

Chapter One

Introduction

1.1 Background to the Study

Microfinance is adjudged globally as a veritable tool for poverty reduction, job creation, wealth generation, social stabilization and economic development in developing nations. Thus, Microfinance Banks provide services that are well implemented and play important role in modern society, as it provides services such as collection of savings, micro credit loans, transfer services and other nonfinancial services that are needed by clients¹. Today, Microfinance Banks in Nigeria and the world over, occupies a very strategic position in the enhancement of the socio-economic well being of the poor by building financial system that effectively and efficiently serves the needs of the poor. It is a powerful weapon to fight poverty all over the world. This is true because when poor people have access to financial services, they can earn more, build their assets and cushion themselves against external shock as they arise². It is crystal clear from the foregoing that the focus and key objective of Microfinance Banks is poverty alleviation or reduction. Again, Microfinance Banks (MfBs) are the custodians of microcredits, which signify their importance in any economy. Therefore, the financial health of Microfinance Banking sub- sector is an essential prerequisite for economic stability and growth³.

In recent times there has been remarkable growth in Microfinance Banks, which can be attributed to credit provision brought by desire to provide financial services to the low income earners or people so as to finance and improve their income generation activities, that is, productive activities. Thus, there are many product and services offered by various Microfinance Banks which determine the level of risks involved. Such products may include

short and long term loans, advisory services, et cetera⁴. Despite all the risks, loans still constitute a more significant proportion of credit risks as they generally account for 10 to 15 times the bank equities⁴.

However, credit provision requires due attention as credit risk management is one of the critical aspects and challenges faced by Microfinance Banks because loan repayment defaults by clients are what the banks are facing, and if not properly managed, it is capable of running down the banks⁵. It is an open secret that most Microfinance Banks in Nigeria are facing the severe challenges of loan delinquency, and these no doubt are hampering the financial performance and growth of the Microfinance Banks. As credit risks increase, their negative consequences on the financial performance and survival of Microfinance Banks also increase. Credit risk portfolio is deterioration in loan portfolio quality that results in loan losses and high loan management costs⁶.

Bad loans have become one of the fundamental reasons why banks are experiencing distresses⁷. Bad loans therefore are attributable to moral hazards, which lead to adverse incentives on bank owners and consequently affect their lending strategies⁴. Insider lending and lending at high credit risks contrary to the interests of the bank's creditors were also suggested as jeopardising the solvency of the banks⁸. Importantly, improperly managed credit risks may lead to liquidity risks which may result in the liquidation of the banks⁸.

However, effective credit risk management is crucial for the financial performance and survival of MfBs, since their primary business is the provision of credit facilities⁹. Credit risk management constitutes a critical component of a comprehensive approach to risk management in the banking sector¹⁰. A fundamental necessity for viable credit risk management is the capacity to sagaciously and productively oversee clients' credit lines.

Credit management for a loan does not stop until the full and the last instalment has been recovered¹¹. Credit management includes the totality of procedures, techniques, systems, strategies and control a bank has in place to ensure the efficient collection of customer's payments, thereby minimizing the risk of default¹².

There are several credit management strategies and procedures relating to the performance of MfBs, which have been identified and discussed by different scholars. Some of these strategies, which include credit terms, client's appraisal and loan collection policy, have been utilized in many developing countries, such as Malaysia, Ghana, Kenya and some East Africa nations ^{13 14 15}. Therefore, for any Microfinance Bank to ensure financial performance, it must as a matter of necessity have strong credit risk management. This is very fundamental to making Microfinance Banks stable and sustainable in Nigeria. The ability of Microfinance Banks to manage their operations is essential.

1.2 Statement of the Problem

Today, Microfinance Banks face many problems like every other banks operation in Nigeria. These problems result in the liquidation of many Microfinance Banks. In 2005, the Central Bank of Nigeria (CBN) formulated a new policy framework to enhance the access of financial services to micro-entrepreneurs and low income households who require such facilities (soft loan and investable funds) to expand and modernize their operations and their contribution to economic growth and development in Nigeria⁴. The objective is in line with the institutions policy in ensuring financial inclusion for all such that financial services reach the poor whether in rural or urban communities as this would help improve their productivity level and also help contribute to the nation's gross domestic product (GDP) ¹. Since the emergence of regulated Microfinance Banking practice in 2005 over 400

Microfinance Banks (MfBs) have been liquidated by the regulatory bodies for institutional failure arising from factors such as fraud, embezzlement, ineffective corporate governance and poor credit management¹⁶.

However, Microfinance Banks suffer from the market imperfections relevant to the credit industry in a more critically acute way¹. The inability of banks to identify risks associated with credit has been one of the major setbacks in the control and management of credit risks in Microfinance Banks in Nigeria. The wrong selection of credit customers also impose greater risk which may occur when the bank has insufficient information to make a distinction between good and bad customers¹⁷. Imperfect records or information about customers is problematic sometimes. It is also a common practice within Microfinance Banks where loans are given without any or adequate collaterals. In such situations, recovery of such loans may become doubtful, if not fully irrecoverable and will have negative impact on the financial performance of such Microfinance Banks⁵. Inability to collect loans given to customers will eventually lead to bad loans which must be written off as an expense thereby reducing the profit of the Microfinance Bank with negative implications on all performance indicators such as Return on Equity, Return on Assets, Net Interest Margin and so on.

The inability of Microfinance Banks to recover in full their loan portfolios at any given time has always posed some financial problems to the banks. It has been realized that a number of the banks' clients do not honour their debt obligations with the banks due to lackadaisical nature of banks clients in loan repayment, which include borrowers attitude towards their loan, amount received as income, business failure and experience including family

background¹. The banks are therefore faced with this terrible scenario of not being able to recover their loans in full. This seeming inability to fully recover their loan portfolios negates the banks' profitability portfolios⁴.

Badly managed loan portfolios would always result into bad debts⁷. This would invariably result into banks distress. Bad loan portfolios could be traced to reckless lending strategies and poor management styles of the banks⁴. It is also evident that insider lending and connivance is another problem arising from bad credit management where, the bank officials compromise the lending ethics of the banks and do not apply the laid down rules sufficiently enough to guarantee perfect loan monitoring and performance⁴.

This misconduct is not only limited to commercial banks but is also prevalent in Microfinance Banks. This has led to the liquidation of many Microfinance Banks in Nigeria⁸. In general terms, it can be seen that poor credit management in Microfinance Banks brings about massive bank liquidation in the economy. It is important that each Microfinance Bank identifies the credit risks inherent in its clientele. In addition, they should also be able to manage such loans and the attendant risks associated with them. Microfinance Banks in Nigeria need to adopt strategies which would not run counter to their management's strategic plans. Moreover, knowledge is particularly important for Microfinance Banks, whose customers frequently do not possess long historical backgrounds about their businesses¹⁸. Sustainability and survival therefore becomes the watchwords for Microfinance Banks in relation to their loan portfolios. Such can only be achieved through strong and sustainable credit administration characterised by adequate backup plans⁴. Therefore, this study set out to unveil the effect of Credit Risk Management practices with respect to nonperforming loans,

capital adequacy, loan loss provision to deposit ratio, assets quality and leverage ratio, on performance of Microfinance Banks in Nigeria.

1.3 Aim and Objectives of the Study

The aim of this study is to examine the effect of credit risk management practice on Microfinance Banks Performance. The specific objectives are to:

- (i) examine the effect of Non-performing Loan Ratio on Microfinance Banks performance.
- (ii) identify effect of Capital Adequacy on Microfinance Banks performance.
- (iii) investigate the effect of relationship between Loan loss Provision to deposit ratio and Microfinance Banks performance.
- (iv) evaluate effect of Assets quality and Leverage Ratio on Microfinance Banks performance.
- (v) determine the effect of joint predictors of credit risk management practice on Microfinance Banks performance.

1.4 Research Questions

To solve the problems highlighted above, providing answers to the following research questions become imperative:

- (i) What effect does Non-performing Loan Ratio have on Microfinance Banks performance?
- (ii) What is the effect of Capital Adequacy on Microfinance Banks performance?
- (iii) How does Loan loss Provision to deposit ratio have effect on Microfinance Banks performance?
- (iv) In what way does Assets quality and Leverage Ratio have effect on Microfinance Banks performance?

- (v) In what way does joint predictors of credit risk management practice have effect on Microfinance Banks performance?

1.5 Hypotheses

The following null hypotheses were developed to investigate the effect of credit risk management practices on Microfinance Banks performance

- H₀₁: Non-performing Loan Ratio have no significant effect on the Microfinance Banks performance
- H₀₂: Capital Adequacy have no significant effect on performance of Microfinance Banks performance.
- H₀₃: Loan loss Provision to deposit ratio have no significant effect on Microfinance Banks performance.
- H₀₄: Assets quality and Leverage Ratio have no significant effect on Microfinance Banks performance.
- H₀₅: Joint predictors of credit risk management practice have no significant effect on Microfinance Banks performance.

1.6 Significance of the Study

In view of increasing degree/huge non-performing loans (NPLs) which negatively impacted on the performance of MfBs and eventually impaired the capital base of MfBs in Nigeria during the last 20 years, studying credit risk management in Microfinance Banks in Nigeria has become quite significant and interesting. The findings of the study will be beneficial to the following stakeholders in our national economy when taking critical financial and economic decision:

- (i) The study will assist the management and board of MfBs in Nigeria to appreciate the need to cooperate with the relevant regulatory bodies for their efficient and effective supervision and recognize the need to consistently monitor, control, prevent and mitigate the incidence of non-performing loans. This is because loan default and huge loan-loss provisioning for risk assets in their books would consequently affects the banks' profitability, growth and going concern status on the long run.
- (ii) Regulatory authorities would derive many benefits from the study. It will assist them to fine-tune and re-align their various policies in monitoring and evaluating credit risk and performance of selected MfBs in Nigeria. It would also assist relevant government agencies and policy makers to formulate policies that can assist them to appraise the quality of their regulations and surveillance on the credit operations of MfBs in Nigeria.
- (iii) The shareholders, prospective investors and the general public will find the study invaluable in distilling the factors which influences the profitability of selected MfBs in Nigeria. The existing customers of the MfBs in Nigeria would also find the content of this research very incisive, insightful, informative and educative.
- (iv) The outcome of the study will assist academician and researchers to bridge the knowledge gaps that exist in the relationship between credit risk and profitability of MfBs in Nigeria. The academicians will find the study incisive, insightful and useful as it would assist to highlight areas for further research and as well as contribute to existing body of knowledge.

1.7 Scope of the Study

This study covered the review of the credit risk and profitability of 8 selected National Microfinance Banks operating in Nigeria as at December 2021. The study also covered a period of 5 years from 2016 to 2020. The choice of National Microfinance Banks was informed by the fact that all National Microfinance Banks are operating all over the country, with branches in every state of the Federation including the Federal Capital Territory. Again these banks have large Capital base compared to all other State and Unit Microfinance Banks whose operations are limited to their respective States or Local Government area¹⁹. Credit risk management is measured using Non-performing loan ratio, Capital adequacy, Loan loss provision to deposit ratio, Assets quality and, Leverage ratio while Microfinance Banks performance are measured using Return on Assets, Return on Equity, Net Interest Margin and Client base.

1.8 Limitation of the study

Understanding of some limitation that relate to the structure of process and techniques used in this study will be taken into consideration. The generalization of this study is limited to the period of study from 2016 – 2020. The study is also limited to the sample of National Microfinance Banks in Nigeria¹⁹. State Microfinance Banks and Unit Microfinance Banks are totally excluded from the study.

The limitation of this study to only National Microfinance Banks is because data is not readily available for state and unit microfinance banks. These categories of Microfinance Banks are mainly owned by individuals who sees the bank as totally private investments and not ready to share the financial information regarding their business for research purposes. Based on this the generalisation of this study is limited to the behavior of our main variables conditioned to the sampled national Microfinance Banks in Nigeria.

1.9 Operational Definition of Terms

The following concepts are defined in accordance with their literal and inferred meanings and usage during the study:

Assets Quality Ratio: Asset quality ratio is a measurement of the non-performing loan as a ratio of total outstanding loans.

Capital Adequacy: This is the ratio which assists banks in determining its ability to meet its day to day obligations from its capital base. It is measured as shareholders' funds expressed as a percentage of available deposits.

Client Base: The client base of the Microfinance Banks is the total number of customers who have taken one form of loan or the other or have an outstanding loan that is still outstanding during the period under consideration.

Credit Risk: This is the likelihood of customers being unable to repay loans and other obligations as and when due.

Performance: This is the measurement of a bank's ability to operate efficiently, profitably and improve positively in terms of shareholders' funds, return on assets, operating income, profit before tax and retained earnings.

Leverage Ratio: Leverage ratio measures the mix of the funds used by the banks for their operations. It states the percentage of total deposits to the shareholders' funds.

Loan Loss Provision: Loan loss provision is the amount that the banks have provided to cover the loans which have already passed due date and likely no longer be paid by the customer concerned.

Microfinance Banking Sector: It is the sector of the economy that concern holding of financial assets for others and investing those financial assets on low-income members of the community, as leverage to create more wealth and the regulation of those activities by government agencies.

Net Interest Margin: This refers to the balance of income in terms of interest on loans after subtracting interest expenses paid by the bank on deposits from various customers.

Non- Performing Loan Ratio: A non-performing loan (NPL) is a loan in which the borrower is in default and has not paid the monthly principal and interest repayments for a specified period. Non-Performing loan ratio is the ration of total non performing loans to total loans outsatnding at a particualr period.

Return on Assets (ROA): ROA is the measurement that shows a bank's profitability against its total assets. It is calculated as profit before Interest and Tax divided by Total Assets.

Return on Equity (ROE): ROE is the measurement that shows a banks' profitability against its shareholders' funds. It is calculated as Profit before Interest and Tax divided by average shareholders' funds.

Endnotes

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Chapter Two

Literature Review

This chapter comprises discussions on the conceptual, theoretical and empirical issues relating to Credit Risk and performance of microfinance banks. The discussions that follows focuses on bringing out relevant issues that will serve as a springboard for the empirical investigation in this work.

2.1 Conceptual Review

2.1.1 Microfinance Institutions (MFIs)

Microfinance Institutions can be established legally after it has gone through the necessary procedures and met the regulatory and legal requirements from the Central Bank of Nigeria (CBN)¹. Therefore, if a Microfinance Institution is illegally established, the Central Bank of Nigeria has the legal authority to stop it from operating. Hence, the survival of a Microfinance Institution, to a large extent, is determined by the degree to which its operations meet the legal and regulatory framework of the country in general and the banking industry.

2.1.1.2 Categories of Microfinance Institutions (MFIs)

Microfinance Institutions is categorised into five. These are discussed and conclusion drawn for this study concerning the category of MFI.

(a) Microfinance Institutions (MFIs) that Provide less Lending

The first category of Microfinance Institutions is those that cannot or have failed to lend large amount of loans to customers. This category includes many highly subsidised Microfinance Institutions that are well supplied with cheap donor or government funds as describe them as a ‘child of subsidy’. These categories of Microfinance Institutions are not yet recognised in Nigeria. Though most Credit Unions and other Savings and Loans receive support in the form of subsidy, they encourage savings mobilisation and lending².

(b) Unregulated and Supervised Microfinance Institutions

The second category of Microfinance Institution is those who have good savings and loans programmes but they are not given the opportunity to mobilise savings from people or disburse loans to the public³. This is because they are not regulated and supervised. Moreover, there is a high risk of these MFIs taking people’s money away if they are allowed to mobilise savings from the public because no form of prudential supervision will apply to them³. This goes down to explain that the legal and regulatory framework of a country determines the sustainability of MFIs to operate successfully. It is a check on them to remain sustainable and offer its services to the public. It could also imply that MFIs may not have the necessary skills to disburse and effectively monitor loan portfolio. MFIs that fall under this category, include those involved in the provision of microfinance, micro-lenders, and social amenities among others⁴.

(c) Unsuccessful MFIs in Savings Mobilisation

This category of MFIs is permitted to mobilize savings and is successful in lending to the public but, they are reluctant to do so. This may be due to the fact that, they still believe that the poor cannot save, do not save, do not trust financial institutions or prefer non-financial forms of saving⁵. This pinpoint that the lack of trust or demand for credits from MFIs could result to their unprofitability. It is also noted that institutions that fall into this category are MFI with commercial banking philosophy. No MFI would feel reluctant to mobilise savings and lending⁵. This is because; they compete among themselves in winning customers, reaping more profit from lending to make them sustainable. Most MFIs in Nigeria are profit makers. They exist to make profit first, create jobs and reduce poverty.

(d) Savings Microfinance Institutions

The fourth category of MFIs are those who are successful and have been given the opportunity to mobilise savings and lending but, they are weak in lending and provide subsidised credit, which puts the mobilised savings at risk⁶. When this happens, it makes the interest rates on subsidised credits and rates paid on deposits low to cover cost of mobilising savings and provide credit effectively to the public. Subsidised loans therefore reduce the Microfinance Institution's capacity to manage loan delinquency rates. MFIs that fall under this category are likely to invest the savings mobilised in government treasuries and securities⁷. They are typically state-owned financial institutions that channel government subsidised credit to rural borrowers. With regards to this, Agricultural Development Bank and Nigeria Commercial Bank can fall into this category. If not because of its state backing, these types of financial institutions would easily collapse⁷.

(e) Lending and Savings Mobilisation Microfinance Institutions

The final category consists of Microfinance Institutions that are successful in savings mobilisation and lending. These Microfinance Institutions are normally known to have large enough interest rate to cover all operating costs and risks associated with the sustainable provision of microfinance services. These MFIs designed workable document to implement their credit delivery and deposit to meet credit demands from the public to make them get more profit in return. Microfinance Institutions in this category consist of commercial Microfinance Institutions that can provide microfinance on a large-scale⁸.

There are various forms of credit facilities offered by financial institutions to their customers. These may include short term credit, medium term credit; long term credit, secured and unsecured credits. The short-term credit is a type of credit that is due for repayment after one year of granting. It is usually used to meet working capital needs. Examples of short-term credit include overdraft, call credit or commercial credits⁹. The medium-term credit is a type of credit facility where its maturity rate is more than one year but less than five years. It is required to finance non-current assets which results to great returns to the financial institution within the credit period. Examples of medium-term credit include letter of credit and consumption credit¹⁰. The long-term credit is used to finance the extension of non-current assets. It is normally large sums of money and as such its maturity is more than five years of grant. Examples of long-term credit include stock replacement credit, industrial credit and equipment leasing credit. Some financial institutions give loans against the securities of concrete pledges by the borrower in favour of lending. The pledged assets by the borrower are the collateral securities. Credit given by financial institutions regarding provision of such collateral securities is termed as secured credits. Unsecured credits are those credits given by financial institutions without the demand of collateral securities¹¹.

Credit facilities can also largely be grouped into performing and non-performing loans. If the customer does not default the loan given to him or her, it means the financial institution is performing well in terms of loan dealings. However, when the customer delays or fails to repay the loan with interest makes it is described as non-performing loans. Examples include doubtful debts, bad debts and loss¹².

2.1.1.3 Microfinance Institutions in Nigeria

The potential of using institutional credit and other financial services for poverty alleviation in Nigeria is quite significant. About 18 million people, or 60% of the population, are poor and mostly out of the scope of formal banking services. According to the National Micro and Small Enterprise Baseline Survey of 1999, there are close to 1.3 million MSEs employing nearly 2.3 million people or 20% of the country's total employment and contributing 18% of overall GDP and 25% of non-agricultural GDP¹¹. Despite this important contribution, only 10.4% of the MSEs receive credit and other financial services¹¹. The formal banking sector in Nigeria over the years has regarded the informal sector as risky and not commercially viable¹³.

However, despite the importance of this sector, experience shows that provision and delivery of credit and other financial services to the sector by formal financial institutions, such as commercial banks have been below expectation¹⁴. This means that it is difficult for the poor to climb out of poverty due to lack of finance for their productive activities. Therefore, new, innovative and pro-poor modes of financing low-income households and MSEs based on sound operating principles need to be developed¹⁴.

Microfinance Institutions fill a needed gap within the financial services industry by offering small loans, or micro-loans, to people unable to access conventional loan services.

Microfinance Institutions vary in size and function with some organizations focusing entirely on micro financing, while others work as extensions of large investment banks¹⁵. People living in under-developed areas can access needed financial resources through the services provided by Microfinance Institutions. In the past, Microfinance Institutions (MFIs) established using either an NGO or a savings and credit co-operative societies framework have been important sources of credit for many low-income households and MSEs in the rural and urban areas of Nigeria¹⁵.

Microfinance Institutions in Nigeria are regulated under The Microfinance Act, 2005 and the Microfinance Regulations issued there under sets out the legal, regulatory and supervisory framework. The principal object of the Microfinance Act is to regulate the establishment, business and operations of Microfinance Institutions through licensing and supervision. The Act enables Deposit Taking Microfinance Institutions licensed by the Central Bank of Nigeria to mobilize savings from the general public, thus promoting competition, efficiency and access. It is therefore, expected that the microfinance industry will play a pivotal role in deepening financial markets and enhancing access to financial services and products by majority of the Nigerian's (Central Bank of Nigeria)¹⁶.

