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Determinants and Management of Credit Risk in Micro Finance Institutions: Empirical Study on Selected MFIs in Ethiopia

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This is to certify that the thesis prepared by Selamsew Yohannes, entitled: Determinants and Management of Credit risk of Micro Finance Institutions: Empirical Study on Selected MFIs in Ethiopia and submitted in partial fulfillment of the requirements for the degree of Degree of Master of Business Administration in Finance complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

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Abstract

Determinants and Management of Credit Risk in Micro Finance Institutions: Empirical Study on Selected MFIs in Ethiopia

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Addis Ababa University, 2012

Credit risk is one of the risks any financial institution is exposed for; managing their credit risk will be the key to their financial sustainability. The general objective of this research is to determine the factors influencing Ethiopian Micro finance institutions credit risk, management of credit risk of major Ethiopian MFIs, and an entire review of the management techniques and practices on credit risk management. The researcher used a mixed approach study where the quantitative data show the determinants of credit risk and the qualitative data describes the causes, techniques and other things related with credit risk which is better described qualitatively. In total ten years data of ten MFIs were used to make an econometrics model and five structured interviews are administered to collect the qualitative data. The finding suggest that five variables i.e. loan to deposit ratio, average loan per borrower, total assets, leverage, and management efficiency are significantly affecting the credit risk, and their credit risk arises from different aspects that can be seen from three perspective i.e. external and internal factors, borrowers and lenders characteristics, and firm and loan characteristics. Although, Ethiopian MFIs have different techniques that are used to manage their credit risk.

Key Words; Credit risk, Micro Finance Institutions

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Dedication

To my father Ato Yohannes Tapano

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Acronyms

- ACCION — American for Community Co-operation in Other Nations
- CBE — Commercial Bank of Ethiopia
- CR — Credit Risk
- CRM — Credit Risk Management
- DBE — Development Bank of Ethiopia
- FIs — Financial Institutions
- GAAP — Generally Accepted Accounting Principles
- IFRS — International Financial reporting standard
- MFIs — Micro-Finance Institutions
- NBE — National Bank of Ethiopia
- NGO — Nongovernmental organizations

CHAPTER ONE: INTRODUCTION

1.1. Background of the Study

Financial institutions (FIs) are very important in any economy. Their role is similar to that of blood arteries in the human body, because financial institutions (FIs) pump financial resources for economic growth from the depositories to where they are required (Shanmugan and Bourke, 1990). Micro-Finance Institutions (MFIs) are Financial Institution (FIs) and are key providers of finance to the economy. They play even a most critical role to emergent economies where borrowers have no access to capital markets (Greuning and Bratanovic, 2003). There is evidence that well-functioning MFIs accelerate economic growth, while poorly functioning MFIs impede economic progress and exacerbate poverty (Chijoriga, 1997; Santomero, 1997; BrownBridge and Harvey, 1998; Kimei, 1998; Basel, 1999, Basel, 2004).

MFIs face various risks that can be categorized into three groups; financial [with credit risk (CR) being a component], operational and strategic (Cornett and Saunders, 1999). These risks have different impact on the performance of MFIs. The magnitude and the level of loss caused by CR compared to others are severe to cause failures (Chijoriga, 1997). Various researchers have studied reasons behind financial institutions problems and identified several factors (Chijoriga, 1997; Santomero, 1997; BrownBridge and Harvey, 1998; Kimei, 1998; Basel, 1999, Basel, 2004). Credit problems, especially weakness in credit risk management (CRM), have been identified to be a part of the major reasons behind micro financing difficulties. Poor loan quality has its roots in the information processing mechanism. BrownBridge and Harvey (1998) observed that these

problems are at their acute stage in developing countries. The problem often begins right at the loan application stage (Liuksila, 1996) and increases further at the loan approval, monitoring and controlling stages, especially when CRM guidelines in terms of policy and strategies/procedures for credit processing do not exist or weak or incomplete.

Lending has been, and still is, the basis of micro finance institutions business, and this is more true to rising economies like Ethiopia where capital markets are not yet developed. CRM is very essential to optimizing the performance of MFIs. Recognizing this importance, this paper focuses on investigating the credit risk and management system of MFIs operating in Ethiopia,

1.2. Statement of the Problem

What motivates the researcher to conduct the research on *Determinants and Management of Credit risk of Micro Finance Institutions: Empirical Study on Selected MFIs in Ethiopia* is, credit risk is always treated as the major risk inherent in financial institution activities. In addition to this, if the risk is not well managed, credit risk may pull the financial institutions into great trouble or even bankruptcy, which can be proved by various financial sector failure cases in the world (see the The Corposol/Finansol Crisis[1]on the appendix 3).

According to the National Bank of Ethiopia report of 2009/2010, the number of microfinance institutions (MFIs) operating in the country reached 30 and currently with

[1] Maria Eugenia Iglesias and Carlos, "Castello, Corposol/Finansol" in Establishing a Microfinance Industry, Craig Churchill (Ed.), p.14-18

the addition of Somali credit and saving institutions their number increased to 31. Their total capital also increased by 36.7 percent to Birr 2.4 million compared to last year. Similarly, their deposit mobilization and credit provision increased by 26.7 and 18.0 percent respectively indicating the growing role of microfinance institutions. Mirroring their expanded activities, total assets of MFIs rose by 20.2 percent and reached Birr 8.0 billion at the end of fiscal year 2009/10 from Birr 6.6 billion last year. In relation with this, is it believable that as the number of the clients or borrowers and credit provision increased the occurrence of low quality loan and default risk also will increase.

Therefore, establishing an appropriate credit risk management must be the main aspect MFIs' operations in addition to lending and taking a deposit. Additionally, MFIs have to operate under a sound credit granting process, maintain an appropriate credit administration, measure, and monitor process ensuring adequate controls over credit risk.

As per the empirical evidence there are no more researches are conducted on the credit risk management aspects of MFIs rather than most of the researchers focus on Banks' credit risk management. However, for MFIs managing credit risk is not a simple task since comprehensive considerations and practices are needed for identifying, measuring, controlling and minimizing credit risk. Therefore, this research focused no examining the credit risk of Micro–Finance Institutions and the management aspect of credit risk by them and finally applicable recommendations and/or suggestions that decrease the credit risk exposure of Micro-Finance Institutions in Ethiopia will be forwarded.

1.3. Objective of the Study

I. General Objective

Credit risk is one of the oldest and most important forms of risk faced by Micro-Finance Institutions as financial intermediaries. Since this risk carries the potential of wiping out enough of a MFIs' capital to force it into bankruptcy. Therefore, managing this kind of risk has always been one of the predominant challenges in running a Micro-Finance Institutions. Therefore, the general objective of this thesis focused on the credit risk and management of credit risk of major Ethiopian MFIs and an entire review of the management techniques and practices on credit risk management.

II. Specific Objective

In harmonious with the above general objective, this research intended to achieve the following specific objectives;

- To determine Micro-Finance Institutions credit risk exposure,
- To determine the determinants of credit risk of Micro-Finance Institutions in Ethiopia
- To examine the application of the elements of credit risk management in the management of credit in microfinance institutions in Ethiopia
- To examine loan portfolio management strategies in Micro finance institutions
- To explore factors that cause credit risk for MFIs, and
- Finally to come up with recommendations that will lead to effective credit risk management practices in MFIs in Ethiopia

1.4. Research Questions /hypothesis

Based on some reviewed literatures, the following hypotheses were forwarded:

Hypothesis 1: Management efficiency, size of total assets, and regulatory capital has negative impact on credit risk

Hypothesis 2: Loan loss provisions, average loan per borrowers leverage and proportion of loan to deposit have positive contribution to credit risk

In addition to the above hypothesis researcher intended to answer the following questions;

1. Are Ethiopian Micro-Finance Institution exposed to credit risk?
2. What are the factors influencing the credit risk of Micro-Finance Institutions in Ethiopia?
3. What techniques do MFIs adopt to manage their credit risk currently?
4. What are the main factors that cause credit risk for Ethiopia Micro Finance Institutions?
5. Have Micro-Finance Institutions' current credit risk management practices satisfied the requirements of NBE on credit risk management guideline?

1.5. Significance of the Study

This thesis research is expected to have a great contribution in many aspects of different MFIs in Ethiopia. Some of them are listed below:

For Micro-Finance Institutions

- Help to know the extent of their exposure toward credit risk
- Understand the causes of default by the clients
- To see the gap between the international requirement and their credit management systems
- To take measures that decrease the probability of the occurrence of credit risk of MFIs based on the recommendations that will be forwarded

For the Clients of MFIs

- To understand what conditions will fail them from loan payment
- To know the MFIs credit management system and to go in harmonious with NBE's requirements
- To be cooperative in minimizing the credit risk and increase the performance of Micro-Finance Institution. Thereby, they will be beneficiary from the MFIs

For the Researchers

In addition to the above contributions to the MFIs as well as their clients, this research paper also serve as a blue print for the researchers who intend to conduct a research on this or related title.

1.6. Conceptual Framework

Based on the literature discuss on chapter two the conceptual framework for this study is presented like this.

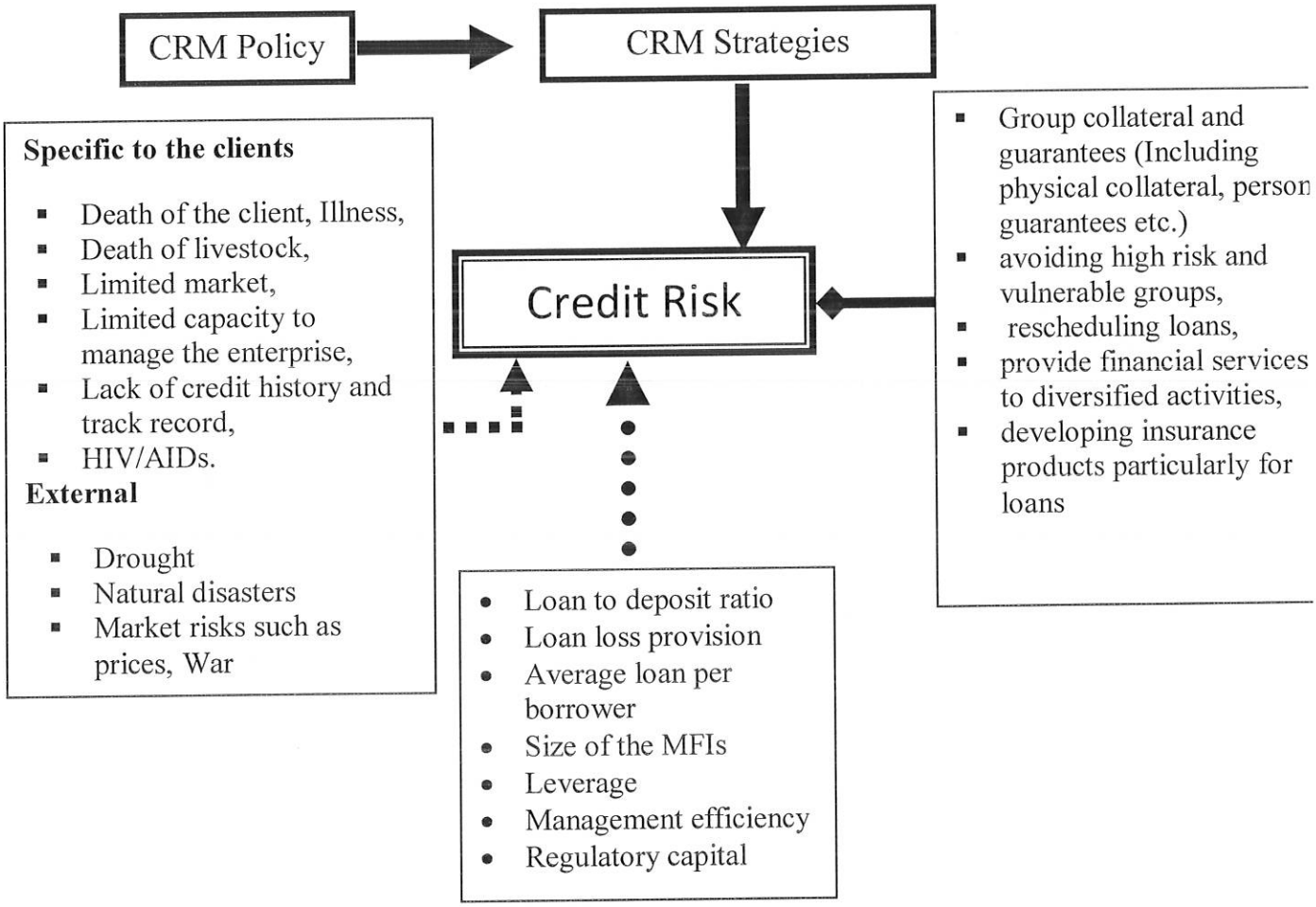


Figure 1. Conceptual framework

Key: Determinants of credit risk

Causes of credit risk

Mechanisms to minimize credit risk

Source: Compiled from different literatures

1.7. Delimitation of the study

It is important to identify the major focus of the study and to ensure that it is comprehensively dealt with. Therefore, to make the research more feasible and affordable it is better to delimit the scope of the research.

Therefore, this research is delimited on two main aspects of Micro-Finance Institution in Ethiopia. That are, the determinant of credit risk exposure of MFIs and the management system of credit risk of ten selected micro finance institution (i.e. Amhara Credit and Saving Institutions S.C (ACSI), Addis Credit and saving Institutions S.C (ADCSI), Benshangul Gumuz MIcrofinance S.C, Dedebit Credit and saving Institutions S.C (DECSI), , Oromia Credit and saving S.C (Ocssco), Omo MIcrofinance S.C, Poverty eradication and Community Empowerment Microfinance Institutions S.c (PEACE), Specialized Financial and Promotional Institutions S.C (SFPI), Wasasa MIcrofinance S.C, Wisdom MIcrofinance S.C)

1.8. Definition of key terms

According to this research paper the key terms and their definitions are;

Credit risk: Credit Risk is the risk to earnings or capital due to borrowers' late and nonpayment of loan obligations. Credit risk includes both transaction risk and portfolio risk. Transaction Risk refers to the risk in individual loans and Portfolio Risk refers to the risk inherent in the composition of the overall loan portfolio.

Micro finance institutions: Microfinance is the provision of a broad range of financial services such as deposits, loans, payment services, money transfers and

insurance products to the Poor and Low-Income Households, for their Micro-Enterprises and Small Businesses, to enable them to raise their income levels and improve their living standards. In addition there are mostly known as credit and saving unions.

1.9. Organization of the paper

This paper is organized in five broad categories (chapter), the first chapter deals about the introduction of the study that is background, statement of the problem, objective, significance, and the research question (hypothesis). The second chapter discusses the theoretical and empirical literatures about credit risk. The third chapter is about the methodology of the research that is the research design, sampling technique, method of data analysis and so on. Fourthly, then paper contain the findings of this paper that is the quantitative and qualitative data analysis part. Finally the fifth chapter deals with the summary, conclusion and recommendations made by the researcher.

1.10. Limitation of the study

As it is well understood that most of firms in developing country do not keep records of their financial statements in appropriate way; based on the IFRS or GAAP standard of accounting, consistently, and timely manner. Thereby, besides analyzing and interpreting the data firstly it becomes a hindering factor to search for reliable data that will give a meaningful result, which takes the largest time in this study. That was the main problem in this study.

