.**

Group Pressure

The following three dummy variables are used as proxy for group pressure to measure whether group pressure may take place within groups. They are expected to have a positive effect on group loan repayment performance (Mawire, 2012).

X_9: **The existence of members' willingness to put pressure on other members to repay loan have a positive effect on the repayment performance.**

X_{10}: **The existence of members feels anger against defaulting member have a positive effect on the repayment performance.**

X_{11}: **The existences of a penalty within the group have a positive effect on the repayment performance.**

Peer Support/Group Solidarity

The following one dummy variable is used as proxy for peer support to measure whether peer support may take place within groups. It is expected to have a positive effect on group loan repayment performance (Verhelle & Berlage, 2003).

X_{12}: **The existences of group members help one another in times of need have a positive effect on the repayment performance.**

II. INSTITUTIONAL FACTOR

Number of supervisory visits by the loan officer (NVISIT): This is a continuous variable which indicates the number of follow up and supervisory visit made by the DECSI loan officers on the borrowers' loan utilization. It is not enough to advance loan input only, but it should accompany by complimentary activities like timely supervision. If there is a continuous follow up and supervisory visit to evaluate the loan utilization, it helps borrower to monitor her/his obligations and improve proper utilization of the loan thereby improving repayment performance. So, a positive impact is expected for this variable on group loan repayment performance (Tnsue, 2011).

X_{13}: **The existence of loan officer pays a visit to the group has a positive effect on the repayment performance.**

III. PERSONAL CHARACTERISTIC

Sex of the Respondent (sex)

This is a dummy explanatory variable that assumes a value of 1 if the sample group borrower is male and 0 otherwise.   There is a belief among many microfinance specialists that female are better payers than male borrowers, taking into consideration their being more entrepreneurial, social ties and family responsibilities. It is expected to have positive impact on loan repayment performance (Feroze et al., 2011).

X_{14}: **Female borrowers have positive effect on repayment performance.**

IV. ECONOMIC FACTOR

The economic factor is related to availability of other source of credit.

Availability of Other Source of Credit (AOSC)

On the normal circumstance, if borrowers have other sources of loan, they may use these sources to be able to settle their loan obligation in case they want to continue borrowing from the same source, thus we may expect a positive impact on the loan repayment performance. On the other hand, borrowers may feel careless in settling their loan (domino effect) if they decide to take no more round of loan from the same source because they can get loan from the alternative sources. Hence, it may have negative impact on the loan repayment performance. It is measured by a dummy variable assuming a value of 1, if borrowers have other source of credit and 0 otherwise (Jemal, 2003). In this study the variable has negative effect on the repayment performance.

> **X_{15}: The existences of group members have other sources of credit have negative effect on the repayment performance.**

5.2.7. MODEL SPECIFICATION

Group loan repayment performance is the dependent variable, while the different influencing factors, i.e., personal characteristics, control variables**;** institutional and group characteristics factors were considered as independent variables. The dependent variable was measured as 1 and 0, in which 1 stands for a group paid all installments on time until the survey took place, otherwise 0.

Therefore, loan repayment is treated as dichotomous (binary) dependent variable. Loan repayment is, therefore, a non-continuous dependent variable that does not satisfy the key assumptions in the linear regression analysis. To examine the factors affecting the group loan repayment performance, discrete choice model should be used. Thus, the most widely used and appropriate qualitative response models are the logit and probit models (Verbeek, 2008).

$$\Pr(Y_i) = \alpha + \sum \beta_i X_i + \mu_i \dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

Accordingly, in this study, binary logit model was used to analyze the factors influencing group loan repayment performance. The function specified as:

Where: **Yi** = Loan repayment (1, 0) is dependent variable in which 1 stands for if a group paid all installments on time until the survey took place, otherwise zero.

Xi = independent variables; **Group characteristics** (i.e., peer-monitoring, social ties, peer- pressure, peer screening, and peer support), **personal characteristics** (sex), **economic factor** (other source of credit), and **institutional factor** (loan officers visit).

βI = Parameters to be estimated μI = disturbance term.

Peer-monitoring

X_1 (know monthly sales): group members know the monthly sales of the other group members.

X_2 (loan purpose): group members know for what purpose the other members have used the loan.

X_3 (rules regulation): groups have rules and regulation on how to run the group.

X_4 (gmember visits other): group members regularly visit other group members.