Before the enactment of this bill, the MFIs operating in Nigeria were unregulated unless they optionally entered the Association for Microfinance Institutions (AMFI), based in Nigeria and funded by a USAID grant. Under the new bill, MFIs operating in Nigeria are vulnerable to the fines imposed by the CBN for every guideline to which they do not comply. The new regulations will protect the 60 percent of the Nigerian population who are out of the scope of the formal banking services from bogus MFIs¹⁷.

Many MFIs access commercial borrowing to fund their portfolio. Other sources of funds for operational and financial activities are International NGOs and Aid Agencies including USAID, IFC, UNDP, HIVOS, DANIDA, European Commission, OIKO Credit, World Vision, Churches and individual donors among other¹⁸. Some commercial banks have also invested in microfinance institutions. MFI Members' shares have also been a source for funds for the MFIs. Donors in Nigeria (such as USAID, IFC, UNDP, HIVOS, DANIDA, European Commission, Oikocredit, World Vision etc.) are active not only in funding MFIs but also in providing capacity building services¹⁸.

2.1.2 Credit Risks

Credit is the direct borrowing of money or loan from financial institutions. It is that which is provided by a financial institution or debt which is owed¹⁹. The provision of credit to customers by financial institutions and other routine activities and transactions result to risk. Risk is defined as the insecurity about the future and the expression of the future danger that the effective future outcome will deviate from the expected or planned outcome in a negative way. This definition highlights on speculation of risk in the future and how it can affect the outcome or performance of an institution in achieving its stated goal or objectives. This definition fits into the effective ways of managing future risk. This is because when an institution speculates a kind of risk, be it operational or credit risk, then the institution can start developing plans to address or prevent it from happening¹⁹.

Risks that occurred in financial institutions can be grouped as credit risk, interest risk, operational risk, market risk, legislative risk and reputation risk²⁰. Among the risks, credit risk is the most frequent that financial institutions experience especially in both the developed and the developing countries. This is because the risk depends predominantly on customers. Credit risk is defined as the situation where counterparty fails to meet its obligations in harmony with lay down procedures or agreed terms. Within the context of banking institutions, credit risk is the situation where a borrower defaults in payment of loan. Default is the total or partial loss of any amount lent to the borrower. A large default rate result to great losses and consequently lead to bankruptcy and insolvency of the bank²¹.

Credit risk is the degree of value fluctuations in debt instruments and derivatives due to changes in the underlying credit quality of borrowers and counterparties. Credit risk as losses from the refusal or inability of credit customers to pay what is owed in full and on time. Credit risk, therefore, refers to the potential that a borrower will fail to meet its obligations (principal, interests, commissions) on time or in accordance with the agreed terms. Credit risk is the exposure faced by banks when a borrower (customer) defaults in redeeming debt obligations on due date or at maturity. This risk interchangeably called “counterparty risk” can put the bank in distress if not adequately managed. The main sources of credit risk include, limited institutional capacity, inappropriate credit policies, volatile interest rates, poor management, inappropriate laws, low capital and liquidity levels, direct lending, massive licensing of banks, poor loan underwriting, laxity in credit assessment, poor lending practices, government interference and inadequate supervision by the central bank²².

An increase in bank credit risk gradually leads to liquidity and solvency problems. Credit risk may increase if the bank lends to borrowers, it does not have adequate knowledge about. In

the banking system, risk management plays an important role and regulators of the banking system are responsible for controlling banks risk exposures in order to avoid financial and economic crises. Credit risk management needs to be a robust process that enables financial Institutions to proactively manage facility portfolios in order to minimize losses and earn an acceptable level of return for shareholders²³.

Credit risk management refers to measures employed by banks to avoid or minimize the adverse effect of credit risk. Credit risk management accordingly is a structured approach to managing uncertainties through risk assessment, developing strategies to manage it, and mitigation of risk using managerial resources. The strategies include transferring to another party, avoiding the risk, reducing the consequences of a particular risk. Adequately managing credit risk in financial institutions is critical for the survival and optimal performance of the financial institutions. Credit risk arises from a debtor being unlikely to pay its obligations or deterioration of the financial capacity of the debtor(s) resulting in an economic loss for the bank. Credit risk also arises from loan agreements signed between a bank and individuals, corporations, financial institutions or state²⁴.

Although, banks loans are the most visible source of credit risk; credit risk equally arises from other banking activities such as on and off-balance sheet activities. Banks also faces credit risk when they trade various financial instruments such as bank receipts, interbank transactions, exchange rate transactions, future, swaps and options contracts. The components of credit risk management are loan loss provision, non-performing loans to total assets and total loans and advances as a ratio of total assets. Loan loss provision measures nonperforming loan as a ratio of total loans²⁵. Loan loss provision is an implicit cost that captures the impact of credit risk exposure of banks in their lending portfolio. Loan portfolio is one of the greatest sources of

risk to the quality of bank asset because bank loans and advances basically make up the largest asset and major source of bank revenue. It implies that the level of interest risk inherent in the bank loans might depend on the classification of its loan portfolio. Banks with higher credit risk exposure in their lending portfolio would be required to maintain a higher level of loan loss provision²⁶. Variations in loan loss provision affect profitability as well as capital positions of banks which have a strong implication on credit supply. This suggests that loan loss provision is one of factors that affect business cycle volatility indicating that decreases in bank loan loss provisions increases bank lending²⁶.

A critical observation of the commercial banks in Nigeria showed that in the year 2000 for instance, the ratio of nonperforming loans to total loans of the industry was 21.5% and as at the end of 2001, the ratio had improved to 16.9%. In 2002, 2003 and 2004, the ratio deteriorated to 21.3%, 21.6% and 23.8% respectively. However, in 2005, 2006, 2007 and 2008 there were consistent improvement of, 18.1%, 8.8%, 8.4% and 6.3% respectively (CBN). Unfortunately, non-performing loans is becoming cyclical in Nigerian banks. The commercial banks recorded an increase in non-performing loans from N344.26 billion as at August 2013, to N400.57 billion, as of August 2014 which represents a 16.36% increase. Also, total credit delivery recorded a growth rate of 23.8% in 2004, 30.4% in 2005, 40.9% in 2006, 82.7% in 2007 and 62.3% in 2008. Unfortunately, non-performing loans is becoming cyclical in Nigeria²⁷.

The Deposit Money Banks recorded a N56.31 billion increase in non-performing loans from August 2013 to August 2014. The increase in non-performing loans from N344.26 billion as at August 2013, to N400.57 billion, as at August 2014, represents a 16.36% increase Gross loans of banks also increased from N9.278 trillion in August, 2013 to N11.229 trillion as at

August, 2014 and this represents 21.03% increase in gross loans²⁸. Adequately managing credit risk in financial institutions is critical for the survival and optimal performance of the financial institutions. A sound credit risk management framework is crucial for banks to enhance profitability and guarantee survival. Credit risk management maximizes bank's risk adjusted rate of return by maintaining credit risk exposure within acceptable limits in order to provide framework for understanding the impact of credit risk management on banks' profitability²⁸.

Loans and advances are the largest and the most obvious source of credit risk, however, credit risk could stem from activities relating to both on and off-balance sheet transactions. Bank credit inherently contains an element of the risk of default by the debtor. The bank granting the credit has no control over the inherent risk. Thus, risk is determined by factor extraneous to the bank such as general unemployment levels, changing socioeconomic conditions, debtors' attitudes and political issues²⁹. Credit risk is the risk that an asset or loan becomes irrecoverable, in the case of total default or the risk of delay in servicing of loans and advances. Basel Committee of Banking Supervision (BCBS) defined credit risk as the possibility of losing the outstanding loan partially or totally due to credit events (default risk)²⁹.

Banks are increasingly facing credit risk (or counterparty risk) in various financial instruments other than loans, including acceptances, interbank transactions, trade financing foreign exchange transactions, financial futures, swaps, bonds, equities, options, and in the extension of commitments and guarantees, and the settlement of transaction. Basel Committee on Banking Supervision defines credit risk as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms. Counterparty risk comes

from non-performance of a trading partner²⁹. Credit risk as a risk based on the assumption that a borrower would default in repayment to the lender. Credit risk in banks arises from two sources namely systematic and idiosyncratic. Systematic risk represents the effects of unexpected changes in macroeconomic and financial market conditions on the performance of borrower guarantees, and the settlement of transaction³⁰. Credit risk is the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms. Counterparty risk comes from non-performance of a trading partner. Credit risk is a risk based on the assumption that a borrower would default in repayment to the lender. Credit risk in banks arises from two sources namely systematic and idiosyncratic. Systematic risk represents the effects of unexpected changes in macroeconomic and financial market conditions on the performance of borrower³¹.

2.1.3 Sources of Credit Risks in Financial Institutions

Credit risk occurs as a result of loans granted by financial institutions. The activities of financial institutions such as bookkeeping, trading, both on and off the balance sheet, are sources of credit risks. Recently, financial institutions increasingly face credit risk in various financial instruments other than loans including swaps, equities, foreign exchange, and financial futures and in the expansion of commitments and guarantees, and the settlement of transactions³³.

Credit risks are usually seen as a result of systematic risk derived from the macro standpoint. The huge problems in financial institutions that is caused by the failure of financial market participants to meet repayment requirements on expansions of credit is characterized as systematic risk³⁴. The problem is systematic because the incapacity of one participant to repay the loan can result to an inability of the other participant to meet loan obligations³⁴.

2.1.3.1 Internal and External Sources of Credit Risks

Credit risk can be grouped into internal and external sources. The sources of credit risk include bad governance, unsuitable credit policies, reduce capital and liquidity levels, explosive interest rates, poor governance and management control³⁵. Other external sources of credit risk include directed lending, reckless lending, poor loan underwriting, unsuitable laws, poor lending practices, huge licensing of financial institutions including Credit Unions, poor credit assessment, carelessness in credit assessment, limited institutional capacity insufficient supervision and government interference. These sources of credit risks are much documented in literature. The degree of the above-mentioned external sources of credit risks varies across countries³⁵.

Apart from the external sources of credit risks stated above, there are also internal credit risk sources. The financial incentives given to workers at financial institutions are regarded as an internal source of credit risk. This is because such workers have a strong propensity to moral hazards and opportunism by lending to weakly functioning individuals and firms with uncertain credit records. The period of information asymmetry and uncertainty, it is not easy to plan an incentive scheme for workers at financial institutions who oversee lending and credit. It has been mentioned that internal sources of credit risk are much acknowledged in research. The assumption is that these workers at the financial institutions will be responsible for what they are working for, and their action perfectly reflects the interests of banks³⁶. To address the effects of these factors, it is important for financial institutions to provide services to greater percentage of customers, share information about borrowers, reduce non-performing loans, stabilize interest rates and improve bank deposits, reduce loan default and strengthen corporate governance³⁶.

2.1.3.2 Credit Risk Management and Bank Performance

Credit risk was defined as the potential that a bank borrower or counter party will fail to meet its obligation in accordance with agreed term. The severity of credit risk reduced the balance sheet of financial institutions during and after the 2007-2009 financial crisis and this brought about significant changes in how banks operate and particularly how they manage risks³⁷.

By being exposed to credit risk, banks have been faced with a lot of problems. The banks couple of years ago realized that credit risk is important, and the banks need to monitor, identify, control and measure it as it's very significant. Due to this, the effective management of credit risk has become a critical component of approaching risk management. This approach will be especially important in terms of the long-term success of any bank. Banks now ensure that they have large amounts of capital against any form of credit risks so that they can be in position to adequately tackle any risks which will be incurred³⁸.

Credit risks are some of the most prevalent risk elements in the books of most financial institutions and if not managed in the most efficient manner, can weaken individual banks or even cause many episodes of financial instability by affecting the whole banking system. Thus, to the banking sector, credit risk is an inherent and crucial part. Credit risk arises whenever a borrower is expecting to use future cash flow to pay a current debt. The risk is primarily that of the lender and includes lost principal and interest, disruption to cash flows and increased collection costs. The loss may be complete or partial and can arise in several circumstances. To reduce the lender's credit risk, the lender may perform a credit check on the prospective borrower, may require the borrower to take out appropriate insurance or seek security or guarantees of the third parties³⁹.

Credit risks can be classified into many forms such as options, equities, mutual funds, bonds, loans and other financial issues, as well as extensions of guarantees and the settlements of these transactions. It's important to consider credit risk very seriously in order to increase shareholder value through presentation and value optimization, increase confidence in the marketplace, and alleviate regulatory constraints and distortions⁴⁰. The Basel II Accord specifies that banks must have new procedures for measuring against credit risks²⁸. Credit risk management practices differ from bank to bank. Generally, these types of practices are dependent on the type and complexity of the credit activities which are taken by the banks. In recent years banks have been using models for credit risk management⁴⁰.

Lenders mitigate credit risk by using several methods; Risk-based pricing; where lenders charge a higher interest rate to borrowers, who are more likely to default. This estimates the effect on yield that is credit spread which reflects the additional net yield an investor can earn from a security with more credit risk relative to one with more credit risk. Covenants: lenders may write stipulations on the borrower into loan agreements, Credit insurance and credit derivatives; lenders and bond holders may hedge their credit risk by purchasing credit insurance or have contracts that transfer the risk from the lender to the seller in exchange for payment. Tightening, diversification, Deposit insurance among others⁴¹.

The main function of the risk manager is to monitor, measure and control credit risk. It includes identification of possible events or future changes that could have a negative impact on the institution's credit portfolio and the financial institution's ability to withstand the changes. Reduced credit risk encourages effective risk management which requires a reporting and review structure to ensure that risks are effectively identified, and responses are in place.

Risk monitoring can be used to make sure that risk management practices are in line and

proper risk monitoring also help bank management to discover mistakes at early stage and deal with moral hazard problem⁴².

Loans are the larger source of credit risk to microfinance banks. Nevertheless, other sources of credit risk exist throughout the operations of a bank. Banks are slowly facing credit risk (or counter-party risk) in diverse financial instruments other than loans, in addition to, inter-bank transactions, foreign exchange transactions, acceptance, financial futures, swaps, bonds, equities, options, trade financing, and in the extension of commitments and guarantees, and the settlement of undertakings. The aim of credit risk management is to build up a bank's risk adjusted rate of return by conserving credit risk exposure within acceptable parameters. Banks need to manage the credit risk inherent to the entire portfolio as well as the risk in individual credits as transactions⁴³.

Credit risk management should be at the core of banks operations in order to keep up financial sustainability and reaching more clients. Despite these facts, over the years there has been increased number of significant bank problems in both, matured as well as emerging economies³⁸. Bank problems, mostly failures and financial distress have afflicted numerous banks, many of which have been closed by the regulatory authorities. Among other determinants, weakness in credit risk management has all along been cited as the main cause for bank problems. Since exposure to credit risk persists to be the leading source of deadlocks in banks world-wide, banks and their supervisors should be able to draw useful lessons from past experiences³⁸. Banks should now have an avid awareness of the need to recognise, measure, monitor, and control credit risk as well as to determine that they hold adequate capital against these risks and that they are adequately compensated for risks incurred⁴⁴.

Risk Management represents a burning issue among organizations in different nations of the world. This is because the ability of an organization to continue to operate into the foreseeable future depends on managing risks and uncertainties and converting the downside of risks to upside risks to create competitive advantage that will ensure organizational survival. The discourse on risk management is particularly topical among financial institutions because they are exposed to all kinds of risks including strategic risk, operational risk, security risk, reputational risk, legal risk, money laundering risk, and cross border risks⁴⁵. Meanwhile, financial institutions cannot afford to collapse, as such eventuality could create systemic risks, which could weaken not only the financial system but the economic system of a nation at large⁴⁶. Thus, it becomes important for financial institutions to put in place adequate risk management processes and structures for them to operate as going concern, and to effectively perform their roles of mediating between the deficit and surplus unit of the financial system⁴⁶. Microfinance banks occupy a strategic position in the value chain of any financial system, as they make finance more accessible to the financially disadvantaged who may be unable to access finance from conventional deposit money banks due to stringent conditions for obtaining loans and advances⁴⁷. There is therefore no denying that microfinance banks are critical for realizing financial inclusion goals in the nations of the world, especially in developing countries⁴⁷.

Despite the well acknowledged relevance of Enterprise Risk Management (ERM) to organizational survival in the financial service sector, studies on risk management practice of microfinance institutions are limited in comparison to commercial banks and other non-bank financial institutions. Most of the studies on ERM emanate from developed countries⁴². Studies on ERM of microfinance banks are scanty in Nigeria, as most studies have focused on

commercial banks. Knowledge is limited on the factors influencing ERM of microfinance bank in the Nigerian context. As microfinance banks would typically invest resources to implement ERM initiatives, little is known on the extent to which this has impacted organizational sustainability. In the context of this study, organizational sustainability is the ability of microfinance banks to continue to operate in the foreseeable future, as the industry is replete with history of microfinance banks that have failed shortly after commencing operations⁴⁸.

Nigeria currently has eight hundred and eighty-two (882) licensed microfinance banks in Nigeria as of September 20, 2018. With such a sizeable and growing number of microfinance banks in Nigeria contributing to micro financing in the country, a study on the risk management practice of microfinance banks in Nigeria is considered topical, timely and important, as such knowledge would be important in addressing some of the challenges facing microfinance banks in Nigeria, with a view towards repositioning them for competitiveness and effectiveness of service delivery⁴⁹.

The risks inherent in the management of funds by financial institutions varies in type, duration and severity. This brings to fore the need for financial institutions, including microfinance banks, to evolve various strategies for managing risks. Some of the risks include Strategic risk, Operational risk, Security risk, Reputational risk, Legal risk, Money laundering risk, and Cross Border risks, among other⁵⁰.

Strategic risk is the current and prospective impact on earnings or capital arising from adverse business decisions, improper implementation of decisions, or lack of responsiveness to industry changes. Strategic risk is a function of the compatibility of an organization's strategic goals, the business strategies developed to achieve those goals, the resources deployed to

achieve those goals, the resources deployed against these goals, and the quality of implementation⁵¹.

Operational risks take the form of inaccurate processing of transactions, unenforceability of contracts, compromises in data integrity, data privacy and confidentiality. Operational risk as transaction risk and explained that it is the current and prospective risk to earnings and capital arising from fraud, error, and the inability to deliver products or services, maintain a competitive position, and manage information. A high level of transaction risk may exist with internet banking products, particularly if those lines of business are not adequately planned, implemented and monitored⁵².

Security risk refers to the unauthorized access or intrusion to a bank's information systems and transactions. Unauthorized access to customers' account and other confidential information are inherent danger when deploying Internet banking facilities. Reputational risk is the current and prospective impact on earnings and capital arising from negative public opinion and it affects the institution's ability to establish new relationships or services⁵¹. Reputational risk may expose institution to litigation, financial loss, or a decline in its customer base. As there are myriads of risks that financial institutions are exposed to, there are several approaches for managing risks, which include but are not limited to Top Management/ CEO commitment (tone and messaging from the top)⁵¹.

2.1.3.3 Risk Policies and/or Mission Statements of Microfinance

Determinants and Impact of Enterprise Risk Management (ERM) on Sustainability of Microfinance including adapting any company risk or audit committee charter to incorporate ERM; Existence of an ERM Team in charge of managing the risk; Gathering risks across the organization by encouraging all employees to report risks; Adoption or development of a risk

framework; Incorporating risk into appropriate employees' job descriptions and responsibilities; Incorporating risk into the budgeting function; Integrating risk identification and assessment into the strategy of the organization; Sensitizing, training and developing staff on enterprise risk; and Use of financial management tools such as sensitivity analysis, simulation, shorter payback period, etc. to manage financial risks⁵².

As there are various stakeholders with, sometimes, conflicting interest in an organization, there could be various factors which may affect the ERM of financial institutions⁵³. The theory of institutional isomorphism suggests that a collection of factors may exert on the management practice of organizations exposed to similar environmental conditions, such that the structure or management practice for such organizations are similar. The institutional theory adduced three isomorphic factors which may exert on organisations to be similar, namely: normative, mimetic and coercive factors. The Normative factors stem from stakeholder groups or organizations that may influence the practice of an organization by making recommendations on best practice. Consultants, professionals or experts that an organization depends on for assistance and technical guidance may normatively influence the management practice of organizations⁵⁴.

Mimetic factors capture the effect that other organizations which an organization emulates, mimics or tries to resemble affect organizational practice. Mimetic influence may come from industry leaders, leading competitors or other organizations controlled by the same Management team (such as parent companies, subsidiaries or associate companies). Coercive factors come from external pressure. Other organizations, stakeholder or institutions may be able to exert pressure on an organization because they wield such influence or are able to coerce or force an organization to impement an initiative or adopt a practice⁵⁵.