CHAPTER TWO: LITERATURE REVIEW

2.1. Overview of Finance in Ethiopia

2.1.1. Classification

Ethiopian financial system can be categorized in to two forms that are formal and informal finance.

2.1.1.1. Formal

The formal sources are financial institutions that are set up legally and engaged in the provision of credit and mobilization of savings. These institutions are regulated and controlled by the National Bank of Ethiopia. In the Ethiopian context formal financial sector includes National Bank of Ethiopia, commercial banks (owned by private and public), Development Bank of Ethiopia, credit and savings institutions, insurance companies (both public and private) and microfinance institutions (owned by regional governments, NGOs, associations and individuals) (NBE, 2009/2010).

2.1.1.2. Informal

A study by the NBE (1996) concluded that "Commercial Bank of Ethiopia (CBE) and Development Bank of Ethiopia (DBE) have only catered for insignificant demand for credit of small farmers. The bulk of financial services provided to small and micro-enterprises in rural and urban areas, therefore, mostly originated from the informal sector such as Iqqub, moneylenders and friends" (NBE, 1996).

On the other hand, as Sisay Yehuala (2008) coated from Dejene (2003) stated the non-formal sources in Ethiopia include relatives and friends, moneylenders, neighbors, Iddir,

Iqqub and Mahaber. The major sources of loans include friends and relatives (66 percent), moneylenders (14 percent), and Iddir (7 percent).

2.1.2. Microfinance Regulation in Ethiopia

The regulatory framework includes the proclamation 40/1996 and the 12 directives of the National Bank of Ethiopia (NBE). NBE (proclamation No. 83/1994) has the authority to license and supervise, and regulate banks, insurance companies and other financial institutions The Proclamation includes foreign nationals (banks) from involving in banking business

- **Entry to the microfinance industry and ownership**
  - Minimum paid up capital of Birr 200,000 (the MFIs deliver loans much higher than this)
  - The MFIs should be fully owned by Ethiopians
  - An MFI should be established as share company (it attempts to create business like shareholders), however, there is no private capital in the industry
- **Clear criteria of selecting officers and directors of board of the MFI**
  - Board members should have the educational level of high school complete
  - CEO of MFI should have at least first degree with minimum of three years experience in senior post in a financial institution
- **Operational modality**
  - The practitioners understand that the law only allows group guarantee
  - Loan ceiling of 5,000 Birr
  - Loan term of maximum 12 months

- **Interest rate**
  - Removed the lending interest rate
  - The minimum interest rate for saving was set 6%
- **Reporting**
  - Submit quarterly reports of income statement, balance sheets, reports on loan, savings, and provisioning to the NBE
  - Annual external audits are required in each MFI
- **Branching out**
  - Inform the NBE on opening new branch
  - MFIs can only close a branch after obtaining approval from the NBE
- **Taxable status**
  - There is no clear government directive on tax exemption for MFIs
- **Re-registration**
  - MFIs should register when the saving mobilized reached Birr 1,000,000
- **Supervision**
  - Off-site supervision by NBE
  - On-site supervision by NBE
  - The methods used to supervise banks and MFIs by the NBE is the same Comparing the Ethiopian Legal Framework with other countries
  - Difficult to compare with other countries

In addition to these the National Bank of Ethiopia pursuant to the power vested in it by article 41 of the Monetary and Banking Proclamation and article 25 of the Licensing and

Supervision of the Business of Micro-financing Institutions Proclamation No. 40/1996, Micro-finance institutions shall predominantly make credit available on the basis of group guarantee and to borrowers who have joined a membership arrangement. However, they may also lend on a limited scale to non-members on the basis of physical or other collateral.

For the purpose of provisioning, micro-finance institutions shall classify non-performing loans into the following three categories on the basis of number of days past due.

Category	Past due	Number of days
i)	Substandard	91-180 days
ii)	Doubtful	181-365 days
iii)	Loss	Over 365 days

Micro-finance institutions shall hold the following minimum provisions against each category of non-performing loans.

Category Minimum Requirement

i) Substandard: 25% of the outstanding balance

ii) Doubtful: 50% of the outstanding balance

iii) Loss: 100% of the outstanding balance

2.2. MFIs lending strategy

Several different types of microfinance lending are employed throughout the world. Despite the different approaches, all of the institutions work toward the same goal: the reduction of poverty and the promotion of economic growth (Crabb and Keller, 2006). The first approach is individual lending. It is the provision of credit to individuals who are not members of a group that is jointly responsible for loan repayment. Each loan is

specifically tailored to the individual and business involved. This approach tends to work best when used with larger urban businesses or small rural farmers, since collateral is generally required. Also, the personal nature of the relationship between the bank and the borrower often results in repeated transactions over a long period of time Crabb and Keller (2006).

A second microfinance model is group lending a strategy initially developed by the Grameen Bank of Bangladesh (Crabb and Keller, 2006). It was designed to serve rural and landless women who wish to finance income generating activities. The general approach is as follows: Small groups of four to seven unrelated individuals are formed. Before receiving any loans, each member is required to contribute savings for 1 to 2 months and continue saving throughout the duration of the loan. Additional requirements for loans include prompt repayment, mandatory weekly meetings, and pre credit orientation and assistance. After these conditions are satisfied, the credit officer loans money to two individuals. No further lending occurs until the initial loans are repaid. The same process occurs for the remaining members of the group. This model is especially effective at reaching out to women from low income groups, since borrowers do not need collateral. Instead, the other members of the group guarantee and are responsible for the loans to all members of the group. In addition, the savings of the group is managed by the group and can be loaned. The Ethiopian micro finance institutions also provide these two types of lending mainly (Wolday Amha, 2009).

2.3. Credit and Credit Risk

Since the topic of this thesis is credit risk and management in Micro Finance Institutions. In order to understand credit risk management, knowledge of credit and credit process should first be acquired.

2.3.1. Credit

Credit is defined by the Economist Dictionary of Economics as "the use or possession of goods or services without immediate payment" and it "enables a producer to bridge the gap between the production and sale of goods" and "virtually all exchange in manufacturing, industry and services is conducted on credit" (Colquitt, 2007, P-2).

Consequently, credit generates debt that a party owes the other. The former is called a debtor or borrower. The latter is a creditor or lender. Certainly the debtor will have to pay an extra amount of money for delaying the payment. In that circle, both debtor and creditor expect a return which is worth their paying more and waiting, respectively.

So now it is clear why credit exists and how important it is to the economy. Firms or individuals that run short of capital need credit to continue or expand their businesses/investments. The ones that have excess money, on the other hand, never want to keep it in the safes. As a result, all are growing and making more money.

In financial institutions specifically, two primary kinds of credit services based on customer categories are offered: retail credit and wholesale credit. Lending in retail or personal services are subject to individuals and may fall under: home mortgages,

installment loans (e.g. consumer loans, educational loans, auto loans...), credit card revolving loans, revolving credits (e.g. overdrafts), etc (Crouhy et al., 2006).

Wholesale lending, on the other hand, involves firms as the borrowers and therefore is of much higher value, more complicated and poses more threats to the banks.

2.3.2. Credit risk

Basically, it is understandable that credit risk occurs when the debtor cannot repay part or whole of the debt to the creditor as agreed in the mutual contract. More formally, "credit risk arises whenever a lender is exposed to loss from a borrower, counterparty, or an obligor who fails to honor their debt obligation as they have agreed or contracted". This loss may derive from deterioration in the counterparty's credit quality, which consequently leads to a loss to the value of the debt. Colquitt (2007, P-1) or in the worst case, the borrower *defaults* when he/she is unwilling or unable to fulfill the obligations.

In MFIs, credit failures are not rare and they critically affect the MFI's liquidity, cash flows and eventually, profit and shareholders' dividends. Financial institutions call them *'bad debts'*.

Again it is necessary to stress that credit risk has always been the biggest threat to any bank's performance and "the principal cause of bank failures" (Greuning & Bratanovic 2009). Therefore, a sound credit risk management framework is indispensable to a healthy and profitable banking institution.

2.4. Credit Risk Management

As MFIs play an increasingly important role in local financial economies and compete for customers and resources, the rewards of good performance and costs of poor performance are rising. Those MFIs that manage risk effectively creating the systematic approach that applies across product lines and activities and considers the aggregate impact or probability of risks are less likely to be surprised by unexpected losses (down-side risk) and more likely to build market credibility and capitalize on new opportunities (up-side risk).

The core of risk management is making educated decisions about how much risk to tolerate, how to mitigate those that cannot be tolerated, and how to manage the real risks that are part of the business. For MFIs that evaluate their performance on both financial and social objectives, those decisions can be more challenging than for an institution driven solely by profit. A risk management framework allows senior managers and directors to make conscious decisions about risk, to identify the most cost-effective approaches to manage those risks, and to cultivate an internal culture that rewards good risk management without discouraging risk-taking.

According to GTZ (2000) more sophisticated approaches to risk management are important to MFIs for several reasons. Many MFIs have grown rapidly, serving more customers and larger geographic areas, and offering a wider range of financial services and products. Their internal risk management systems are often a step or two behind the scale and scope of their activities. Second, to fuel their lending growth, MFIs increasingly rely on market-driven sources of funds, whether from outside investors or from local

deposits and member savings. Preserving access to those funding sources will require maintaining good financial performance and avoiding unexpected losses. Third, the organizational structures and operating environments of MFIs can provide unique challenges. They may be very decentralized or too centralized (both can be a risk), tend to be labor- and transaction-intensive, have concentration risk in certain regions or sectors (e.g., agriculture) due to their mission, and often operate in volatile and less mature financial markets. Finally, MFIs are striving for financial viability through cost-effective and efficient operations, making effective risk management essential to achieving better capital and cash management without undue risk. In relation to this some of the mechanisms that ca n help the Ethiopian micro finance institutions to overcome their credit risk are discussed below.

2.4.1. Components of credit risk management

A typical Credit risk management framework in a financial institution may be broadly categorized into the following main components (State Bank of Pakistan, 2000, p 5).that are; Board and senior Management's Oversight, Organizational structure, Systems and procedures for identification, acceptance, measurement, monitoring and control risks. On the other hand NBE (2010) has also stated the above components of credit risk management in its guideline for Ethiopian MFIs credit risk.

I. Board and Senior Management's Oversight

According to NBE, (2010) the board of directors has the critical role and ultimate responsibility for reviewing and approving a microfinance institution's credit risk strategy and policies. Each microfinance institution should develop a strategy that sets the

objectives of its credit-granting activities and adopts the necessary policies and procedures for conducting such activities.

The board should ensure that it: first has approves broad business strategies and policies that govern or influence the management of credit risk of the microfinance institution. Second have sets out the microfinance institutions' tolerance for credit risk in the context of types of credits, economic sectors, geographical locations, currencies, and maturities[2]; thirdly has to establishes goals for credit quality, earnings and growth; fourthly has to establishes clear levels of delegation within the credit risk management function; fifth has to ensures that senior management as well as individuals responsible for credit risk management posses sound expertise and knowledge to accomplish the credit risk management function; sixth has to ensures that the microfinance institution's management adopts appropriate plans and procedures for credit risk management; seventh has to ensures that credit risk is adequately measured, monitored and controlled and effectively communicates the strategies and policies to all relevant microfinance institutions personnel; eighth has periodically re-evaluate significant credit risk management policies as well as overall business strategies that affect the credit risk exposure of the microfinance institution.

The board of directors is also responsible for monitoring compliance with the credit risk management strategy. This is usually accomplished through periodic reporting of

[2] Types of credit might also include identify target markets and the overall characteristics the microfinance institution seeks in its credit portfolio (including levels of diversification and concentration tolerances.

management and internal auditors. The reports must provide sufficient information to satisfy the board of directors that a microfinance institution is complying with its credit risk management policies and NBE directives. The board should review loans in line with NBE directives on provisions.

Moreover, the Board of Directors should: Ensure that internal audit reviews the credit operations to assess whether or not the institutions policies and procedures are adequate and being addressed to; require independent reviews of credit operations to assess whether the microfinance institution's policies and procedures are being properly followed on ongoing basis; review exposures and policies regarding credit to related parties as defined by the NBE directives; review exposures and policies regarding credit to corporations or other legal entities controlled by the microfinance institution through ownership or management structure; review all credit exposures that are in excess of the credit approval authority delegated to management; review all restructured exposures; review trends in portfolio quality and the adequacy of the microfinance institution's provision for credit losses; specify the content and frequency of management reports to the board on credit risk management; and Ensure compliance with all relevant regulations and NBE directives.

The board is also responsible for the selection and retention of senior management capable of managing the credit activities of the microfinance institution and seeing that such activities are performed within the NBE regulations, the risk strategy, policies and tolerances approved by the board.

II. Organizational Structure

According to State Bank of Pakistan, (2000, p 5) in order to maintain MFI's overall credit risk exposure within the parameters set by the board of directors, the importance of a sound risk management structure is second to none. While the banks may choose different structures, it is important that such structure should be commensurate with institution's size, complexity and diversification of its activities. It must facilitate effective management oversight and proper execution of credit risk management and control processes.

Each micro finance institutions, depending upon its size, should constitute a Credit Risk Management Committee (CRMC), ideally comprising of head of credit risk management Department, credit department and treasury. This committee reporting to MFI's risk management committee should be empowered to oversee credit risk taking activities and overall credit risk management function. The CRMC should be mainly responsible for; The implementation of the credit risk policy / strategy approved by the Board, Monitor credit risk on a bank-wide basis and ensure compliance with limits approved by the Board, Recommend to the Board, for its approval, clear policies on standards for presentation of credit proposals, financial covenants, rating standards and benchmarks, and Decide delegation of credit approving powers, prudential limits on large credit exposures, standards for loan collateral, portfolio management, loan review mechanism, risk concentrations, risk monitoring and evaluation, pricing of loans, provisioning, regulatory/legal compliance, etc.

Further, to maintain credit discipline and to enunciate credit risk management and control process there should be a separate function independent of loan origination function. Credit policy formulation, credit limit setting, monitoring of credit exceptions / exposures and review /monitoring of documentation are functions that should be performed independently of the loan origination function. For small banks where it might not be feasible to establish such structural hierarchy, there should be adequate compensating measures to maintain credit discipline introduce adequate checks and balances and standards to address potential conflicts of interest. Ideally, the banks should institute a Credit Risk Management Department (CRMD). Typical functions of CRMD include: To follow a holistic approach in management of risks inherent in banks portfolio and ensure the risks remain within the boundaries established by the Board or Credit Risk Management Committee, The department also ensures that business lines comply with risk parameters and prudential limits established by the Board or CRMC, Establish systems and procedures relating to risk identification, Management Information System, monitoring of loan / investment portfolio quality and early warning. The department would work out remedial measure when deficiencies/problems are identified, and The Department should undertake portfolio evaluations and conduct comprehensive studies on the environment to test the resilience of the loan portfolio (State Bank of Pakistan, 2000, p-6).

Notwithstanding the need for a separate or independent oversight, the front office or loan origination function should be cognizant of credit risk, and maintain high level of credit discipline and standards in pursuit of business opportunities.

III. Systems and Procedures

1. Credit Origination

According to State Bank of Pakistan, (2000) MFIs must operate within a sound and well-defined criteria for new credits as well as the expansion of existing credits. Credits should be extended within the target markets and lending strategy of the institution. Before allowing a credit facility, the bank must make an assessment of risk profile of the customer/transaction. This may include; Credit assessment of the borrower's industry, and macro economic factors, the purpose of credit and source of repayment, the track record /repayment history of borrower, Assess/evaluate the repayment capacity of the borrower, The Proposed terms and conditions and covenants, and Adequacy and enforceability of collaterals, Approval from appropriate authority.