Social ties

X_5 (born same area): group members born in the same area where the survey was held

X_6 (member knew the other group): group member knew the other group members before the group was formed

X_7 (member of another group): group member has ever been a member of another group.

Peer Screening

X_8 (group rejected join group): group has ever rejected a borrower who would like to join the group.

Peer- pressure

X_9 (members put pressure): members are willing to put pressure other members in to repaying.

X_{10} (member feels against defaulter): how the member feels against defaulting member.

X_{11} (ppenalty): the presence of a penalty within the group

Peer Support

X_{12} (group members help): group members help one another in times of need

Institutional Factor

X_{13} (loan officer visit): loan officer pays a visit to the group

Personal Characteristic

X_{14} (sex): age of the respondent member

Economic Factor

X_{15} (other sources credit): group members have other sources of credit

5.2.8. MODEL SPECIFICATION TEST

Before applying the binary logistic regression model, a measure of model fit for binary logistic regression model,

which is the Hosmer-Lemeshow test of goodness of fit was used to see how well the model fits the data. Hosmer- and Lemeshow's goodness of fit test shows how much predicted values match closely the observed values. This test states that the more closely the observed frequencies and predicted frequencies matched, the better the fitness of the model. This test is more appropriate test for binary logistic model (Hosmer & Lemeshow, 1980).

To test/check goodness fit of the model "*lfit*" has been conducted. There are no fixed points as to judge the model as a best or bad predictor yet it is generally agreed that a model with its overall predictive power of three percent or more is good (Anders, Ari, & Magnus, 2006). The result of the test indicates the p-value (0.5989) is greater than 0.05 Therefore, the null hypothesis (i.e., Ho: The model fits the data well) is accepted.

To detect the data problem for heteroskedasticity, multicollinearity, specification bias and normality tests (i.e., hettest, VIF test and OV test), respectively, were conducted.

The other assumption of homoskedasticity means that the errors terms are equal across the whole population. Conversely, with heteroskedasticity different sub-groups may have different variability which in regression methods may cause the standards errors to be large or small, therefore, affecting the statistical significance of the parameters to be estimated. Test of heteroskedasticity says the null hypothesis that the variance of the residuals is homogeneous. If p-value is very small, i.e., $Pr < 0.05$ (at 95% confidence), the null hypothesis will be rejected and accept the alternative hypothesis that the variance is not homogenous (Gujarati, 2004).

The "*hettest*" was used to check whether there is heteroskedasticity problem or not. As Breusch-Pagan/Cook-Weisberg test shows, the null hypothesis (i.e., Ho: Constant variance) was rejected because the test result showed P-value of 0.4813, which is greater than the significance level (10 percent). Therefore, the result indicated that there is equal variance among the error terms. Therefore, there was no problem of heteroskedasticity in the process of model specification and the model was well fitted.

Multicollinearity problem arises when at least one of the independent variables is a linear combination of the others. Variance Inflating Factor (VIF) was used to check for multi-collinearity problem among and between explanatory variables. The larger the value of VIF_i the more collinear the variable X_i is. As a rule of thumb, if the VIF of a variable exceeds 10, there is a multicollinearity problem (Gujarati, 2003). However, VIF result shows that there is no perfect collinearity among and between explanatory variables because the VIF value is below 1.89, only multi-collinearity can be a problem if and only if VIF value exceeds 10. Furthermore, Multi-collinearity diagnostics test was done to check the presence of high collinearity among and between the dependent and each independent variable. In order to test the existence of multicollinearity problem, the Pearson correlation matrix was utilized ('pwcorr'). As a general rule multicollinearity is a problem when the correlation result is above 0.80 and below -0.80 (Stock & Watson, 2007) however, the value is under 0.5660 and over -0.2887.

The Ramsey RESET test, "*ovtest*" has been used to check whether the model has omitted variables or not. It tests the null hypothesis that Ho: model has no relevant omitted variables. As a decision rule according to Ramsey RESET test, a model specification is fit or no omitted variables and ready for analysis if P-value stated in P>F greater than the chosen level of significances, i.e., 1 percent, 5 percent, and 10 percent. Therefore, the result indicated that the model had no relevant omitted variables since the test failed to reject the hypothesis, i.e., Prob.>F of 0.1586 is found greater than 10 percent significance levels of the specified model of the study.

Finally, Table 4 below shows summary of the logit regression model test for its fitness by using *lfit, hettest, VIF, pwcorr* and *ovtest* and that was found fit for analyzing the factors that influence group loan repayment performance.

