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Factors Affecting Loan Repayment Performance of Smallholder Farmers in East Hararghe, Ethiopia

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ABSTRACT

This paper examined the determinants of loan repayment performance among smallholder farmers in East Hararghe zone, Ethiopia specifically Kombolcha and Babile districts. In the study area, the Regional Government through Oromiya Saving and Credit Share Company, and Non-Governmental organizations have extended credit facilities to farming households to narrow the gap between the required and the owned capital to use improved agricultural technologies that would increase production and productivity. However, there is serious loan repayment delinquency in the study area, which discourages the rural finance from promoting and extending credit. A structured questionnaire was used to gather information from 140 smallholder farmers from two districts, using the multistage sampling technique. The study revealed that of the total sample households 71.4 percent and 28.6 percent households were partial loan defaulters and complete non-defaulters, respectively. A two-limit tobit regression model was applied to identify factors that influenced loan repayment**.** The results indicate that agro ecological zone, off-farm activity and technical assistance from extension agents positively influenced the loan repayment performance of smallholder farmers, while production loss, informal credit, social festival and loan-to-income ratio negatively influenced the loan repayment of smallholder farmers ($p<0.05$). Based on the findings policy implications were drawn for improving loan repayment performance and sustainability of credit services and institutions in the study areas.

Key words: Loan repayment, smallholder farmers, and two - limit tobit model

1. Introduction

In subsistence agriculture and low-income countries like Ethiopia, where smallholder farming dominates the overall national economy, smallholder farmers work on 96.3 percent of the total cultivated area and produce over 95 percent of the national crop production (CSA, 2007). However, smallholder farmers face severe shortage of financial resources to purchase productive agricultural inputs. The prices of inputs rise very rapidly every year. Consequently, the hope of the subsistence farmers on financial institutions for credit has become substantially higher in the recent times.

It is important that borrowed funds be invested for productive purposes, and the additional incomes generated be used to repay loans to have sustainable and viable production processes and credit institutions. However, failure by farmers to repay their loans on time or to repay them at all has been a serious problem faced by both agricultural credit institutions and smallholder farmers. Poor loan repayment in developing countries has become a major problem in agricultural credit administration, especially to smallholders who have limited collateral capabilities (Okorie, 2004).

Loan default problem has been a tragedy as it leads to a system failure to implement appropriate lending strategies and credible credit policies. In addition, it discourages the financial institutions from refinancing the defaulting members, which put the defaulters once again into vicious circle of low productivity. Eastern Hararghe is one amongst autonomous zone of Oromiya Regional State. In this administrative zone, the Regional Government through Oromiya Saving and Credit Share Company, and Non-Governmental organizations have extended credit facilities to farming households to narrow the gap between the required and the owned capital to use improved agricultural technologies that would increase production and productivity. However, there is a serious loan repayment problem in the area. Therefore, this study was undertaken to analyze how non-default and default rates

were associated with different loan characteristics as well as personal and socio-economic characteristics of farm households.

In the Ethiopian context, farm credit has been made available through public financial institutions of which Commercial Bank of Ethiopia (CBE) and Development Bank of Ethiopia (DBE) are the two major providers of input credit (such as fertilizer, improved seed, herbicides, and farm tools). However, DBE sharply reduced its supply of fertilizer loans in the early 1990s as its existence was threatened by massive default. Development Bank of Ethiopia (DBE) stopped extending input credit since 1997. Currently the major sources of input credit are CBE and some rural micro finance institutions.

There are 27 micro-financial institutions officially recognized by the National Bank of Ethiopia (NBE, 2010). These institutions deal directly with individual farmers who fulfill the loan provision criteria set by their management. Though figures on the amount of credit they provide are not available, it is believed that these institutions play an important role in narrowing the gap between the demand and supply of credit in rural areas. The advantage of these financial institutions is that farmers can get loan in cash and use it to purchase the most limiting production resources.

