

DETERMINANTS OF MICROFINANCE CREDIT RISK IN HO MUNICIPALITY, GHANA

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Abstract

The objective of this study was to identify the major risk factors that influence credit default among microfinance clients in the Ho Municipality, Ghana and to develop a model that links these factors to any client in the microfinance sector. A questionnaire-based survey was the main method used for this study. Logistic regression analysis was used to identify the major risk factors of credit default. Results show that high interest rates, poor monitoring and supervision of loans, duration of loan repayment, business failure and number of dependents were significant to the prediction of credit default with a predicted default rate of 69.51%. We suggested that there was a need for Micro-Finance Institutions to adopt among others the default risk model to ascertain the level of risk since it is relatively efficient and cost effective. There should also be adequate training for loan officers of the Micro Finance Institutions in order to improve on their client's assessment skills and method of granting credits. Finally, Bank of Ghana should consider reducing the prime rate to enable Micro Finance Institutions and other lenders grant credit to their customers at a lower interest rate thereby reducing the finance cost of borrowing.

Keywords: Credit risk, Logistic Regression, Microfinance, Micro-Finance Institutions, Portfolio at risk (PAR), Ghana

INTRODUCTION

Microfinance has become one of the most powerful engines in the global effort to end the crushing poverty that deprives hundreds of millions of the world's people of sustenance and hope. Steel & Andah (2002) define microfinance as small financial transactions with low income households and micro enterprises using non-standard methodologies like character-based lending, group guarantee and short term repeated loans. According to Otero (1994) microfinance creates access to productive capital for the poor, which together with human capital, addressed through education and training, and social capital, achieved through local organization building, enables people to move out of poverty. By providing material capital to the poor, their sense of dignity is strengthened and this can help to empower them to participate in the economy and society.

In Ghana, the microfinance sector serves over 8 million clients of which 62% are women and contributes between 13-15% of the total banking assets. The sector employed a total of 31,071 persons at the end of December 2014 (Bank of Ghana, 2014). Despite their major contributions, Micro-finance Institutions (MFIs) are entrapped by various types of risks, such as credit/default risk, currencies risk, interest rate risk, data security issues and risks related to cyber crime. Bourke & Shanmugam (1990) identified credit risk as the key among the risks in terms of its effects on the performance of financial institutions, individuals and businesses at large. Credit risk is the risk that a borrower will default on any type of debt by failing to make payments as and when due. Credit risk leads to less capital adequacy because the financial institutions will look for other sources of finance to cover up the loss. It will also lead to less liquidity to meet up with other customer's demand and thus less profitability because of a slowdown in business or even bankruptcy. This goes to show that credit risk and returns are so intertwined so, the more credit risk, the less returns and vice versa (Sinkey, 1992).

Of late, there have been complains by MFIs in Ghana regarding high rate of default by their clients which is an indication that most MFIs are not achieving the internationally accepted standard portfolio at risk of 3% (Addae-Korankye, 2014). The sustainability of MFIs depends largely on their ability to collect their loans as efficiently and effectively as possible. In other words to be financially viable or sustainable, MFIs must ensure high portfolio quality based on 100% repayment ,or at worst low rate of default, cost recovery and efficient lending (Addae-Korankye, 2014). Investors and other stakeholders would want to feel confident that the management of MFIs understand the key risks they face and could manage and monitor them efficiently. This study seeks to identify the major factors that influence credit default among microfinance clients in the Ho Municipality and make valuable recommendations that will help

MFIs to reduce credit risks and avoid being financially distressed with the consequence being bankruptcy.

LITERATURE REVIEW

Concept of Microfinance

Microfinance has evolved as an approach to economic development intended to benefit low income women and men. It expanded enormously in 1990s (Ledgerwood, 1999) cited by Setargie, (2013). Steel and Andah (2002) defined microfinance as small financial transactions with low income households and micro enterprises using non-standard methodologies like character-based lending, group guarantee and short term repeated loans. Microfinance creates access to productive capital for the poor, which together with human capital, addressed through education and training, and social capital, achieved through local organization building, enables people to move out of poverty. By providing material capital to a poor person, their sense of dignity is strengthened and this can help to empower them to participate in the economy and society (Otero, 1994). Credit granting non-governmental organizations, credit cooperatives and to some extent, a few rural banks have utilized microfinance as a sustainable mechanism to provide basic financial services to small-scale borrowers (Llanto, 2001). The wide network of low-income clients of microfinance institutions proves that there is a great demand for credit by the poor and that they can successfully use these small loans to earn income (Llanto, 2001).