Table 4: Summary of Model Specification Test Results

Tests	Test Names	Null Hypothesis	Ch^2/F-value	Prob>ch^2/F-value
lfit	*Hosmer-Lemeshow*	Model fits data	6.43	0.5989
hettest	*Breusch-Pagan/cook-Weisberg*	Constant variance	0.50	0.4813
vif	Minimum = 1.10	Maximum = 1.89	Mean = 1.40	
pwcorr	Minimum = -0.2887	Maximum = 0.5660		
ovtest	*Ramsey RESET*	No omitted variables	2.106	0.1586
vif	Minimum = 1.12	Maximum = 1.90	Mean = 1.42	

Source: Own Computation (2014)

6.   DATA ANALYSIS AND DISCUSSION
6.1.   CHARACTERISTICS OF SAMPLE RESPONDENTS
The group sex and group representative's personal characteristics are presented with particular reference to education and age in Table 5 below.
According to the Table 5 below;

- The sample was composed of both male and female group borrowers. Of the total sample, 35(42.17%) were male groups and 48(57.83%) were female groups.
- Of the total sample of the group borrowers, 23(27.71%) groups have attended diploma; 3(3.61%) TVET; and 2(2.41%) first degree and above. Of the remaining groupborrowers,19(22.89%), 10(12.05%), 11(13.25%), 7(8.43%), 8(9.64%) were within the education category of illiterate, 1-4, 5-8, 9-10, 11-12, respectively.
- Group borrowers in the age category of 18 to 30; 31 to 40; 41 to 55 and above 55 accounts 37.35%, 30.12%; 28.92% and 3.61%, respectively.

Table 5: Characteristics of Sample Respondents

| Category	Number	Percent
sex		
Male group	35	42.17
Female group	48	57.83
Total	**83**	**100**
Education level		
Illiterate	19	22.89
1-4	10	12.05
5-8	11	13.25
9-10	7	8.43
11-12	8	9.64
TVET	3	3.61
Diploma	23	27.71
First degree and above	2	2.41
Total	**83**	**100**
Age		
18 to 30	31	37.35
31 to 40	25	30.12
41 to 55	24	28.92
55+	3	3.61
Total	**83**	**100**

Source: Own Computation (2014)

6.2.   RESULTS, ANALYSIS AND DISCUSSIONS
6.2.1.   STATUS OF GROUP LOAN REPAYMENT

To know the loan repayment status, group borrowers were asked whether they have fully repay loans on time or not in the form of "Yes" or "No" response question. Such an objective response and direct measurement of the binary dependent variable (i.e., group loan repayment performance equal to "1" if groups were non-defaulters and "0" otherwise) was used to determine the factors that affect group loan repayment performance in a similar studies of Kangaroo et al. (2013), Habteab et al. (2004), and Bassem (2008).Therefore, both group defaulters and non-defaulters were taken into analysis for the identified common explanatory variables.

Figure 2: Status of loan repayment by the group borrowers
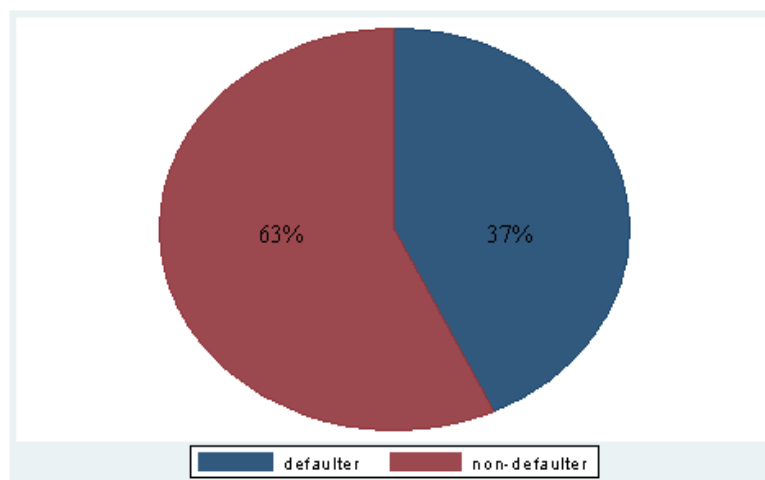
Source: Own Computation (2014).