In order to increase loan repayment most of the micro financing schemes in Ethiopia provide loans to organized members, who are not required to put up physical collateral but operate in a group mechanism in which risks of non-repayment are transferred to the group. Essentially, most micro financing schemes in the country have, with slight modifications, adopted the Grameen Bank micro credit mechanisms (Fantahun, 2000). Even if group liability claims to improve repayment rates and lower transaction costs when lending to the poor by providing incentives for peers to screen, monitor and enforce each other's loans, the problem of poor loan repayment performance persists.

2. Methodology

2.1 Data Source and Sampling Technique

The study was carried out in East Hararghe zone of the Oromiya regional state of Ethiopia. The East Hararghe zone has a land area of about 24,900 square kilometers and a population of 2.7 million people. The altitude varies between 900 to 2500 meters above sea level and subsistence livestock-crop mixed farming is the major livelihood activity.. The main crops grown are *khat*, maize, sorghum and groundnut while cattle, sheep, goats, camels, chickens and donkeys are the major livestock species kept.

The data was obtained from primary source through structured questionnaires that were administered on smallholder farmers. A total of 140 farmers from the two districts who received loan during 2008/2009 production year were randomly drawn for the study, using the multistage sampling technique.

2.2 Analytical Methods

Quantitative data was analyzed using descriptive statistics such as mean, standard deviation and percentage used to investigate the relative importance of major variables hypothesized to influence loan repayment performance of smallholder farmers. Moreover a two-limit tobit model was used to select variables which most significantly distinguish between non-defaulters and defaulters of agricultural loan, from a set of personal and socio-economic variables hypothesized to influence repayment behavior.

The various studies on loan repayment performance in different countries identified the most probable causes of loan default. Moreover, the major independent variables such as age, gender, credit experience, loan diversion, education level, weak supervision, among others, were analyzed using different models such as logit, probit, and Ordinary Least Square multiple regression method. However most of the studies conducted in modeling the determinants of loan repayment have used dichotomous discrete choice models (Logit and Probit) where the dependent variable is a dummy that takes a value of zero or one depending on whether or not a farmer has defaulted. However, Lynne *et al*. (1988) pointed out possible loss of information if a binary variable is used as the dependent variable because of the dependent variable may have more than two outcome. In addition, binomial models, explain only the probability that an individual made a certain choice (i.e. defaulted or has not defaulted) and they fail to take into account the degree of loan recovery. The linear probability model (LPM), even though computationally and conceptually simpler and easier than the binary choice models, it depends on the use of ordinary least squares (OLS) approach. Application of OLS to censored model however, inherently produces heteroscedastic disturbance term (ε_i) and as a result, the standard deviations of the estimates are biased. These inadequacies are minimized with the use of the Tobit Model (Tobin, 1958). Therefore, the current study employed two limit tobit regression model to determine causes of loan repayment performance in the study areas.

In this study, the value of the dependent variable is repayment ratio that has been computed as the ratio of amount of loan repaid to the total amount due from formal sources of credit. Thus, the value of the dependent variable ranges between 0 and 1 and a two-limit Tobit model has been chosen as the appropriate econometric model. The two-limit Tobit was originally presented by Rossett and Nelson (1975) and discussed in detail by Maddala (1992) and Long (1997). The model derives from an underlying classical normal linear regression and can be represented as:

$y^* = \beta' x_i + \varepsilon_i$, (1)

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

Denoting Y_i as the observed dependent (censored) variable

$$Y_i = \begin{cases} 0 & \text{if } Y^* \le 0 \\ Y^* = X\beta + \varepsilon_i & \text{if } 0 < Y^* < 1 \\ 1 & \text{if } Y^* \ge 1 \end{cases} \quad (2)$$

Where,

Y_i = the observed dependent variable, in our case repayment rate (ratio of amount repaid to the amount due)

Y_i^* = the latent variable (unobserved for values smaller than 0 and greater than 1).