The institutions involved in microfinance are formal, semi-formal or informal. The formal microfinance institutions in Ghana include the traditional commercial banks, rural and community banks and other financial institutions such as the savings and loans companies whose operations are registered, licensed and regulated by the Bank of Ghana. The semi-formal microcredit institutions comprise of informal institutions that are formally registered but not licensed/regulated by Bank of Ghana such as the Credit Unions of Ghana, Ghana Cooperatives Susu Collectors Association, Ghana Cooperative Council and Association of Financial Non-Governmental Organizations. They constitute the key stakeholders of the Microfinance Sub-sector in Ghana. The informal sector is the components of the financial sector whose service providers are usually not registered and unregulated by the Bank of Ghana and rarely involve legal documentation. The segment includes money lenders, Susu clubs, Rotating Savings and Credit Associations (ROSCAs).

According to Gyamfi (2016), data from Bank of Ghana indicates that as at 2014, service providers operating within Ghana's microfinance product space include: Rural and Community Banks (143 with over 651 branches and outlets), Savings and Loans Companies (24 with over

404 branches), Tier 2 Deposit Taking Microfinance Companies (661), Credit Unions (555), Financial Non-Governmental Organizations (40), Corporate Money Lenders (107).

The underlying business principles and characteristics of these institutions influence their client basis and affect the repayment of the facilities they grant. The informal financial institutions have a cost advantage over the formal intermediaries in addressing the information asymmetry problem because they have access to devices and mechanisms to collect the necessary information about their clients. They frequently have more detailed knowledge of clients and their communities, and the local conditions in which they operate. As a result, they often face lower transaction cost in their service delivery. According to Aleem (1990), informal lenders mainly use the established relationship with borrowers as a screening and credit rationing mechanism. The formal institutions on the other hand enjoy economy of scale and can mobilize large amounts of deposits for lending.

Microfinance Services

This section presents the broad range of products that are provided by the microfinance industry to the poor and low-income households, for their micro enterprises and small businesses, to enable them raise their income levels and improve their living standards.

Services/Products	Details
Micro savings	It is a possibility to save money without any minimum balance. It allows people to retain money for future use or for unexpected costs.
Micro insurance	It gives entrepreneurs the chance to focus more on their core business which drastically reduces the risk affecting their property, health or working possibilities. There are different types of insurance services like life insurance, property insurance, health insurance and disability insurance
Micro leasing	For entrepreneurs or small businesses who cannot afford to buy at full cost they can instead lease equipment, agricultural machinery or vehicles. Often no limitations of minimum cost of the leased object;
Money transfer	A service for transferring money, mainly overseas to family or friends. Money transfers without opening current accounts are performed by a number of financial institutions through international money transfer systems such as Western Union.
Education /support services	Credit with education, support client with basic book keeping etc

Source: Ghana Microfinance Institutions Network (GHAMFIN), 2016

The Concept of Credit Risk

The terms credit risk; credit/loan default and portfolio at risk have similar meanings and are therefore used in most literature interchangeably. Credit risk is directly related to the portfolio of the organization and is one of the most significant risks from an MFI perspective (Abhay, 2010). Whenever an MFI lends to a client there is an inherent risk of money not coming back, i.e. the client turning into a defaulter, this risk is called the Credit risk. Credit risk is the risk that a borrower will default on any type of debt by failing to make payments as and when due. Basel, (1999) defines credit risk as the potential that a bank borrower or counterparty will fail to meet their obligations in accordance with agreed terms. "It is an estimate of the probability that a borrower will not repay all or portion of the loan on time" (Niu, 2004).