In case of new relationships consideration should be given to the integrity and repute of the borrowers or counter party as well as its legal capacity to assume the liability. Prior to entering into any new credit relationship the banks must become familiar with the borrower or counter party and be confident that they are dealing with individual or organization of sound repute and credit worthiness. However, a bank must not grant credit simply on the basis of the fact that the borrower is perceived to be highly reputable i.e. name lending should be discouraged.

While structuring credit facilities institutions should appraise the amount and timing of the cash flows as well as the financial position of the borrower and intended purpose of the funds. It is utmost important that due consideration should be given to the risk reward trade –off in granting a credit facility and credit should be priced to cover all embedded

costs. Relevant terms and conditions should be laid down to protect the institution's interest.

Institutions have to make sure that the credit is used for the purpose it was borrowed. Where the obligor has utilized funds for purposes not shown in the original proposal, institutions should take steps to determine the implications on creditworthiness. In case of corporate loans where borrower own group of companies such diligence becomes more important. Institutions should classify such connected companies and conduct credit assessment on consolidated/group basis.

In loan syndication, generally most of the credit assessment and analysis is done by the lead institution. While such information is important, institutions should not over rely on that. All syndicate participants should perform their own independent analysis and review of syndicate terms.

Institution should not over rely on collaterals/covenant. Although the importance of collaterals held against loan is beyond any doubt, yet these should be considered as a buffer providing protection in case of default, primary focus should be on obligor's debt servicing ability and reputation in the market.

2. Limit setting

NBE (2010) stated that an important element of credit risk management is to establish exposure limits for single obligors and group of connected obligors. Institutions are expected to develop their own limit structure while remaining within the exposure limits. The size of the limits should be based on the credit strength of the obligor, genuine

requirement of credit, economic conditions and the institution's risk tolerance. Appropriate limits should be set for respective products and activities. Institutions may establish limits for a specific industry, economic sector or geographic regions to avoid concentration risk.

Sometimes, the obligor may want to share its facility limits with its related companies. Institutions should review such arrangements and impose necessary limits if the transactions are frequent and significant. Credit limits should be reviewed regularly at least annually or more frequently if obligor's credit quality deteriorates. All requests of increase in credit limits should be substantiated.

3. Credit Administration

Ongoing administration of the credit portfolio is an essential part of the credit process. Credit administration function is basically a back office activity that support and control extension and maintenance of credit State Bank of Pakistan (2000) and NBE (2010). A typical credit administration unit performs following functions:

a. **Documentation.** It is the responsibility of credit administration to ensure completeness of documentation (loan agreements, guarantees, transfer of title of collaterals etc) in accordance with approved terms and conditions. Outstanding documents should be tracked and followed up to ensure execution and receipt.

b. **Credit Disbursement**. The credit administration function should ensure that the loan application has proper approval before entering facility limits into computer systems. Disbursement should be effected only after completion of covenants, and

receipt of collateral holdings. In case of exceptions necessary approval should be obtained from competent authorities.

c. **Credit monitoring**. After the loan is approved and draw down allowed, the loan should be continuously watched over. These include keeping track of borrowers' compliance with credit terms, identifying early signs of irregularity, conducting periodic valuation of collateral and monitoring timely repayments.

d. **Loan Repayment.** The obligors should be communicated ahead of time as and when the principal/markup installment becomes due. Any exceptions such as non-payment or late payment should be tagged and communicated to the management. Proper records and updates should also be made after receipt.

e. **Maintenance of Credit Files**. Institutions should devise procedural guidelines and standards for maintenance of credit files. The credit files not only include all correspondence with the borrower but should also contain sufficient information necessary to assess financial health of the borrower and its repayment performance. It need not mention that information should be filed in organized way so that external / internal auditors or SBP inspector could review it easily.

f. **Collateral and Security Documents.** Institutions should ensure that all security documents are kept in a fireproof safe under dual control. Registers for documents should be maintained to keep track of their movement. Procedures should also be established to track and review relevant insurance coverage for certain facilities/collateral. Physical checks on security documents should be conducted on a regular basis.

While in small Institutions it may not be cost effective to institute a separate credit administrative set-up, it is important that in such institutions individuals performing sensitive functions such as custody of key documents, wiring out funds, entering limits into system, etc., should report to managers who are independent of business origination and credit approval process.

2.4.2. Measuring Credit Risk

Even if due to the less severity and capacity of the institutions, micro finance does not measure their credit risk quantitatively however it is better to discuss how credit risk can be measure and thereby managed. As Xiuzhu (2007) quoted from Fabozzi (2006), measuring risk is always a crucial part in risk management process and by quantifying credit risk can be complicated due to the lack of sufficient historical data, the diversity of involved borrowers and the variety in default causes. With the dramatic development of technology, credit risk measurement evolves greatly during the last 20 years.

In the following, the fundamentals of credit risk measuring and the three categories of methods for credit risk measurement credit rating, credit scoring and credit modeling will be explained.

2.4.2.1. Fundamentals of Credit Risk Measurement

Generally speaking, measuring risk is about trying to obtain some measures of the dispersion of possible future outcomes, and in practice, the focus is usually on the downside outcomes (Lowe 2002). The credit risk in banks should be measured by size as well as scope of the exposure, and as pointed out by Lowe (2002), all kinds of credit risk

measuring approaches comprise of four common building blocks, including the probabilities of borrowers defaulting (PDs), the correlation of PDs across borrowers, the possible loss in the event of default (LGD) and the correlation between PDs and LGD. Based on these elements, the approaches may differ in assumptions and modeling methodologies.

2.4.2.2. Credit Risk Rating

A credit rating is for assessing the creditworthiness of an individual or corporation to predict the probability of default, which is based on the financial history and current assets and liabilities of the subject. As Xiuzhu (2007) quoted and mentioned by the Federal Reserve (1998), credit risk ratings may reflect not only the likelihood or severity of loss but also the variability of loss over time.

2.4.2.3. Internal Credit Ratings

A consistent and meaningful internal risk rating system can be a useful means for differentiating the degree of credit risk in loans and other sources of exposure (Basel 1999a). The internal credit ratings of banks are becoming increasingly important since the recommendations, as per the latest Basel II accord (Basel 2006), emphasize the adoption of robust internal credit rating system for risk assessment and buffer capital calculation, which will certainly encourage and lead banks to further development in this method.

2.4.2.4. External Credit Ratings

Standardized approach to credit risk of Basel II accord (Basel 2006), banks are allowed to slot assets into weighting bands according to ratings from eligible external agencies (Jackson, 2001), and it is quite possible that the future role of external ratings will keep on expanding.

2.4.2.5. Credit Scoring Systems

Credit-scoring approaches, as quoted by Xiuzhu (2007) and stated by Reto (2003), can be found in virtually all types of credit analysis and share the same concept with credit ratings. A credit scoring system determines points for each pre identified factor, which are combined to predict the loss probability and the recovery rate. According to Altman and Saunders (1998), there are two types of accounting based credit-scoring system in banks univariate and multivariate. The first one can be used to compare various key accounting ratios of potential borrowers with industry or group norms while in the latter one, key accounting variables are combined and weighted for producing a credit risk score or a probability of default measure, which if higher that a benchmark, indicates a rejection to the loan applicant or a further scrutiny.

2.4.2.6. Credit Risk Modeling

According to Basel (1999b), credit risk models attempt to aid banks in quantifying, aggregating and managing credit risk across geographical and product lines, and the outputs can be very important to banks' risk management as well as economic capital assignment. Those models, despite of the possible differences in assumptions, share the common purpose to forecast the probability distribution function of losses that may arise

from a bank's credit portfolio (Lopez and Saidenberg 1999). And regarding the potential benefits from the application of credit risk models in banking sectors, Basel (1999b) has concluded that they are responsive and informative tools offering banks "a framework for examining credit risk in a timely manner, centralizing data on global exposures and analyzing marginal and absolute contributions to risk".

2.5. EMPIRICAL LITERATURE REVIEW

2.5.1. Introduction

As Alemayehu (2008) qoated from (IFAD 2001), initially, micro credit started as a government and non-government organizations motivated scheme. Following the 1984/85 severe drought and famine, many NGOs started to provide micro credit along with their relief activities although this was on a limited scale and not in a sustained manner in Ethiopia.

Micha'el (2006) find that the repayment rate of microfinance credit in the city of Addis Ababa has decreased considerably and averaged around 69 percent of the total loans due per year. And in the other hand many people agree that the initial success of MFIs can be largely attributed to the management of credit risks.

Successful MFIs have managed to maintain high levels of loan recovery rates, generally over 95%. These remarkably high loan recovery ratios triggered the initial wave of funds from funding agencies and the subsequent inflow from a variety of social investors which they could use to expand their operations. While many successful MFIs continue to contain credit risks within desired levels, they face greater challenges than before as

indicated by the increased volatility of their portfolio at- risk (PAR) ratios. The sources of these challenges include increased competition in the market, addition of new credit products with longer-term structures, shift to individual lending, increased scale of operations, and geographical expansion and efforts to deepen the outreach (Nimal, 2008). Credit risk also has other dimensions. Initially, microfinance credit risk was assumed to have been confined almost entirely to risk associated with the possible default by borrowers of MFIs. This is reflected in the definition of credit risk as "the risk to earnings or capital due to borrowers' late and nonpayment of loan obligations."

However, a broader definition of credit risk also includes the risk of default by other financial institutions, which have payment obligations to MFIs (Bruett, 2004). This is particularly true with MFIs that continue as NGOs. Such payment obligations may arise because MFIs use those institutions as depository institutions, investment outlets, or for money transfers. Also, such risks may arise due to the agency services that MFIs provide to other financial institutions.

Aside from generally recognized default risks by clients, another type of credit risk arises when MFI clients deposit their savings in other financial institutions which are weak and not covered by a credible deposit protection scheme. Clients may not have ready access to their funds and thus lose a source of loan repayment for their MFI loan if the bank where they keep their deposits runs into difficulties (Bruett 2004). In such cases, loan recovery rates may suddenly fall.

2.5.2. Cause of Credit Risk of Micro Finance Institutions

According to Wolday (2009) the credit risk of micro finance institutions come from three different aspects. That are, internal to the MFIs, external risks and specific to the clients, and External risks involving groups of clients (covariant risks).

The internal cause of micro finance institutions are; inappropriate products, Weak targeting approaches, Limited capacity of the staff to appraise the projects of clients, Weak MIS, Limitations in the commitment and efficiency of staff, Lack of incentives to collect loans. The external risks and specific to the clients that cause credit risk are; Death of the client, Illness, Death of livestock, Limited market, Limited capacity to manage the enterprise, Lack of credit history and track record, HIV/AIDs. Finally, the external risks involving groups of clients (covariant risks) that are; Drought and natural disasters leading to crop failure, Market risks such as prices, War and political crisis (Ethio-Eritrea), Political intervention to by votes (Wolday, 2009).

Other results of the studies show the causes of credit risk of MFIs can be divided into four factors namely individual/borrowers factors, firm factors, loan factors and institutional/lender factors (Norhaziah & Mohd, 2010).

According to Norhaziah & Mohd (2010) finding, when a loan is not repaid, it may be a result of the borrowers' unwillingness and/or inability to repay. They recommend that the financial institutions should screen the borrowers and select the "good" borrowers from the "bad" borrowers and monitor the borrowers to make sure that they use the loans for the intended purpose. This is important to make sure the borrowers can pay back their

loans. Borrower's past record and economic prospects to determine whether the borrower is likely to repay or not.

Besides characters of the borrowers, collateral requirements, capacity or ability to repay and condition of the market should be considered before giving loans to the borrowers Norhaziah & Mohd (2010).

i. Individual/ Borrower Characteristics

Some authors link the repayment performance with firm characteristics such as Oke et al. (2007) mention that firm's profit significantly influenced loan repayment. Besides that, Norhaziah & Mohd (2010) raise the question of whether default is random, influenced by irregular behavior, or systematically influenced by area characteristics that determine local productions conditions or branch-level efficiency. Their study supports the idea of partial influence of area characteristics. Rural electrification, road width, primary educational infrastructure and commercial bank density are positively correlated with a low default rate as well as predicted manager's pay.

ii. Firm Characteristics

Godquin (2004) suggests that the provision of non-financial services such as training, basic literacy and health services has a positive impact on repayment performance. Roslan & Mohd Zaini (2009) found that borrowers that did not have any training in relation to their business have a higher probability to default.

Additionally, Tedeschi (2006) notes that there are two possible reasons for default: strategic default or default due to a negative economic shock. The lending contract

provides incentives to discourage strategic default, but default due to an economic shock is unavoidable. In contrast, Hulme & Mosley (1996) argue that the important factors contribute to loan repayment performance are the design features of the loan. They categorize the design features into three categories namely access methods, screening methods and incentive to repay. Access methods generally ensure that poor people access the loans not the richer people and the features include maximum loan ceilings and high interest rate. Screening methods are used to screen out bad borrowers.

However, Stearns (1995) argues that, "it is the lender not the borrower, who causes or prevents high levels of delinquency in credit programs. While, Awoke (2004), reports that most of the default arose from poor management procedures, loan diversion and unwillingness to repay loans. Therefore, the lenders must devise various institutional mechanisms that aimed to reduce the risk of loan default.

iii. Institutional/lender characteristics

A few researchers also found that loan characteristics play an important role in determining repayment performance (Roslan & Mohd Zaini, 2009; Njoku, 1997; Ugbomeh et al., 2008) found that defaults generally arise from poor program design or implementation, not from any essential problems with the borrowers.

iv. Loan characteristics

Vigenina & Kritikos (2004) find that individual lending has three elements namely the demand for non-conventional collateral, a screening procedure with combines new with

traditional elements and dynamic incentives in combination with the termination threat in case of default, which ensure high repayment rates up to 100 percent.

Roslan Abdul Hakim et al. (2007) in their study conclude that close and informal relationship between MFIs and borrowers may help in monitoring and early detection of problems that may arise in non-repayment of loans. In addition, cooperation and coordination among various agencies that provide additional support to borrowers may help them success in their business. The study compared the good practices and performance of selected MFIs in Malaysia namely; Amanah Ikhtiar Malaysia, TEKUN, Koperasi Kredit Rakyat and Bank Pertanian Malaysia.

Additionally, 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. Government owned and not-for-profit non- governmental 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 (Micha'el, 2006).

Furthermore, Befekadu, (2007) stated the following causes of credit risk for the MFIs;

- *Improper selection;*
- *Ineffective repayment enforcement mechanism;*
- *Absence of effective group pressure or collateral;*
- *Negligence of clients;*
- *Crop failure in rural areas;*

- *Sickness of the borrower or family member; and*
- *Bankruptcy in the business of clients, etc.*

2.5.3. Challenges of Micro Finance in Addressing Credit Risk

Wolday (2009) presented that the following are the challenges of Ethiopian Micro-Finance institutions to address credit risk; Lack of client awareness, Limited knowledge and understanding of the MFIs on the magnitude of the risks, Limited insurance products, Limited capacity of the MFIs and insurers to develop insurance products, Absence of a regulatory framework to provide micro-insurance. MFIs focusing on insuring credit not protecting the clients.