The contextualization of the institutional theory of isomorphism to this study implies that the ERM practice of microfinance banks may be similar because it may be influenced by a combination of normative, mimetic and coercive factors. Government regulations through the Central Bank of Nigeria, Company's shareholders mandates and requirements of financial institutions/Fund Providers may force or coerce microfinance banks to implement ERM (i.e. influence of coercive institutional factors). The desire to satisfy customer to survive competition may also force microfinance banks to implement robust ERM practice (coercive institutional factors)⁵⁶.

The need to embrace best practice as implemented by Multinational financial institutions and competitors may affect ERM practice of microfinance banks (Mimetic institutional factors). The recommendations of experts, professional bodies and consultants that partner with microfinance banks may also shape ERM practice (normative institutional factors). Prior studies have invoked the institutional theory to explain similarity in management practice⁵⁷.

Scholars have suggested that the extensive implementation of ERP can sustain organizational performance. This is hinged on the argument that ERM encourages a proactive approach to risk management. Since the risks can be anticipated, control measures to minimize the risks can be implemented in advance. Further, as risk has its upside, proactively managing risks as advocated by ERM enables an organization to foresee opportunities inherent in risks, such that the organization can take a position which actualizes the benefits or upside of the risk. ERM also assist an organization in refraining from actions or activities that invokes the negative side of risks which eventually results into losses⁵⁸. Taken together, by avoiding activities or placing mitigating measures that blocks the negative side of risks on one hand, and instituting measures that cash in on the benefits of the upside of risks, organizations can go beyond

maintaining shareholders value to creating and sustaining value for stakeholders, thereby enhancing organizational sustainability.

Results from an analysis of survey data obtained from 104 microfinance banks in Lagos, Nigeria, using structural equation modelling (SEM) and least square regression, suggests that Company's customers exert the greatest influence on ERM practice, followed by Company's shareholders⁵⁹. Other institutional factors such as Government regulations, financial institutions/Fund Providers, Competitors' activities, Multinational organizations, and Recommendations of Consultants/ Professional bodies have no significant impact on ERM practice of microfinance banks in Nigeria. Result also shows that although the impact of ERM organizational sustainability is negligible and negative, the result is not statistically significant⁵⁹.

In other words, ERM practice has no significant impact on sustainability of Microfinance banks in Nigeria. Whilst the extensive implementation of ERM has the potential to enhance organizational sustainability, it appears that the inability of ERM practice to significantly engender organizational sustainability is not unconnected to the generally shallow implementation level of ERM. The study draws attention to the need for microfinance banks to step up the robustness and intensity of implementing ERM for them to realize the ensuing benefits. It is recommended that organizations should concentrate on proactively and deliberately managing risks arising from its core competencies⁶⁰.

The credence to the fact that the best warning signs of financial crises are proxies for the vulnerability of the banking and corporate sector. The most obvious gauge that can be used to forecast banking crises are those that relate directly to the soundness of the banking system. In the 1980's and early 1990's, a lot of countries in developed, developing and transition

economies experienced several banking crises requiring a major overhaul of their banking systems⁶¹. As the banking sector continues to welcome innovations, the intensity and variety of risks that the players are exposed also continue to increase concurrently. To certify that the growth in the banking sector does not endanger its stability, risk management is crucial⁶¹.

2.1.3.4 Types of Bank Risks

The risks associated with the provision of banking services vary by the type of service rendered. Different authors have grouped these risks in various ways to develop the frameworks for their analyses but the common ones which are considered in this study are credit risk, market risks (which includes liquidity risk, price risk, interest rate risk and foreign exchange risk), and operational risks which sometimes include strategic risk⁶².

Credit risk: The probability that some of a financial institution's assets especially its loans will decline in value and perhaps become worthless is known as credit risk. Because financial firms tend to hold little owners' capital relative to the aggregate value of their assets, only a small percentage of total loans need to turn bad to push them to the brink of failure. The purpose of credit risk management is to maximise a bank risk-adjusted rate of return by upholding credit risk exposure within acceptable parameters⁶³.

Market risks: In market-oriented economies, where most of the world's leading financial institutions offer their service today, the market values of assets, liabilities, and net worth of financial service providers are constantly in a state of flux due to uncertainties concerning market rates or prices⁶³. Market risk as the change in net asset value due to changes in underlying economic factors such as interest rates, exchange rates, and equity and commodity prices⁶³.

Liquidity risk: The Basel Committee on Bank Supervision, in its consultative paper of June 2008, defined liquidity as the ability of a bank to fund increases in assets and meet obligations as they become due, without incurring unacceptable losses. A micro finance bank faces liquidity risk when it does not have the capability to efficiently contain the redemption of deposits and other liabilities and to cap funding increases in the credit and investment portfolio⁶³.

Interest rate risk: With more volatile market interest rates in recent years, bankers and their competitors have developed several new ways to defend their earnings margins against interest rates changes, including interest-rate swaps, options, and financial future contracts. In general, interest rate risk is the potential for changes in interest rates to reduce a bank earnings or value⁶³.

2.1.3.5 Credit Risk Management Measurement

Operating and financial ratios have long been utilised as tools for ascertaining the condition and the performance of a firm. Modern early warning models for financial organisations gained recognition when resorted to discriminant analysis for identifying and distinguishing problem banks from sound banks and the CBN investigated the savings and loan industry⁶⁴. To assume banks' financial deterioration, procedures have been developed to identify banks remote financial distress. These procedures, though changing from country-to-country, are designed to generate financial soundness ratings and are commonly referred to as the CAMEL rating system⁶². In Nigeria, the Central Bank also applies the CAMEL rating system to assess the soundness of financial institutions which is an acronym for Capital Adequacy, Asset Quality, Management Quality, Earnings and Liquidity⁶⁴.

Diverse prior studies have investigated the efficacy of CAMEL ratings, and they altogether conclude that publicly available data combined with regulatory CAMEL ratings can identify and/or anticipate problem or failed banks⁶⁵. Kirkpatrick points out that the internal factors generating bank failures are decisions over which the managers and directors of the bank have absolute control. The analytical framework of credit risk management in this study is based on the agent variables of CAMEL rating system components⁶⁵.

Capital Adequacy: is a measurement of a bank to demonstrate if solvency can be preserved due to risks that have been incurred during business. Capital allows a financial entity to grow, establish and maintain both public and regulatory confidence, and provide a cushion (reserves) to be able to absorb possible loan losses above and beyond identified problems. Capital adequacy ratio is defined as the measure of total capital (TC) to total risk weighted assets (TRWA) will be used as a proxy for credit risk, a healthy capital base strengthens confidence of depositors⁶⁶.

Asset Quality: assesses risk, controllability, adequacy of loan loss reserves, and acceptable earnings; and the effect of off-balance sheet earnings and loss. Asset quality is the ratio of non-performing loans to total loans (NPLR) and is an indicator of the quality of credit decisions made by bankers. Higher NPLR is an exhibit of poor credit decision-making⁶⁷.

Management Quality: sound management is vital to banks' performance but is difficult to measure because it is a qualitative determinant applicable to individual institutions. There are several factors that can serve as an indicator of management soundness. For this study, the non-interest expense (salaries and benefits) to total assets (MGT) will be used as an indicator of management quality since salaries and benefits are mainly the largest non-interest

expenditure element of bank overhead, are also controllable by management and reflects the management policy stance⁶⁸.

Earnings: determines the capacity of a bank to increase capital (through retained earnings), absorb loan losses, support the future growth of assets, and give a return to investors. It can be measured by the return on asset ratio (ROA) which is a ratio of the net income to total assets.

Liquidity: cash maintained by the banks and balances with central bank to total asset ratio (LQD) is a gauge of bank's liquidity. Generally, banks with a larger volume of liquid assets are understood safe, since these assets would allow banks to meet unexpected withdrawals⁶⁸.

Banking is the intermediation between financial savers on one hand and the funds seeking business entrepreneurs on the opposite hand. As such, within the process of providing financial services, banks assume various types of risk both financial and non-financial. Today, banks' financial risk management is one of the foremost important key functions in banking operations as microfinance banks are within the risk business. All banks are exposed to an outsized number of risks like credit risk, liquidity risk, exchange risk, market risk, and rate of interest risk, among others – the risks which can create some source of threat for a bank's survival and success⁶⁹.

The analysis of the financial soundness of borrowers has been at the core of banking activity since its inception. This analysis refers to what nowadays is thought of as credit risk, that is, the risk that the counterparty fails to perform any obligation owed to its creditor. This can be the uncertainty attached to the gathering of loans. The probability that some bank's asset value, especially its loans will decline and maybe become worthless is thought of as credit risk. A non-performing loan could be a loan that is not earning income and full payment of principal

and interest is not any longer anticipated, the due date has passed, and payment fully has not been made⁷⁰.

Credit risk as losses from the refusal or inability of credit customers to pay what is owed fully and on time. It arises mainly from direct lending and certain off-balance sheet products like guarantees, letters of credit, exchange, forward contracts, and derivatives and from the bank's holding of assets within the kind of debt securities. It should take the shape of delivery or settlement risk⁷⁰. It is critical to bank survival or failure because banks traditionally earn huge profits from interest on their risk exposures. The management of credit risk could be a critical component of a comprehensive approach to risk management and is crucial to the long-term success of a microfinance bank⁷¹. A study of Pakistani banks concluded that credit risk is a significant predictor of bank margins, which is usually a key indicator of the bank's level of efficiency in terms of its fundamental role of financial intermediation. The higher the credit risk faced by banks, the greater their profitability⁷².

Risk management guideline credit risk is the risk of financial loss, despite the realization of collateral security or property, resulting from the failure of a debtor to honor its obligations to the bank. The area of credit risk includes default risks related to a bank's portfolio of bonds (credit through investment) and other fixed-income investments, counterparty risk on derivative contracts, and the risk of default on loans or insured debts and trade debtors. The major risk that arises from a weakening of the credit portfolio is the impairment of capital or liquidity. For most banks, extending credit through investment and lending activities banks an important portion of their business. Therefore, the quality of an institution's credit portfolio contributes to the risks borne by policyholders (liquidity) and shareholders (capital

impairment)⁷³. Credit risk management comprises all management functions such as identification, measurement, monitoring, and control of credit risk exposure⁷³.

2.1.4 Liquidity Risk

Liquidity risk is the degree to which debt obligations coming due within the next 12 months are often paid from cash or assets which will become cash. It is usually measured by the present assets to current liabilities (current ratio)⁷⁴. It shows the power to convert an asset to cash quickly and reflects the flexibility of the firm to manage working capital when kept at normal levels. A firm can use quick assets to finance its activities and investments when external finance is not available, or it is too costly⁷⁴. On the opposite hand, higher liquidity would allow a firm to influence unexpected contingencies and to deal with its obligations in periods of low earnings. The liquidity of an investment is defined by how quickly and to what extent it is often converted into cash. The flexibility to convert the investment into cash is, however, dependent on several factors that influence the scope of the liquidity risk. Additionally, to general market conditions which necessitate the dissolution of investment under unfavorable conditions, an unexpected demand for liquidity could also be triggered by a credit rating downgrade, negative publicity (whether justified or not), or reports of problems of other companies within the same or similar lines of business⁷⁵.

Risk management guideline operating liquidity or cash management covers the day-to-day cash requirements under normally expected or likely business conditions. Strategic liquidity considers liquidity needs on a longer-term basis and recognizes the possibility of various unexpected and potentially adverse business conditions. Risk management guideline identify different points regarding liquidity risk management practices these are for safe and sound

management of companies managing liquidity is a fundamental component⁷⁶. Sound liquidity management involves prudently managing assets and liabilities (on and off-balance sheet) to ensure that cash inflows have an appropriate relationship to the size of approaching cash outflows⁷⁶. Liquidity planning assesses potential future liquidity needs, considering various possible changes in economic, market, political, regulatory, and other external or internal conditions, and planning for liquidity needs involves identifying known, expected, and potential cash outflows and weighing alternative business management strategies to ensure that adequate cash inflows will be available to the company to meet these needs⁷⁷.

2.1.5 Solvency Risk

The solvency risk defines the risk that a bank cannot meet maturing obligations because it has a negative net worth; that is; the value of its assets is smaller than the value of its liabilities. This may happen when a bank suffers some losses from its assets because of the write-offs on securities, loans, or other bank activities, but then the capital base of the institution is not sufficient to cover those losses⁷⁸. In such a case, the bank will be unable to meet its obligations, defaults and loses its franchise value. To avoid such risk, banks need to keep an adequate buffer of capital, so that in case of losses, the bank can reduce capital accordingly and remain solvent. On this reasoning, we may consider the solvency position of a bank as determined by two main factors: the availability of an appropriate buffer of capital and the profitability of bank activities⁷⁸.

With the rising prominence of stress tests in recent years, increased attention is being paid to the interaction between bank solvency risks and funding costs. Increased solvency risk is associated with higher marginal funding costs (ie market discipline); rising funding costs, in

turn, are linked to reduced regulatory capital ratios and thereby to increased solvency risk. Solvency is the ability of a financial institution to meet its obligations in the event of cessation of activity or liquidation. It refers to a company's long-run financial viability and its ability to cover long-term obligations. A bank is considered solvent if the total assets exceed total liabilities⁷⁹. If the total assets are lower than total liabilities, the bank faces an insolvency risk and is said to be "technically insolvent". Insolvency risk shows the probability of default by a bank on its obligations⁷⁹.

The solvency problem tends to be more long-term than the previously described liquidity issue and historically, banks have always held on to funds and stopped lending when there is a solvency crisis⁸⁰. Financial ratios that measure solvency include total debt to total capital, total debt to equity capital, long-term debt to equity capital, and short-term debt to equity ratios⁸⁰.

2.1.6 Operational Risk

Malfunctions of the data systems, reporting systems, internal monitoring rules, and procedures designed to require timely corrective actions, or compliance with the interior risk policy rules lead to operational risks⁸¹. Operational risks, therefore, appear at different levels, like human errors, processes, and technical and data technology. Because operational risk is an occurrence risk, within the absence of efficient tracking and reporting of risks, some important risks are going to be ignored, there will be no trigger for corrective action, and this could lead to disastrous consequences. Developments in a modern banking environment, like increased reliance on sophisticated technology, expanding retail operations, growing e-commerce, outsourcing of functions and activities, and greater use of structured finance (derivative)

techniques that claim to cut back credit and market risk have contributed to higher levels of operational risk in banks⁸¹.

Basel Committee on Banking Supervision addressed operational risk in its Core Principles for Effective Banking Supervision by requiring supervisors to confirm that banks have risk management policies and processes to spot, assess, monitor, and control or mitigate operational risk. In its 2003 document, Sound Practices for the Management and Supervision of Operational Risk, the Committee further guided banks for managing operational risk, in anticipation of the implementation of the Basel II Accord, which needs a capital allocation for operational risks⁸². Despite these efforts by the regulators at addressing operational risk, practical challenges exist when it involves its management⁸².

The importance of operational risk management cannot be overemphasized. Inadequate operational risk management can result in unpredictable financial performances. It also can impact negatively on banks' revenues and erode banks' net worth, most significantly, it can have calamitous systemic consequences as was highlighted on the part alluded to possess been played by operational risk in the 2008 financial crisis⁸³. Therefore, as for the objectives of putting in place an operational risk management framework to be accomplished, it's going to require a change within the behavior and culture of the firm. Management must also not only ensure compliance with the operational risk policies established by the board but also report regularly to senior executives. A definite amount of self-assessment of the controls in place to manage and mitigate operational risk is going to be helpful⁸³.

2.1.6.1 Interest Rate Risk

The real interest rate is expected to have a positive relationship with profitability in the essence of the lend-long and borrow-short argument. Interest rate risk arises from movements in interest rates. A bank is exposed to interest rate risk when it experiences a situation of imbalance in terms of size or maturity dates between assets and liabilities sensitive to interest rates. This leads to potential losses for the bank when the interest rate increases or declines and this influences the net asset value in the budget, which some call risk gap⁸⁴.

There are three main methodologies for interest rate risk management: difference (gap) analysis, duration analysis, duration-difference analysis. Difference (Gap) Analysis includes the analysis of all bank balance items according to possible reappraisal dates and their sensitivity for interest rate shift. Another very important factor while conducting the difference analysis is evaluating the bank's assets and liabilities sensitivity to the interest rate shifts. Not all assets and liabilities are sensitive to interest rate shifts. Indifference analysis relates only to assets and liabilities that are sensitive to interest rate shifts, i.e., the instruments whose prices will change if the interest rate varies in the market, are used. Firstly, all the assets and liabilities delivering no interest must be excluded. A calculated positive gap means that more assets would be reappraised comparing with liabilities at the given period. A negative gap means that at the given moment more liabilities will be reappraised comparing to the assets⁸⁵.

Consequently, after the increase of interest rate, interest outcomes will grow more than interest incomes, i.e., when the interest rate increases, net income received from the interest will decline. If the interest rate declines, net income from the interest will grow. The goal of interest rate risk management is to maintain a bank's interest rate risk exposure within self-imposed parameters over a range of possible changes in interest rates. As expressed in Basel Committee on Banking Supervision (2003), a system of interest rate risk limits and risk-taking

guidelines provides the means for achieving that goal⁸². Such a system should set boundaries for the level of interest rate risk for the bank and where appropriate, should also provide the capability to allocate limits to individual portfolios, activities, or business units. Limit systems should also ensure that positions that exceed certain predetermined levels receive prompt management attention⁸⁶.

An appropriate limit system should enable management to control interest rate risk exposures, initiate discussion about opportunities and risks and monitor actual risk-taking against predetermined risk tolerances. Limits should be consistent with an overall approach to measuring interest rate risk⁸⁷. Aggregate interest rate risk limits clearly articulating the amount of interest rate risk acceptable to the bank should be approved by the top management and re-evaluated periodically. Such limits should be appropriate to the size, complexity, and capital adequacy of the bank as well as its ability to measure and manage risk⁸⁷.

2.1.7 Foreign Exchange Risk

Exchange rates tell us how many units of one currency may be bought or sold for one unit of another currency. The spot rate is the exchange price for transactions for immediate delivery. The forward rate applies to a deal that is agreed upon now but where the actual exchange of currency is not due to take place until some future date⁸⁸.

The exchange of currencies at the future date will be at the rate agreed upon now. Foreign exchange risk as incurring losses due to changes in exchange rates.

Exchange rate risk occurs as a result of either transaction risk or economic risk.

Transaction risk occurs from the effect of changes in nominal exchange rates that affect the company's contractual cash flows in foreign currencies⁸⁹. It relates to

contracts already entered, but which have yet to be settled. Thus, a company is subject to transaction risk whenever it imports goods from or exports goods to another country which are paid later, or where a company borrows or invests in a foreign currency or uses derivatives denominated in a foreign currency⁸⁹.

Foreign Exchange risk arises when a bank holds assets or liabilities in foreign currencies and impacts the earnings and capital of the bank due to the fluctuations in the exchange rates. An exchange rate can move in either upward or downward direction at any time. This uncertain movement poses a threat to the earnings and capital of banks⁹⁰. The direct foreign exchange risk can be either Transactional or it can be Translational. Transactional risk, as the name implies is because of transactions in foreign currencies and translational risks is an accounting risk arising because of the translation of the assets held in foreign currency. The indirect exchange rate risk is emanated from economic exposure which is reflected through demand for a bank loan and bank loan performance⁹⁰. Additionally, foreign exchange risk of a bank comes from its very trade and non-trade services.

2.1.8 Concept of Bank Performance

Bank performance is usually measured by profitability. Also, profitability is normally proxied by two alternative measures: the return on assets (ROA), which is the ratio of profits to assets and return on equity (ROE), which is profit to equity ratio. Generally, ROA shows the ability of banks management to generate profits from the bank's assets, which may be biased due to off balance-sheet

transactions. On the other hand, ROE, which is often referred to as bank's equity multiplier, indicates the return to shareholders on their equity and it equals return on assets times the total assets-to-equity ratio. Banks with high equity and low leverage in the capital structure usually report high ROA, but low ROE³². However, the analysis of return on equity (ROE) ignores the high risk associated with high leverage, and bank financial leverage is usually determined by monetary authorities. Hence, ROA emerges as the key ratio for analyzing bank profitability. Therefore, for the purpose of this study, ROA, which is measured as running year averages, is used as a proxy for MFB performance³².

2.1.9. Improving Organizations Productivity Level.

Productivity is an essential performance indicator that shows how well an organization is streaming its operations by reflecting the amount of output per unit of input. In financial institutions, it's mainly measured in terms of workload of loan officers⁹¹. Organizations which have credit risk committees review the institutions credit risk, including performance trends, concentrations, loan quality and provisions that help to improve on the organization's productivity level⁹¹.

2.1.9.1 Selection of Clients According to Risk Portfolio.

The risks and default rates vary mostly between client segments which are why identifying the clients' respective default and an active management of credit risk could further reduce the amount of bad debts. The risk management practice of reducing credit risk helps in selection of clients according to their risk portfolio as it helps to approve all insider loans, in addition to large exposures whose limits are reviewed regularly⁹².