Credit risk has constantly been a locality of anxiety not only to financial institutions but also to all in the business world (Achou et al, 1998). Credit risk leads to capital inadequacy because the MFIs will have to look for other sources of funding to cover up the loss. Moreover, it could have negative implications for the MFIs liquidity to meet up with other customers' requests and thus less profitability because of a decline in business operations or even liquidation (Sinkey, 1992). Managements of MFIs try to have an objective view of credit risk and want to measure its effect on their portfolio.

The credit risk profile of a MFI can be measured using various indicators. Of these indicators, portfolio at risk (PAR) is considered to be the most effective and is now a very common indicator across MFIs. As explained by Setargie, (2013), Portfolio at risk or PAR tries to measure the amount of loan outstanding that the MFI can lose in case an overdue client does not pay a single instalment from the day of calculation of PAR. PAR is the proportion of loan with overdue clients to the total loan outstanding of the organization. $PAR\% = (\text{Loan outstanding on overdue loans} / \text{Total loan outstanding of the MFI}) \times 100$. PAR is further refined by MFIs to make it meaningful by including ageing in it. So MFIs often calculate PAR 30, PAR 60, and PAR 90, etc. PAR 30 means outstanding of all loans, which have overdue greater than 30 days as a proportion of total outstanding of the MFI. Besides, arrears rate equals total overdue over total loan outstanding times hundred. Apart from PAR, Repayment rate and Arrear rate are other ratios, which also provide information about the portfolio quality of a MFI.

Causes of credit defaults

A number of factors have been identified as the causes of credit default among microfinance borrowers. Setargie, (2013) in his study identified lack of education, inadequate loan size, and credit diversion, availability of other credit sources, poor loan supervision, and suitability of credit repayment period and income to be significant determinants of credit default. Addae-

Korankye, 2014) cited late disbursement of the loan, business failure, unfavourable payment terms, high interest rate, inadequate loan sizes, unforeseen contingencies, for instance illness and death of a family member, lack of training for the clients before and after disbursement as some of the causes of loan default. In the study of Bichanger & Aseya, (2013) they identified inadequate monitoring of micro credit beneficiaries, delays by financial institutions in processing and disbursement of loans, diversion of funds, over-concentration of decision making, where all loans are required by some banks to be sanctioned by Area/Head Offices as the major factors that lead to loan default. Other studies have also identified inadequacy of collateral security against loans, unrealistic terms and schedule of repayment, lack of follow up measures, natural calamities, the nature, and time of disbursement to be the cause of high default rates among small and medium scale enterprises. [Berger and De Young (1997), Okorie (1986)].

METHODOLOGY

Study Area

Ho Municipal is one of the twenty five (25) Municipalities and Districts in the Volta Region of Ghana. The Municipality is also the administrative capital of the people of the Volta Region. The Municipality lies between latitudes $6^{\circ} 20'N$ and $6^{\circ} 55' N$ and longitude $0^{\circ} 12' E$ and $0^{\circ} 53' E$. The Municipality shares boundaries with the Republic of Togo to the east, to the west with Ho West District, to the north with Hohoe Municipality and to the south with Agotime–Ziope. The Municipality has a total population of 192,871 with 94,951 males and 97,920 females. (Ho Municipal Assembly, 2016)

Design of the Study

This study employed the survey design which involves the collection of information from a sample of individuals through their responses to questions (Saunders, Lewis & Thornhill, 2007). The population for the study was all loan officers of microfinance institutions (MFIs) and their customers in the Ho Municipality.

Data and study sample

Data for the study was obtained using questionnaires purposively administered to a total of 350 respondents; made up of three hundred and forty-five (345) customers and five (5) loan officers of five (5) of MFIs in the Ho Municipality. The questionnaire was designed to find the customers' and staff views on why loans are not paid back or paid late when collected.

Data analysis approach

The main tool for data analysis was IBM Statistical Package for Social Sciences (SPSS) version 20. The software was used to obtain descriptive statistics such as tables, frequency and test of relation among variables.