Out of the total respondents, 52(63%) groups were non defaulter, i.e., they repay their loan fully on time, and the remaining 31(37%) group respondents were defaulter (Figure 2). As it was discussed in the literature, the problem of loan default reduces the lending capacity of microfinance institutions and it may also deny new applicants access to credit as the bank's cash flow management problems increase in a direct proportion to the increasing default problem (Godquin, 2004). Regarding this matter, annual reports of DECSI indicated that the loan default rate for DECSI is increasing from time to time (i.e., 21 %, 27 %t, 53 %, 68 % and 57 % in 2009, 2010, 2011,2012 and 2013 and 17%, 20%, 47%, 58% and 57% in 2009, 2010, 2011, and 2012 and 2013) in both the south and north sub branches, respectively, particularly in the group lending (DECSI, 2014). This result also found 37% default. Therefore, this high loan default rate might adversely affect the financial sustainability of DECSI.

6.2.2. BINARY LOGISTIC REGRESSION RESULT, ANALYSIS AND DISCUSSIONS

As it was discussed in the methodology part of this study, a binary logit model is used to identify the factors influencing group loan repayment performance. Accordingly, the estimated results of the binary logistic regression odds ratio, the p-value and the marginal effects of the explanatory variables included in the model are shown below in Tables 6. A total of 15 explanatory variables were considered, out of which ten variables were found to significantly influence the loan repayment performance.

        From group characteristics, the statistically significant variables are peer-monitoring (i.e., group members know the monthly sales of the other group members and group members regularly visit other group members), screening (i.e., group members have rejected a borrower/s who would like to join the group), peer-pressure (i.e., members put pressure on other members to repay, members feel against defaulting member, and presence of penalty within the group), social ties (i.e., group members knew the other group members before the group was formed and group members have been a member of another group), **institutional factor** (loan officer visit to the group) and **economic factor** (other sources of credit) (Table 6).

Table 6: Logistic Regression Estimation Result

Logistic regression	Number of obs	=	83
	LR chi2(15)	=	60.02
	Prob> chi2	=	0.0000
Log likelihood = -24.836469	Pseudo R2	=	0.5472
Variables	**Odds Ratio**	**P>|z|**	**Marginal effect (dy/dx)**
I. Personal Characteristics			
sex	1.137739	0.887	.0285051
II. EconomicFactor			
othersourcescredit	10.1289	0.042**	.4324535
III. Group Characteristics			
Peer-Monitoring			
loanpurpose	2.547833	0.411	.2175232
knowmonthlysales	9.635267	0.058***	.3938794
rulesregulation	.258724	0.397	-.2277665

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gmembervisitsother	8.961814	0.048**	.4968553
Peer Support			
groupmembershelp	4.247783	0.118	.2948997
Screening			
grouprejectedjoingroup	.1494195	0.060***	-.4214595
Peer-Pressure			
membersputpressure	12.34024	0.027**	.552973
memberfeelsagainstdefaulter	.2316855	0.061***	-.3242149
ppenalty	52.06456	0.005*	.7551248
Social Ties			
memberknewtheothergroup	8.313488	0.057***	.4820797
bornsamearea	.8615555	0.865	-.0330374
memberofanothergroup	9.449064	0.054***	.4092474
IV. Institutional Factor			
loanofficervisit	9.364436	0.067***	.4406333

*Significant at 1%, **Significant at 5%, ***Significant at 10%
Source: Own Computation (2014)

HYPOTHESES TESTING
According to Table 6 above, the ten explanatory variables that have statistically significant impact on the loan repayment performance are presented and discussed below.

Economic Factor
X_1: **The existences of group members have other sources of credit have negative effect on the loan repayment performance.**
As Table 6 above shows that the existence of other sources of credit is found significantly positive in this study. Its odds ratio(10.13) result indicated that holding other factors constant, the probability of group loan repayment is 10.13 times higher for *group members who have other sources of credit than those who do not have other source of source of credit.* Similarly, the marginal effect of 0.432 shows the probability of group loan repayment increases by 43.2 percent for those *group members who have other sources of credit* as compared to those groups who do not have, all other factors kept constant. Based on this, the hypothesis that assumes "*the existence of group members have other sources of credit have negative effect on the repayment performance*" is rejected at 5 percent level of significance. This result is similar to the findings of Matin (1997), Samuel (2012), and Zeller (1998) who found that when borrowers have other sources of credit significantly positively affects loan repayment performance; because borrowers who have other sources of credit use these sources to be able to settle their loan obligation in case they want to continue borrowing from the same source. Therefore, the alternative hypothesis that is the existences of group members have other sources of credit have positive effect on the repayment performance may be accepted.