2.1.9.2 Indication of the Sensitivity of Portfolio Exposures to the underlying Risk Factors.

Risk factors are underlying risk exposures that drive the return of an asset class. By targeting exposure to these underlying risk factors, investors can select a mix of asset classes that provide more diversified portfolio risk and credit strategies to follow⁹³. Reduced credit risk helps to ensure alignment between the banks credit strategy and its risk appetite for compliance with the financial institutions Act. This helps to indicate the sensitivity of portfolio exposures to the underlying risk factors⁹³.

2.1.9.3 Liquidity Risk Management

Liquidity is the capability of raising cash sufficiently for lending opportunities, meeting depositors' obligation when they want to withdraw money at a reasonable cost and within a reasonable time frame. Liquidity is the ability of a bank to meet its immediate obligations. Banks face liquidity by collecting deposits and raising finances for their customers. Liquidity risk exists when banks are not able to raise liquidity or raise liquidity at a high cost⁹⁴. Liquidity risk is a mysterious notion as it is easier to recognize than it's defined.

However, bank liquidity risk does not arise on its' own and other liquidity risk such as market liquidity (ability to trade assets or securities in the market without affecting its prices), liquidity of financial instruments (ability to exchange financial assets without lack of difficulty and losing its value), funding liquidity and balance sheet liquidity (amount of liquid assets on balance sheet) are also interrelated even though these liquidity risks are distinct from each other. Liquidity risk is the risk that a given security or asset cannot be traded quickly enough in the market to prevent a loss or a required profit. It arises from situation in which a

party interested in trading an asset cannot do it because nobody in the market wants to trade for the asset⁹⁵.

An institution might lose liquidity if its credit rating falls; it experiences sudden unexpected cash out flows, or some other event causing counterparties to avoid trading with or lending to the institution. Liquidity risk criterion is determined based on financial gap ratio as introduced. Financial institutions like banks mostly assume core deposits as stable sources of funds which can permanently finance the supply of banking loans⁹⁶. Generally, core deposits are regarded as loan resources with the least cost. Financial gap is defined as the difference between loan and banks should fill this gap by its cash funds through selling cash assets and borrowing from money markets. Therefore, financial gap can be estimated by subtracting the borrowed funds from the cash assets. This financial gap represents financial needs of the bank after selling its cash assets. When the economy is under stagnation and financial market increasingly demands for cash funds, it is when the banks are more exposed on liquidity risk⁹⁷.

The primary role of liquidity risk management is to prospectively assess the need for funds to meet obligations and ensure the availability of cash or collateral to fulfill those needs at the appropriate time by coordinating the various sources of funds available to the institution under normal and stressed conditions⁹⁸. Liquidity problems may affect banks earnings and capital and in extreme circumstances may result in the collapse of an otherwise solvent bank. Most financial institutions may have to borrow from the market even at an exceptionally high rate during a liquidity crisis. This ultimately causes a decline in the bank's earnings⁹⁸. Moreover, a bank's further borrowing to meet depositors demand may place the bank's capital at stake. Thus, debt to equity ratio will rise affecting the bank's efforts to maintain an optimal capital

structure. Liquidity risk may cause a fire brigade sale of the assets of the bank's capital base. This scenario may dictate offering price discount to attract buyers⁹⁹.

Bank may refuse lending even to potential entrepreneur, if it feels that the liquidity need of the bank is quite high. This is an opportunity loss for the bank. They continue to emphasize that a mismatch in the depositor's demand and production of resources forces a bank to generate the resources at a higher cost¹⁰⁰. Liquidity has a greater impact on the tradable securities and portfolios. Broadly, it refers to the loss emerging from liquidating a given position. It's essential for banks to be aware of its liquidity position from a marketing perspective. It helps to expand its customer loans in case of attractive market opportunities. This places a bank at a competitive disadvantage, as a contrast to those of the competitors¹⁰⁰.

2.1.9.4. Establishing Guidelines on the Banks Tolerance for Risk and Expectation from Investment.

Controlled liquidity risk helps to ensure that all assets and liabilities are managed for optimum returns within the agreed fundamental guidelines, and this is through establishing guidelines on the bank's tolerance for risk and expectation from investments. If an appropriate liquidity management solution is effectively implemented, the corporation stands to enjoy a range of benefits (these otherwise representing opportunity costs)¹⁰¹. Balance consolidation: This is realized by eliminating the cost of maintaining cash deficits and surpluses in the same currency that could otherwise have been offset. In financial terms, it is determined by the differential between the interest rates applicable to the credit and debit balances that are offset¹⁰¹.

2.1.9.5 Setting Specific Financial Target.

Controlled liquidity risk helps in setting specific financial targets for the bank and monitoring managements performance against those targets. This also helps in stressing out the organizations goals of protecting financial strength and ability to withstand stressful events in the marketplace. Liquidity helps in learning concrete cash management techniques that will enable the bank to make informed decisions and improve your organization's financial efficiency and cash flow. Liquidity also helps to keep on top of financial situation while increasing the banks value¹⁰².

2.1.9.6 Increasing the Size of the Aggregate Cash Position

Increasing the size of the aggregate cash position attracts better interest terms than those achievable on individual balances left idle or invested separately. It is a function of the interest-rate differential between the rates achieved with and without aggregation. Balance stability: Connecting multiple accounts into a larger liquidity structure has the portfolio effect of reducing overall net balance volatility. As a result, it becomes easier to identify and isolate a stable liquidity "core" within this net balance. This confers two primary advantages: The structure is better able to absorb unexpected cash flow events and mitigate their impact, thereby also minimizing the effect of any inaccuracies in the cash forecasting process. Determining accurate "time slicing" of available cash is easier, thereby facilitating more efficient distribution of investments across the maturity spectrum¹⁰³.

2.1.9.7 Management Cost/Time Savings

Management cost/time savings, particularly when using passive and fully automated techniques; Increased visibility and control of cash flows; more rigorous counterparty risk management, such as on idle balances or balances invested locally with institutions not validated/approved by treasury; reduced dependency on local credit facilities; improved enterprise-wide liquidity risk management; and greater strategic financial flexibility¹⁰⁴. Liquidity ratios indicate the ease of turning assets into cash to assess your organizations' ability to pay its bills as they fall due. They include the current ratio, the quick ratio, and working capital (which is discussed in detail in the section on working capital management). In general, the higher the ratios in this category, the sounder are the organization's activities and its ability to withstand tight cash flow periods¹⁰⁴.

2.1.9.8 Monitoring of the Bank's Capital.

Controlling liquidity risk helps the institutions senior management to take steps necessary to monitor and control liquidity risk, this helps to set and regularly review limits on the size of their liquidity position on an annual basis. Market conditions have driven the need to minimize liquidity risks, reduce funding costs and maximize strategic financial flexibility without compromising solvency¹⁰⁵. As a result, treasuries around the globe have been assessing various liquidity management techniques and their suitability for addressing these needs. While these techniques can be combined into sophisticated and complex liquidity management structures, at its most basic level liquidity management is essentially simple, namely the optimal combination of positive and negative cash flows with other funding sources or investments¹⁰⁵.

2.1.9.9 Market Risk Management

Market risk is the risk of losses in positions or risk that the value of an investment will decrease due to moves in market prices or factors. Market risk is also systematic risk; it cannot be eliminated through diversification though it can be hedged against¹⁰⁵. The risk that a major natural disaster will cause a decline in the market is an example of market risk. Other sources of market risk include recessions, political turmoil, changes in interest rates and terrorist attacks¹⁰⁵.

Market risk as one of the categories of investment risk. The four standard market risk factors include Equity risk; the risk that interest rates will change, Interest rate risk; the risk that foreign exchange rates will change, Currency risk; the risk that foreign exchange rates will change, Commodity risk; the risk that commodity prices (i.e. grains metal) will change, Equity index risk; the risk that stock or other index prices will change adversely¹⁰⁶.

Market risk is typically measured using a value at risk methodology. Value at risk is well established as a risk management technique, but it contains its accuracy. The first assumption is that the composition of the portfolio measured remains unchanged over the single period of the model. For short time horizons, this limiting assumption is often regarded as acceptable. For longer time horizons, many of the transactions in the portfolio may mature during the modeling period. Intervening cash flow, embedded options, changes in floating rate, interest rate and so on are ignored in a single period modeling technique. Market risk can also be contrasted with specific risk, which measures the risk of a decrease in one's investment due to a change in a specific industry of sector as opposed to market wide move¹⁰⁷.

Market risk determines costs of capital financial institutions are dependent on obtaining adequate financial resources from the financial markets. Change of regulation changes markets risk and therefore cost of capital. Market risk also refers to the effect that changing interest rates have on the present value of fixed income security and can also be referred to as interest rate risk. There is an inverse relationship between interest rates and price. As interest rates raise, the value of a security falls, the reverse is true as interest rates fall¹⁰⁸.

2.1.10 Financial Incentives

Risk management practices increase preparedness before adverse events occur which in turn helps to minimize operational surprises and losses. Awareness of risks involved in processes will help align resources which may increase productivity and revenues, as well as improve service delivery capabilities. Scrutiny of controls embedded in processes based on risk and agreed-upon tolerance levels will also help with resource allocation as well as enhance efficiencies. Documentation helps to link growth, risk and return and rationalize funding¹⁰⁹.

2.1.10.1 Enhanced Internal Communications

A consistent vocabulary and methodology may provide employees with a clear and common understanding of the organization's goals and objectives, therefore enhancing strategic and values-driven communications across the organization. Effective communications lead to enhanced staff morale and help promote teamwork. Employees may desire a clear perspective on the impacts their role has on the overall mission of the organization and the value they provide – Risk management practices can help highlight that value¹¹⁰.

2.1.10.2 Improved Decision Making

Informed strategic choices can be made consistent with the organization's goals and objectives based on a consideration of risks and rewards. Risk management provides increased risk intelligence, and thereby may reduce traditional risk aversion-based decisions. Risk management helps stimulate defined success criteria, increased accountability, clearer performance measurement, and improved performance reporting¹¹¹.

Risk management framework can be used to guide organizations in reducing the losses resulting from the realization of threats to IT use and it will provide IT managers with a comprehensive view of their overall risk management situation because it allows them to smoothly move from one component to another by identifying and understanding the possible courses of action in the different steps. The approaches used for software development process like waterfall or evolutionary makes easy for the software projects to be highly risky¹¹².

2.1.10.3 Enhanced Partnerships

Risk management processes may highlight opportunities for working across the enterprise on providing integrated responses to multiple risks and pathways to seizing opportunities. An effective risk management framework brings several benefits. First and most importantly, a formalized risk management framework can help develop a common understanding of risk across the deposit insurer's operations. That is, a risk decision-taker in one area of an insurer's operations is aware of the risk implications of his or her decisions for other aspects of the deposit insurer's operations⁹¹. In addition, a formalized risk management framework can facilitate the development of a common risk lexicon, ensure that risks are being identified and

that appropriate timely action is being taken to address them, and prioritize risks such that resources can be allocated to the risks that are considered most significant¹¹³.

2.1.10.4 Institutional Sustainability Growth

Risk management ensures institutional sustainability and facilitates growth, it has significant implications for MFIs with a social mission to serve an increasing number of poor households. With the increasing level of maturity in the industry, many microfinance stakeholders seem to realize more now, than was the case about 10 years ago, that risk management is the heart of the microfinance industry as it is the broader banking industry. If MFIs and other organizations are keen to continue its operations, it must take management seriously and put in place systematic measures for the purpose¹¹⁴.

2.1.11 Financial Performance

Performance is the approach for adopting and managing the existing resource to achieve specified goals and objectives. That is, it is the capacity to adopt measures that could overcome challenges in order to achieve a goal within a planned period. Within the context of organisations, performance is defined as the ability of an entity to perform well by achieving its stated objectives successfully¹¹⁵. That is the approach taken by organisations to implement a strategy in an effective manner. Financial performance accordingly is the comparison of the worth produced by an organisation with the worth owners expected to generate from the organisation. The use of simple outcome-based financial indicators is used to measure the achievement of financial goals of the organisation¹¹⁶.

Financial performance is measured using indicators such as sales growth for one and three years, profit growth for one and three years, net margin, and return on equity. Accounting-

based performance using two indicators: Return on Assets (ROA) and Return on Equity (ROE). Various studies have used ROE and ROA in assessing the performance of financial institutions a 2 percent rate of ROA signify higher performance of the financial institution in terms of profitability¹¹⁷.

2.1.11.1 Return on Equity

There are various important measures in determining profitability of an organisation. These include Net Profit Margin and Return on Equity (ROE). In 1972 David Cole made known procedure for evaluating bank performance via ratio analysis¹¹⁸. This procedure enables an analyst to appraise the source and level of banks' profits relative to selected risks taken. David Cole applied Return on Equity model to analyse bank profitability and identified specific measures of credit risk, liquidity risk, interest rate risk, operational risk and capital¹¹⁹. Profitability ratios are frequently used in a high esteem as the determinants of credit analysis in banks, since profitability relates to the results of management performance.

The purpose of ROE as a measurement of the profit accrued by the equity in the firm. It is also revealed that the ROE is an indicator of the efficiency to generate profit from equity. This capability is affiliated to how well the assets are used to produce the profits as well. The effectiveness of asset utilisation is considerably tied to the amount of assets that the company creates for each naira of equity. The measure of net income to equity is the accounting return on equity (ROE). It frequently serves as a target profitability measure at the overall bank level. Thus, the agent for measurement of an entity financial performance will be Return on Equity (ROE)¹²⁰.

2.1.11.2 Return on Assets

Return on Assets (ROA) is the financial performance measurement that shows an entity's profitability against its total assets. It is calculated as Profit before interest and tax divided by total assets. ROA primarily indicates managerial efficiency¹¹⁷. It shows how the management of the organisation has been effective in converting its assets into income¹⁶⁸. In other words it is a measure the level of an organisation's profitability in relation to its assets. The higher the ratio, the better or efficient the management is in utilising the assets available to the organisation in generating income and consequently improving the shareholders funds¹⁷¹.

2.1.11.3 Net Interest Margin

Net Interest Margin (NIM) refers to the balance of income generated as interest on loans and advances after subtracting interest expense paid on deposits from various customers. Net Interest Margin is a measure of performance that reveals how good an organisation's decisions are in generating income in comparison to the cost incurred on its deposits¹²⁵. Net Interest Margin is another measure of bank's efficiency. A negative value of NIM shows that the organisation is not making optimal decisions as interest expenses are much more than the interest generated by the bank on its various loans and advances¹⁶⁹. A positive value of NIM of course means a better generation of interest income over and above interest expenses incurred on deposits¹⁷¹.

2.1.11.4 Factors that Determines Financial Profitability of Financial Institutions

The financial performance of financial institutions is influenced by several factors. These include but not limited to the following: loan portfolio and amount of loans given out to clients, interest rate and interest amount received, subsidy (donor involvement), group lending¹²¹.

(a) Interest Rate

The charge banks put on loans given to their clients may determine the amount of income they get. It is one of the main sources of income to financial institutions. The bank's ability to grant more loans to its clients and charge interest on them implies that they stand a chance of getting back more profit (loan interest). The financial performance of financial institutions depends on the capacity of the institution to grant more loans to people at an interest rate to cover all its cost. It is argued that high interest rates on loans positively correlate with the profitability of financial institutions¹²².

However, from the economic point of view, the larger the interest rate, the less clients will develop the interest in obtaining such loans unless under a critical condition. Thus, when clients fail to obtain loans because of the high interest rates, it will negatively affect the profit of the bank it is necessary to ensure that interest rate on loans must be incentive. Being incentive means that the interest should be less than what the borrower will get from investing the borrowed loans from the banks¹²³. What the borrower will get from the investing loan may be financial or non-financial benefits. This will make the borrower be encouraged to go in for loan from financial institutions. The way to determine the levels of interest on loans to make it incentive-packaged depends on the type of technique that would be used by financial institutions

(b) Loan Repayment Rate

The profitability of financial institutions is also depended on the degree of loan repayment rate.

Higher interest rate and loan amount are not sufficient to have determined the financial performance of financial institutions if the loan repayment rate is very low. Thus, the financial performance of financial institutions can be determined by combining the interest rates, and

the loan amount together with high repayment rate. High repayment rate depends on the capacity of the financial institution to collect the loans from its clients¹²⁴. This implies that less efficient financial institutions in collecting its loans from customers will stand at risk of default thereby affecting its financial performance. The efficiency of banks to collect loans lead to bad loans, meaning that the client cannot fully pay the loan in addition to the interest. When this happens, it means, instead of profit, financial loss is encountered leading to adverse effects on profitability. Another effect of bad loans on banks can be seen in their lending capacity. It has been argued that bad loans reduce bank's capacity to lend¹²⁵.

Financial performance involves measuring the results of a firm's policies and operations in monetary terms. These results are reflected in the firms return on investment, return on assets and value added. Financial performance is the ability to operate efficiently, profitably, survive, grow and react to the environmental opportunities and threats. Again, performance is measured by how efficient the enterprise is using its resources in achieving its objectives¹²⁶. Firms' low performance is the result of poorly performing assets. MFIs earn financial revenue from loans and other financial services in the form of interest fees, penalties, and commissions. Financial revenue also includes income from other financial assets, such as investment income. An MFI's financial activities also generate various expenses, from general operating expenses and the cost of borrowing to provisioning for the potential loss from defaulted loans. Profitable institutions earn a positive net income (i.e., operating income exceeds total expenses)⁹⁵.

Today, Microfinance institutions are seeking financial sustainability. Many MFIs were restructured in order to achieve financial sustainability and finance their growth. Sustainability is defined as the capacity of a program to stay financially viable even if subsidies and

financial aids are cut off⁹⁶. It embraces “generating sufficient profit to cover expenses while eliminating all subsidies, even those less-obvious subsidies, such as loans made in hard currency with repayment in local currency”. In order to optimize their performance, MFIs are seeking to become more commercially oriented and stress more on improving their profitability; therefore, self-sustainability¹²⁷.

(c) Inflation

Inflation can be defined as continued general increase in prices of goods and services in an economy which leads to decline in the purchasing power of money¹²⁸. Inflation become apparent under two different scenarios: Demand pull inflation and cost push inflation. Demand pull inflation results when demand for products and services exceeds their current supply while cost push inflation occurs if supply of a product or service reduces as a result of increased costs of production or non-availability of certain inputs¹²⁸.

Inflation affects every aspect of the economy one way or the other as a result of the fall in the value of the purchasing power of money. The effect is however different for different categories of individuals or organisations¹²⁹, while some categories lose, some make gains and some others may not be so much affected. Generally, debtors gain and creditors usually lose as they have to collect the same amount of money even though there is a reduction in value. It is therefore imperative that inflation is curtailed to limit its adverse effects on the society at large. The Central Bank of each country is saddled with the responsibility of ensuring that inflation is guarded as much as possible through the use of monetary policies, fiscal policies and sometimes wages controls¹²⁹.

Microfinance Banks as an institution operating within an economy is affected in various ways in its day to day operations. While banks expenses are adversely affected by upward increases in prices, the interest rates charged by the banks is positively affected as interest rates tend to increase as prices generally increases in the economy¹³⁰. The performance of banks may therefore be affected either positively or negatively depending on the final effect when all the competing increases are set off against each other^{131, 132}.

2.1.12 Credit Management

Credit management is the method by which you collect and control the payments from your customers. Credit management as methods and strategies adopted by a firm to ensure that they maintain an optimal level of credit and its effective management. It is an aspect of financial management involving credit analysis, credit rating, credit classification and credit reporting¹³³.

A proper credit management will lower the capital that is locked with the debtors and reduces the possibility of getting into bad debts¹³³. Unless a seller has built into his selling price additional costs for late payment or is successful in recovering those costs by way of interest charged, then any overdue account will affect his profit. In some competitive markets, companies can be tempted by the prospects of increased business if additional credit is given, but unless it can be certain that additional profits from increased sales will outweigh the increased costs of credit, or said costs can be recovered through higher prices, then the practice is fraught with danger¹³⁴. Most companies can readily see losses incurred by bad debts, customers going into liquidation, receivership or bankruptcy¹³⁴.

The writing-off of bad debt losses visibly reduces the Profit and Loss Account. The interest cost of late payment is less visible and can go unnoticed as a cost effect. It is infrequently

measured separately because it is mixed in with the total bank charges for all activities. The total bank interest is also reduced by the borrowing cost saved by paying bills late. Credit managers can measure this interest cost separately for debtors, and the results can be seen by many as startling because the cost of waiting for payment beyond terms is usually ten times the cost of bad debt losses¹³⁵.

Effective management of accounts receivables involves designing and documenting a credit policy. Many entities face liquidity and inadequate working capital problems due to lax credit standards and inappropriate credit policies. A sound credit policy is the blueprint for how the company communicates with and treats its most asset, the customers¹³⁶. A credit policy creates a common set of goals for the organization and recognizes the credit and collection department as an important contributor to the organization's strategies. If the credit policy is correctly formulated, carried out and well understood at all levels of the financial institution, it allows management to maintain proper standards of the bank loans to avoid unnecessary risks and correctly assess the opportunities for business development¹³⁶.