Estimation technique

The study makes use of the logistic regression model to determine the predictors of credit risk. Logistic regression is based on binomial probability theory. It is a mathematical modeling approach used in describing the relationship of several independent variables to a dichotomous dependent variable or a limited dependent variable. Binary Logistic regression is a prognostic model that is fitted where there is a dichotomous/binary dependent variable like in this instance where the researcher is interested in whether a credit beneficiary default, or not. Usually, the categories are coded as “0” and “1” as it results is a straightforward interpretation. Normally the category of interest also affectionately referred to the case is typically coded as “1” and the other group is also known as a “non-case” as “0”. In this work credit default, “case”, is denoted by 1 and non-credit default “non-case” is denoted by 0.

According to Harrell (2001), the formula for a logistic regression model is given by;

$$\begin{aligned}\pi(x_i) &= P(y_i = 1: x_i) \\ &= [1 + \exp(-X^T \beta)]^{-1}\end{aligned}$$

$$\text{where, } y_i = \begin{cases} 1, & \text{if a beneficiary default} \\ 0, & \text{if a beneficiary did not default} \end{cases} \quad i = 1, 2, \dots, n$$

$$X^T \beta = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_{p-1} x_{p-1}$$

$$\beta_{p \times 1} = \begin{bmatrix} \beta_0 \\ \beta_1 \\ \vdots \\ \beta_{p-1} \end{bmatrix}, \quad X_{p \times 1} = \begin{bmatrix} 1 \\ X_1 \\ \vdots \\ X_{p-1} \end{bmatrix}, \quad X_{ip \times 1} = \begin{bmatrix} 1 \\ X_{i1} \\ \vdots \\ X_{i,p-1} \end{bmatrix}$$

where x_1, x_2, \dots, x_k are independent variables

β_0 is the coefficient of the constant terms

$\beta_1, \beta_2, \dots, \beta_{p-1}$ are the coefficient of p independent variables

$\pi(x_i)$ is the probability of an event that depends on p – independent variables

$$\text{Since } \pi(x_i) = [1 + \exp(-X^T \beta)]^{-1}$$

$$= \frac{1}{1 + \exp(-X^T \beta)}$$

$$\Rightarrow 1 - \pi(x_i) = \frac{1}{1 + \exp(-X\beta)}$$

$$\begin{aligned}
&= \frac{[1 + \exp(-X^T \beta)] - 1}{1 + \exp(-X^T \beta)} \\
&= \frac{\exp(-X^T \beta)}{1 + \exp(-X^T \beta)} \\
\Rightarrow \frac{\pi(x_i)}{1 - \pi(x_i)} &= [\exp(-X^T \beta)]^{-1} \\
\text{Thus, } \ln\left(\frac{\pi(x_i)}{1 - \pi(x_i)}\right) &= \text{logit}[\pi(x_i)] \\
&= X^T \beta
\end{aligned}$$

Furthermore, Kutner, Nachtsheim, Neter, and Li (2005) state that since the dependent variable can take values 1 and 0 with probabilities $\pi(x_i)$ and $1 - \pi(x_i)$ respectively, Y follows a Bernoulli distribution with $(Y) = \pi(x_i)$.

$$\begin{aligned}
\text{Thus, } Y_i &= \pi(x_i) + \varepsilon_i \\
E(Y_i) &= \pi(x_i) \\
&= [1 + \exp(-X^T \beta)]^{-1} \\
&= \frac{1}{1 + \exp(-X^T \beta)} \\
P(Y_i = 1) &= \pi(x_i) \\
P(Y_i = 0) &= 1 - \pi(x_i)
\end{aligned}$$

The probability density function can be presented as

$$f_i(Y_i) = \pi(x_i)^{Y_i} [1 - \pi(x_i)]^{1-Y_i}, \quad \text{for } Y_i = 0, 1, 2, \dots, n$$

The Y_i 's are assumed to be independent and thus, the joint probability function is given by

$$\begin{aligned}
g(Y_1, \dots, Y_n) &= l(\beta) = \prod_{i=1}^n f_1(Y_i) \\
&= \prod_{i=1}^n \pi(x_i)^{Y_i} [1 - \pi(x_i)]^{1-Y_i}
\end{aligned}$$

Where β is a vector of unknown parameters.