X_i = is a vector of independent variables (factors affecting loan repayment and Intensity of loan recovery)

β_i = Vector of unknown parameters

ε_i = Residuals that are independently and normally distributed with mean zero and a common variance σ^2, and i= 1, 2…n (n is the number of observations).

X_1 = Agro ecological zone (Dummy; highland =1, 0 otherwise)

X_2 = Age farmer (years)

X_3 = Sex (Dummy; male =1, 0 otherwise)

X_4 = Experience credit use (years)

X_5 = Family size (number)

X_6 = Off farm (Dummy; participation off farm activity=1, 0 otherwise) These include petty trading, charcoal selling, firewood selling and others.

X_7 = Production loss during the loan period production year (Dummy; 1=crop or livestock failure or disease happen 0, otherwise)

X_8 = Informal credit during the formal credit period (Dummy; 1=if HH use informal credit, 0 otherwise)

X_9 = Membership extension package (Dummy; household member of extension package=1, 0 otherwise)

X_{10} = Distance from credit source (minute)

X_{11} = Social festival during loan period (Dummy; house hold cerebrate social festival=1, 0 otherwise)

X_{12} = Contact with development agents (Numbers of day contact per month)

X_{13} = Numbers of livestock (TLU)

X_{14}= Loan income ratio (Ratio of total loan received to annual income)

X_{15} =Land size (hectare)

X_{16}= Education dummy (Dummy; literate =1, 0 otherwise

By using the two-limit Tobit model, the ratio of repayment was regressed on the various factors hypothesized to influence loan repayment performance of smallholder farmers in the study area. The regression parameters do not directly correspond to probability changes or changes in the expected level of usage. But their signs do indicate the direction of change in probability of being non-defaulter and marginal intensity of loan recovery as the respective explanatory variable change (Amemiya, 1984; Goodwin, 1992; Maddala, 1985).

The Tobit model has an advantage in that its coefficients can be farther disaggregated to determine the effect of a change in the i[th] variable on changes in the probability of being non-defaulter (Mc Donaled and Moffit, 1980) as follows:

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

$$\frac{\partial \Phi(\delta)}{\partial Xi} = \phi(\delta)\frac{\beta_i}{\sigma} \quad (4)$$

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

$$\frac{\partial E(Y_i / U > Y_i^* > L, X)}{\partial X_i} = \beta_i\left(1 + \frac{\delta_L\phi(\delta_L) - \delta_U\phi(\delta_U)}{\Phi(\delta_U) - \Phi(\delta_L)} - \left[\frac{\phi(\delta_L) - \phi(\delta_U)}{\Phi(\delta_U) - \Phi(\delta_L)}\right]^2\right) \quad (5)$$

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

$$\frac{\partial E(Y / X_i)}{\partial X} = \beta i\left(\Phi(\delta_u) - \Phi(\delta_L)\right) \quad (6)$$

Where,

X_i = explanatory variables,

$\Phi(\delta)$ = the cumulative normal distribution

$\delta = \frac{\beta_i X_i}{\sigma}$ = the Z-score for the area under normal curve

βi = a vector of Tobit maximum likelihood estimates

σ = the standard error of the error term.

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

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

L and U are threshold values (L =0 and U =1)

ϕ and Φ are probability density and cumulative density functions of the standard normal distribution, respectively.

3. Results and Discussion

3.1 Respondents' Socio-Economic Profiles

Tables 1 and 2 present socio-economic and institutional characteristics among partial defaulters and complete non-defaulters in the study area.

The results revealed a significant mean difference at less than 5 percent significance level, between the defaulters and complete non-defaulter households in terms of, total land size, contact with development agent, total annual income and experience credit use. Moreover, off farm income, crop and livestock disease, social ceremonies, received loan from the informal sector and education level all had systematic relationship with loan repayment. However, other variable such as age and family size, were not significantly different between defaulters and non-defaulters.