2.2. Theoretical Review

Theoretical frameworks are critical in deductive, theory-testing sorts of studies. Scientists when performing research studies to formulate a theory use a theoretical framework. The theoretical framework is a foundation for the parameters, or boundaries, of a study.

It has been shown that there exists information asymmetry in assessing bank lending applications¹³⁷. Information asymmetry describes the condition in which relevant information is not known to all parties involved in an undertaking¹³⁷. Studies on transaction costs have shown that transaction costs occur "when a good or a service is transferred across a

technologically separable interface". Therefore, transaction costs arise every time a product or service is being transferred from one stage to another, where new sets of technological capabilities are needed to make the product or service. Therefore, it may very well be more economic to maintain the activity in-house, so that the company will not use resources on contacts with suppliers, meetings and supervision¹³⁸. Managers must therefore weigh the internal transaction costs against the external transaction costs, before the company decides whether to keep some activity in-house. This part of the report will review various theories in credit management¹³⁸.

2.2.1 Asymmetric Information Theory

Information asymmetry theory was propounded by 3 major economists, Joseph Stiglitz (1961), George Akertlof (1970) and Micheal Spence (1973)¹³⁹. The work of these economists was aggregated to formulate the theory in year 2001¹³⁹. Information asymmetry refers to a situation where business owners or manager know more about the prospects for, and risks facing their business, than do lenders. It describes a condition in which all parties involved in an undertaking do not know relevant information. In a debt market, information asymmetry arises when a borrower who takes a loan usually has better information about the potential risks and returns associated with investment projects for which the funds are earmarked¹³⁹.

The lender on the other hand does not have sufficient information concerning the borrower. Information asymmetry poses two problems for the banks, moral hazard (monitoring entrepreneurial behavior) and adverse selection (making errors in lending decisions). Banks will find it difficult to overcome these problems because it is not economical to devote resources to appraisal and monitoring where lending is for relatively small amounts. This is

because data needed to screen credit applications and to monitor borrowers are not freely available to banks. Bankers face a situation of information asymmetry when assessing lending applications¹⁴⁰. The information required to assess the competence and commitment of the entrepreneur, and the prospect of the business is either not available, uneconomic to obtain or difficult to interpret. This creates two types of risks for the Banker¹⁴¹. The risk of adverse selection which occurs when banks lend to businesses which subsequently fail (type II error), or when they do not lend to businesses which go on to become "successful" or have the potential to do so (type I error)¹⁴¹.

2.2.2 Finance Distress Theory

Finance distress theory is based on the cash flow theory propounded by William Beaver in 1966 and further developed by R.J. Taffler in 1983¹⁴². Finance distress theory signifies the situation in which a firm's business deteriorates to the level where it cannot meet its liability, the firm is therefore described as having progressively enter a state of financial distress. The primary signals of financial distress are violations of debt payments and failure or reduction of dividends pay-outs. Financial distress become noticeable when cash inflows is less than current maturing debts. The firm has enough to pay its creditors if the cash flows exceed the present debt obligations. The key to identifying firms in financial distress is their inability to fulfill contractual debt obligations¹⁴². However, substantial financial distress effects are incurred well before default. Firms enter financial distress as a result of economic distress, declines in their performance, and poor management, especially on risks¹⁴².

Financial distress that begins with a period characterized by a collection of bad economic conditions and poor management which commits costly mistakes. Other creditors also must be

compelled to be taken into consideration when firms are setting up risk management measures. Credit risks in banks also must be compelled to be addressed since it's going to cause financial distress. Loan portfolio management is a vital determinant of the firm's liquidity. The banks should manage the credit and liquidity risk to avoid financial distress¹⁴³.

The theory of financial distress emanates from the liquidity and credit risk facing a firm. This theory provides for a non-biased perspective on the link between credit risk and financial performance variables employed by the study. By providing information that the results of financial distress occur before default risk, the theory offers a neutral platform to undertake an incisive empirical analysis of this relationship within the microfinance banks¹⁴⁴.

The potential for a key employee to leave the firm unexpectedly or the possibility of discovering gold under corporate headquarters are unique factors that are not shared with other firms. On the other hand, risk factors concerning the potential for unexpected and rapid growth in the National (or International) economy that affect the operating costs for all firms represent example of common risk factors. While portfolio formation reduces the influence of unique risks associated with individual securities, it cannot eliminate exposure to common risk factors. Stated differently, properly constructed portfolios allow for diversification of unique risk, but not for systematic (market) risk¹⁴⁵.

Credit Risk Theory poses several gaps; the initial intent by Markowitz was to address the importance of investment portfolio for investors to spread risk when investing and not management of loan portfolio in banks. This industry is also making significant progress toward developing tools that measure credit risk in a portfolio context. They are also using credit derivatives to transfer risk efficiently while preserving customer relationships. The

combination of these two developments has precipitated vastly accelerated progress in managing credit risk in a portfolio context over the past several years¹⁴⁶.

Risk management is the identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events or to maximize the realization of opportunities. Risk management is a constant process of evolution. In general, risks include credit risk, market risk (include liquidity risk, interest rate risk, and exchange rate risk), and operational risk. If banks ignore the risks, they could not have a normal operation. Therefore, every organization should learn to apply effective methods and make these methods positively to identify, analyze, evaluate, treat and control business risks¹⁴⁷. The study anchored its variables on two theories namely: (i) Asymmetric Information theory that is linked with market risks and (ii) Finance distress theory which is linked with the credit and liquidity risks.

2.3 Review of Empirical Studies

This study reviews various empirical studies in order to establish a basis for the study and achieve the study objectives. The review of the related empirical literature is therefore presented in this section.

2.3.1 Non Performing Loan Ratio and Microfinance Bank Performance

The increased incidence of non-performing loans (NPL) in Nigerian bank generated the current literature on quality of banks profitability. Though there have been reforms in the banking industry to ensure effective financial institutions, the banks' shareholders' funds are affected by the non-performing loans. In a study on the impact of non-performing loans on firms' profitability of banks in Nigeria using secondary data obtained from the Annual Report and

Statement of Accounts of the NDIC for a period of seven (7) years (2006- 2012) revealed that there is a relationship between the Non-performing Loans (NPL) and Return on Assets (ROA) of Nigerian Banks¹⁴⁸. This means that the asset values of the firms are not affected by the level of NPL. The shareholders wealth maximization is affected as second result showed that there is a relationship between the Non-performing Loan (NPL) and Return on Equity (ROE) of Nigerian Banks. The study therefore asserted that the banks should ensure that the banks customer has viable means of repaying the loan, which should be monitored to ensure efficiency¹⁴⁸.

Empirical findings from a sample of 22 Ghanaian banks on macroeconomic determinants of nonperforming loans (NPLs) as well as the impact of NPLs on bank profitability using a fixed effect panel model in estimating three different empirical models revealed that bank-specific factors as well as macroeconomic factors determining NPLs such as inflation and industry concentration respectively are not significant in determining NPLs, although both are positively related to NPLs. The findings of this study have important implications for policy makers and bank manager¹⁴⁹.

Though, several other studies have been carried out in Nigeria with respect to Non-performing Loans and Bank Performance, including study on the impact of Non-performing Loans on the performance of Selected Commercial Banks in Nigeria with special emphasis on Access Bank, United Bank for Africa and Union Bank of Nigeria Plc¹⁵⁰. The study specifically determined the effect of non-performing loans, provision for loan loss and loans and advances on the performance of banks measured by Return on Assets and Return on Equity. The study utilized

secondary data obtained from annual report and accounts of the selected banks. The data were analyzed using ordinary least square method and ratio analysis. The specific finding of the work is that return on asset and return on equity have inverse relationship with non-performing loans and loan loss provision respectively while they are positively related to loans and advances. The conclusion therefore is that the effects of non-performing loans on Commercial Banks' performance is negative and cannot be underestimated, and poses a fundamental danger to the very existence of the Banks as corporate business entities. Based on the above findings, the study recommends that banks should maintain high credit standards while the Apex Bank and other regulatory agencies should maintain high surveillance on banks' credit operations¹⁵⁰.

The maintenance of asset quality, efficiency and profitability is a vital requirement for the survival and development of Banks. Loans constitute the main asset class from which banks generate their major portion of income and also signify the greatest risk to banks. The default rate of loan has been on the increase and perturbing to all. Due to the detrimental effect that Non-Performing Loans (NPLs) have on a bank's revenue, a study sort to determine the impact of NPLs on Universal Banks profitability based on a quarterly data from 2000 to 2014 while employed the ARDL bounds test of co-integration as an estimation technique to show the evidence of long run relationship among the variables¹⁵¹. The study found that NPLs had a significant negative impact on Universal Banks profitability in both the short run and long run. The study suggested that Universal Banks should revise their lending policy depending on the situation and economic condition of the country as well as minimising their periodic loans targets by not engaging in risky loaning practices¹⁵¹.

Huge nonperforming loans portfolio erodes the ability of banks to make profits. In addition, a study has shown that nonperforming loans portfolio has negative effect on bank profitability while the study adopted exploratory research design to examine Nonperforming loans portfolio and its effect on bank profitability in Nigeria¹⁵². However, the problem of nonperforming loans furthers widening with an evil trend of loan embezzlement among the industrial borrowers in most especially developing countries. The analysis of the impact of non-performing loan (NPL) on profitability considered net interest margin (NIM). The empirical results represent that non-performing loan (NPL) as percentage of total loans on listed banks in Dhaka Stock Exchange (DSE) is very high and they holds more than 50 % of total non-performing loans (NPLs) of the listed 30 banks in Dhaka Stock Exchange (DSE) for year 2008 to 2013¹⁵³. Moreover it is one of the major factors of influencing banks profitability and it has statistically significant negative impact on net profit margin (NPM) of listed banks for the study periods¹⁵³.

In a further study that examined the impact of Non-performing loans on bank's profitability using information asymmetry theory and bad management hypothesis. This study adopted causality research design using panel data (2007 to 2015) of 16 commercial banks in Tanzania¹⁵⁴. The study employed Descriptive statistics and multiple regression analysis estimation methods. Likewise, Ordinary Least-Squares (OLS) regression technique was also used, and then Fixed Effects (FE) and Random Effects (RE) assumptions were considered. The study found that occurrence of non-performing loans is negatively associated with the level of profitability in commercial banks in Tanzania. The results extend further the

information asymmetry theory and bad management hypothesis. The findings of the study have both theoretical and managerial implications for practitioners and policy-makers¹⁵⁴.

The foregoing empirical reviews on non-performing loans and profitability further confirmed that Non-performing loan ratio (NPLR) negatively affect profitability of banks but rate of capital adequacy ratio (CAR) showed a significant positive relationship with profitability using panel regression analysis to establish the relationship in order to account for heterogeneity among selected banks. The Bank Size equally showed a positive relationship with profitability. The study posited that managers of banks are to comply strictly with the rules that regulate the operations of banks in Ghana especially on the issue of capital adequacy ratio. Banks should also be cautious on the rate they expand since bank size can equally affect the fortunes of banks. The central bank must also be up and doing to ensure that banks keep- to all ratios set down by the Central Bank, the banking regulations and the various bards¹⁵⁵.

Similarly, to investigate the impact of non-performing loan ratio, capital adequacy ratio and provision maintenance ratio on the return on asset (ROA) of all Bangladesh Banks based on the last twenty-one years data employing Ordinary Least Square (OLS) method and Vector Auto Regression (VAR) model. The results of the study reveal that there are different directional short-run causality exist between variables and the OLS regression analysis confirms that two independent variables; non-performing loan ratio and provision maintenance ratio are statistically significant to the dependent variable; return on asset (ROA)¹⁵⁶.

In addition, the effect of Non-Performing Loans on the financial performance of commercial banks in Nigeria between the periods of 1985 to 2016 was examined. The study employed the multiple regression techniques to analyze data collated from the Central Bank of Nigeria (CBN) statistical bulletin and Nigeria Deposit Insurance Corporation (NDIC) publications for various years. The result of the study shows that Non-Performing Loans to Total Loans ratio (NPL/TLR) and Cash Reserve Ratio (CRR) had statistically negative significant effect on Return on Asset (ROA). These result shows that a high level of non-performing loans would reduce the financial performance of commercial banks in Nigeria. Consequently, the study recommends that the regulatory authorities in Nigeria should create and support an environment where commercial banks in Nigeria can have a strong risk management practices¹⁵⁷.

The study of whether non-performing loans affect the bank's profitability in Turkey was carried out. The study applies a panel regression method to the quarterly data set including 1809 observation belongs to 55 Banks in Turkey during the period from 1st quarter of 2005 to 3rd quarter of 2016. It is found that there is a significant, negative relationship between non-performing loans and bank profitability which is measured by return on equity and return on asset. The higher non-performing loans, the lower asset quality, leads to the lower return on equity and return on asset, and the lower non-performing loans, the higher asset quality, leads to the higher return on equity and return on asset¹⁵⁸.

2.3.2 Capital Adequacy and Microfinance Bank Performance

Existing evidence supports the notion that capital adequacy strongly and actively stimulate and improve the financial performance of banks. The impact of the adoption of the Capital

Adequacy Standards on the performance of Nigerian banks was investigated. The study involved the use of ordinary least squares (OLS) estimation technique to examine and determine the effect of the independent variables – loans and advances, shareholders' funds, total assets and customer deposits – on the dependent variables – Earnings per share (EPS) and profit after tax. The results of the analysis showed that capital adequacy standards, exert a major influence on bank performance. In addition the impact of the Nigerian monetary authority on the new capital requirements was found to be complemented with the adoption of the Basle accord framework. The study concludes with the recommendation that the CBN should not rely only on the capitalization of banks as a determinant of bank performance but also should concentrate on efficient and effective bank supervision and risk management¹⁵⁹.

The analysis of long run relationship between bank financial performance variables and capital adequacy indicators in the Nigerian banking industry has been tested and verified. The study revealed the existence of significant long run relationship between bank financial performance variables and capital adequacy indicators in the Nigerian banking industry. The granger causality test results reveal that there is unidirectional causality flowing from the ratio of shareholders fund to bank total assets (SHF/BTA). Causality also trickle from the ratio of shareholders fund to return on assets (ROA) in Nigerian banks. These suggest that capital adequacy strongly and actively stimulate and improve the financial performance of banks in Nigeria¹⁶⁰.

In a further study, the effect of Capital Adequacy on Financial Performance with a focus on selected quoted Deposit Money Banks in Nigeria from 2010-2015 was ascertained. The study

made use of secondary data obtained from fact books, annual reports and account of the Deposit Money Banks under study. The data were subjected to statistical analysis using Pearson Coefficient of Correlation, Multiple Regression Analysis, Variance Inflation Factors, Multicollinearity, Heteroskedasticity test and Hausman test. The result of this study revealed that there is a positive and significant relationship between Capital Adequacy and Financial Performance. It was also empirically verified that Capital Adequacy has a statistically significant effect on Financial Performance on Deposit Money Banks at 5% level of significance. This study recommended that banks should avoid overreliance on debt, as increase in the proportion of debt in the capital structure increases the financial risk and the risk of financial distress and bankruptcy¹⁶¹.

However, to examine whether or not capital adequacy ratio affects bank profitability using secondary data that covered five years financial statement taking case studies of five selected commercial banks. The findings reveal that there is a positive and significant relationship between capital adequacy and bank's profitability. This suggests that banks with more equity capital are perceived to have more safety and such advantage can be translated into higher profitability. The higher the capital ratio, the more profitable a bank will be¹⁶².

2.3.3 Assets Quality and Microfinance Bank Performance

Empirical findings on banks asset quality and performance in Nigeria using secondary data obtained from the annual reports and accounts of the six largest banks listed on the Nigeria Stock Exchange based on market capitalization with a sample interval of fifteen-year period from 1999 to 2013 revealed that asset quality had a statistically relationship and influence on bank performance. Based on the findings the study suggested policies that would encourage

revenue diversification, minimize credit risk, and encourage banks to minimize their liquidity holdings¹⁶³.

In same vein, study has also examined the relationship between asset quality and the profitability of the fifteen (15) quoted commercial banks in Nigeria from 1980 – 2013. Return on Investment (ROI) was modeled as the function of percentage of non-performing loans to Total Loans (NPL/TL), percentage of Non-performing Loans to Total Customers' Deposit (NPL//TCD), percentage of Loan Loss Provision to Total Loans (LLP/TL) and percentage of Loan Loss Provision to Total Asset (LLP/TA). Findings from the regression result proved that percentage of non-performing loans to Total Loans and percentage of non-performing Loans to Total Customers' Deposit have positive relationship with Return on Investment while percentage of Loan Loss Provision to Total Loans and percentage of Loan Loss Provision to Total Asset have negative relationship with Return on Investment of the commercial banks. The co-integration reveals long run relationship between the variables while the granger causality reveals no causal relationship among the variables. The study concludes that there is significant relationship between asset quality and the profitability of the commercial banks¹⁶⁴.

Credit risk management is a crucial strategy which determines banks' survival, growth and profitability. Because credit granting is one of the key sources of income generating activity in rural banks, the management of the risk related to credit affects the performance of the banks. A study from Ghana examines the impact of credit risk management on the profitability of rural and community banks in the Brong Ahafo Region of Ghana. The study used the annual financial statements of ten rural banks from the period of 2006 to 2010 (five years). The panel

regression model was employed for the estimation. In the model, definition of Return on Equity (ROE) and Return on Asset (ROA) were used as profitability indicators while Non-Performing Loans (NLP) and Capital Adequacy Ratio (CAR) as credit risk management indicators. The findings indicate a significant positive relationship between non-performing loans and rural banks' profitability revealing that, there are higher loan losses but banks still earn profit. This indicates that, rural banks do not have sound and effective credit risk management practices. Theoretically, non-performing loans reduce the profit levels of rural banks but in a situation where non-performing loans are increasing proportionately to profitability, then it means that rural banks do not have effective institutional measures to deal with credit risk management. What the banks do is that they shift the cost on loan default to other customers in the form of higher interest rate on loans. Higher interest margin charged on loan by rural banks due to weak credit risk management practices prevent microenterprises from accessing loans. Such a situation prevents business expansion and rural industrialization which are essential for poverty reduction¹⁶⁵.

2.3.4 Loan Loss Provision and Microfinance Bank Performance

Other studies in this area tend to focus on the big commercial banks, one among them analyze the effect of credit risk and operational efficiency to the banking profitability. Credit risk as measured by non-performing loans (NPLs), operational efficiency as measured by ratio of operating expense to operating income (OEOI) and banking profitability as measured by return on assets (ROA), the method used is descriptive and verification method, with secondary data from financial statements of 26 Regional Development Bank in Indonesia as a research object units. Data analysis technique is the multiple linear regression, hypothesis testing while using T - test to examine the effect of partial variables and F - test to examine

the effect of variables simultaneously with a significance level of 5 %. Based on the results, it is concluded that the partial, NPLs has positive and significant effect to ROA; While the OEOI has negative and significant effects to the ROA Simultaneously that variable of NPLs and OEOI significantly influence to ROA variable with the level of 57.1%, while the remaining 42.9% thought to be influenced by other variables not examined in this study¹⁶⁶.

Further research study also examines the determinants of banking sector profitability in Egypt to shed light on the most influential variables that have a significant impact on the performance of this vital sector. The analysis includes a time series model of quarterly data from 2004 to 2014. The model utilizes Cointegration technique to investigate the long-run relationship between the return on equity as a proxy for bank profitability and several bank-specific variables including liquidity, capital adequacy, and percentage of non-performing loans. In addition, Vector Error Correction Model (VECM) is utilized to explore the short-run dynamics of the model and the speed of adjustment to reach the long-run equilibrium. The main findings of this work show that banking sector profitability is inversely related to capital adequacy, the percentage of loan provisions and the ratio of deposits to total assets. On the other hand, it is positively related to the size of the banking sector which implies that the banking sector exhibits economies of scale. The implications of this work is that it helps reveal the major factors affecting bank performance in the short-run and long-run, and hence provide bank managers and monetary policy makers with beneficial insights on how to enhance bank performance¹⁶⁷.

2.3.5 Leverage Ratio and Microfinance Bank Performance

However, study on whether there is influence of Current Ratio, Debt to Total Asset, Sales Growth to Return on Asset after acquired and ownership structure as moderator was also carried out. The research sample is the target acquisition companies listed on the BEI, amounting to 9 companies. The independent variable is Current Ratio, Debt to Total Asset, Sales Growth, while the dependent variable is ROA, the moderating variable is the ownership structure. Data collection techniques with documentation techniques, analysis techniques with Classic Assumption Test, Multiple Regression Equation, Test t, Test F and Coefficient of Determination. Result of research prove Current Ratio partially have positive and significant influence to ROA, Debt Total Asset have positive and not significant to ROA, Sales Growth have negative and significant influence to ROA. The ownership structure does not moderate the influence of Current Ratio on ROA and Sales Growth on ROA, whereas Debt to Total Asset is moderated by Ownership Structure on target acquisition companies registered in IDX for financial report period 2011 – 2016¹⁶⁸.