In addition to the above problems like; Many donors are not keen about MFIs and reluctant to fund; Less saving habits; Limited loan products; Absence of legal title of assets in rural areas; and Easy dissemination of bad mouthing (some clients are not visionary; they opt for immediate benefits in illegal way), Less willingness from commercial banks to lend to MFIs without collateral; The legal environment is not conducive enough in enforcing the loan contract; Shortage of experienced human resources; and Shortage of Logistics in rural areas such as road, telephone, etc (Befekadu, 2007) have also an indirect t relation with the probability of the occurrence of default by the borrower.

2.5.4. Risk aversion mechanisms by micro finance institutions

Wolday (2009) presented nine mechanisms for aversion of micro finance's credit risk. That are, group lending, avoiding high risk and vulnerable groups, rescheduling loans,

provide financial services to diversified activities, developing insurance products particularly for loans, Credit guarantee schemes (guarantee schemes of the regional government), Require property collateral for bigger loans, Strong follow-up and supervision, Developing saving products.

According to Dilin (2009) recommendation micro finance institutions can minimize their credit risk by using the following mechanisms;

1. Require clients to have experience as a micro entrepreneur, in order to verify the economic viability of their activities
2. Require provision for a bad debt, beginning on the first day any payment is made past due
3. Prohibit the use of collateral as part of the loan loss provisions, except for duly registered real collateral
4. Require lenders to book rescheduled loans as past due loans
5. Require that documentation in client files reflect the information generated through credit analysis, although not all documents required of large borrowers need to be

Other thing that can be used as a mechanism for reducing credit risk is group lending. Since the 1970s, group-lending programs have been promoted in many developing countries. A common characteristic of group lending is that the group obtains the loan under joint liability, so each member is made responsible for repayment of loans of his or her peers. Joint liability, but possibly more so, the threat of losing access to future credit, incites members to perform various functions, including screening of loan applicants,

monitoring the individual borrower's efforts, fortunes and shocks, and enforcing repayment of their peers' loan (Zellar, 1996).

Zeller (1996) argues that probably the most important rationale for group lending is the information and monitoring advantages that group-based financial institutions at the community level have, compared to individual contracts between a bank and borrower. Group members get important information like reputation, indebtedness and asset ownership of the loan applicants at a lower cost. They can also easily monitor individual efforts made towards ensuring repayment.

In a publication released in 2010, National bank of Ethiopia (NBE) cited a number of techniques are available to microfinance institutions to assist in the mitigation of credit risk. Group collateral and guarantees are the most commonly used. Various forms of other collateral and guarantees (Including physical collateral, personal guarantees etc.) could also be used. Notwithstanding the use of various mitigation techniques individual credits transactions should be entered into primarily on the strength of the borrower's repayment capacity. Microfinance institutions should also be mindful that the value of collateral might well be impaired by the same factors that have led to the diminished recoverability of the credit.

Microfinance institutions should have policies covering the acceptability of various forms of collateral, procedures for the ongoing valuation of such collateral, and a process to ensure that collateral is, and continues to be, enforceable and realizable. With regard to guarantees, microfinance institutions should evaluate the level of coverage being

provided in relation to the credit-quality and legal capacity of the guarantor. Microfinance institutions should be careful when making assumptions about implied support from third parties including government entities.

2.5.5. Credit Risk and Explanatory Variables

The dependent variable that is credit risk of the Micro finance is measured by NPL to total loans is taken as a proxy for credit risk. On the other hand nonperforming loan (NPLs) to loan outstanding ratio can also be an alternative indicator for measuring profit quality, which has an effect on financial sustainability of a MFIs (Befekadu, 2007).

In making loans, financial institutions face the risk that borrowers will default and the full amount of the loan will not be recovered. When a loan loss becomes likely, a FI will make a charge to the profit and loss statement ("provision") to create a loan loss reserve that is shown on the balance sheet. When the full amount of principal and interest on the loan becomes uncollectible, the loan balance is reduced through a charge to the loan loss reserve (Sarawan, 2009).

Loan loss provisioning levels and the adequacy of the reserve are only as good as the methodology used to estimate losses in the loan portfolio. A loan grading scheme assigns each loan a grade that reflects its probability of default. Loans in one of the lower credit quality grades are often referred to as "non-performing loans" (NPLs), although the

precise definition of what constitutes an NPL differs across countries and time.[3] An inadequate loan grading scheme undermines the provisioning process and leads to distortions in a bank's balance sheet and an overstatement of capital and capital ratios. Loan loss reserves should reflect not only the probability of default, but also the amount the lender can recover in case of default. An important source of repayment in such an event is collateral. As the likelihood of default increases and the assigned loan grade worsens, the value of the collateral becomes more important. More specifically, it has a direct impact on the loss that a bank suffers in the event of default and the amount for which it must provision (Sarawan, 2009).

The size of total assets which is taken as to measure the firms size have significant and negative influence on credit risk of banking (Nor and Shahrul, 2004). On the other hand management efficiency also have significant and negative influence on credit risk of banking (Nor and Shahrul, 2004)

Higher leverage should make it easier to satisfy return requirements from shareholders and at the same time provide the lowest borrowing rates for customers. Higher leverage in the microfinance industry is also important for Equity and the importance of financial leverage is the use of fixed rate financial instruments (usually debt) to raise additional

[3] For example, in some countries any loan that is delinquent more than 30 days would be considered an NPL while in other systems the designation may only apply to loans that are 90 days past due. For example in Ethiopia Substandard NPL from 91-180 days, Doubtful from 181-365 days, and Loss Over 365 days

capital to magnify the potential return on equity. Leverage is used when the ability of a business to generate return on investments is higher than the cost of debt used to finance those investments. While financial leverage can magnify return on investments, it can also harm an enterprise if the return is lower than the cost of borrowings. The extent of this effect depends on the proportion of the investment in the enterprise that is financed with debt; a higher level of debt implies higher leverage and, consequently, higher magnification of return (or loss) on equity.

In manufacturing and service organizations (other than financial enterprises banks or non-bank finance companies) leverage is measured as the debt equity ratio; the higher the debt-equity ratio, the higher the leverage. In financial enterprises, leverage is measured as the Risk-weighted Capital Adequacy Ratio (CAR). A lower CAR indicates a higher degree of leverage since equity (or owners' capital) contributes a lower proportion of funds deployed in the investments of the institution in assets that earn an income but carry risk at the same time. In certain situations, if revenue earned from assets is less than interest charges on debt, there will be a potential default. The risk of default increases with an increase in leverage Micro-Credit Ratings International Limited, (2005).

On the other hand Berger and DeYoung (1997) recommended that where higher debt has a high probability of higher credit risk from default payments of the borrowers. According to Abel, (2006) regulatory capital is the minimum capital required by the regulator. Credit risk are significantly affected by regulatory capital (Nor and Shahrul, 2004).

CHAPTER THREE: METHODOLOGY

In this part, the techniques and approaches that will be engaged in the research process discussed briefly. This includes the general research design, the research data source and descriptions of dependent and independent variables, research population, samples and sampling techniques, and method of data collection and analysis.

3.1. Research Design

Due to the objectives of this research, combined methodologies of both quantitative and qualitative approaches have been applied. The quantitative approach in this research is mainly for answering the first and second research question. From the research aims it can be seen that the focus is on reviewing the credit risk management techniques and practices among selected Ethiopian Micro finance Institutions, therefore this quantitative part of research is actually only serving as a preliminary stage work for making the whole research a little more comprehensive. In order to get a general understanding of Ethiopian MFIs' credit risk level and credit risk determinants. The researcher used the last ten years financial data of ten Micro Finance institutions for adopting a credit risk model.

As to the techniques chosen for this research, textual analysis is employed. It is believed that these methods are suitable for the research because through analyzing the relative MFIs performance reports, access to all the available information needed in the research can be gained and assessment can be made, which provides both a separate evaluation and generalization on the sample MFIs' credit risk management practices. Those outcomes are the findings about the third research question and the basis of the rest of questions. While comparisons, as already implied in the research questions, are obviously

necessary means for answering the last three research questions and possible suggestions and recommendations can also be drawn. In fact, although it is not the focus of this research, comparison also exists in descriptions of NBE guideline and the current practice of Micro Finance Institutions in managing credit risk.

3.2. Research Data Source and Description

a. Quantitative Data

The quantitative data that will be needed are eight (8) financial ratios relating mainly to MFIs' credit exposure and lending decision quality. The choice of these ratios is based on a survey of related literature on credit risk determinants (Ahmad, 2003; Hassan, 1992, 1993; Hassan et al., 1994; Shrieves and Dahl, 1997; Angbazo et al, 1998); several variables have been identified to form the regression model. Out of these eight variables one (average loan per borrower) is added by the researcher because I believed that this variable has a significant influence in creating risk of credit for the micro finance institutions. Nonperforming loan (NPL) to total loans is taken as a proxy for credit risk (Rose, 1996; Berger and DeYoung, 1997; Corsetti, Persenti and Roubini, 1998). The estimated predictors consist of seven (7) variables: Management Efficiency (ME), Leverage (LV), Regulatory Capital (RC), Loan Loss Provision (LLP), Natural Log of Total Assets (LnTA) and Proportion of Loan to Deposit (LD).

b. Qualitative Data

The qualitative data needed in this research mainly comes from the selected five MFIs credit management rules and regulations, annual and financial reports, National Bank of

Ethiopia proclamations and other published results from Associations of Ethiopian Micro-Finance Institutions. After examining all the reports, it is confirmed that they all have independent review sections on credit risk management. Those reports outline items such as the MFIs' credit risk management policies, structures, qualitative and quantitative measures for risk control together with all the relevant figures, thus they are the basis of the whole research.

3.3. Research Population

The research is intended to cover all Micro-Finance Institutions in Ethiopia which are currently in operation i.e. about 31 MFIs which have 433 branches and 598 sub branches in Ethiopia.

3.4. Sampling Technique

Selecting sampling techniques that appropriately capture the objective of the research and minimize the level of bias resulting from unrepresentative samples depend on the degree of consideration given to variables that affect sample selection techniques. The success of a sampling technique including a fair and representative sample from the sample frame depends on the characteristics of the population, the sampling unit, the data collection method, and sample size (Kahan, 2007; Freedman, 2004; Magnani, 1997).

Compared with many other countries, the Ethiopia has a smaller number of Microfinance Institutions which is attributable to the large scale of consolidation in the domestic market. However, there is dispersion between the Micro-Finance Institutions on the service experience, capital, and number of clients. For example, out of the total 2.3 million clients of all micro finance institutions in 2003 the majority of the clients (1.6

million) are served by five major Micro-Finance Institutions (i.e., ASCI, DESCI, OCSCO, ADCSI, and Wisdom serve 687,586, 412,293, 339,018, 115,563, and 56,304 respectively (Yigerem, 2010).

Furthermore, the amount of loan as well as deposit is higher than others, and the selected Micro-Finance Institutions are active in lending, and have been in operation for a relatively longer period and depending on the availability of ten years financial data the researcher purposively selected Ten (10) micro finance institutions for the quantitative data required and the above five (5) MFIs are also again selected for an interview question to collect a primary data about their credit risk management.

3.5. Data Collection Methods

Data collection method should be in accordance with the design of the research. Secondary data which can show the credit risk and the management of credit risk of Micro-Finance Institutions were reviewed from the MFIs' annual reports, financial statement, Association of Ethiopian Microfinance Institutions annual bulletin, and NBE report and proclamation on MFIs. Additionally the majority of the quantitative data used in this research is collected from the MIX market (http://www.mixmarket.org). To make the research more comprehensive and reliable an interview questions will be designed to the credit risk management officers or concerned body of selected Micro-Finance Institutions.

3.6. Data Processing and Analysis

After the collection of data, the data will be analyzed and processed in order to comprehend the qualitative and quantitative nature of the research. The quantitative data will give us the availability of credit risk exposure and determinants which have significant impact on the selected MFIs through the regression model. The qualitative data that are analyzed, in order to show the policy and practices of the micro finance institution, problems in managing credit risk, causes of credit risk and a comparison will be made to show the credit risk management of the MFIs is in accordance with the requirement of NBE.

The Model

The equation for the model used in this study is:

$$CR_{it} = \lambda_0 + \lambda_1 \mathrm{ME_{it}} + \lambda_2 \mathrm{LV_{it}} + \lambda_3 \mathrm{RC_{it}} + \lambda_4 \mathrm{LLP_{it}} + \lambda_5 \mathrm{lnTA_{it}} + \lambda_6 \mathrm{LD_{it}} + \lambda_7 \mathrm{lnALPB} + \varepsilon_{j,t}$$

Where:

- ME: Management Efficiency
- LV : Leverage
- RC: Regulatory Capital
- LLP: Loan Loss Provision
- LnTA: Natural Log of Total Assets
- LD: Loan to Deposit Ratio
- LnALPB: Natural Log of Average Loan Per Borrowers

The computations for all of the variables (dependent and explanatory) are based on the review of literature and are discussed below;

Dependent variable

- Credit Risk/CR

In order to calculate credit risk of the Micro Finance Institutions, non-performing loan for the current year to total loan of $MFIs_i$ in year t is used.

$CR_{it} = \frac{NPL}{TL}$ Where; CR is credit risk, NPL is non performing loan, and TL is total loan.

Independent variable

- **Management efficiency/ME**

There are different methods to see the efficiency level of firms' management, for this study the ratio of return to total assets of $MFIs_i$ in year t is applied by the researcher.

$ROA_{it} = \frac{NI}{TA}$ Where; ROA is return on asset, NI is net income, and TA is total assets.

- **Leverage/LV**

Firms' leverage can be computed by using different calculation (mathematical ratios). For this study the leverage is computed by dividing the total assets financed from debt source of finance to total assets financed from equity source of finance.

$LV_{it} = \frac{TD}{TE}$ Where; LV is leverage, TD is total debt, and TE is total equity.

- **Regulatory Capital/RC**

The regulatory capital for Ethiopian micro finance institution is computed as ratio of the total amount of reserve and minimum capital required by National Bank of Ethiopia (NBE) to total assets.

$RC_{\text{it}} = \frac{RCs}{TA}$ Where; RC is regulatory capital ratio, RCs is regulatory capitals, and TA is total assets.

- **Loan loss provision/LLP**

The provision for loan loss of the micro finance institutions is computed by dividing the loan loss provision to their total loan.

$LLP_{\text{it}} = \frac{LLP}{TL}$ Where; LLP is the ratio of loan loss provision to the gross loan.

- **Total assets/TA**

The value of the total assets is much larger than other variables used in this regression therefore in order to overcome this problem the researcher used natural log of total assets of MFIs_{i} in year_{t}.

- **Loan to deposit ration/LD**

$LD_{\text{it}} = \frac{TL}{TD}$Where; LD is loan to deposit ratio, TL is total loan, and TD is total deposit

3.7. Limitation of the Methodology

Even if the researcher try to adjust the model to match the Ethiopian situation however, there some variable which are not included in this model. For example, Risk-Weighted Assets (RWA) was one of the variables which are not included in this model because it is

impossible to calculate this ratio due to the absence of clear system of calculating the risky weighted assets of Ethiopian MFIs. The second variable which is not included in the model is risky sector loan exposure (RSLE). Here this ratio is calculated by using RSECT ratio which is the summation of property loans (residential properties loans + non-residential property loans + real estate loans + construction loans), purchase of securities loans, and consumption credit loans which are not well recorded by Ethiopian Micro Finance Institutions. Additionally, the funding cost was one of the determinants of credit risk but it is impossible to calculate due to the absence of exact cost of equity capital in Ethiopia.