The total number of sampled households from study area where 140 of which 78 (55.71%) and 62 (44.29%) were male and female headed households, respectively. Out of the total sample 100 (71.43%) and 40 (28.51%) were defaulters and non-defaulters, respectively. Across the study districts, 52 (74.3%) and 48 (68.6%) of the respondents were loan defaulters in Babile and Kombolcha districts, respectively. The average loan repayment rate

was 78.3 percent for male household head and 74 percent for female household head, and total recovery rate of this district was 76.2percent.

Education is an important determinant of loan repayment. An educated farmer is able to use modern agricultural technologies, perform farming activities based on cropping calendar, and manage resources properly. All these factors boost production, which improves loan repayment. From the survey, 30.7 percent of the household heads were literate and about 50 percent were non-defaulters while 23 percent were defaulters.

Compared to other productive resources, land is by far the most important resource in agriculture. The fertility status, location and other attributes of land in association with its size makes it a binding resource. This study found the mean land size of defaulters to be 1.52ha and that of non-defaulters was 1.10 ha.

On average, the number of years of formal credit experience of household head was 3.3 with defaulters and non-defaulters having an average of 3.1 and 4.1 years respectively.

The average revenue earned by a borrower from crops and livestock during the production period 2008/2009 was 11602 Birr. The non-defaulters obtained more cash from crops, livestock and off farm (11843.8 Birr) than defaulters (9596.4 Birr). About 48.6 percent of the sampled household heads reported that at least one of their family members was engaged in off-farm activities, which helped them to earn additional income. A larger proportion of non-defaulter households (75 percent) sent their members to off-farm activities as compared to the defaulter households (38 percent).

The informal sources of credit included shopkeepers, friends, relatives and rich farmers. These sources were linked with kinship, cultural and social ties between the borrower and the lender. About 36 percent of the defaulters and 14 percent of complete non defaulters obtained other loans from informal sources.

A social festival such as wedding, circumcision, funeral of a family member or close relative and engagement was also described. The analysis shows that Out of the 140 respondents, 90 (or 64.3 percent) had celebrated one or more ceremonies during the year preceding the survey. Of the 90 respondents who had participated in a ceremony during the preceding year, 10 respondents were complete non-defaulters while 80 respondents were defaulter.

About 59 percent of the respondents indicated that they had experienced crop failure and livestock disease during the year preceding the survey. Of these, 10 and 78 percent were complete non-defaulters and defaulters respectively.

On average, defaulters and complete non-defaulters respectively had 1.04 and 2.2 contacts with the extension agents per month, implying that complete non-defaulters had more contact with extension agents compared to defaulters.

The majority of defaulters (59 percent) and non-defaulters (47.5 percent) were dissatisfied in group formation and group liability. The reasons for this dissatisfaction-included reluctance to group formation, low communication among group members, low responsibility for loan repayment, low confidence and lack of trust among the group members.

3.2 Factors Influencing Loan Repayment

To determine the explanatory variables that are good predictors of the loan repayment performance of rural smallholder farmers in East Hararghe zone specifically Babile and Combolcha districts, the two-limit tobit regression model was estimated. The results of the analysis are presented in Table 3.

A total of 16 explanatory variables were considered in the econometric model out of which 7 variables were found to significantly influence the probability of being non-defaulter and intensity of loan recovery among the farm households at less than 5 percent level of probability. The result from tobit regression model shows that agro ecological zone (X1), off-farm activity (X6), production loss (X7), informal credit (X8), celebration of social ceremonies (X11), number of contact days of the farm household lead with extension agents (X12) and loan income ratio (X14) are important factors influencing the loan repayment performance of small holder farmers in the study area.

Getting income from off-farm activities (X_6) is another economic factor that is positively and significantly related to loan repayment performance of smallholder farmers. This might be due to the fact that off-farm activities were additional sources of income for smallholders and the cash generated from these activities could back up the farmers' income to settle their debt even during bad harvesting seasons and when repayment period coincides with low agricultural prices. During this time, farmers who practice off-farm activities can easily repay their loan on time than those without or little off-farm income. Participation in off-farm activities increased the probability of

being non-defaulter by 13.82 percent and on average increased the rate of loan repayment by 7.65 percent for the entire respondents. Chirwa (1997) and Bekel (2001) also obtained similar result on agricultural credit repayment in Malawi and Ethiopia respectively.