ANALYSIS AND RESULTS

Demographic information of the respondents

Table 1 summarizes the socio-demographic information of the respondents. About 38.9% of the respondents were males while 61.1% were females. In which 45.4% were between the ages of 30 and 39, 28% were between 20 to 29; 24% were between 40 to 49, and 2.6% of them were 50 years and above. The respondents' distribution by level of education appears to be evenly

distributed among the three categories with tertiary and secondary recording the highest values among the respondents. What this means is that about 76% of the times, findings in this research can be attributed to people having secondary and tertiary education. The analysis further indicated that 30% of the respondents were never married; 56.6% were married while the rest 13.3% were divorced/separated. Table 1 also revealed that majority of the respondents (52%) make an average daily turnover less than GH¢100.00. Thirty percent of the respondents make a daily turnover between GH¢ 101.00 and GH¢ 200.00. Ten percent make between GH¢ 201.00 and GH¢ 300.00 above. Cumulatively, only 19% (10%+5.5%+3.5) make a daily turnover above GH¢ 251.00. The average daily turnover of respondents determines the amount of loan and respondents' ability to repay the loan.

Table 1: Demographic information of the respondents (n=350)

Variables	Frequency	Percentage
Gender		
Male	136	38.9
Female	214	61.1
Age Group		
20-29	98	28.0
30-39	159	45.4
40-49	84	24.0
50 and above	9	2.6
Level Education		
Basic	84	24
Secondary	110	31
Tertiary	156	45
Marital Status		
Never married	105	30.0
Married	198	56.6
Divorced/Widow	47	13.4
Daily Turnover (GH¢)		
Less than 150	179	52
151-250	100	29
251-350	35	10
351-450	19	5.5
Above 450	12	3.5

Determinants or Causes of Credit Default

The Wald statistics and the significance level in Table 2 shows that five out of the fifteen independent variables namely; “X1 (*High interest rates*)”, “X4 (*Poor monitoring and supervision of loans*)”, “X5 (*Duration of loan repayment*)”, “X6 (*Business failure*)” and “X8 (*Number of dependents*)” were significant to the prediction of loan default payment. This is because they had p-values values of less than 0.05 (sig. in Table 2). Thus the logistic function is given by the equation (2) below:

$$P(\text{Default}) = \frac{1}{1 + e^{-(1.058+0.482X1+0.279X4-0.529X5-0.575X6+0.109X8)}}$$

The odd ratio ($Exp(\beta)$) for the significant factors, shows the increase (or decrease if the ratio is less than one) in odds of being in one outcome category (turnover or no turnover) when the value of the predictor increases by one unit. From table 2, the odds or risk of a client defaulting, is 1.620 for X1 (*High interest rates*). This indicates that, the risk of a client defaulting is 1.620 times higher for a client who perceived interest rates on the loan to be high, all other factors being equal. For X4 (*Poor monitoring and supervision of loans*), the odd ratio of 1.322 indicates that risk of a client defaulting is 1.322 times higher for a client when there is poor monitoring and supervision of loans, all other factors being equal. For X5 (*Duration of loan repayment*), the odd ratio of 0.589 indicates that the risk of a client defaulting payment is 0.589 times higher for a client who has been given shorter duration to pay back than those who has been given longer duration, all other factors being equal.

Furthermore, for X6 (*Business failure*), the odd ratio of 0.563 indicated that the risk of a client defaulting payment is 0.563 times higher for a client whose business has failed, all other factors being equal. Finally, the odd ratio of 1.115 for X8 (*Number of dependents*) indicates that the risk of a client with larger number of dependents, is 1.115 times more likely to default in repayment as compared with those with least number of dependents, all other factors being equal.

The findings of this study is consistent with the findings of Addae-Korankye (2014) and Bichanger & Aseya, (2013) who also identified high interest rate, inadequate monitoring of micro credit beneficiaries, business failure, and other factors as the major causes of credit default among microfinance borrowers. High interest rate increases the cost of capital of businesses thereby increasing their cost of production.