CHAPTER FOUR: Data Presentation, Analysis and Interpretation

This chapter consists mainly two broad categories that are the presentation, analysis and interpretation of the qualitative data which are gathered through interview question and quantitative data which collected from National Bank of Ethiopia and The dataset used to conduct the econometric study is taken from the MIX market (http://www.mixmarket.org), a database that compiles information on MFIs. The mission of the MIX is to promote the exchange of information within the micro finance sector and to help create a micro finance market by offering data collection services, performance tracking tools, sector comparisons and specialized information services.

Specifically; the quantitative analysis includes, Descriptive Analysis of Explanatory variables, Correlation Analysis of the explanatory variables, and Regression analysis (Diagnosis tests, and Empirical results). The qualitative analysis discuss over, the Techniques adopt by MFIs to manage their credit risk, Factors that cause credit risk for Ethiopia Micro Finance Institutions (External versus internal factors, Borrowers versus lender characteristics, and Firm versus loan characteristics), and Fairness of current credit risk management techniques.

4.1. Descriptive Analysis of Explanatory variables

Descriptive statistics for the dependent variables involved in the regression model that are; Mean, maximum, minimum value and standard deviation of loan to deposit ratio (LD), loan Loss Provision (LLP), Natural log of Average loan per borrower (LnALPB), Leverage (LV), Management Efficiency (ME), and Regulatory Capital (RC) are

presented. These figures give overall description about explanatory variables used in the regression model.

Table 1. Descriptive Statistics of explanatory variable

	LD	LLP	LnALPB	LNTA	LV	ME	RC
Mean	3.00	0.02	2.12	7.05	2.13	0.03	0.40
Maximum	7.68	0.37	2.49	8.30	8.56	0.11	0.89
Minimum	0.45	0.00	1.70	5.37	0.13	-0.07	0.01
Std. Dev.	1.23	0.05	0.16	0.72	1.75	0.04	0.17
Observations	98	98	98	98	98	98	98

Source: E-views result

As per the above table (table 1.) the descriptive statistics of the explanatory (independent) variables for credit risk of Ethiopian Micro Finance Institutions are described below. The first explanatory variable, ratio of loan to deposit has 3, 7.68, and 0.45 of mean, maximum, and minimum value respectively. Which show a high variation between the micro finance loans from their amount of deposit that can be more supported by its highest standard deviation i.e. 1.23. Some of the MFIs lend more than 7 times of the deposit they take from their customers. These micro finance institutions have a higher demand for loan than other micro finance institutions in the industry or a lower amount of deposit that might be due to their low level interest rate or other reason. Thereby, it can be said that these micro finance institutions have high earning asset. On the other hand

some of the micro finance institutions can lend only 45% of the money they receive from the depositors. Therefore, these MFIs have large amount of non earning asset and this might be as a result of low demand for their loan (higher interest rate) or due to high amount of deposit they take. However, the industry loan to deposit ratio is three (3) which shows the majority of Ethiopian MFIs assets are earning assets that means they can lend large sum of money which exceeds the amount of deposit they take. However, this may have a negative impact on their liquidity and if they cannot manage the amount of cash on their hand it may cause a liquidity risk.

The second independent variable, loan loss provision has a mean of 0.022, a maximum of 0.37, and a minimum of 0.00 with a standard deviation of 0.05. Loan Loss Provision or LLP is a percentage (%) that reflects accumulated provision expenses (minus write-offs) and gives an indication of the management's expectation of future loan losses. It is a rough indicator of the overall quality of the portfolio, and it represents the "loan loss reserve amounts maintained by a Microfinance Institution (MFI) to offset the default risk in its total (outstanding) loan portfolio". Therefore, the above result shows that the Ethiopian micro finance institutions have the probability to incur a loss from lending activity because the minimum LLP shows almost zero percent, which means they may write off all reserve they have. This is a negative implication on the repayment performance of the lenders and the availability of higher credit risk in the micro finance institutions. However, the maximum of the micro finance's loan loss provision is 0.37 or 37%, which show some of Ethiopian micro finance institutions are incurring loss from this (lending) activity which fall under the doubtful classification (i.e. past due 180 to 365

days) Generally, the loan loss provision of the Ethiopian micro finance institutions show a positive implication, because the mean of LLP is 0.02 or 2% which mean the majority of the loan does not past away from 180 days.

Natural log of average loan per borrowers, third independent variable has 2.12, 2.49, and 1.70 mean, maximum and minimum respectively with the standard deviation of 0.161. In order to give it is better to see the raw data which is not transformed in to Log, and the data shows a minimum of 50, a maximum of 314, and a mean of 140 US dollar per borrower. Even if the maximum loan per borrower exceeds the average of African MFIs, but the mean of Ethiopian MFIs is very small which counts half of the mean of African MFIs (273 us dollar[4]).

The fourth variable is the size of the micro finance institutions that is computed as the natural log of their total assets, has a mean of 7.05, maximum 8.30 and the minimum value of 5.37 with the standard deviation of 0.72. This show Ethiopian MFIs have highest deviation in their size which can be seen from the row data which do not transform in to log have a maximum of 198,749,626, minimum of 234,274, and mean of 36,882,267 dollar. This shows a great variation on the size of Ethiopian MFIs.

Leverage, the fifth explanatory variable for MFIs' credit risk has a mean of 2.13, a maximum of 8.56, and a minimum value of 0.13 with 1.75 standard deviation. This shows some of Ethiopian micro finance institutions are highly leveraged, i.e. their total debt exceeds 8.56 times their equity source of capital. On the other hand some of the

[4] http://www.mixmarket.org/mfi/region/Africa

MFIs have financed their business from debt source of finance only 13% of the finance from equity, which show a lowest leverage risk. Generally, leverage refers to the extent to which a MFI borrows money relative to its amount of equity. In other words, it answers the question of how many additional Birrs can be mobilized from commercial sources for every Birr worth of funds owned by the MFI. The micro financing industry has financed the majority of their asset from debt source of finance that is the average of the industry leverage is 2.13 that is the capital financed from debt source of finance exhibits more than 2 times of the capital financed from equity source of finance.

The six independent variable, management efficiency has 0.03, 0.11, and -0.07 of mean, maximum and minimum value with a standard deviation of 0.17. There are different methods to evaluate the efficiency level of the management; one of these methods is return on asset (ROA) a ratio analysis method applied to this study has showed that the largest amount of return they earn for the past 10 years is 11% of the total amount of the assets which reflect the higher management efficiency in the firms. In contrary to this there was a firm has incur a loss which counts approximately 7% of the total assets which might result from low level of management to increase firm's profit. However, the industry average show a positive management efficiency that helps to earn more than 3% of the total assets invested.

Finally, the last explanatory variable is regulatory capital of the Ethiopian micro finance institutions has a minimum value of 0.01, maximum of 0.89, and a mean of 0.40 with a standard deviation of 0.17. The regulatory capital the Ethiopian micro finance institutions supposed to have accordingly the National Bank of Ethiopia directives depends on their

size; therefore this ratio shows a highest deviation. As we can see that the maximum for this ratio is 0.89 which is more larger than the minimum value that is 0.05.

4.2. Correlation Analysis of the explanatory variables

The correlation between two variables measures the degree of linear association between them. If it is stated that y and x are correlated, it means that y and x are being treated in a completely symmetrical way. Thus, it is not implied that changes in x cause changes in y, or indeed that changes in y cause changes in x. Rather, it is simply stated that there is evidence for a linear relationship between the two variables, and that movements in the two are on average related to an extent given by the correlation coefficient Chris brooks (2008, p-28).

The correlation between the explanatory variables that are; loan to deposit, natural log of total assets, leverage, management efficiency, regulatory capital, loan loss rate will be presented and analyzed bellow.

Table 2. Correlation of the Explanatory Variables

	LD	LLP	LNALPB	LNTA	LV	ME	RC
LD	1						
LLP	0.205	1					
LNALPB	-0.001	0.003	1				
LNTA	-0.266	0.073	0.550	1			
LV	-0.012	0.036	0.036	0.285	1		
ME	-0.159	-0.041	0.195	0.333	-0.092	1	
RC	0.0348	0.007	-0.124	-0.378	-0.841	-0.026	1

Source: E-view result

According to table 2. the highest correlation in the explanatory variables is 0.55 that is the correlation between size of firm and average loan balance per borrower. However, this cannot affect the regression because a correlation that does not exceed 0.80 can be tolerated since Cooper & Schindler (2009) suggested that a correlation above 0.8 between explanatory variables should be corrected for. The lowest correlation between the explanatory variables is negative 0.84 i.e. the correlation coefficient of regulatory capital and management efficiency.

Furthermore, even if the coefficient is insignificant[5], loan loss provision with loan to deposit ratio, average loan per borrower with loan loss provision, firm size with loan loss provision, firm size with average loan per borrower, leverage with loan loss provision, leverage with average loan per borrower, leverage with firm size, management efficiency with average loan per borrower, management efficiency with firm size, regulatory capital with loan to deposit ratio, and regulatory loan loss provision are positively correlated. On the other hand, average loan per borrower with loan to deposit ratio, firm size with loan to deposit ratio, leverage with loan to deposit ratio, management efficiency with loan to deposit ratio, management efficiency with loan loss provision, management efficiency with leverage, regulatory capital with average loan per borrower, regulatory capital with firm size, regulatory capital with leverage, regulatory capital with management efficiency have a negative correlation coefficient.

[5] Generally speaking all of the repressors correlation coefficient is insignificant which is less than 55%

4.3. Regression analysis

In this section regression analysis of factors that influence Credit Risk of Micro Finance institutions; loan to deposit, natural log of total assets, leverage, management efficiency, regulatory capital, loan loss rate will be presented.

According to Chris brooks (2008), if the *p*-value for the Hausman test is less than 1%, indicating that the random effects model is not appropriate and that the fixed effects specification is to be preferred. Due to this fact, after running random effect model regression, p-value for the Hausman test (appendix 1) was more than 1%, therefore running random effect model is appropriate.

4.3.1. Diagnoses tests

In order to satisfy the Classical Linear Regression Models (CLRM) assumptions, before running the regression model tests have been done to see the data are according to the assumptions. Chris brooks (2008, pp-129-130), recall that five assumptions were made relating to the classical linear regression model (CLRM). These were required to show that the estimation technique, ordinary least squares (OLS), had a number of desirable properties, and also so that hypothesis tests regarding the coefficient estimates could validly be conducted. Specifically, it was assumed that: $E(u_t)= 0$, $var(u_t)=\sigma 2<\infty$, $cov(u_i,u_j) = 0$, $cov(u_t,x_t) = 0$, and $u_t \sim N(0,\sigma^2)$ that means the average value of the errors is zero, the variance of the errors is constant, disturbance terms is that the covariance between the error terms over time (or cross sectionally, for that type of data) is zero, the regressors are

not correlated with the error term of the estimated equation, and the disturbances are normally distributed respectively.

In fact, if a constant term is included in the regression equation, the first assumption will never be violated. Since, no intercept parameter without constant term the first assumption will never be go against that means there is no potentially severe biases in the slope coefficient estimates in the regression model.

Secondly, the variance of the errors has to me constant, σ^2 this is known as the assumption of homoscedasticity. If the residuals of the regression have systematically changing variability over the sample, that is a sign of heteroscedasticity. White taste was used for general test of heteroscedasticity.

Table 3. Heteroskedasticity Test (White)

Heteroskedasticity Test: White			
F-statistic	0.949692	Prob. F(7,90)	0.4728
Obs*R-squared	6.740854	Prob. Chi-Square(7)	0.4564
Scaled explained SS	13.94389	Prob. Chi-Square(7)	0.0612

Source: E-views result

In this case, all the F-, χ^2 ('LM'), and 'Scaled explained SS' versions of the test statistic give the same conclusion that there is no evidence for the presence of heteroscedasticity, since the p-values are considerably in excess of 0.05.

Thirdly, According to Chris brooks (2008), the CLRM's disturbance terms is that the covariance between the error terms over time (or cross-sectionally, for that type of data) is zero. In other words, it is assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are 'autocorrelated' or that they are 'serially correlated'. To test this assumption the Durbin–Watson (DW) statistical test can be applied if there is a constant term in the regression, if the regressors are non-stochastic, and if the dependent variables have no lags in the regression. After seeing this condition the researcher tests the availability of autocorrelation using this method.

Table 4. Autocorrelation Test (DW Test)

	Weighted Statistics		
R-squared	0.713919	Mean dependent var	0.053581
Adjusted R-squared	0.691669	S.D. dependent var	0.026509
S.E. of regression	0.014720	Sum squared resid	0.019501
F-statistic	32.08523	Durbin-Watson stat	1.860128
Prob(F-statistic)	0.000000		
	Unweighted Statistics		
R-squared	0.713919	Mean dependent var	0.053581
Sum squared resid	0.019501	Durbin-Watson stat	1.860128

Source: E-view result

As we can see from the above-views result, the value of Durbin-Watson test shows 1.86 which is almost closer to 2, which can be concluded like; there is no autocorrelation in the residuals that satisfy the third assumption.

Fourthly, if one or more of the explanatory variables is contemporaneously correlated with the disturbance term, the OLS estimator will not even be consistent Chris brooks (2008). However, if the first assumption is satisfied this expression will be zero and therefore the estimator is still unbiased, even if the repressors' are stochastic.

Finally, assumption five require to check whether the disturbances are normally distributed or not. According Chris brooks (2008), one of the most commonly applied tests for normality is the Bera-Jarque (hereafter BJ) test. BJ uses the property of a normally distributed random variable that the entire distribution is characterized by the first two moments, the mean and the variance. If the residuals are normally distributed, the histogram should be bell-shaped and the Bera--Jarque statistic would not be significant. This means that the *p*-value given at the bottom of the normality test screen should be bigger than 0.05 to not reject the null of normality at the 5% level. As we can observe from appendix 2 graph and table, the *P* value for Jarque-Bera test is above 0.05, therefore we can concluded that the data are normally distributed and can satisfy the fifth assumption of CLRM.

4.3.2. Empirical results

This section presents and analyses the regression output for the determinant of Ethiopian Micro Finance Institution Credit Risk which have a great influence on the occurrence of default risk, the descriptive statistics of credit risk, and a graphical comparison of the selected ten Micro finance institutions.