Peer Monitoring
X_2:   **If group members know the monthly sales of the other group members then have a positive effect on the   loan repayment   performance.**
Group members know the monthly sales of the other group members (knowmonthlysales) are a peer monitoring variable. It refers to whether the *group members know the monthly sales of the other group members.* In line with this expectation, the variable group members know the monthly sales of the other group members have a positive effect on the repayment performance (knowmonthlysales) and it is statistically significant at 10 percent level of significance (Table 6). Holding other factors constant, its odds ratio (9.64) result indicates that the probability of group loan repayment is 9.64 times higher for group members who know the monthly sales of the other group members than those who do not know. Besides, the marginal effect of 0.394 shows, other things remain constant, the probability of loan repayment increases by 39.4percent for those group members who know the monthly sales of the other group members, as compared to those group members who don't know. The variable group members know monthly sales of the other group members is a proxy for peer-monitoring. It indicates higher monitoring activities in the group helps group members have information about members' monthly income and such information may help group members to enforce repayment in case a group member fails to pay her/his obligations or help group member/s face difficulty in repaying. Therefore this increases the probability of higher repayment performance of the group.

Hence, the hypothesis *"group members know the monthly sales of the other group members have a positive effect on the loan repayment performance"* is accepted at 10 percent significance level. From this result, it can be concluded that the probability of group loan repayment performance increases as far as *group members*

know the monthly sales of the other group members. Similar results have been found by Habteab et al. (2004) and Wydick (1999), i.e., the knowledge one member has of the weekly sales of other members is positively related to repayment performance.

X₃: ***The existence of group member regularly visits other group members have a positive effect on the loan repayment performance.***

The logistic regression results indicated in the above Table 6 reveals that the existence of group members regularly visits other group members have a positive effect on the repayment performance and is statistically significant at 5 percent level of significance. Its odds ratio shows that the probability of loan repayment is 8.96times higher for the group who regularly visits other group members than groups which do not apply the technique. Besides the marginal effect of 0.497 implies, holding other variables constant, the probability of repaying the loan increases by 49.7percent for those group borrowers who regularly visits other group members as compared to those borrowers who do not visit their group members.

The variable group members regularly visit other group members is another monitoring variable indicating higher monitoring activities in the group. The possible reason as to why group members regularly visit other group members has a positive effect on the repayment performance is that there is higher opportunity to have more information on each other, which may help the group can take corrective measures to reduce repayment problem of individual group members before the due date of the loan and, therefore, increase repayment performance.

As a result, the hypothesis which states "*the existence of group members regularly visits other group members have a positive effect on loan repayment performance*" is accepted at 5 percent significance level. This result is also similar to the findings of Al-Azzam and Sudipta (2007) and Feroze et al. (2011) who found that peer monitoring reduces loan delinquency rate.

Screening

X₄: ***If a group has rejected borrowers who would like to join the group then have a positive effect on the loan repayment performance.***

The logistic regression result (odds ratio = 0.15) indicated in the Table 6 above illustrates that, holding other factors constant, the probability of group loan repayment decreases by 0.15times higher for a group which has rejected a borrower who would like to join the group. Similarly, the marginal effect (-0.421) shows the probability of group loan repayment decreases by 42.1 percent for those groups rejected borrowers who would like to join the group as compared to those groups who do not reject, all other factors kept constant. The variable group has rejected borrowers who would like to join the group is one of the screening variable, which indicates that there is higher screening activities in the group. However, the hypothesis that states "if a *group has rejected borrower/s who would like to join the group then have a positive effect on the loan repayment performance*" is rejected at 10 percent significant level. The possible reason as to why group has rejected borrowers who would like to join the group has a negative effect on the loan repayment performance is that group members might not have enough information about the borrowers. As a result they may reject creditworthy borrower/sand select defaulting member/s.

This result is in contrast with the empirical finding of Bassem (2008) who stated that the good choice of borrowers appears as the key for success of the loan repayment and the variable the group rejects a borrower who wants to join it (selection) conformed its positive impact in the improvement of the group loan repayment performance. Besides, the empirical study of Zeller (1998) confirms with Bassem (2008) who supports the positive role of the selection on the loan repayment performance.