In determining an efficient working capital policy, the company faced on the issue of the exchange (trade-off) between liquidity and profitability factors. Companies are also faced with the problem of determining the source of funds. If the company uses more debt than equity capital the solvency level will decrease due to interest expense on the liability also increases. This will impact on declining of profitability. The analysis revealed that Working Capital Turnover (WCT), the Current Ratio (CR) and Debt to Total Assets (DTA) simultaneously influence the Return on Investment (ROI). Partially Working Capital Turnover (WCT) is the dominant variable affecting the Return on Investment (ROI) enterprises¹⁶⁹.

In view of examining the effects of current ratio and debt-to-equity ratio, return on asset and return on equity for companies of the food and noodle sub-sector, a total of 10 companies listed on the Indonesia Stock Exchange (ISX) were sampled from 2014 to 2017. Results showed that current ratio and debt-to-equity ratio had a significant effect on return on equity and return on asset. Results of the regression coefficient analysis showed that current ratio and debt-to-equity ratio accounted for 14.9% of ROA, while the remaining 85.1% was explained by other variables, as indicated by the coefficient determinants. The regression coefficient analysis for ROE showed that 61.4% was explained by other variables not studied in this research. Results of the F-test showed a significance value of $0.019 < 0.05$ for ROA and $0.000 < 0.05$ for ROE, meaning that both the current ratio and debt-to-equity ratio had a significant effect on ROA and ROE in food and beverage industry companies listed in Indonesia Stock Exchange¹⁷⁰.

Finally, in attempt to discuss the effect of liquidity, activity and leverage on company performance and the value of food and beverage companies listed on the Indonesia Stock Exchange utilizing data taken in time series for 3 years, 2015, 2016 and 2017. The results prove that liquidity as measured by CAR, CHR, QAR has a positive and significant effect on financial performance as measured by NPM, ROA, and financial performance has a significant positive effect on firm value as measured by PBV, PER and Tobin's q. While activities measured by PAT, PMK, PTA and leverage measured by DAR and DER did not significantly influence financial performance and firm value¹⁷¹.

2.4 Conceptual Framework

A conceptual framework is a research tool intended to assist a researcher to develop awareness and understanding of the situation under scrutiny and communicate it. When clearly articulated, a conceptual framework has potential usefulness as a tool to assist a researcher to make meaning of subsequent findings. To guide the study, the interrelationship between variables discussed above was presented in the conceptual framework model.

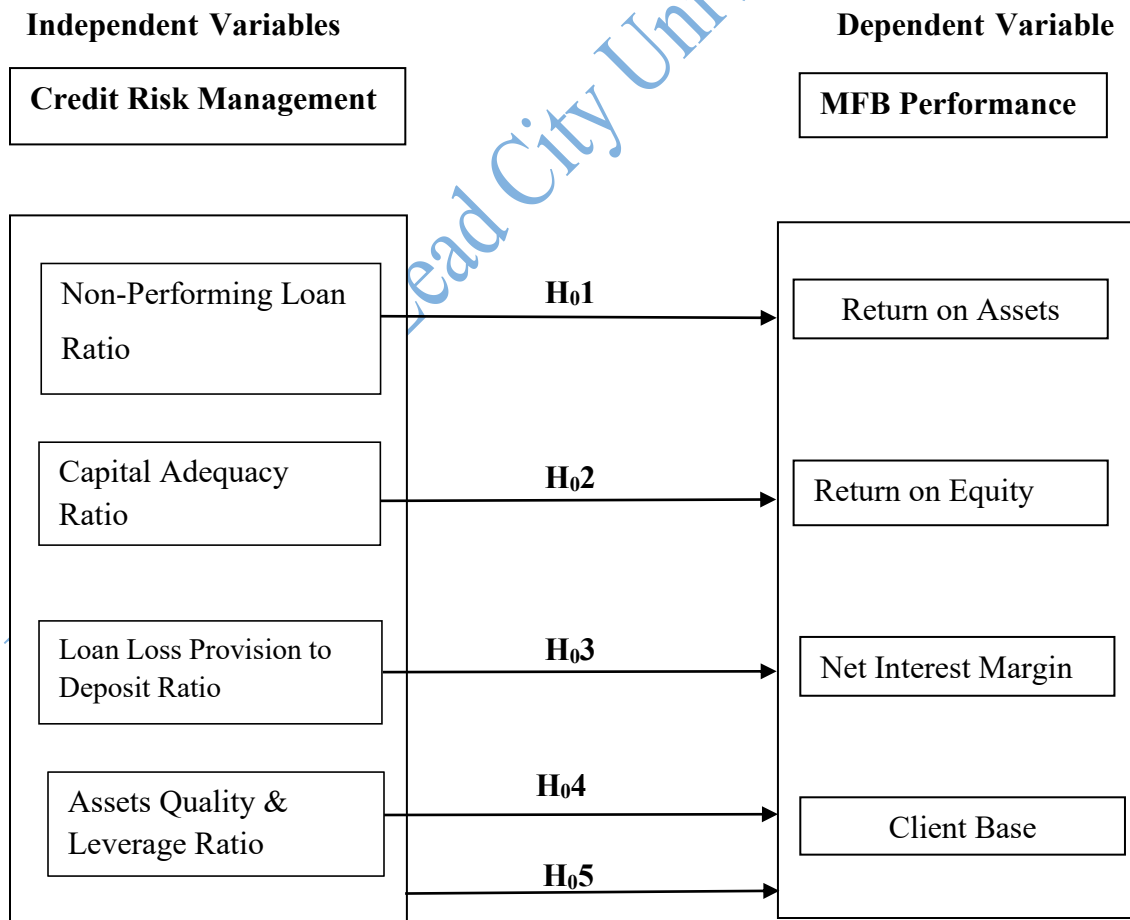


Figure 2.1 Conceptual Links between Credit Risk Management Practices and MFBs Banks Performance

Source: Reseacher's Model (2022).

2.5 Summary of Gap in Literature

The empirical results of reviewed studies particularly with respect to Microfinance Banks shows that much has not been done regarding study of the effect of credit risk management practices and performance of Microfinance Banks in Nigeria. Past studies have essentially concentrated on Money Deposit Banks in Nigeria over the years. Again previous studies reviewed have all concentrated on few proxies of credit risk management practices such as Non performing loan ratio, Capital adequacy, Loan loss provisions to deposit ratio and so on but did not consider combining these proxies of credit risk management practices as a single index (using principal component analysis) which would have assisted in better understanding of the dynamics of these individual factors and the combined effect on the performance of the banks.

Furthermore, the focus of Microfinance Banks performance measurements had always been concentrated on financial performance measurements using proxies such as Return on equity, Return on assets and so on. However, this study went a step further by considering a non financial measure by including Client base as one of the proxies of measure of performance of Microfinance Banks. Client base is an essential measure of performance of Microfinance Banks in line with their outlook to reach the unbanked members in every nook and corner of Nigeria. The use of Client Base as one of the proxies of performance measures therefore make the study more robust and more relevant to Microfinance Banks in Nigeria. In view of these missing gaps in existing literature, this study examined the effect of credit risk management practices considering proxies such as non performing loans, capital adequacy, loan loss provision to deposit ratio as well as assests quality and leverage ratio on performance of Microfinance Banks

in terms of ROE, ROA, NIM and Client base in Nigeria using selected Microfinance Banks as case study.

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Chapter Three

Methodology

This chapter discusses the research design adopted, population, sampling method and sampling size, research instrument, modes of data collection and data analysis.

3.1 Research Design

This study is quantitative by nature and based on the circumstance, it adopted descriptive and inferential statistics of the panel data of the variables stated in the models because of the need to test the hypothesis. The research design used in the study was *ex-post facto*.

The research design adopted in this study is both descriptive statistic and panel data design. Based on the descriptive statistic and panel data analysis, relevant data of 8 selected microfinance banks in Nigeria was gathered from secondary sources extracted from the banks published audited account of National Microfinance Banks in Nigeria. The secondary data comprises of time-series and cross-sectional data which were assembled into a panel data set and estimated using STATA 14 for multiple regression analysis based on ordinary least square (OLS) and E-view statistical package for the descriptive statistic including maximum, minimum, mean and standard deviation of the extracted data.

3.2 Population of the Study

The population of this study is 8 National Microfinance Banks operating in Nigeria as of December 31, 2021. The National Microfinance Banks offers banking services to customers in every State of the Federation as compared to other State Microfinance Banks that operate only in their respective states and Unit Microfinance Banks that are licensed to operate only within

their local government area. Microfinance Banks in Nigeria as of December 31, 2021, is made up of 8 National Microfinance Banks, 135 State Microfinance Banks, 306 Tier 1 Unit Microfinance Banks and 427 Tier 2 Unit Microfinance Banks¹.

The choice of National Microfinance Banks was informed by the fact that all National Microfinance Banks are operating all over the country, with branches in every State of the Federation. The National Banks have large Capital base compared to all other State and Unit Microfinance Banks whose operations are limited only to their respective States or local government area and it is only these set of MfBs that have published accounts needed for this study².

3.3 Sample and Sampling Technique

The sample size for this study is 8. The entire population of all the 8 National Microfinance Banks¹ were selected for the study using census approach as the sampling technique as the total number of the population is so small.

Table 3.1 – Sample of Selected MfBs

S/N	NAME
1.	AB Microfinance Bank
2.	ACCION Microfinance Bank
3.	ASHA Microfinance Bank
4.	BAOBAB Microfinance Bank
5.	LA FAYETTE Microfinance Bank
6.	LAPO Microfinance Bank
7.	LETSHEGO Microfinance Bank
8.	NPF Microfinance Bank

Source – Researcher Model (2022)

3.4 Description of Research Instrument

The data used for the study is secondary in nature. The secondary data was collected from the relevant annual published financial statements of 8 selected National Microfinance Banks in Nigeria for a period of five years, covering 2016 to 2020. Year 2016 marked the 1st year that the non performing loan ratio of Microfinance Banks exceeded the 5% bar set by the Central Bank of Nigeria³. The non performing loan ratio for year 2016 stood at 12.8% as against 4.9% reported in year 2015³. The study therefore set out to review the next 5 years from this base year to understand how the various proxies of credit risk management practices affected the performance of the selected Microfinance Banks.

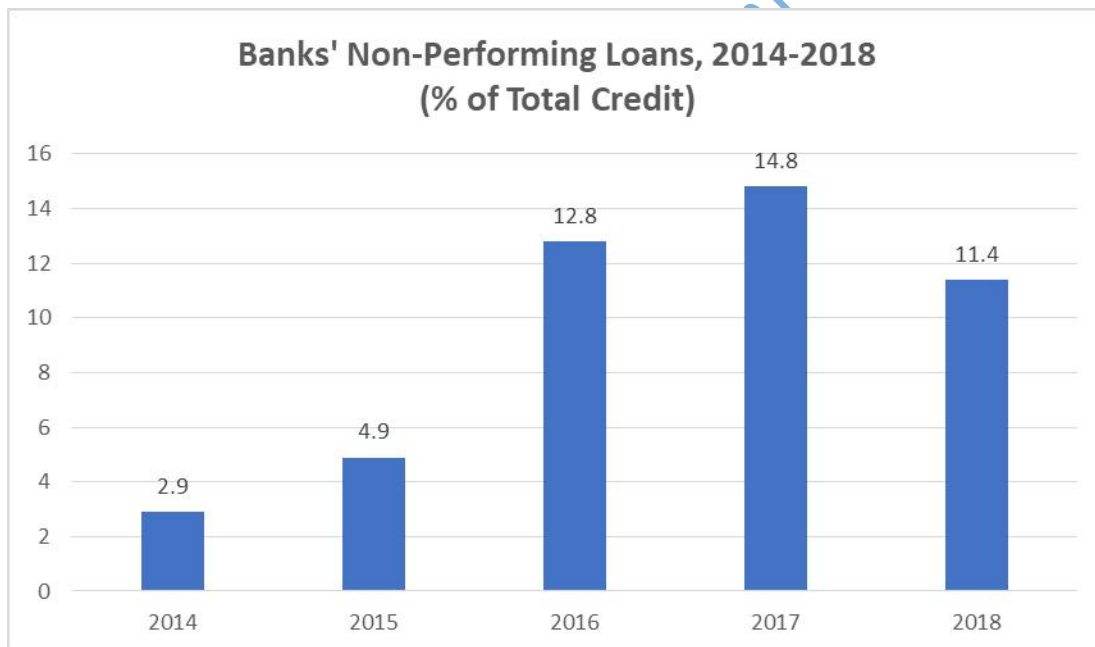


Figure 3.1 MfBs' Non-Performing Loans, 2014 – 2018

Source: CBN Annual Report 2019

3.5 Validity and Reliability of Research Instrument

The researcher made use of annual published accounts of 8 selected MfBs that have been duly audited and approved by the Central Bank of Nigeria. The secondary data was sourced from the published audited accounts of the selected MfBs that were very reliable.

3.6 Administration of Research Instrument and Method of Data Collection

The data for the study was sourced from the individual concern bank published financial statements and CBN statistical bulletin of the selected MfBs.

3.7 Methods of Data Analysis

Data for this study is secondary in nature. The secondary data collected was mainly from the annual published financial reports of the eight selected MfBs, thus, the study is empirical and analytical in nature using descriptive statistic to establish the relationship between credit risk and performance of MfBs for a period of five years (2016 to 2020) representing 40 bank years' observations. Therefore, since the study seeks to establish the relationship between credit risk management and performance of MfBs in Nigeria, the data generated was analysed using E-view and STATA 23 statistical package. The E-view statistical package was used to carry out the understated statistical analysis: Simple descriptive statistical methods such as minimum and maximum, mean, standard deviation, bar chart and correlation analysis in order to determine the status of credit risk management and level of performance of MfBs.

The STATA 23 statistical package was used to carry out the understated statistical analysis after testing for the best estimator from pool OLS, fixed effect and random effect estimator based on Breusch and Pagan LM test, F-test and Hausman test. Multiple regression analysis

using ordinary least square (OLS) to identify the causality of credit risk and performance of MfBs based on secondary data collected from the eight selected National Microfinance Banks.

The cross-sectional and time series data was then subjected to the cross-sectional ordinary least square (OLS) regression analysis with the aid of STATA 23 for estimating the coefficients of the independent variables.

3.7.1 Model Specification

This study adapts an empirical model to investigate the effect of risk management (RM) on banks performance (BF) using the Microfinance Banks as case study. The model is stated functionally as:

$$RM = f(bf) \dots\dots\dots (3.1)$$

Where: BF denotes bank performance; *RM* represents a column vector of risk management predictors such as Non-Performing Loan Ratio (NPL), Capital Adequacy (CA), Loan Loss Provision to Deposit Ratio (LLPDR), Leverage Ratio (LR), Assets Quality (AQ). In an implicit form, the model can be re-written as:

$$BF = \alpha + RM \text{ [where } \alpha \text{ are parameters]} \dots\dots\dots (3.2)$$

Furthermore, the study accounts for individual characteristics by incorporating the features into the model (equation 3.2) as control variables as they influence the bank performance. These factors are types of credit, acceptable collateral, credit maturity, credit ceiling, procedures of the credit and follow up. Also, it is important to introduce stochastic term into the above equation (3.2) to represent the unexplained variations in bank performance. In a stochastic form, Equation (3.2) is re-stated as:

$$BF = \phi + RM + CV + \mu \quad \dots\dots\dots (3.3)$$

Where: *BF* denotes bank performance; *RM* represents a column vector of risk management predictors such as Non-performing Loan Ratio, Capital Adequacy, Loan loss Provision to deposit ratio, Leverage Ratio, Assets quality; *CV* is control variables such as types of credit, acceptable collateral, credit maturity, credit ceiling, procedures of the credit and follow up all in a row-vector form. ϕ, φ, ρ are parameters and μ is disturbance term. Expanding the control variables in Equation (3.3), the model becomes:

$$BF = RM + TC + AC + CM + CC + PCF + \mu \quad \dots\dots\dots (3.4)$$

Where: *BF* denotes bank performance; *RM* represents a column vector of risk management predictors such as Non-performing Loan Ratio, Capital Adequacy, Loan loss Provision to deposit ratio, Leverage Ratio, Assets quality; *TC* is types of credit, *AC* is acceptable collateral, *CM* is credit maturity, *CC* is credit ceiling, and *PCF* is procedures of the credit and follow up. $\phi, \varphi, \rho_{1-5}$ are parameters and μ is disturbance term. Equation (3.4) formed the hypothetical model used in testing the five (5) hypotheses in this study. To ensure robustness of the results and policy implications, the study considers five indicators of bank performance. They are Return on Assets (ROA), Return on Equity (ROE), Net Interest Margin (NIM), Client Base (CB), Operating Income (OI). They enter the equation (3.4) in a column vector form as:

$$BF = \begin{pmatrix} ROA \\ ROE \\ NIM \\ CB \\ OI \end{pmatrix} \dots\dots\dots (3.5)$$

3.7.2 A priori Expectations from the Study

From the model developed for the study, a change in the level of bank performance depends on Credit Risk Management. Credit Risk Management, however, is determined by a set of predictors vis-à-vis, Non-performing Loan Ratio, Capital Adequacy, Loan loss Provision to deposit ratio, Leverage Ratio, Assets quality which influence in deferring degree and magnitude on bank performance. Thus, expectedly, the absence of Non-performing Loan Ratio, Loan loss Provision to deposit ratio, will enhance bank performance. Capital Adequacy, Leverage Ratio, Assets quality is expected to share a positive relationship with bank performance.

3.7.3 Empirical Model for Hypothesis I

The first empirical hypothesis is formulated to evaluate the effect of Non-performing Loan Ratio on Microfinance Banks return on equity. The model for this hypothesis is stated as:

$$BF = + NPLR + TC + AC + CM + CC + PCF + \mu \quad \dots\dots\dots (3.6)$$

Where: *BF* denotes bank's performance measured by Return on Assets (ROA), Return on Equity (ROE), Net Interest Margin (NIM), Client Base (CB), Operating Income (OI). NPLR represents Non-performing Loan Ratio; TC is types of credit, AC is acceptable collateral, CM is credit maturity, CC is credit ceiling and PCF is procedures of the credit and follow up. $\alpha, \beta, \delta_{1-5}$ are parameters, *i* is surveyed bank performance and e_i is disturbance term. The

model first tested the hypothesis without augmenting control variables into the banks performance model. Thereafter, the study incorporates the control variables into the model to verify how they influence Non-performing Loan Ratio towards Microfinance Banks

performance. The expected signs and a priori expectation of equation (3.6) are presented in Table 3.2

Table 3.2: A priori Expectation of Hypothesis I

S/N	Variable	Expected sign	A priori
BF = banks performance			
Independent variables			
1.	Non-performing Loan Ratio (NPLR)	-	$\beta > 0$
2.	Types of credit (TC)	+	$\delta_1 > 0$
3.	Acceptable collateral (AC)	+	$\delta_2 > 0$
4.	Credit maturity (CM)	+	$\delta_3 > 0$
5.	Credit ceiling (CC)	+	$\delta_4 > 0$
6.	Procedures of the credit and follow up (PCF)	+	$\delta_5 > 0$

Note: $\alpha, \beta, \delta_{1-5}$ are parameters.

Source: Researcher's computation (2022).

3.7.4 Empirical Model for Hypothesis II

The second empirical hypothesis is formulated to evaluate the effect of Capital Adequacy on Microfinance Banks return on equity. The model for this hypothesis is stated as:

$$BF = + CA + TC + AC + CM + CC + PCF + \mu \dots\dots\dots (3.7)$$

Where: *BF* denotes bank's performance measured by Return on Assets (ROA), Return on Equity (ROE), Net Interest Margin (NIM), Client Base (CB), Operating Income (OI).

CA represents Capital Adequacy; TC is types of credit, AC is acceptable collateral, CM is credit maturity, CC is credit ceiling and PCF is procedures of the credit and follow up. $\alpha, \beta, \delta_{1-5}$ are parameters, i is surveyed bank performance and e_i is disturbance term. The model first tested the hypothesis without augmenting control variables into the banks performance model. Thereafter, the study incorporates the control variables into the model to verify how they influence Capital Adequacy towards Microfinance Banks performance. The expected signs and a priori expectation of equation (3.7) are presented in Table 3.3

Table 3.3: A priori Expectation of Hypothesis II

S/N	Variable	Expected sign	A priori
	BF = banks performance		
	Independent variables		
1.	Capital Adequacy (CA)	-	$\beta > 0$
2.	Types of credit (TC)	+	$\delta_1 > 0$
3.	Acceptable collateral (AC)	+	$\delta_2 > 0$
4.	Credit maturity (CM)	+	$\delta_3 > 0$
5.	Credit ceiling (CC)	+	$\delta_4 > 0$
6.	Procedures of the credit & follow up (PCF)	+	$\delta_5 > 0$

Note: $\alpha, \beta, \delta_{1-5}$ are parameters

Source: Researcher's computation (2022).