Table 5. Descriptive Statistics of Credit Risk of Ethiopian MFIs

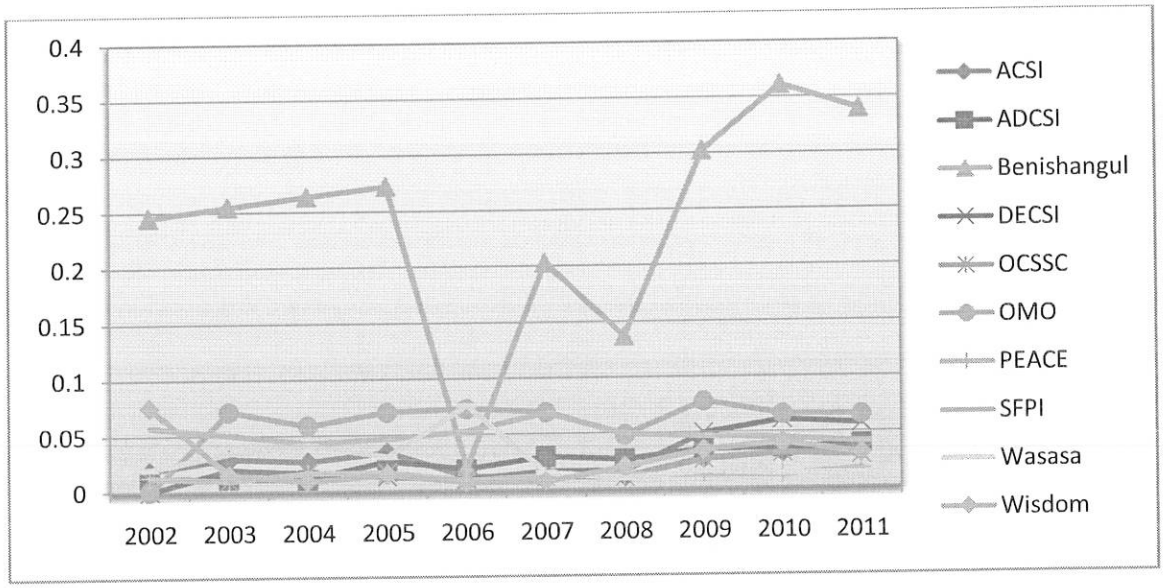
	Credit risk
Mean	0.054414
Maximum	0.360912
Minimum	0.006877
Std. Dev.	0.076656
Observations	100

Source: E-views result

Table 5. show the descriptive statistics of Ethiopian micro finance institution credit risk. The minimum risk for credit of the micro finance institutions is 0.007 or 0.7% and the maximum credit risk that they face is 0.36 or 36%. The average or the mean of their credit risk is 0.05 or 5% with 0.0766 standard deviation. This shows highest variation on the credit risk exposure between Ethiopian MFIs, since some of them have a little credit risk which counts 0.7% of their loan provided and some of the MFIs have the highest credit risk that is about 0.36 or 36% of their loan.

Furthermore, the trend of Ethiopian MFIs credit risk shows an increasing rend from time to time (see appendix 4).

Figure 2. Credit Risk of Selected MFIs



As per the above diagram the majority of Ethiopian micro finance institutions have almost equal amount of risk on their credit. Nine of the micro finance institution credit risk falls between zero and 10%. The only micro finance institution that has the highest credit risk is Benishangul micro finance institutions which have scored more than 35%.

Table 6. Regression Results of Determinants of Credit Risk

Dependent Variable: CR
Method: Panel EGLS (Cross-section random effects)
Sample: 2002-2011
Periods included: 10
Cross-sections included: 10
Total panel (unbalanced) observations: 98

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.008	0.023	0.349	0.7281
LD	0.005	0.001	3.750	0.0003***
LLP	0.011	0.030	0.378	0.7063
LNALPB	0.115	0.011	10.914	0.0000***
LNTA	-0.028	0.003	-10.172	0.0000***
LV	-0.003	0.001	-1.982	0.0505**
ME	-0.104	0.041	-2.548	0.0125**
RC	-0.018	0.015	-1.199	0.2337

Weighted Statistics

R-squared	0.714	Mean dependent var	0.054
Adjusted R-squared	0.692	S.D. dependent var	0.026
S.E. of regression	0.015	Sum squared resid	0.019
F-statistic	32.085	Durbin-Watson stat	1.860
Prob(F-statistic)	0.000		

Unweighted Statistics

R-squared	0.714	Mean dependent var	0.054
Sum squared resid	0.019	Durbin-Watson stat	1.860

*,** and *** indicate 10,5 and 1 percent level.

Source: E-views result

Table 6. shows the regression results of the factors influencing credit risk of Ethiopian Micro Finance institution (represented by 10 MFIs). Five variables i.e. loan to deposit ratio, average loan per borrower, total assets, leverage, and management efficiency are significantly influencing the credit risk of Ethiopian Micro Finance Institutions. Loan to deposit ratio, loan loss provision, and the average loan per borrowers has a positive relationship with credit risk. However, total asset, leverage, management efficiency, and regulatory capital have a negative coefficient to credit risk.

The higher R-square of 71.4 percent in Ethiopian micro finance institution suggests that these variables collectively have a stronger influence on their credit risk. Thus the variables are significant to determine the determinant of Ethiopian MFIs credit risk.

The first explanatory variable, Loan to deposit ratio has a positive coefficient of 0.005 which show the positive relationship between credit risk and loan to deposit ratio. That means a single increment on the loan to deposit ratio will increase the credit risk of Ethiopian MFIs by 0.5 percent. This is due to that the increment in the loan amount increase the probability of default by the borrowers because as per the amount of the loan increased the capability of the borrowers may not increase to repay their loan and it becomes infeasible to repay the whole amount of loan at the specified time.

Loan loss provision has a coefficient of positive 0.0115 which shows the positive relationship of credit risk of micro finance institutions and their loan loss provision. LLP (loan loss provision to average loans outstanding) has been identified in banking literature as a proxy for credit risk (Rose, 1996: 196). Ahmed (1998) found LLP to be positive and is significantly associated with NPL. Hence, a higher LLP indicates an

increase in risk and deterioration in loan quality. Fisher, Gueyie and Ortiz (2000) find similar results where LOANQUAL (LLP to total loans) is positively related to risk. Further Nor and Shahrul (2004) found that credit risk are significantly affected by loan loss provision.

Average loan per borrowers has a coefficient of 0.1155, in which credit risk is positively related with average loan per borrowers. This means, if the average loan per borrower has increased by a single amount the occurrence of default risk in the Ethiopian MFIs will increase by 11.55 percent. Large amount of the ratio of average loan per borrower show a single borrower has borrowed a large amount loan from the institution. Thereby, this leads the borrower not to repay the expected loan repayment in the required time and increased the default risk of the firm.

The size of the institutions (Micro finance institutions) that is the natural log of total assets has a negative coefficient of 0.028 Fisher, Gueyie and Ortiz (2000) find similar results where Size, (LOGTA), is negative and is significantly related to credit risk. As per the size of the firm increased, their capacity to allocate (assign) resources for management of credit risk will be increased. Therefore, larger Micro Finance Institutions have little probability toward credit risk than those micro finance institutions which are small in their size. Thus we can concluded that 1% increment in the total asset of the firm decreases approximately

Further leverage has a negative coefficient of 0.0029 which is a significant predictor of credit risk of Ethiopian Micro Finance Institutions. This finding is not consistent with

Berger and DeYoung (1997) and finance theory where higher debt has a high probability of higher credit risk from default payments however, leverage was not a significant predictor in their study. Additionally, it's also inconsistent with the Micro-Credit Ratings International Limited, (2005) which says in certain situations, if revenue earned from assets is less than interest charges on debt, there will be a potential default. The higher the Ratio, the greater the risk being assumed by creditors. A lower Ratio generally indicates greater long-term financial safety. Creditors generally prefer low leveraged firms, since this provides a large cushion of protection. Also, a Microfinance Institution (MFI) with a low leverage usually has greater flexibility to borrow in the future. A more highly leveraged MFI has a more limited debt capacity.

Management efficiency has also a negative relationship with credit risk cause as it is presented in the regression result table management efficiency has a negative coefficient of 0.1042. Return on asset is used to measure the efficiency level of institutions' management. Therefore, this result can be seen in two directions; first the increments in the firms' return decrease the probability of credit risk and second the availability of high management efficiency decrease the Ethiopian MFIs credit risk. Generally, we conclude that an increment in the firms return or management efficiency decrease their credit risk by 10.42 percent. In addition to this, this result is consistent with the finding of Nor and Shahrul (2004).

Finally, regulatory capital has a negative coefficient of 0.01857 which show the negative relationship between credit risk and regulatory capital of Ethiopian MFIs. According to (Abel Elizalde and Repullo, 2006) regulatory capital is the minimum capital required by

the regulator. Even if this variable is insignificant in determining the credit risk of Ethiopian micro finance institutions but it has a little influence on their credit risk. The increment in regulatory capital of the MFIs decreases the probability of credit risk by 1.8 percent. A negative coefficient of regulatory capital (RC) which is consistent with moral hazard theory postulate in Berger and DeYoung (1997) where smaller capitalized banks assume higher risk.

4.3.3. Summary of Expected and Empirical Results

Generally the majority of the explanatory variables have the expected sign which is

Table 7. Summary of expected and empirical sign of explanatory variables

Variables	Expected sign	Empirical result
Loan to deposit ratio	+ve	+ve
Loan loss provision	+ve	+ve
Average loan per borrower	+ve	+ve
Size	-ve	-ve
Leverage	+ve	-ve
Management efficiency	-ve	-ve
Regulatory capital	-ve	-ve

4.4. Techniques adopt by MFIs to manage their credit risk

Ethiopian micro finance institutions have their own strategy to manage their loan activity and overcome the problem of credit risk. The data gather from structured interview show the following mechanisms used to manage their credit risk. That can be classified in the following categories; Approval authorities, established criteria for loan approval, business plan presentation, Credit Limits and Credit Concentration, credit documentation, and monitoring and control.

4.1.1. Approval Authorities

Clearly defined and appropriate levels of authorities for credit approval, provisions or write-offs help ensure that credit decisions are prudent and acceptable, that the integrity and credibility of the credit process is protected by fair, consistent and objective credit decisions, and that the risk is acceptable given the expected return.

Approval limits may relate to size, security or other criteria, such as industry sector. Authorities may be absolute, incremental or a combination thereof and may also be individual, pooled, or shared within a committee.

4.1.2. Loan Criteria

It is important for credit policy to document key lending criteria and required credit investigations. Policy should set general requirements to evaluate a borrower's character, cash flow, capital and collateral security, mandate special investigations relating to environmental risk, commercial and agricultural credits. Operational procedures should detail the minimum terms and conditions for different loan classes.

Ethiopian MFIs has their own independent criteria to approve borrowers' loan request. Some of the criteria are; the borrower residence has to be permanent where the micro finance branch is located, the borrower has to be willing and commitment to engage in micro and small enterprise and income generating activities, he/she has to be within working age, he/she need to be credit worthy, with good reputation among the community that can be confirmed by the local credit and savings committee, they should present a business plan that also confirms the availability of market for the product/service loan is requested, he/she must be willing to save some or part of his/her business income in the institutions, the borrowers must deposit some percent of loan requested in that branch, he/she must agree to pay the interest and any other fees to be paid to access a loan, if the loan is group loan, each of the group members have to agree to pay loans defaulted by other group member, further more if the borrower is married he/she has to get the approval of and signature of the spouse on the loan agreement, he/she must agree to and respect centre bylaws and so on.

4.1.3. Business Plan Presentation

One of the mechanisms that can help the Ethiopian micro finance institutions to minimize the probability of the occurrence of credit risk is business plan presentation by the borrowers. The majority of Ethiopian micro finance institution requested the presentation of business plan how ever in some of the MFIs no business plan is required to access the predetermined loan size but the group must unanimously approve the progression of a particular client to the next higher loan size.

The business plan has to be established with the clear goal of expansion. It distinctly has to describes loanee's name, sex, age, address, loan duration, type of activity to be financed, expected expense by item, expected income, total requested loan amount, approved loan amount, and so on.

Furthermore some of the MFIs established an application form that serves as a business plan presentation for requesting a loan. And the application form contains personal information (i.e. name, age, gender, address, etc), asset base of household (i.e. household size, education, land and cattle holding, available saving, etc), activity proposed, amount proposed by the group, comment of the field worker, approval of the loan by the credit and saving committee for new borrowers, data loan payment starts and ends, etc.

4.1.4. Credit Limits and Credit Concentration

To ensure diversification, exposure limits are needed in all areas of the microfinance institution's activities that involve credit risk. Microfinance institutions should establish credit limits for individual counterparties and groups of connected counterparties that aggregate different types of on and off balance sheet exposures. Under no circumstance can limits established by microfinance institutions be higher than regulatory limits set by NBE. Limits should also be established for particular industries or economic sectors, geographic regions specific products, a class of security, and group of associated borrowers.

Credit concentration can occur when a microfinance institution's portfolio contains a high level of direct or indirect credits to: A single counterparty, an industry/sector, a geographical region, a type of credit facility, and a class of collateral.

Excessive concentration renders a microfinance institution vulnerable to adverse changes in the area in which the credit is concentrated and to violations of statutory and regulatory limits. Sound and prudent risk management involves the minimization of concentration risk by diversifying the credit portfolio. At a minimum, credit diversification policies should be stated clearly include goals for portfolio mix; Place exposure limits on single counter parties, key industries or economic sectors, geographical regions and new or existing products; and be in compliance with NBE statutory and regulatory limits on single exposures.

In considering potential credits, microfinance institutions recognize the necessity of establishing provisions for identified and expected losses in line with the NBE directives on provisions and holding adequate capital to absorb unexpected losses. These considerations should factor into credit-granting decisions as well as the overall portfolio risk management process.

4.1.5. Documentation

In developing and maintaining a sound loan portfolio, the terms of each credit must be adequately and accurately documented. Inadequate, incomplete, or unenforceable documentation could lead to non collection of funds, particularly in instances where lenders are obliged to resort to legal action for credit repayment.

In order to conduct credit reviews and ensuring that assets are soundly and conservatively valued, the Ethiopian micro finance institution maintain credit files supporting the credit granting and review process. In common Ethiopian MFIs credit file includes; identifies the borrower by name and occupation or type of business, provides evidence of the borrower's legal ability to borrow, financial condition, and ability to repay including, the timing and source of repayment, describes the terms of the credit obligation, including the purpose of the credit, describes and evaluates the collateral (mostly for group loan).

4.1.6. Monitoring & Control

Credit risk monitoring refers to continual monitoring of individual credits inclusive of Off-Balance sheet exposures to obligors as well as overall credit portfolio of the MFIs. MFIs need to express a system that enables them to monitor quality of the credit portfolio on day-to-day basis and take remedial measures as and when any deterioration occurs. Such a system would enable them to ascertain whether loans are being serviced as per facility terms, the adequacy of provisions, the overall risk profile is within limits established by management and compliance of regulatory limits.

Establishing an efficient and effective credit monitoring system would help management to monitor the overall quality of the total credit portfolio and its trends. Consequently the management could fine tune or reassess its credit strategy /policy accordingly before encountering any major setback. The MFIs credit policy explicitly provides procedural guideline relating to credit risk monitoring. At the minimum it should lay down procedure relating to; the roles and responsibilities of individuals responsible for credit

risk monitoring, the assessment procedures and analysis techniques (for individual loans & overall portfolio), the frequency of monitoring, the periodic examination of collaterals and loan covenants, the frequency of site visits, the identification of any deterioration in any loan.

4.1.7. Other mechanisms

Ethiopian micro finance institutions also use different mechanisms in order to minimize the probability of credit risk. That are; Group lending, Avoiding high risk and vulnerable groups, Rescheduling loans, Provide financial services to diversified activities, developing insurance products particularly for loans, Credit guarantee schemes (guarantee schemes of the regional government), Require property collateral for bigger loans, Strong follow-up and supervision, and Developing saving products

4.2. Factors that cause credit risk for Ethiopia Micro Finance Institutions

The data gathered from the managers of the micro finance institution through structured interview questions provided the following reasons for the occurrence of credit or default risk in micro finance institutions and this factors that cause credit risk for the Ethiopian micro finance institution which can be seen from three broad categories; i.e. external versus internal factors borrowers versus lender characteristics, and firm versus loan characteristics.

4.2.1. External versus internal factors

External factors are the factors which are not in the control of the firm and that can affect the whole industry at a time like; Death of the client, Illness, Death of livestock, Limited market, HIV/AIDs, Drought and natural disasters leading to crop failure, Market risks such as prices.