Agro ecologic difference (X_1) was one of the factors, which significantly influenced loan repayment performance of the farmers. The econometric model result revealed that being residence of adequate rainfall agro-ecological area decreased the probability of being a defaulter by 22.73 percent and increased the rate of repayment on average by 12.69 percent for the entire sample respondents. The reason behind this is that farmers in good rainfall areas (Kombolcha) have the opportunity of growing different crops that would help them derive good income from these activities and diversify their income earning portfolio, thereby enabling them to pay the loans they borrowed, more than farmers living in moisture deficit areas (Babile).

Other factors affecting loan repayment performance negatively is production loss (X_7) due to bad weather, diseases, and pests, among others. Agriculture is widely considered more risky than other business activities. Thus, it is not surprising that agricultural lending projects have had poor repayment performance. Thus the farmers who probably had lost their products due to the above reason were less likely to repay loans compared to other farmers. For a discrete change in dummy variable from 0 to 1, the loan recovery rate declines by 17.71 percent and in addition the probability a borrower to be non default also decreases by 35.04 percent.

The results of the tobit model reveal that informal loan (X_8) affects loan repayment performance for formal institution negatively. A farmer borrowed from informal sources has a bearing on credit repayment to formal institutions since farmers prefer to settle loans from nearby lenders and relatives than distant and non-traditional financial institutions. Therefore, informal borrowers would tend to be defaulters of formal institution by as compared to those who do not borrow from informal services. The marginal effect total sample indicates that if a borrower received loan from informal source, the probability that it will non default decreases by 12.25 percent, the loan recovery rate will decrease by 07.34 percent for entire sample.

The results of the tobit model reveal that Celebration of social ceremonies (X_{11}) affected loan repayment performance negatively. The possible explanation is that celebration of one or more of social ceremonies need much material and financial resources, which are beyond what the borrowers could afford. This means the money, which could have been used for repayment, might have been used for the celebrations. For a discrete change in dummy variable from 0 to 1, the loan recovery rate declines by 10.58 percent for the entire respondents. In addition the probability a borrower to be defaulter also increases by 20.10 percent.

Number of contact days of the farm household head with extension agents (X_{12}) is another important institutional factor, which was positively related to the dependent variable. This implies that farmers with more access to technical assistance on agricultural activities were able to repay their loan as promised more than those who had less or no assistance at all. The reason for this is that farmers who have frequent contact with development agents are better informed about markets and production technologies. As a result, they are motivated to timely repay their loans compared to those with less or no contact with extension. Each additional contact increases a probability of being non-defaulter by 8.25 percent and increases the rate of repayment by 04.59 for the entire sample. Similar result was also obtained by Chirwa (1997), Belay (2002), Roslon and Abdkarin (2009).

The loan-to-income ratio (X_{14}) is hypothesized to influence loan repayment performance negatively. The results of the tobit model also indicate that borrowers who had high loan-to- income ratio had poor loan repayment performance. The possible explanation is that borrowers who had higher ratio received high loan relative to economic status without considering annual income and production. Indirectly, this result reveals that the farmers who had higher annual income from agriculture and off- farm activity were more likely to repay their loans on time. For a unit increase in loan income ratio, loan recovery rate declines by 33.05 percent while the probability of non-default decreases by 59.36 percent.

4. Conclusion and Policy Implication

The study found that smallholder farmers within the study area sourced their credit from both formal and informal credit institutions. The results of the Tobit model also indicated that the agro-ecological zone, off-farm activity, production loss, informal credit, celebration of social ceremonies, number of contact days of the farm household head with extension agents and loan income ratio, determined repayment performance.