Group Pressure/Peer-Pressure

X₅: ***The existence of members put pressure on other defaulting member/s to repay loan have a positive effect on repayment performance.***

The logistic regression results indicated in the above Table 6 reveals that the existence of member's willingness to put pressure on other members to repay loan has a positive relation with loan repayment and is statistically significant at 5 percent level of significance. The odds ratio (12.24) shows that the probability of loan repayment is 12.34times higher for the groups who put pressure on other members to repay than groups who do not apply pressure. Besides, the marginal effect of 0.553 implies, holding other variables constant, the probability of repaying the loan increases by 55.3 percent for those groups who exercise a pressure on defaulting members as compared to those groups who do not employ pressure on defaulting members to enforce loan repayment.

The presence of pressure by group members on the defaulting member/members helps in alleviating moral hazard behavior of the borrowers, reduces the number of days of later repayment and improves the group repayment performance. In addition, group members are highly interested on enforcing on defaulting members, since the non-repayment of one of the other members will be costly for her/him and may cut off access to loans in the future. As a result, the hypothesis which states "the existence of members put pressure on other defaulting members to repay loan have a positive effect on repayment performance" is accepted at 5 percent significance level. This result is similar with the empirical findings of Al-Azzam and Sarangi (2007), Kangogo et al. (2013)

and Matta (2004) who have examined the determinants of group loan repayment and found that loan repayment increased by peer pressure.

X_6:   *The existence of a member feels anger against defaulting member have a positive effect on loan repayment performance.*

The other peer-pressure variable found significant at 10 percent is group members feels anger against defaulting members (Table 6). The result indicates that group members feel very angry against defaulting members has a negative effect on the probability of group loan repayment performance. The odds ratio shows that the probability of loan repayment decreases by 0.23 times higher for group borrowers who feel very angry against defaulting members as compared to group borrowers who do not feel angry against defaulting member/s, other factors kept constant. Besides, the marginal effect of -0.324 implies that, holding other factors constant, the probability of loan repayment decreases by 32.4 percent for those who feel anger against defaulting member than those who do not feel anger.

Hence, the hypothesis which says *"the existence of members feels anger against defaulting members have a positive effect on repayment performance"* is rejected at 10 percent level of significance. Therefore, the alternative hypothesis (members feels anger against defaulting members have a negative effect on repayment performance) may be accepted.

Here the perspective might be due to the fact that feel very angry against defaulting members may create conflict among group members that create problem on repayment performance. This may imply that those group members feel very angry against defaulting rather than help the defaulting member/s may create conflict among group members which is not encouraged them in repaying loan on time.

X_7: *The existence of penalty within the group has a positive effect on the repayment performance.*

The presence of a penalty within the group (ppenalty) is also other peer-pressure variable that is found significant at 1 percent level (Table 6). The result indicates that the existence of a penalty within the group have a positive effect on repayment performance. Similarly, the odds ratio shows that the probability of loan repayment increases by 52.06 times higher for groups that have penalty for defaulting members than who do not have, other factors kept constant. Besides, the marginal effect of 0.755 implies that, holding other factors constant, the probability of loan repayment increases by 75.5% for groups who have penalty for defaulting members than who do not have.

Hence, the hypothesis which says *"the existence of a penalty within groups have a positive effect on loan repayment performance"* is accepted at 1 percent level of significance.

The possible reason as to why existence of a penalty within groups has a positive effect on repayment performance may be due to fear of penalty (i.e., he/she will be denied subsequent loans, and he/she will be reported to the credit officer and pay the required 2% penalty) and, hence, group members respect their contract reduces the number of days of later repayment and improve repayment performance of a group.

Therefore, it is possible to conclude that those groups that have penalty for defaulting members would be good performers in loan repayment as compared to those who do not have penalty. This finding is also similar with the finding of Al-Azzam and Sudipta (2007), Bassem (2008) and Kangogo et al. (2013) who found that penalty is significantly and positively affects loan repayment performance.

Social Ties

X_8: *If group member knew background of the other group members before the group was formed then have a positive effect on the loan repayment performance.*

Group members knew background of the other group member/s before the group was formed (memberknewtheothergroup) is a proxy for a social ties variable which is found significant at 10 percent level. It refers to the *group members knew the other group member/s before the group was formed*. The result on Table 6 above indicates positive effect on repayment performance. The odds ratio (8.31) shows that the probability of loan repayment increases by 8.31times higher for group members who knew background of the other group member/s before the group was formed as compared to the other group members who didn't know their group member/s' background. Besides, the marginal effect of 0.482 shows, other things remain constant, the probability of loan repayment increases by 48.2percent for those group members who knew the other group member/s' background before the group was formed as compared to those group members who didn't know. Hence, the hypothesis "*if group members knew the other group member/s background before the group was formed then have a positive effect on loan repayment* performance" is accepted at 10 percent significance level.