Internal factors are the factors which are internal to the firm and can be changed or minimized by the firm. That are, poor management procedures, loan diversion, poor program design or implementation, Limited capacity of the staff to appraise the projects of clients, Weak Management Information System (MIS), Limitations in the commitment and efficiency of staff, Lack of incentives to collect loans and Lack of credit history and track record.

4.2.2. Borrowers versus lender characteristics

Borrowers' characteristics are causes of credit risk of micro finance institution from view point of the borrowers i.e. Unwillingness and inability to repay loans, awareness problem about the significance of repaying a loan, inappropriate products, Educational level of borrowers, and Credit attitude of borrowers towards the loan, as if it were grant, instead of a liability at the time of difficulty.

The lenders characteristics are causes of credit risk of micro finance institution from view point of the lenders (Micro finance Institutions). Which are more also similar with the internal factors which are discussed in part 4.4.1.

4.2.3. Firm versus loan characteristics

Firm characteristics are credit risk causes that arise from the type (nature) the firm the loan is invested. These are inappropriate products/service they produced which is not more profitable, weak market targeting approaches to sale their product or services, limited market this caused due to lack of study on the size of the market they want to engage, sometimes the borrowers also may not have enough capacity to manage the enterprise, and firms my exposed to market risks such as prices. On the other hand the credit risk of Ethiopian MFIs arises from the characteristics of the loan.

4.3. Fairness of current credit risk management techniques

Most of the interviewee agreed that the current practice of Ethiopian micro finance institution in managing their credit risk is not in accordance with the guideline of National Bank of Ethiopia. Some of the reasons for not following NBE guideline are; Firstly, Lack of client awareness which means most of the borrowers are have no awareness on the national bank of Ethiopia guideline. Second, Limited knowledge and understanding of the MFIs on the magnitude of the risk, which means some of the institution themselves have a little knowledge on the impact as well as on the availability of credit risk. Thirdly, Limited capacity of the MFIs and insurers to develop insurance products, here as it is well understand having a sufficient credit risk management system may require a large amount budget and the micro finance institution are not willing to incur it. Finally, MFIs focusing on insuring credit not protecting the clients.

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CHAPTER FIVE: Summary, Conclusion and Recommendation

5.1. Summary and Conclusion

This paper analyzed the financial variables that affect the credit risk of Ethiopian micro finance institutions. The general objective of this thesis focus on the credit risk and management of credit risk of major Ethiopian MFIs in harmonious with the this the research try to address the following specific objectives (i.e. determine Micro-Finance Institutions credit risk exposure, determine the determinants of credit risk of Micro-Finance Institutions in Ethiopia, examine the application of the elements of credit risk management in Ethiopia, examine loan portfolio management strategies in Micro finance institutions, and To explore factors causing credit risk for Ethiopian MFIs).

This study is expected to have a great contribution in many aspects of different stakeholders in Ethiopia. Some of them are; For Micro-Finance Institutions it Help to know the extent of their exposure toward credit risk, Understand the causes of default by the clients, To see the gap between the NBE and their credit management systems, and To take measures that decrease the probability of the occurrence of credit risk of MFIs based on the recommendations that will be forwarded. For the Clients of MFIs; to understand what conditions will fail them from loan payment, to know the MFIs credit management system and to go in harmonious with MFIs' requirements, To be cooperative in minimizing the credit risk and increase the performance of Micro-Finance Institution. Thereby, they will be beneficiary from the MFIs.

Due to the objectives of this research, combined methodology of both quantitative and qualitative approaches are applied. The quantitative approach in this research is mainly for determining the factors that influence the credit risk of MFIs. The qualitative study part provides an easy understanding of the analysis of words and images rather than numbers (Creswell, J.W. 2003). As to the techniques chosen for this research, textual analysis is employed. It is believed that these methods are suitable for the research because through analyzing the relative MFIs performance reports, access to all the available information needed in the research can be gained and assessment can be made, which provides both a separate evaluation and generalization on the sample MFIs' credit risk management practices.

The quantitative data used for econometric analysis are eight (8) financial ratios relating mainly to MFIs' credit exposure and lending decision quality. The choice of these ratios is based on a survey of related literature on credit risk determinants. Nonperforming loan (NPL) to total loans is taken as a proxy for credit risk. The estimated predictors consist of seven (7) variables: management efficiency (ME), leverage (LV), regulatory capital (RC), Loan loss provision (LLP), natural log of total assets (LnTA) and proportion of loan to deposit (LD).

The qualitative data needed in this research mainly comes from the selected five MFIs credit management rules and regulations, annual and financial reports, National Bank of Ethiopia proclamations and other published results from Associations of Ethiopian Micro-Finance Institutions. The researcher purposively selects Ten (10) micro finance institutions depending on the availability of ten years financial data in order to represent

the total population of the study. Furthermore, the majority of the clients are served by these MFIs, the amount of loan as well as deposit is higher than others, and the selected Micro-Finance Institutions are active in lending, and have been in operation for a relatively longer period. Data collection method should be in accordance with the design of the research. The majority of the quantitative data used in this research is collected from the MIX market (http://www.mixmarket.org). To make the research more comprehensive and reliable an interview questions will be designed to the credit risk management officers or concerned body of selected Micro-Finance Institutions.

The quantitative data show the availability of credit risk exposure and determinants which have significant impact on the selected MFIs through the regression model. The qualitative data that will be analyzed in order to show the practices of the micro finance institution, problems in managing credit risk, causes of credit risk and a comparison will be made to show the credit risk management of the MFIs is in accordance with the requirement of NBE.

As per the regression results of the factors influencing credit risk of Ethiopian Micro Finance institution, the following conclusions are drawn;

- Five variables i.e. loan to deposit ratio, average loan per borrower, total assets, leverage, and management efficiency are significantly influencing the credit risk of Ethiopian Micro Finance Institutions.
- Loan to deposit ratio, loan loss provision, and the average loan per borrowers has a positive relationship with credit risk.

- Total asset, leverage, management efficiency, and regulatory capital have a negative coefficient to credit risk.

On the other hand, Ethiopian micro finance institutions have their own strategy to manage their loan activity and overcome the problem of credit risk. The data gather from structured interview show the following mechanisms used to manage their credit risk. That can be classified in the following categories; Approval authorities, established criteria for loan approval, business plan presentation, Credit Limits and Credit Concentration, credit documentation, and monitoring and control.

Approval Authorities: Clearly defined and appropriate levels of authorities for credit approval, provisions or write-offs help ensure that credit decisions are prudent and acceptable, that the integrity and credibility of the credit process is protected by fair, consistent and objective credit decisions, and that the risk is acceptable given the expected return.

Loan Criteria: Ethiopian MFIs has their own independent criteria to approve borrowers' loan request. Some of the criteria are; the borrower residence has to be permanent where the micro finance branch is located, the borrower has to be willing and commitment to engage in micro and small enterprise and income generating activities, he/she has to be within working age, he/she need to be credit worthy, with good reputation among the community that can be confirmed by the local credit and savings committee, they should present a business plan that also confirms the availability of market for the product/service loan is requested, he/she must be willing to save some or part of his/her business income in the institutions, the borrowers must deposit some percent of loan

requested in that branch, he/she must agree to pay the interest and any other fees to be paid to access a loan, if the loan is group loan, each of the group members have to agree to pay loans defaulted by other group member, further more if the borrower is married he/she has to get the approval of and signature of the spouse on the loan agreement, he/she must agree to and respect centre bylaws and so on.

Business Plan Presentation: The business plan distinctly has to describes loanee's name, sex, age, address, loan duration, type of activity to be financed, expected expense by item, expected income, total requested loan amount, approved loan amount, and so on.

Furthermore some of the MFIs established an application form that serves as a business plan presentation for requesting a loan. And the application form contains personal information (i.e. name, age, gender, address, etc), asset base of household (i.e. household size, education, land and cattle holding, available saving, etc), activity proposed, amount proposed by the group, comment of the field worker, approval of the loan by the credit and saving committee for new borrowers, data loan payment starts and ends, etc.

Credit Limits and Credit Concentration: To ensure diversification, exposure limits are needed in all areas of the microfinance institution's activities that involve credit risk. Some of Ethiopia Microfinance institutions established credit limits for individual counterparties and groups of connected counterparties that aggregate different types of on and off balance sheet exposures. Under no circumstance can limits established by microfinance institutions be higher than regulatory limits set by NBE. Limits should also

be established for particular industries or economic sectors, geographic regions specific products, a class of security, and group of associated borrowers.

Documentation: In order to conduct credit reviews and ensuring that assets are soundly and conservatively valued, the Ethiopian micro finance institution maintain credit files supporting the credit granting and review process. In common Ethiopian MFIs credit file includes; identifies the borrower by name and occupation or type of business, provides evidence of the borrower's legal ability to borrow, financial condition, and ability to repay including, the timing and source of repayment, describes the terms of the credit obligation, including the purpose of the credit, describes and evaluates the collateral (mostly for group loan).

Monitoring & Control: Credit risk monitoring refers to continual monitoring of individual credits inclusive of Off-Balance sheet exposures to obligors as well as overall credit portfolio of the MFIs. MFIs need to express a system that enables them to monitor quality of the credit portfolio on day-to-day basis and take remedial measures as and when any deterioration occurs. Such a system would enable them to ascertain whether loans are being serviced as per facility terms, the adequacy of provisions, the overall risk profile is within limits established by management and compliance of regulatory limits.

Other mechanisms: Ethiopian micro finance institutions also use different mechanisms in order to minimize the probability of credit risk. That are; Group lending, Avoiding high risk and vulnerable groups, Rescheduling loans, Provide financial services to diversified activities, developing insurance products particularly for loans, Credit

guarantee schemes (guarantee schemes of the regional government), Require property collateral for bigger loans, Strong follow-up and supervision, and Developing saving products

The data gathered from the managers of the micro finance institution through structured interview questions provided the following reasons for the occurrence of credit or default risk in micro finance institutions and this factors that cause credit risk for the Ethiopian micro finance institution which can be seen from three broad categories; i.e. external versus internal factors borrowers versus lender characteristics, and firm versus loan characteristics.

External factors: are Death of the client, Illness, Death of livestock, Limited market, HIV/AIDs, Drought and natural disasters leading to crop failure, Market risks such as prices.

Internal factors: are poor management procedures, loan diversion, poor program design or implementation, Limited capacity of the staff to appraise the projects of clients, Weak Management Information System (MIS), Limitations in the commitment and efficiency of staff, Lack of incentives to collect loans and Lack of credit history and track record.

Borrowers characteristics: are Unwillingness and inability to repay loans, awareness problem about the significance of repaying a loan, inappropriate products, Educational level of borrowers, and Credit attitude of borrowers towards the loan, as if it were grant, instead of a liability at the time of difficulty.

Firm characteristics: are inappropriate products/service they produced which is not more profitable, weak market targeting approaches to sale their product or services, limited market this caused due to lack of study on the size of the market they want to engage, sometimes the borrowers also may not have enough capacity to manage the enterprise, and firms my exposed to market risks such as prices.

As most of the interviewee agreed that the current practice of Ethiopian micro finance institution in managing their credit risk is not in accordance with the guideline of National Bank of Ethiopia. The reasons for not following NBE guideline are; Lack of client awareness, Limited knowledge and understanding of the MFIs on the magnitude of the risks, Limited insurance products, Limited capacity of the MFIs and insurers to develop insurance products, and MFIs focusing on insuring credit not protecting the clients.

5.2. Recommendation

Based on the above findings the researcher forward the following recommendation in order to enhance the credit risk management system of Ethiopian MFIs and thus to minimize their credit risk exposure.

First of all the average loan per borrower which has a significant contribution for the occurrence of credit risk can be managed by limiting the amount of loan allowed for the borrowers at the lowest amount that can be repaid by them. The amount /limit shall be better to depend on the amount of income the borrower have and the expected profitability of the business were the loan is given.

Secondly, the sizes of the firm and management efficiency have a significant impact in minimizing the credit risk probability of the MFIs. Therefore, it's better to try to expand their size and the capacity of the management through training and other mechanisms.

Thirdly, the micro finance institutions should screen the borrowers and select the "good" borrowers from the "bad" borrowers and monitor the borrowers to make sure that they use the loans for the intended purpose. This is important to make sure the borrowers can pay back their loans. Before allowing the credit, borrower's past record and economic prospects to determine whether the borrower is likely to repay or not.

Fourthly, besides characters of the borrowers, collateral requirements, capacity or ability to repay and condition of the market should be considered before giving loans to the loanee.

Further, the foundation of an effective credit risk management programme is the identification of the existing and potential risks inherent in an institution's credit products and credit activities, and the development and implementation of clearly defined policies, formally established in writing, that set out the credit risk philosophy of the institution and the parameters under which credit risk is to be controlled. Pressure for increased profitability, marketing considerations and a vastly more complex financial environment has resulted in innovative credit instruments and approaches to credit. Measuring the risks attached to each credit activity permits the determination of aggregate exposures to counterparties for control and reporting purposes, concentration limits and risk/reward returns.

Finally, to be effective, policies must be communicated in a timely fashion, be implemented through all levels of the organization by appropriate procedures and revised periodically in light of changing circumstances. The credit policies need to contain, at a minimum:

- A credit risk philosophy governing the extent to which the institution is willing to assume credit risk;
- General areas of credit in which the institution is prepared to engage or is restricted from engaging;
- Clearly defined and appropriate levels of delegation of approval, and provision or write-off authorities; and
- Sound and prudent portfolio concentration limits.