Table 2: Logistic Regression Estimates of Predictors of Loan Default Payment

Predictors	B	S.E.	Wald	Df	Sig.	Exp)	95.0% C.I. EXP(B)	
							Lower	Upper
HIR	0.482	0.194	6.211	1	0.013	1.620	1.109	2.368
TOL	-0.018	0.174	0.011	1	0.916	0.982	0.698	1.382
NOYIB	0.124	0.217	0.326	1	0.568	1.132	0.739	1.733
PMSOL	0.279	0.165	2.857	1	0.011	1.322	0.956	1.827
DULR	-0.529	0.191	7.671	1	0.006	0.589	0.405	0.857
BUSF	-0.575	0.220	6.806	1	0.024	0.563	0.365	0.867
INADLS	-0.146	0.254	0.329	1	0.566	0.864	0.526	1.422
DEPEND	0.109	0.215	0.257	1	0.019	1.115	0.731	1.701
MOREP	0.100	0.178	0.318	1	0.573	1.106	0.780	1.568
CONSTANT	1.058	0.854	1.538	1	0.215	2.882		

Definition of Variables

X1= High interest rates (HIR)

X2= Type of loan(TOL)

X3= Number of years in business(NOYIB)

X4= Poor monitoring and supervision of loans(PMSOL)

X5= Duration of loan repayment(DULR)

X6= Business failure(BUSF)

X7= Inadequate loan size(INADLS)

X8= Number of dependents(DEPEND)

X9= Mode of repayments(MOREP)

Significance Test for Samples from Male and Female Populations

Table 3 shows significance test for samples of male and female populations. At a significant value of $\alpha = 0.05$, it appears that none of the asymptotic is less than 0.05. This suggests that there is no significant difference between the male and female respondents rating of the nine factors the respondents consider to be responsible for microfinance credit default; and that there is no significant difference between the responses of males and that of females.

Table 3: Significance Test for Samples from Male and Female Populations

	Mann-Whitney U	Wilcoxon W	Asymp. Sig. (2-tailed)
High interest rates	13850	32186	0.137
Type of loan	14139.5	26859.5	0.219
Number of years in business	14797.5	33133.5	0.662
Poor monitoring and supervision of loans	13993	32329	0.149
Duration of loan repayment	14361.5	32697.5	0.329
Business failure	14198	32534	0.225
Loan size	13853.5	32189.5	0.143
Number of dependents	14477	32813	0.439
Mode of repayment	14586.5	32922.5	0.471

CONCLUSION AND RECOMMENDATION

This study aims at identifying the major factors that influence credit default among microfinance clients in the Ho Municipality, Ghana and to develop a model that links these factors to any client in the microfinance sector. The study reveals that five main factors; high interest rates, poor monitoring and supervision of loans, duration of loan repayment, business failure and number of dependents were significant predictors of loan default payment with a predicted default rate of 69.51%. This indicates that there is probability that 69.51% of the time a client in the microfinance sector, with the given characteristics is likely to default. Therefore, there is a need for micro-financial institutions to adopt among others the default risk model to ascertain the level of risk since it is relatively efficient and cost effective. There should also be adequate training for loan officers of MFIs in order to improve on their client's assessment skills and method of granting credits. It is necessary for MFIs to properly screen loan applicants to assess their credit worthiness before a loan is granted. As posits by Warue (2012), MFIs should also put in place a monitoring system that would highlight repayment problems clearly and quickly, so that loan officers and their supervisors can focus on credit risk before it gets out of their control. In addition, MFIs need to consider introducing a micro insurance policy for borrowers. An insurance plan would not only reduce the burden on the borrowers if their businesses failed but also reduce the financial burden on the MFIs from uncollectible loans. Finally, the Bank of Ghana should consider reducing prime rate. Prime rate serves as a basis, or point of reference, for determining the interest rate MFIs and other lenders make available to borrowers. Currently Ghana's policy/prime rate stands at 16% per annum and it is considered as one of the highest in the West African sub region. A reducing in the prime rate would enable MFIs grant credit to their customers at a lower interest rate thereby reducing the financial burden on borrowers.

LIMITATIONS AND FURTHER STUDY

The scope of the study was limited to five (5) MFIs in the Ho Municipality only and this could affect the generalizations of the findings. It is, therefore, recommended that a similar study be conducted to include other MFIs in the Municipalities and Districts in the Volta Region of Ghana in order to broaden the response rate so that better generalizations could be made.

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