The variable group members knew the background of other group member/s before the group was formed is a proxy of social ties variable which indicates the existence of social ties among group members that may help the group members to have better information to monitor and pressure for defaulting member/s to repay loan on time. This increases the probability of loan repayment performance. Thus, it is possible to conclude that those group members that knew the background of the other group members before the group was formed improves loan repayment performance as compared to those group members who didn't know.

Similar results have been found by Bassem (2008) that stated the knowledge of other group members

before the formation of group indicates mutual knowledge among group members and increases the existence of social ties and consequently reduces the loan delinquency (loan repayment problem).

From the result, it is possible to conclude those group members knew background of the other group members before the group was formed are most probably increase the loan repayment performance. This might be due to the fact that group members had enough information in selection of group member/s that may help group members to screen and monitor each other's behavior before group formation and helps to mitigate repayment problems.

X_9: If group members have been a member of another group then have a negative effect on the repayment performance.

Group members have been a member of another group (member of another group) is also another social ties variable which is found significant at 10 percent (Table 6). It refers to the *group members have been a member of another group*. It is hypothesized that group members have been a member of another group have negate effect on repayment performance. However, the result indicates that those group members who have been a member of another group have a positive effect on loan repayment performance. The odds ratio (9.45) shows that the probability of loan repayment increases by 9.45 times higher for group members who have been a member of another group as compared to the other members who have not been a member of another group. Similarly, the marginal effect of 0.409 shows, other things remain constant, the probability of loan repayment increases by 40.9 percent for those group members who have been a member of another group as compared to those members who have not been a member of another group.

The possible reason as to why group members who have been member of other group positively affect the probability of repayment performance may be due to the fact that the members who have been a member of another group may have better information on individual members and experience of monitoring and pressure group member/s that improves the probability of loan repayment performance. Hence, the hypothesis "*if group members have been a member of another group then have a negative effect on the loan repayment performance*" is rejected at 10 percent significance level.

This result is similar to the findings of Al-Azzam and Sudipta (2007) who found that social ties among group members reduce the probability of delinquency (loan repayment problem) and Zeller (1998) reported that group members with stronger social ties have more information about each other and are, therefore, better able to screen, monitor and enforce between group members, and groups with stronger social ties show higher repayment rates.

Institutional factor

X_{10}: The existence of loan officer pays a visit to the group has a positive effect on the repayment performance.
The institutional factor variable (i.e., loan officer visit) is found significant at 10 percent (Table 6). The result indicates that the loan officer visit to the group borrowers has a positive effect on the probability of group loan repayment. The odds ratio (9.36) shows that the probability of loan repayment increases by 9.36 times higher for group visited by loan officer as compared to group borrowers who were not visited, other factors kept constant. Similarly, the marginal effect of 0.441 implies that, holding other factors constant, the probability of loan repayment increases by 44.10 percent for groups who were visited by loan officer than who do not.

The reason for this result might be due to the loan officers continuously visited to evaluate the loan utilization and they may put pressure on defaulting group members. Hence, the research hypothesis which says *"the existence of loan officer pays a visit to the group has a positive effect on the repayment performance"* is accepted at 10 percent level of significance. The result is similar with the empirical studies of Tnsue (2011) which stated a continuous follow up and supervisory visit by loan officers to evaluate the loan utilization helps borrower monitor her/his obligations and improve proper utilization of the loan, thereby, improving repayment performance.

7.   CONCLUSIONS AND RECOMMENDATIONS
7.1.   CONCLUSIONS
The study covered factors influencing group loan repayment performance by considering economic, institutional, personal, and group characteristics factors. It has applied binary logistic regression model to analyze the factors influencing group loan repayment performance and their marginal effect on loan repayment performance. Therefore, based on the research findings, the following conclusions are drawn.

The logit regression model revealed that among the fifteen (15) explanatory variables which were hypothesized to influence group loan repayment, ten (10) variables were found to be statistically significant at 1 percent, 5 percent, and 10 percent levels.