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Appendix 1

Hausman test

Correlated Random Effects - Hausman Test

Equation: RANDOM

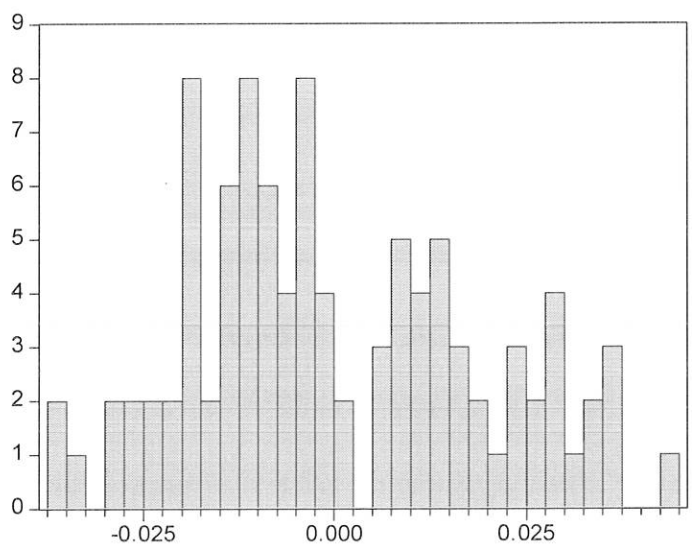
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	9.182046	7	0.1636

** WARNING: estimated cross-section random effects variance is zero.

Appendix 2

Test of normality



Series: Standardized Residuals
Sample 2002 2011
Observations 98

Mean	1.16e-17
Median	-0.003871
Maximum	0.043646
Minimum	-0.035771
Std. Dev.	0.018733
Skewness	0.322628
Kurtosis	2.305957
Jarque-Bera	3.667048
Probability	0.159849

Appendix 3

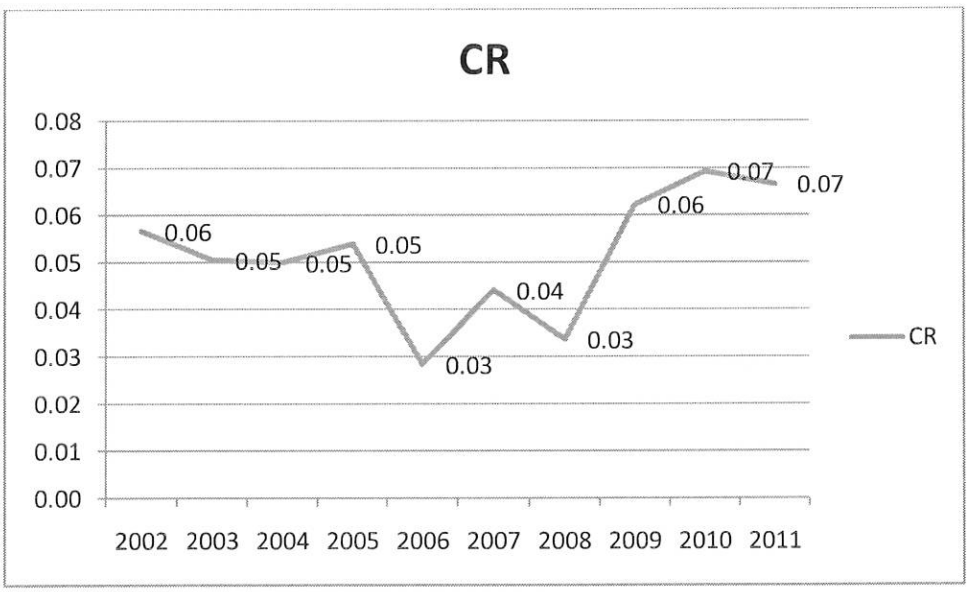
The Corposol/Finansol Crisis

In 1996, Finansol, a regulated financial intermediary in Columbia, suffered from severe deterioration of its loan portfolio. While a lack of transparent and separate accounting from its parent NGO, Corposol, added to the problem, the MFI's rapid growth and poor risk management were initial culprits. In 1995, Finansol's microfinance portfolio grew from $11 million to $35 million. Many of the credit officers who delivered this growth were new and not well trained, and were simultaneously responsible for promoting three new untested microfinance products for Corposol. There was no mechanism to prevent clients from receiving multiple loans from the MFI; in fact, many clients had two to three loans outstanding. The new products were mostly unsuccessful and the management information system had difficulty managing the diversity of products. As a temporary measure to reduce the negative impact on the income statement resulting from provisioning, Finansol refinanced loans on a wide scale and extended loan terms. This further concealed Finansol's deteriorating asset quality. Under pressure to generate revenue for Corposol, whose operating revenues were heavily dependent on training fees from new clients, loan officers continued to expand their loan portfolios by adding new clients without much regard for credit risk. To circumvent a government policy that limited the asset growth of regulated financial institutions to 2.2 percent per month, Corposol retained a significant portion of Finansol's loan portfolio on its balance sheet, which further distorted Finansol's financial statements.

It wasn't until July 1995, when ACCION International conducted a formal evaluation of the entire microfinance operation that the problem came to light. A recapitalization plan called for an end to the relationship between Corposol and Finansol and the recruitment of new investors to raise the level of capital high enough to meet the Superintendency's requirements and to fuel future growth. With the assistance of private and non-profit sectors, the recovery plan successfully saw Finansol through its institutional metamorphosis into what is now FINAMERICA, S.A. FINAMERICA began operations in 1997, and as of year-end 1998, it had achieved financial solvency with 9,800 active clients and a loan portfolio of $13.4 million. This crisis demonstrates the need to integrate risk management in all an MFI's activities.

Appendix 4

Average Credit Risk of Ethiopian MFIs



Appendix 5

Regression result

Dependent Variable: CR
Method: Panel EGLS (Cross-section random effects)
Date: 04/20/12 Time: 13:08
Sample: 2002 2011
Periods included: 10
Cross-sections included: 10
Total panel (unbalanced) observations: 98
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.008	0.023	0.349	0.7281
LD	0.005	0.001	3.750	0.0003***
LLP	0.011	0.030	0.378	0.7063
LNALPB	0.115	0.011	10.914	0.0000***
LNTA	-0.028	0.003	-10.172	0.0000***
LV	-0.003	0.001	-1.982	0.0505**
ME	-0.104	0.041	-2.548	0.0125**
RC	-0.018	0.015	-1.199	0.2337

Weighted Statistics

R-squared	0.714	Mean dependent var	0.054
Adjusted R-squared	0.692	S.D. dependent var	0.026
S.E. of regression	0.015	Sum squared resid	0.019
F-statistic	32.085	Durbin-Watson stat	1.860
Prob(F-statistic)	0.000		

Unweighted Statistics

R-squared	0.714	Mean dependent var	0.054
Sum squared resid	0.019	Durbin-Watson stat	1.860

Appendix 6

Structured Interview

Addis Ababa University

School of Business and Public Administration

MBA in Finance Program

This is an academic endeavor that envisages collection of data regarding credit risk management practices in selected micro finance institutions in Addis Ababa. In order to fulfill the University's (Addis Ababa University) requirement set for awarding of a Masters Degree in Business Administration (MBA in Finance).

Hence, I am kindly asking you respondents to give me your candid information for these responses will have eminent influence on the research output. Your responses will be used for academic purposes and your identity will not be disclosed to anyone anywhere.

Thank you in advance for you cooperation!

Selamsew Yohannes

laladama@yahoo.com

Q1. How do you relate Ethiopian Micro Finance Institutions and their Credit Risk level?

Q2. What strategies and techniques does your organization use to manage Credit Risk currently?

Q3. What are the main factors that cause Credit Risk for Ethiopia Micro Finance Institutions? Or factor increase the failure of borrowers to repay the loan?

Q4. Do you think that your organization current credit risk management practices satisfied the requirements of NBE on Credit Risk management guideline? Or is it good enough to manage this risk?

Q5. What do you recommend other MFIs to effectively manage their credit risk?

Appendix 7

Quantitative Data Used for Econometric Analysis

name	Year	CR	ME	LV	RC	LLP	lnTA	LD	LnALPB
1	2002	0.018	0.030	7.571	0.117	0.011	7.411866	1.429	1.85733
1	2003	0.029	0.061	1.139	0.467	0.035	7.517634	1.635	1.91907
1	2004	0.026	0.077	1.984	0.335	0.035	7.726233	1.810	2.01703
1	2005	0.035	0.065	2.090	0.324	0.085	7.832066	1.867	2.07188
1	2006	0.012	0.080	2.335	0.300	0.001	7.981505	1.879	2.16435
1	2007	0.011	0.081	2.718	0.269	0.001	8.142392	1.797	2.26717
1	2008	0.011	0.091	3.250	0.235	0.021	8.29633	1.867	2.34044
1	2009	0.026	0.067	2.808	0.263	0.001	8.267443	1.677	2.28555
1	2010	0.031	0.073	2.755	0.266	0.001	8.279292	1.540	2.21484
1	2011	0.038	0.070	2.541	0.282	0.001	8.238226	1.678	2.09342
2	2002	0.012	-0.003	0.217	0.822	0.002	6.286599	0.448	1.86332
2	2003	0.011	0.002	0.126	0.888	0.004	6.850169	1.440	2.17609
2	2004	0.011	0.042	0.426	0.701	0.005	7.210436	3.060	2.40312
2	2005	0.026	0.017	0.411	0.709	0.006	7.303047	6.117	2.22271
2	2006	0.018	0.040	0.411	0.709	0.003	7.303047	2.842	2.29003
2	2007	0.029	0.048	0.332	0.751	0.004	7.428843	3.173	2.40993
2	2008	0.026	0.042	0.433	0.698	0.078	7.541619	4.125	2.37291
2	2009	0.035	0.036	0.433	0.698	0.104	7.493294	7.682	2.30749
2	2010	0.035	0.030	0.629	0.614	0.142	7.585385	5.087	2.06445
2	2011	0.038	0.024	0.974	0.507	0.180	7.651652	3.222	2.07918
3	2002	0.246	-0.025	0.984	0.504	0.002	6.35266	5.299	2.08278
3	2003	0.255	-0.035	0.883	0.531	0.004	6.340494	3.597	2.09342
3	2004	0.264	0.001	0.787	0.560	0.005	6.327978	3.499	1.97772
3	2005	0.273	-0.013	1.051	0.488	0.006	6.397691	3.540	2.06069
3	2006	0.020	-0.012	2.210	0.312	0.002	6.50684	2.355	2.03342
3	2007	0.203	0.007	1.050	0.488	0.022	6.632483	2.918	2.05307
3	2008	0.137	-0.024	1.458	0.407	0.011	6.729815	3.302	2.07554
3	2009	0.302	0.019	1.413	0.414	0.021	6.591374	2.574	2.34242
3	2010	0.361	0.013	3.744	0.211	0.025	6.697278	2.582	2.43616
3	2011	0.339	0.013	2.492	0.286	0.030	6.602718	2.496	2.45636
4	2002	0.032	0.058	1.321	0.431	0.125	7.48417	#VALUE!	1.71600
4	2003	0.020	0.045	1.284	0.438	0.001	7.531727	1.556	2.01283
4	2004	0.016	0.055	1.952	0.339	0.015	7.757568	2.590	2.13987
4	2005	0.013	0.050	3.301	0.233	0.370	8.014368	3.577	2.26951

4	2006	0.010	0.043	3.750	0.211	0.004	8.072799	3.728	2.3364
4	2007	0.016	0.039	3.978	0.201	0.004	8.233577	3.610	2.44715
4	2008	0.016	0.021	4.202	0.192	0.002	8.269151	3.648	2.4969
4	2009	0.049	0.022	1.633	0.380	0.001	8.217357	2.572	2.34242
4	2010	0.061	0.010	3.134	0.242	0.003	8.298306	2.241	2.43616
4	2011	0.057	0.002	3.428	0.226	0.003	8.22645	1.894	2.45636
5	2002	0.013	-0.006	0.589	0.629	0.005	6.985309	0.480	2.06069
5	2003	0.010	0.044	0.855	0.539	0.003	7.122289	0.747	2.06818
5	2004	0.016	0.039	0.896	0.527	0.016	7.312847	0.907	2.09342
5	2005	0.016	0.060	1.289	0.437	0.002	7.466215	1.196	2.13987
5	2006	0.009	0.050	2.377	0.296	0.008	7.769635	2.083	2.25527
5	2007	0.011	0.042	2.669	0.273	0.005	7.84357	2.400	2.24303
5	2008	0.010	0.034	2.949	0.253	0.001	7.893996	1.860	2.23552
5	2009	0.026	0.044	3.002	0.250	0.002	8.011643	2.136	2.22010
5	2010	0.031	0.036	2.843	0.260	0.001	7.991228	3.510	2.19865
5	2011	0.029	0.034	2.710	0.270	0.002	7.976543	4.223	2.18184
6	2002	#VALUE!	NA	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	#VALUI
6	2003	0.071	-0.009	3.405	0.227	0.008	6.740656	5.149	1.6989
6	2004	0.059	0.006	4.636	0.177	0.005	6.875657	5.220	1.77085
6	2005	0.070	0.009	8.564	0.105	0.001	7.140003	2.191	2.02530
6	2006	0.072	0.031	7.536	0.117	0.001	7.210106	2.255	2.04532
6	2007	0.069	0.020	6.915	0.126	0.007	7.432932	2.434	2.11394
6	2008	0.048	0.008	5.284	0.159	0.002	7.492559	2.527	2.11727
6	2009	0.078	0.003	2.317	0.301	0.001	7.665554	2.571	2.01703
6	2010	0.066	0.015	3.457	0.224	0.002	7.788936	2.656	2.04921
6	2011	0.065	0.026	2.115	0.321	0.002	7.620887	1.554	2.12710
7	2002	0.013	-0.065	1.436	0.410	0.002	5.848901	3.158	1.96848
7	2003	0.010	-0.027	1.372	0.422	0.001	5.940679	4.381	2.03342
7	2004	0.016	0.070	1.270	0.441	0.002	6.118518	4.006	2.06069
7	2005	0.016	0.004	2.601	0.278	0.002	6.346266	4.531	2.11727
7	2006	0.009	0.099	2.734	0.268	0.013	6.522772	4.512	2.20682
7	2007	0.012	0.090	2.186	0.314	0.002	6.603416	4.115	2.25285
7	2008	0.012	0.074	1.976	0.336	0.002	6.64577	3.920	2.29446
7	2009	0.012	0.036	1.698	0.371	0.001	6.592685	3.475	2.23804
7	2010	0.011	0.024	1.407	0.416	0.002	6.532195	3.257	2.22530
7	2011	0.017	0.014	1.301	0.435	0.002	6.539557	3.533	2.17609
8	2002	0.057	-0.049	0.830	0.546	0.013	5.998676	1.851	1.92941
8	2003	0.050	0.009	0.911	0.523	0.043	6.105804	1.933	1.9493
8	2004	0.043	0.005	1.031	0.492	0.043	6.217444	2.390	2.01703
8	2005	0.046	0.006	0.814	0.551	0.003	6.330957	2.604	2.04532

8	2006	0.052	0.031	0.904	0.525	0.010	6.469835	2.823	2.0969
8	2007	0.068	0.014	1.192	0.456	0.030	6.574186	2.654	2.07918
8	2008	0.049	0.030	1.188	0.457	0.031	6.636669	2.296	2.0863
8	2009	0.046	0.023	1.309	0.433	0.041	6.627027	2.090	1.96378
8	2010	0.044	0.022	1.451	0.408	0.016	6.617167	2.187	2.09342
8	2011	0.041	0.021	1.503	0.400	0.039	6.695459	2.584	
9	2002	0.020	0.112	0.387	0.721	0.010	5.369724	3.943	1.87506
9	2003	0.034	0.069	0.435	0.697	0.022	5.5837	3.941	1.83884
9	2004	0.041	0.068	0.920	0.521	0.010	5.979564	3.730	1.85733
9	2005	0.030	-0.001	1.062	0.485	0.043	6.195261	3.010	1.85125
9	2006	0.075	0.019	1.158	0.463	0.043	6.47113	3.280	1.96848
9	2007	0.015	0.060	1.351	0.425	0.003	6.61636	3.116	1.99563
9	2008	0.009	0.073	2.031	0.330	0.004	6.728398	3.268	2.06445
9	2009	0.014	0.095	2.154	0.317	0.009	6.82515	3.050	2.07918
9	2010	0.012	0.082	2.122	0.320	0.010	6.84518	3.147	2.08278
9	2011	0.012	0.066	2.080	0.325	0.021	6.87294	3.560	2.09342
10	2002	0.075	-0.055	7.120	0.015	0.064	6.243765	5.855	1.97772
10	2003	0.015	-0.069	7.679	0.115	0.138	6.311647	4.204	2.06069
10	2004	0.009	-0.018	0.766	0.566	0.045	6.367899	2.875	2.03342
10	2005	0.014	0.002	1.488	0.402	0.029	6.555978	3.593	2.05307
10	2006	0.007	0.052	1.119	0.472	0.013	6.785982	3.886	2.07554
10	2007	0.007	-0.002	1.768	0.361	0.022	6.89978	3.957	2.13987
10	2008	0.020	0.001	1.291	0.436	0.010	6.978163	4.071	2.17318
10	2009	0.034	-0.034	1.268	0.441	0.011	6.929082	4.081	2.12710
10	2010	0.041	-0.025	1.061	0.485	0.012	6.963863	3.790	2.12057
10	2011	0.030	0.011	1.341	0.427	0.010	6.992932	3.396	2.17026