3.7.5 Empirical Model for Hypothesis III

The third hypothesis was developed to investigate the effect of Loan loss Provision to deposit ratio on banks performance. The empirical model was stated as:

$$BF = + \rho \text{ LLPDR} + \pi_1 \text{ TC} + \pi_2 \text{ AC} + \pi_3 \text{ CM} + \pi_4 \text{ CC} + \pi_5 \text{ PCF} + \mu_i \quad \dots \quad (3.8)$$

Where: *BF* denotes banks performance measured by Return on Assets (ROA), Return on Equity (ROE), Net Interest Margin (NIM), Client Base (CB), Operating Income (OI). *NPLR* represents Non-performing Loan Ratio; *TC* is types of credit, *AC* is acceptable collateral, *CM* is credit maturity, *CC* is credit ceiling and *PCF* is procedures of the credit and follow up; $\omega, \theta, \rho_{1-5}$ are parameters, *i* is surveyed bank performance and μ_i is disturbance term.

Table 3.4: A’piori Expectation of Hypothesis III

S/N	Variable	Expected sign	A’piori
	BF = banks performance		
	Independent variables		
1.	Loan loss Provision to deposit ratio	-	$\rho > 0$
2.	Types of credit (TC)	+	$\pi_1 > 0$
3.	Acceptable collateral (AC)	+	$\pi_2 > 0$
4.	Credit maturity (CM)	+	$\pi_3 > 0$
5.	Credit ceiling (CC)	+	$\pi_4 > 0$
6.	Procedures of the credit and follow up (PCF)	+	$\pi_5 > 0$

Note: σ, ρ, π_{1-5} are parameters

Source: Researcher’s computation (2022).

First, the hypothetical model of this objective is tested without augmenting the control variables. Second, the control variables are later incorporated into the model to evaluate how they mediate in the relationship between Loan loss Provision to deposit ratio and banks performance. Table 3.4 presents the expected signs and a priori expectation of equation (3.8).

3.7.6 Empirical Model for Hypothesis IV

The fourth empirical hypothesis was formulated to examine the effect of Assets quality on banks performance. The model for this hypothesis is stated as:

$$BF = + AQ + LR + TC + AC + CM + CC + PCF + \mu \dots\dots\dots (3.9)$$

Where: *BF* denotes banks performance measured by Return on Assets (ROA), Return on Equity (ROE), Net Interest Margin (NIM), Client Base (CB), Operating Income (OI), *AQ* represents Assets Quality, *LR* represents Leverage Ratio; *TC* is types of credit, *AC* is acceptable collateral, *CM* is credit maturity, *CC* is credit ceiling and *PCF* is procedures of the credit and follow up; $\alpha, \theta, \beta_{1-5}$ are parameters, *i* is surveyed bank performance and V_i is disturbance term.

First, the hypothetical model of this objective is tested without augmenting the control variables. Second, the control variables are later incorporated into the model to evaluate how they mediate in the relationship between Assets quality and banks performance. Table 3.5 presents the expected signs and a priori expectation of equation (3.9).

Table 3.5: A’piori Expectation of Hypothesis IV

S/N	Variable	Expected sign	A’piori
BF=banks performance			
Independent variables			
1.	Asset Quality (AQ)	+	$\psi > 0$
2.	Types of credit (TC)	+	$\eta_1 > 0$
3.	Acceptable collateral (AC)	+	$\eta_2 > 0$
4.	Credit maturity (CM)	+	$\eta_3 > 0$
5.	Credit ceiling (CC)	+	$\eta_4 > 0$
6.	Procedures of the credit and follow up (PCF)	+	$\eta_5 > 0$

Note: ω, ψ, η_{1-5} are parameters

Source: Researcher’s computation (2022).

3.7.7 Empirical Model for Hypothesis V

The fifth empirical hypothesis was formulated to examine the joint effect component of credit risk management practice predictors and Microfinance Banks performance. The model for this hypothesis is stated as:

$$BF = +NPLR+CA+LLPDR+LR+ AQ+ TC+AC+CM+CC+PCF+ \mu \quad \dots\dots (3.10)$$

Table 3.6: A’piori Expectation of Hypothesis V

S/N	Variable	Expected sign	A’piori
BF = banks performance			
Independent variables			
1.	Non-performing Loan Ratio(NPLR)	-	$\xi_1 > 0$
2.	Capital Adequacy(CA)	+	$\xi_2 > 0$
3.	Loan loss Provision to deposit ratio (LLPDR)	+	$\xi_3 > 0$
4.	Leverage Ratio(LR)	+	$\xi_4 > 0$
5.	Assets quality (AQ)	+	$\xi_5 > 0$
6.	Types of credit (TC)	+	$\zeta_1 > 0$
7.	Acceptable collateral (AC)	+	$\zeta_2 > 0$
8.	Credit maturity (CM)	+	$\zeta_3 > 0$
9.	Credit ceiling (CC)	+	$\zeta_4 > 0$
10.	Procedures of the credit and follow up (PCF)	+	$\zeta_5 > 0$

Note: $\gamma, \zeta_1 - 5, \xi_1 - 5$ are parameters

Source: Researcher’s computation (2022).

Where: *BF* denotes banks performance measured by Return on Assets (ROA), Return on Equity (ROE), Net Interest Margin (NIM), Client Base (CB), Operating Income (OI) NPLR

represent Non-performing Loan Ratio, CA denotes Capital Adequacy, LLPDR is Loan loss Provision to deposit ratio, LR represent Leverage Ratio and AQ is Assets quality; TC is types of credit, AC is acceptable collateral, CM is credit maturity, CC is credit ceiling and PCF is procedures of the credit and follow up; $\gamma, \xi_{1-4}, \zeta_{1-3}$ are parameters, i is surveyed bank performance and ε_i is the stochastic term. First, the model tested the hypothesis without augmenting control variables into the banks performance model. After that, the study incorporates the control variables into the model to verify how they influence the indicators of credit risk management practice towards banks performance. The expected signs and a priori expectation of equation (3.10) are presented in Table 3.6.

3.7.8 Measurement of the Identified Variables

For this study, the following were identified and were used for measurement:

Credit Risk Management Predictors (The Independent Variables Components) was measured using Non-performing Loan Ratio, Capital Adequacy, Loan loss Provision to deposit ratio, Leverage Ratio, Assets quality while Microfinance Banks Performance (The Dependent Variables) was measured using Return on Assets, Return on Equity, Net Interest Margin, Operating Income

Endnotes

1. CBN. *Central Bank of Nigeria, The List of 882 CBN-Licensed Microfinance Banks in Nigeria*. Retrieved from <https://www.cbn.gov.ng/Supervision/Inst-MF.asp?NV=2>, 2021.
2. CBN, *Central Bank of Nigeria Report Statistical Bulletin, Financial Sector 2020*.
3. CBN, *Central Bank of Nigeria Annual Report 2019*.
4. O. A. Adekunle & A. A. Adegroye, “*Effect of Job Insecurity on Employees Performance in Nigeria Deposit Money Banks*”, **KIU Journal of Humanities**, 6 (2), 2021, 123.

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Chapter Four

Results and Discussion of Findings

This phase of the research study covers the detailed empirical analyses of the effect of credit risk management practices on the performance of selected Microfinance Banks in Nigeria. This empirical analysis was carried out based on the formulated theoretical framework and specified empirical models in the previous chapters. The results presentation and discussion in this chapter were in three sections. The first section dealt with the descriptive and trend analysis of variables under study. Section two presents the empirical results as regards to the set objectives in five sub sections. The data analysis on how non-performing loan ratio affect Microfinance Banks performance is presented in sub section one. The second sub section presents the results of the effect of capital adequacy on performance of Microfinance Banks in Nigeria. In the third sub section, the study provides empirical results regarding the extent at which loan loss provision to deposit ratio affect Microfinance Banks performance. The fourth sub section provides the empirical results on the effect of assets quality and leverage ratio on Microfinance Banks performance. In the fifth sub section, the result on the effect of joint predictors of credit risk management practices on Microfinance Banks performance is presented. The third major section provided the discussion of findings.

4.1 Descriptive Analysis

This section presents descriptive analysis of the variables used in analyzing the effect of credit risk management practices on performance of selected Microfinance Banks in Nigeria. The summary statistics of the series regarding the sampled Microfinance Banks are presented in

Table 4.1. Likewise, Table 4.2 presents the mean and standard deviation values of individual firms considered for the research study. The total number of sampled firms under study is eight with a sample period of 5 years, 2016-2020. The data used for analyzing the relationship between credit risk management practices and Microfinance Banks performance is presented in the Appendix. More so, the detailed estimated results for the entire test carried out in this study are presented in the appendix under different sections accordingly.

The descriptive statistics report that the average of return on assets and return on equity are 0.270 and 0.683 respectively. This implies that the financial institution has a higher profitable equity when compared to the percentage of proceeds from assets generating revenue. It shows that the Microfinance Banks take on some financial leverage to increase their assets. With a 20% ROA, the financial performance of the selected banks is considered better. Comparing the performance among the microfinance banks, LETSHEGO microfinance performed better with ROA and ROE standing at 0.464 and 0.470 respectively (see Table 4.2). The difference between the two indicators is not much as it indicates a low or manageable usage of debt to generate profits over the periods under study. Thus, shareholders' funds are adequately used to generate profit for the bank. The next banks with high return on assets are ACCION Microfinance (0.420), BAOBAB Microfinance (0.360), and AB Microfinance (0.308). Comparing the ROA with their respective banks' ROE values indicate a high financial leverage. The remaining banks' average return on assets is 0.176, 0.164, 0.142 and 0.124 for LAPO Microfinance, ASHA Microfinance, NPF Microfinance and Lafayette Microfinance respectively. Among these four remaining banks, ASHA Microfinance has the uppermost difference between ROE (0.980) and ROA (0.164) which can be attributed to high leverage used to finance its assets. As for NPF Microfinance, the difference between the profitability

indices still signifies some level of financial leverage usage. LA FAYETTE Microfinance has the least difference between ROA (0.124) and ROE (0.152), indicating low leverage. The same can also be said of LAPO Microfinance (see Table 4.2).

Table 4.1: Summary Statistics

	Signs	Mean	Std. Dev.	Max.	Min.	Kurtosis	Skewness	Obs.
<i>Outcome variables</i>								
Return on Assets	roa	0.2697	0.2630	1.54	0.08	14.995	3.6066	40
Return on Equity	roe	0.6827	0.4273	1.91	0.1	0.3855	0.8263	40
Net Interest Margin	nim	11.6055	7.4822	26.67	2.46	-0.8019	0.5734	40
Client Base	cb	115418.4	128715.9	425000	5338	0.0601	1.2497	40
Operating Income	oi	3670.08	2420.76	11705	787	3.8973	1.8698	40
<i>Main explanatory variables</i>								
Non-Performing Loan Ratio	nplr	0.0966	0.0923	0.36	0.01	2.0003	1.6582	40
Capital Adequacy Ratio	ca	3.2148	6.1744	35.62	0.29	20.341	4.2309	40
Loan Loss Provision to Deposit Ratio	llpdr	0.1719	0.3245	1.68	0	12.567	3.3354	40
Assets Quality Ratio	aq	26.317	29.912	135.4	2.81	4.4719	2.1320	40
Leverage Ratio	lr	1.1437	1.0245	3.42	0.03	-0.1297	1.0414	40
<i>Other controlling variables</i>								
Credit Ceiling	cc	26125000	26854009	75000000	1000000	-1.1059	0.6736	40
Credit Maturity	cmy	0.625	0.4903	1	0	-1.8048	-0.5367	40
Types of credit(number)	tct	2.625	0.4903	3	2	-1.8048	-0.5367	40
Acceptable collateral(number)	acl	1.750	0.6699	2	0	3.7407	-2.3571	40
Procedure for credits(number)	pcs	2.125	0.9388	4	1	-0.1366	0.7186	40

Note: Std Dev. - standard deviation; Max. - Maximum; Min. - minimum; Obs. - observation.

Source: Author's computation (2022).

Furthermore, Table 4.1 shows the average net interest margin of banks standing at 11.61 with maximum and minimum values at 26.67 and 2.46 respectively. The positive value of net interest margin indicates that the microfinance banks' business activities are profitable. High differences (range) between the maximum and minimum values indicate some outliers in the performance indicator. As presented in Table 4.2, it is noted in the banks' respective net interest margin as 50% of these banks recorded a double digit, they are: LA FAYETTE Microfinance (21.854), LAPO Microfinance (17.746), AB Microfinance (16.210) and ACCION (11.432) respectively. Those with a single digit are BAOBAB Microfinance (9.668), NPF Microfinance (8.324), LETSHEGO Microfinance (4.206) and ASHA Microfinance (3.404) correspondingly. With the banks' metric regarding net interest margin, it shows good viability and visibility of the microfinance industry regarding profitability of interest income against interest expenses. Despite the supposed leverage of some banks, their interest expenses are lesser than their income from debts.

Concerning client base and operating income, the average stands at 115,418.4 and 3,670.08 respectively. In that order, their maximum values are 425,000 and 11,705, while the minimum values are 5,338 and 787. The client base of the microfinance banks has increased tremendously over the years. NPF Microfinance has the highest client with a mean of 366,200 afterward, ACCION Microfinance (283,946.8), LAPO Microfinance (81,738), BAOBAB Microfinance (74,284.8), AB Microfinance (41,481.2), Lafayette Microfinance (38,180.8), ASHA Microfinance (27,023.4) and LETSHEGO Microfinance (10,491.8) respectively. As regards the operating income of the banks, ASHA Microfinance has the highest statistic with an average of 8,182.4, then, AB Microfinance (4,771.2), ACCION Microfinance (4,302.4),

BAOBAB Microfinance (3,731.6), NPF (2,592.6), LA FAYETTE Microfinance (2,152.6), LETSHEGO Microfinance (1,878.6), and LAPO Microfinance (1,749.2) correspondingly.

Table 4.2: Average of Credit Risk Management and Microfinance Banks Performance

Microfinance Banks	Return on Assets	Return on Equity	Net Interest Margin	Client Base	Operating Income	Non Performing Loan Ratio	Capital Adequacy Ratio	Loan Loss Provision to Deposit Ratio	Assets Quality Ratio	Leverage Ratio
ACCION MFB	0.420 (0.068)	1.030 (0.162)	11.432 (3.801)	283946.8 (37633.2)	4302.4 (676.44)	0.143 (0.026)	1.499 (0.205)	0.165 (0.057)	7.288 (1.321)	0.678 (0.098)
ASHA MFB	0.164 (0.057)	0.980 (0.358)	3.404 (0.802)	27023.4 (8387.20)	8182.4 (3473.42)	0.042 (0.031)	1.308 (0.068)	0.116 (0.130)	51.458 (50.802)	0.766 (0.042)
BAOBAB MFB	0.360 (0.376)	1.320 (0.415)	9.668 (9.072)	74284.8 (22275.5)	3731.6 (1164.1)	0.084 (0.005)	1.464 (1.231)	0.180 (0.207)	12.132 (0.773)	1.122 (0.772)
LA FAYETTE MFB	0.124 (0.033)	0.152 (0.036)	21.854 (5.460)	38180.8 (9451.21)	2152.6 (529.49)	0.080 (0.007)	0.314 (0.021)	0.008 (0.004)	12.468 (0.830)	3.200 (0.208)
LAPO MFB	0.176 (0.034)	0.264 (0.043)	17.746 (1.091)	81738 (33034.6)	1749.2 (832.34)	0.312 (0.036)	4.138 (0.668)	0.104 (0.065)	3.256 (0.356)	0.246 (0.039)
LETSHEGO MFB	0.464 (0.602)	0.470 (0.049)	4.206 (1.008)	10491.8 (4840.12)	1878.6 (188.78)	0.062 (0.022)	15.398 (12.068)	0.778 (0.627)	17.718 (5.743)	0.094 (0.049)
NPF MFB	0.142 (0.008)	0.532 (0.117)	8.324 (1.103)	366200 (52294.4)	2592.6 (774.96)	0.016 (0.009)	0.490 (0.108)	0.014 (0.005)	72.168 (27.978)	2.114 (0.433)
AB MFB	0.308 (0.043)	0.714 (0.091)	16.210 (6.290)	41481.2 (12051.0)	4771.2 (1106.4)	0.034 (0.011)	1.108 (0.198)	0.010 (0.007)	34.044 (11.398)	0.930 (0.194)

Note: Standard deviations are in parenthesis “()”.

Source: Author’s computation (2022).

Concerning the variability, client base is largely dispersed across banks in the industry over the periods which indicate high level of difference in client base among the member banks. Other indicators of financial performance of the Microfinance Banks are dispersed across the banks but not as much as the variability in client base. From Table 4.1, the summary statistics showed that all the financial performance indicators are rightward skewed. As well, return on assets and operating income are highly peaked (implying leptokurtic) and the remaining indices (return on equity, net interest margin, and client base) are platykurtic.

The average of credit risk management indicators are reported in Table 4.1. In the table, the mean values of nonperforming loan ratio and capital adequacy ratio are 0.097 and 3.215 respectively. The average ratio of nonperforming loan to total loan is above the Central Bank of Nigeria's approved regulatory limit of 5.7% as of October 2020. The rate has been reviewed to 5% in 23rd November 2021, when the Monetary Committee had their last meeting. It indicates a high level of microfinance banks' credit risk. Thus, with a 9.7% nonperforming loan ratio, it shows a higher number of loan defaulted as chances of receiving principal and interest repayments are considerably reduced. It is imperative to note that there is high variation among the elected banks' nonperforming loan ratio as the industry's maximum and minimum are 0.36 and 0.01 respectively. The nonperforming loan ratios of NPF Microfinance (1.6%), AB Microfinance (3.4%) and Asha Microfinance (4.2%) fall below the CBN's 5.7% limit. Microfinance banks with the highest nonperforming loan above the 5% are LAPO Microfinance (31.2%), ACCION Microfinance (14.3%), BAOBAB Microfinance (8.4%), LA FAYETTE Microfinance (8%), and LETSHEGO Microfinance (6.2%) respectively. As regards the capital adequacy ratio, its average ratio at 3.215 indicates that the selected microfinance banks' capital level is sufficient to absorb the firms' losses and asset

deficits. LETSHEGO Microfinance has the highest capital adequacy ratio, followed by LAPO, ACCION, BAOBAB, ASHA, AB, NPF and LAFAYETTE respectively.

The mean of loan loss provision to deposit ratio for the selected banks is 0.17. It shows that a considerable proportion of profit statement expenditure put to one side as an allowance for uncollected credit advances to the banks total deposits. LETSHEGO Microfinance has the highest average ratio of loan loss provision to total deposit at 0.778, then BAOBAB Microfinance (0.18), ACCION Microfinance (0.165), ASHA Microfinance (0.116), LAPO Microfinance (0.104), NPF Microfinance (0.014), AB Microfinance (0.010), and LA FAYETTE Microfinance (0.008) correspondingly.

As for asset quality ratio and leverage ratio, their averages are 26.32 and 1.144 respectively. The average ratio of non-performing assets to total capital investment denotes a sizeable credit risk associated with the banks' loan and investment portfolios. The Microfinance Bank with the highest mean of asset quality ratio is NPF Microfinance (72.168), followed by ASHA Microfinance (51.458), AB Microfinance (34.044), LETSHEGO Microfinance (17.718), LA FAYETTE Microfinance (12.468), BAOBAB Microfinance (12.132), ACCION Microfinance (7.288), and LAPO Microfinance (3.256) respectively. The leverage ratio average of 1.14 shows a low leverage ratio as it falls below the CBN's minimum ratio of 4.0% and 5.0% for banks. Concerning the mean of the selected firms, Microfinance Bank that has the upper most average is LA FAYETTE (3.20), followed by NPF Microfinance (2.114), BAOBAB Microfinance (1.122), AB Microfinance (0.930), ASHA Microfinance (0.766), ACCION Microfinance (0.678), LAPO Microfinance (0.246), and LETSHEGO Microfinance (0.094) respectively.

With reference to the series variability in Table 4.1, capital adequacy ratio and asset quality ratio are largely dispersed across banks in the industry over the periods which indicate high level of difference in capital adequacy ratio and asset quality ratio among the member banks. Further, the descriptive statistics showed that all the variables of credit risk management practices are skewed to the right. Moreover, capital adequacy ratio, loan loss provision to deposit ratio and assets quality ratio are leptokurtic and the remaining indices (nonperforming loan ratio, and leverage ratio) are platykurtic. Inflation rate of the Nigeria grew at an average of 13.78% between 2016 and 2020. The Skewness and Kurtosis statistics showed that inflation skewed towards the right path with a flat surface.

Equally, the summary statistics of the controlling variables are reported in Table 4.1. The average credit ceiling of the selected firms is ₦26.125 million with maximum of ₦75 million and minimum of ₦10 million correspondingly. As for credit types, acceptable collateral and credit procedure, their average numbers are 2.63, 1.75 and 2.13 times respectively. The maximum numbers of credit types, acceptable collaterals and credit procedures of these selected banks are 3, 2 and 4 times while their minimums are 2, 0 and 1 correspondingly. Concerning the skewness results, it indicates that credit types and acceptable collateral are negatively skewed while credit procedures skewed rightward. Likewise, the Kurtosis confirmed that the series are not normally distributed as credit types and credit procedures have flat surface (platykurtic) while acceptable collateral is highly peaked (leptokurtic).