These statistically significant variables are **group characteristics,** i.e., peer-monitoring (i.e., group members know the monthly sales of the other group members and group members regularly visit other group members), screening (i.e., group members have rejected a borrower/s who would like to join the group), peer-pressure (i.e., members put pressure on other members to repay, members feel anger against defaulting member,

and presence of penalty within the group), social ties (i.e., group members knew the other group members before the group was formed and group members have been a member of another group), **institutional factor** (loan officer visit to the group) and **economic factor** (other sources of credit) found statistically significant.

The remaining five variables (i.e., group member knows for what purpose the other members have used the loan, the existence of rules and regulation on how to run the group, the existence of group member born in the same area, the existence of group members help one another in times of need or difficulty, and sex of borrowers) were found to be statistically insignificant in determining group loan repayment performance.

7.2.   RECOMMENDATIONS

As presented in the introduction part the availability of financial services plays an important role in creating self-employment opportunities for the majority of low income population. Microfinance institutions provide micro credits to borrowers who did not reach commercial banks and without requiring collateral through group lending. Group lending is an innovation that makes it possible, where the poor borrowers act as guaranties each other by the joint liability. However, there is a problem of poor performance of financial institutions in many developing countries including Ethiopia that is high rate of non-repayment of loan. The default rate of DECSI microfinance institution is increasing from time to time. It is important to consider what sorts of interventions might be considered to solve repayment problem of the sector that determines financial sustainability of the DECSI microfinance institution in order to increase the lending capacity and new applicants access to credit. Thus, based on the conclusion of the research finding, the study has forwarded the following recommendations. Thus;

- DECSI should take a pro-active role in organizing and facilitating the group members to regularly visit or meet other group members and should also be mandatory and more formal nature where members can discuss their business activities and any problems they might be having. DECSI should also encourage by organizing either the loan officer or the head of each group to have enough information on monthly sales of borrowers because information on monthly sales of borrowers helps the group to make decision to help, pressure or impose penalty on defaulting borrower/s that ensures higher repayment performance and reduce willful defaulters.
- The screening criterion should be revised and DECSI's loan officers should have to play major role directly helping the group formation in screening and selection of applicants. This is because DECSI's loan officers have long experience for effective screening and select creditworthy borrowers.
- DECSI should have to play major role directly by screening applicants from same area or community that helps information asymmetry among group borrowers and helps to have better information to monitor and more easily pressure for repayment.
- DECSI's credit officers should have to advocate borrowers put pressure and imposed penalty against will full defaulting borrower/s because in this empirical study the two factors ensured higher repayment performance and reduce delinquency.
- DECSI should encourage group members to help one another when an unforeseen or uncontrollable situation arises rather than feel uncomfortable (anger) with their group member/s to collect the unpaid loan. This could also lead to improved loan repayment performance.
- DECSI should encourage to loan officers to continuously follow up and visit borrowers to evaluate the loan utilization, helps borrowers monitor their obligations and improve proper utilization of the loan and loan officers promote borrowers to better solve their repayment problems, thereby, improving repayment performance.
- DECSI should not prevent credit for applicants who have other sources of credit. Because borrowers who have other sources of credit use these sources to be able to settle their loan obligation and this could lead to higher repayment performance.

7.3.   LIMITATION AND SUGGESTION FOR FURTHER RESEARCH

There may be several factors that influence group loan repayment performance besides the factors that are specified in this study which hamper ability of group borrowers to fulfill their loan repayment obligations as per the repayment periods contract. These factors include experience of group borrowers in the sector, group harmony, loan frequency, interest rate, loan amount or size, household size, personal as well as market shock, and dynamic incentives. In addition, addressing the group representative only for the study may affect the quality or reliability of the study because of biasness even if the assumption was that the representative is the one who can represent on behalf of all group members.

Thus, further research should be carried out by addressing the additional factors and by using sample members of the group borrowers, than only representative to determine the factors influencing group loan repayment performance in order to provide results that can be generalized and give accurate policy recommendations.

7.4.   MANAGERIAL IMPLICATIONS

The research output will be helpful for DECSI to evaluate its group lending criteria and revise it accordingly in favor of credit worthy borrowers so as to alleviate loan repayment constraints; and policy makers to formulate successful credit policies and programs that enable them to allocate scarce financial resources to the development of basic sectors of the economy. Besides, it contributes to the existing empirical literature on the area and will also be used as an input for further studies.

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