Based on these findings, the study recommends that increasing the number of development agents to change the farmers' attitude toward agricultural transformation and timely settlement of debt; Rural development strategies should not only emphasize increasing agricultural production without simultaneous attention to promote off-farm activities in the rural areas; The elders, community leaders, local associations and religious organizations should

consider minimizing the number of traditional ceremonies in order to reduce the associated expenditure through time; Policies and strategies geared towards the development and promotion of new technologies suitable to moisture-deficit areas should be given adequate emphasis in order to improve the loan repayment capacity of smallholder farmers; Lastly, the formation of credit groups through self-selection will help individual members to screen each other effectively. Screening of potential borrowers by initially selecting those of their neighbors, friends and relative whom they believe to be capable of repaying the loans will help to minimize the loan default problem addressed in this study.

5. Reference

Amemiya, T. (1984), Tobit model: a survey. *Journal of Econometrics* 24: 3-63.

Bekele H. (2001), Factors Influencing the Loan Repayment Performance of Smallholders in Ethiopia. *M.Sc.Thesis*, Alemaya University, Ethiopia

Belay A. (2002), Factors Influencing Loan Repayment of Rural Women in Eastern Ethiopia: The Case of Dire Dawa Area, *M.Sc. Thesis*, Alemaya University, Ethiopia.

Chirwa E.W. (1997) Econometric Analysis of the Determinants of Agricultural Credit Repayment in Malawi², *African Review of Money, Finance and Banking*, No.1-2,1997, 107-123.

Okarie, A, (2004), Major Determinant of Agricultural Smallholder Loan Lepayment in Developing Economy: empirical evidence from Ondo state Nigeria, The Journal of Socio-Economics, 21 (4): 223-234,

CSA (Centra Statistics Authority), (2009), Federal Democratic Republic of Ethiopia, Office of Population and Housing Census Commission. Addis Ababa, Ethiopia.

Fantahun M. (2000), Informal Financial Institutions: Impact Analysis of ACORD's Credit Intervention through *Iddirs* in Dire Dawa. *M.Sc. Thesis*, Addis Ababa University, Ethiopia.

Goodwin, B. (1992). An analysis of factors associated with consumers' use of grocery coupons. Journal of Agricultural and Resource Economics. 17(1):110-120.

Long, S. (1997), Regression Models for Catagorical and Limited Dependent Variables. Thous and Oaks,CA:Sage Publications.

Lynne, G.D., Shonkwiler, J.S. and Rola L.R. (1988), Attitudes and Farmer Conservation Behavior. American Journal of Agricultural Economics 70:12-19

Maddala, G.S., (1985), Limited Dependent and Qualitative Variables in Econometrics. Cambridge University Press, Cambridge.

Maddala, G.S. (1992), Introduction to Econometrics. Second Edition. Macmillan Publishing Company, New York.

NBE (National Bank of Ethiopia), (2010), National bank of Ethiopia 2008/2009 Annual Report. Addis Ababa, Ethiopia.

Rosett, R. and Nelson, F. (1975), Estimation of the Two-limit Probit Regression Model. Econometrica. 43(1):141-146.

Roslan, A.H. and Abdkarim, M.Z. (2009). Determinants of Loan Repayment among Smallholder Farmers in Ogbomoso Agricultural Zone of Oyo State, Nigeria. *Journal of social science* 17(1): 59-62 (2008)

Tobin, J., (1958). Estimation of Relation Ships for Limited Dependent Variables. Econometrica. 26(1): 24-36

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Table 1. Socio-economic and institutional characteristics among defaulters and non defaulters in East Hararghe.

	Defaulter		Complete Non defaulter			Total sample	
Characteristics	n=100		n=40		*t*-value	n=140	
	Mean	SD	Mean	SD		Mean	SD
Age	36.8	8.4	36.4	10.6	0.23	36.7	9.0
Experience Credit	3.0	1.7	4.0	2.1	-2.87***	3.3	1.9
Contact with DA	1.0	1.3	2.2	2.1	-4.04***	1.4	1.7
Total land size	1.1	0.4	1.6	1.5	-3.27***	1.3	0.9
Family size	6.0	1.9	5.6	2.2	1.20	5.9	2.0
Total income	9596.4	6712.6	16616.1	11843.8	-4.42***	11602.0	9032.1

Source: Computed from the survey data
SD= Standard deviation DA= Development agent ***, **, * denote significance at 1%, 5% and 10% level

Table 2. Socio-economic and institutional characteristics among defaulters and non defaulters in East Hararghe.

	Defaulters		Complete Non Defaulters			Total	
	n=100		n=40				
Characteristics	No.	Percent	No.	Percent	χ^2-value	No.	Percent
Gender							
Meal	56.00	56.00	22.00	55.00		78.00	55.71
Female	44.00	44.00	18.00	45.00	0.01	62.00	44.29
Off farm income							
No	62.00	62.00	10.00	25.00		72.00	51.43
Yes	38.00	38.00	30.00	75.00	15.65***	68.00	48.57
Crop and livestock disease							
No	22.00	22.00	36.00	90.00		58.00	41.43
Yes	78.00	78.00	4.00	10.00	54.45***	82.00	58.57
Received loan from informal sector							
No	64.00	64.00	26.00	65.00		90.00	64.29
yes	36.00	36.00	14.00	35.00	0.01	50.00	35.71
Any social ceremonies							
No	20.00	20.00	30.00	75.00		50.00	35.71
Yes	80.00	80.00	10.00	25.00	37.64***	90.00	64.29
Education Level							
Illiterate	77.00	77.00	20.00	50.00		97.00	69.29
Literate	23.00	23.00	20.00	50.00	9.79***	43.00	30.71
Opinion on group liability							
Very good	6	6.00	1	2.50		7	5.00
Good	9	9.00	4	10.00	3.276	78	55.71
Fair	26	26.00	16	40.00		13	9.28
Bad	59	59.00	19	47.50		42	30.00

Source: Computed from the survey data
***, **, * denote significance at 1%, 5% and 10% level

Table 3. Two-limit Tobit Model estimates and marginal effect of factors influencing loan-repayment and probability of being Non-defaulter

Variable	β	SE	t-value	P-value	Probability	Unconditional Expected Value
X_1	0.1633	0.0626	2.6100**	0.0100	0.2273	0.1269
X_2	-0.0024	0.0030	-0.7900	0.4310	0.0033	0.0019
X_3	0.0507	0.0431	1.1800	0.2420	0.0704	0.0399
X_4	0.0249	0.0136	1.8200	0.0700	0.0350	0.0195
X_5	-0.0127	0.0136	-0.9300	0.3520	0.0179	0.0100
X_6	0.0982	0.0468	2.1000*	0.0380	0.1382	0.0765
X_7	-0.2388	0.0513	-4.6500**	0.0000	0.3504	0.1771
X_8	-0.0919	0.0428	-2.1500*	0.0340	0.1225	0.0734
X_9	-0.0233	0.0573	-0.4100	0.6850	0.0336	0.0180
X_{10}	-0.0001	0.0002	-0.5300	0.5980	0.0002	0.0001
X_{11}	-0.1412	0.0570	-2.4800*	0.0150	0.2110	0.1058
X_{12}	0.0587	0.0258	2.2700*	0.0250	0.0825	0.0459
X_{13}	-0.0036	0.0145	-0.2500	0.8060	0.0050	0.0028
X_{14}	-0.4222	0.1538	-2.7400**	0.0070	0.5936	0.3305
X_{15}	0.0808	0.0638	1.2700	0.2080	0.1136	0.0632
X_{16}	-0.0132	0.0543	-0.2400	0.8080	0.0184	0.0104
_cons	0.9730	0.1563	6.2200	0.0000		
Number of obs					140	
LR chi2(16)					150.31	
Prob > chi2					0.0000	
Pseudo R^2					0.8437	
Log likelihood					-13.9264	

Source: Survey Result, 2011
SE= Standard error
Note: * and ** indicates significant variables at 5% and 1% significance levels