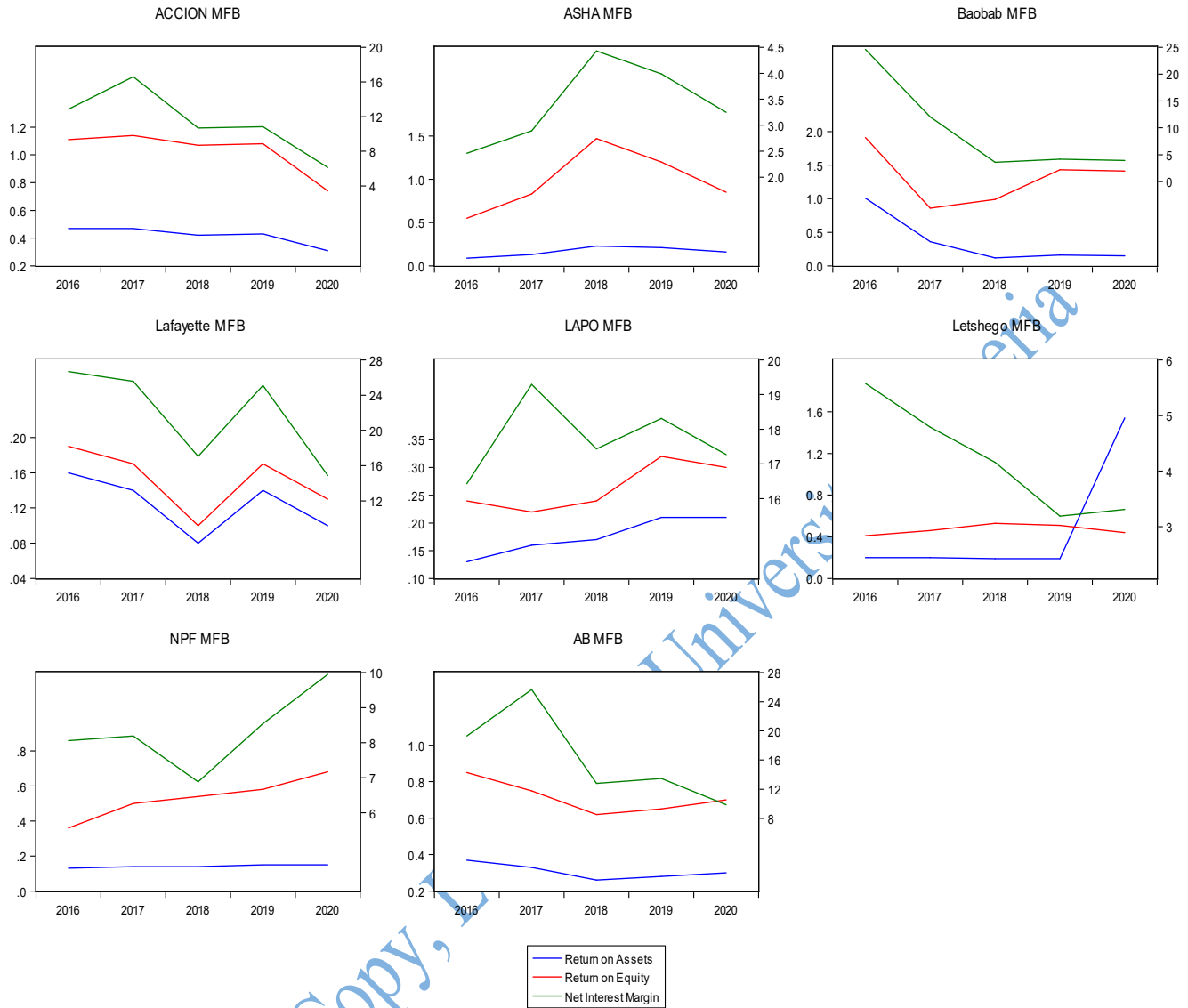


Figure 4.1: Trend Analysis of Return on Assets, Return on Equity and Net Interest Margin
Source: Author's computation (2022).

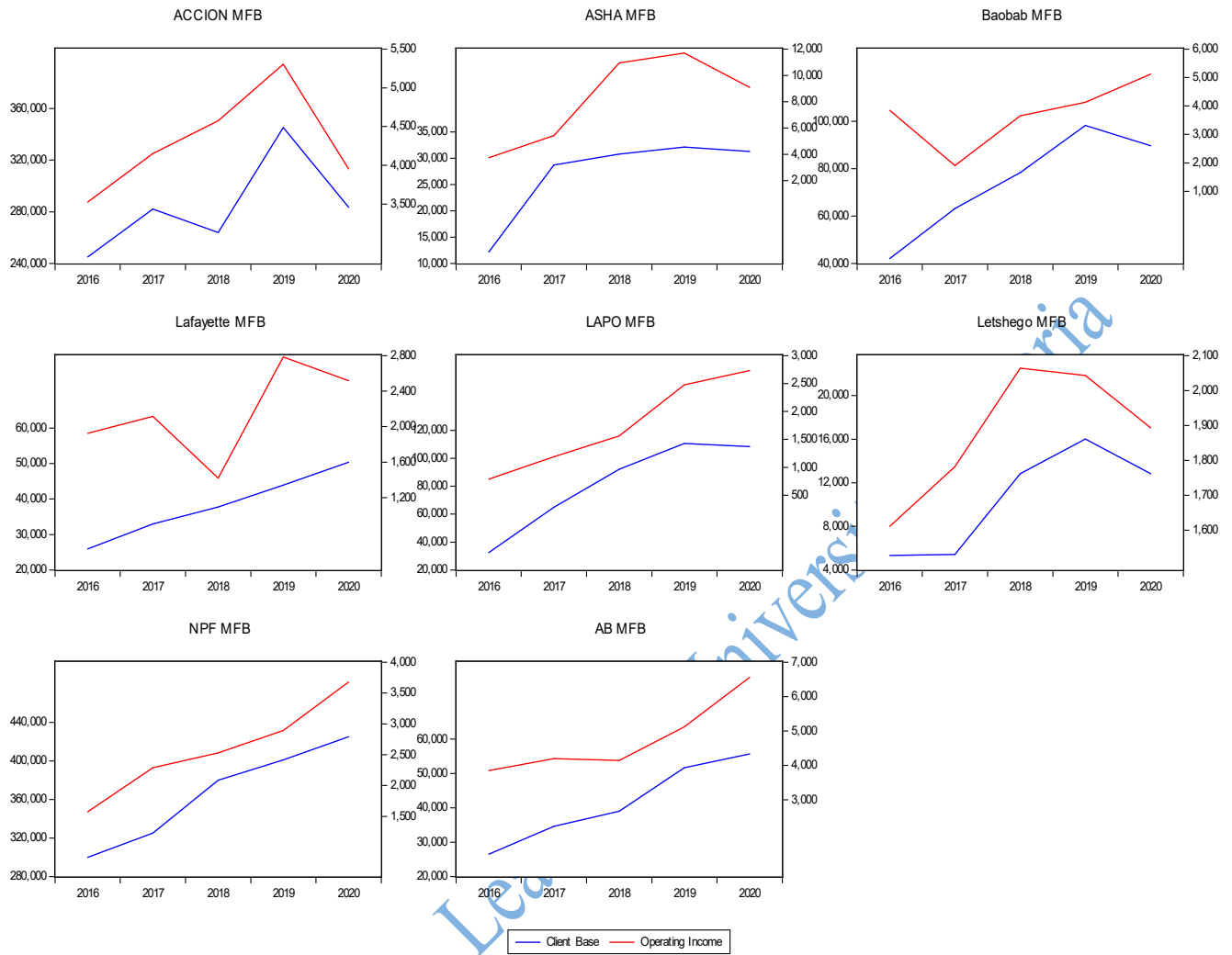


Figure 4.2: Trend Analysis of Client Base and Operating Income
Source: Author's computation (2022).

The time-series plots of indicators of the 8 selected Microfinance Banks' performance are presented in Figures 4.1 and 4.2. Specifically, Figure 4.1 shows the trend movement of return on assets, return on equity and net profit margin, whereas Figure 4.2 reveals the flowchart of client base and operating income. The time-series plots of return on assets, return on equity and net profit margin flow in a similar manner for ACCION, ASHA, BAOBAB, LA FAYETTE and LAPO Microfinance banks. The series movement in ACCION Microfinance grew from 2016 to 2017, but dropped in 2018, steeped during 2019 and fell drastically in 2020. ASHA Microfinance's series slopes upwards through the first three years (2016-2018), afterward, slide downward for the remaining periods. As for BAOBAB, it slides down for the initial periods and steps through except return of equity. The trends of LA FAYETTE dripped within 2016-2018, later streams upward in 2019 and decline in 2020. Net interest margin and return on assets of LAPO Microfinance increase from 2016 to 2017 while the bank's return on equity slightly decreases in the two periods. From 2017 to 2018, ROE and ROA marginally increase whereas net interest margin falls for the periods. The three series slide up in 2019 but fall down in 2020. The trend movements of LETSHEGO, NPF and AB Microfinance banks are not clear.

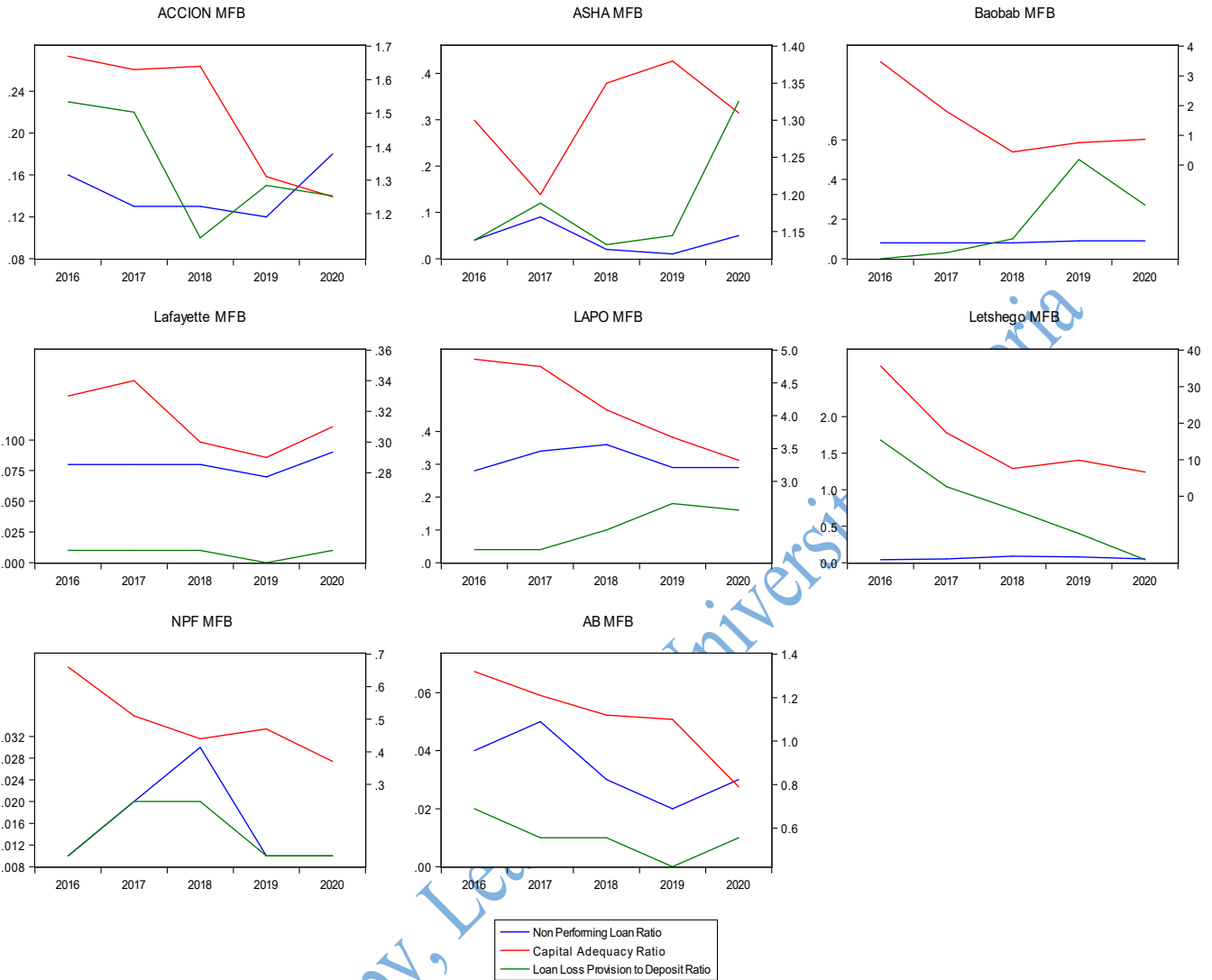


Figure 4.3: Trend Analysis of Non-Performing Loan, Capital Adequacy Ratio and Loan Loss Provision to Deposit Ratio

Source: Author's computation (2022).

In Figure 4.2, it was observed that client base and operating income slope upward for the periods in LAPO, NPF, AB and ASHA Microfinance Banks. The operating income of ACCION Microfinance slopes through the period until 2019 when it dropped. Likewise, the bank's client base has the same trend movement with the exception of a decline between 2017 and 2018. LA FAYETTE has the trend of both client base and operating income slope upward except for a decline recorded in 2017-2018 and 2019-2020 in the latter. Also, the two series trend upward for BAOBAB Microfinance but they dropped in 2016-2017 and 2019-2020 for operating income and client base respectively. As for LETSHEGO Microfinance, both variables drastically move upward from the first period to 2019 and dropped in 2020.

Figure 4.3 presents the trend analysis of non-performing loan, capital adequacy ratio and loan loss provision to deposit ratio, whereas Figure 4.4 shows assets quality ratio and leverage ratio respectively. Non-performing loan, capital adequacy ratio and loan loss provision to deposit ratio sloped downward for LETSHEGO Microfinance. The trend movement is also similar for AB Microfinance except for the period 2019-2020 which shows otherwise for non-performing loan ratio and loan loss provision to deposit ratio. As regards the remaining microfinance banks, their trend slope differently for the periods understudied (Figure 4.3). Concerning the trend of leverage ratio, an upward trend was observed in ACCION, LAPO, LETSHEGO, NPF, and AB Microfinance Banks, whereas the series trend in a zigzag manner in ASHA, BAOBAB and LA FAYETTE Microfinance banks. Assets quality ratio of ASHA, LA FAYETTE and AB Microfinance Banks dips from 2016 to 2017, later rises till 2019 and drops in 2020. NPF's assets quality ratio slopes negatively for the first three periods, plunges upward within 2018-2019, then dips down in 2020. The trend movement of assets quality ratio

in ACCION, BAOBAB, LAPO, and LETSHEGO Microfinance Banks moves in a trend-like manner all through the periods.

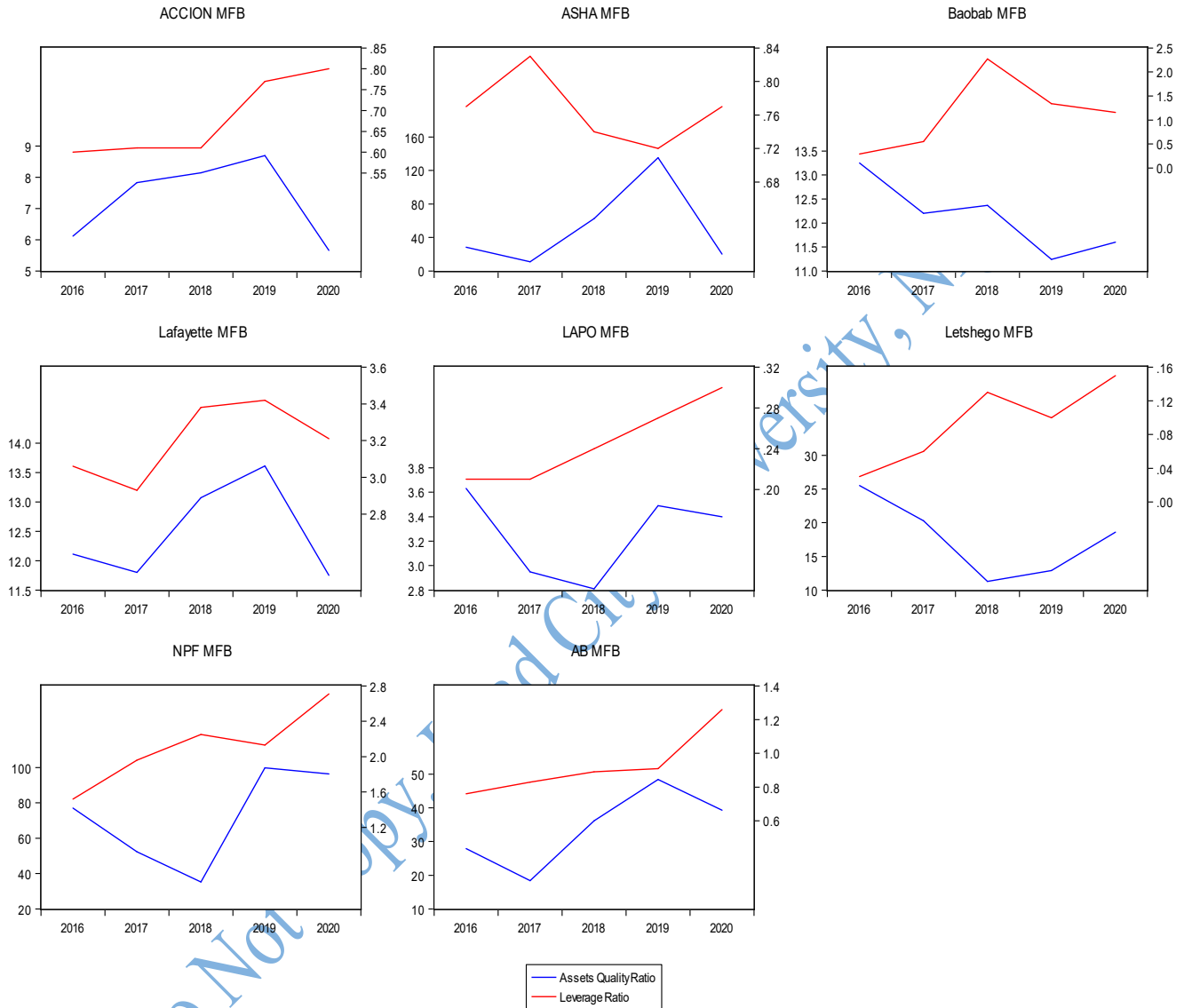


Figure 4.4: Trend Analysis of Assets Quality Ratio and Leverage Ratio
Source: Author's computation (2022).

4.2 Test of Hypotheses

In this section, the research study presents the empirical results in regards to the set objectives in the following five sub-sections. Prior to the findings of the stated objectives, pre-estimation test such as correlation analysis for the detection of multi collinearity problem, and Hausman tests to decide the appropriate estimation test results between panel fixed effects and panel random effects were carried out. The outcomes are presented in the following sub-sections.

4.2.1 Analysis of the First Hypothesis

This sub-section reports the empirical results relating to the relationship among non-performing loan ratio and Microfinance Banks performance in Nigeria.

4.2.1.1 Correlation Analysis and Scatter Plots

Table 4.3 presents the partial correlation coefficients of the variables relating to the relationship among non-performing loan ratio and Microfinance banks performance in Nigeria. The coefficient of correlation result shows that non-performing loan has negative level of association with Microfinance Banks' performance indices (such as return on assets, return on equity, client base and operating income) except net interest margin which has a positive correlation coefficient. A pictorial view of the correlation coefficients is depicted in the scatter graph of the variables in Figures 4.5a-4.5e. Concerning the main explanatory variables, the direct relationship found between non-performing loan ratio and capital adequacy is weak with a correlation coefficient of 0.0196.

Table 4.3: Correlation Matrix

	<i>roe</i>	<i>Nim</i>	<i>cb</i>	<i>oi</i>	<i>Nplr</i>	<i>ca</i>	<i>cc</i>	<i>cmy</i>	<i>tct</i>	<i>acl</i>	<i>pcs</i>
<i>roa</i>	0.3199	0.0471	-0.0545	-0.0044	-0.0570	0.0616	0.0222	0.0827	-0.1046	0.1537	0.0758
<i>roe</i>	1	-0.2689	0.1105	0.6168	-0.2548	-0.1676	0.0765	-0.3028	0.2026	-0.2669	0.5542
<i>nim</i>		1	-0.1092	-0.3269	0.3341	-0.2136	0.4716	0.4072	0.2130	0.4195	-0.2081
<i>Cb</i>			1	-0.0689	-0.0553	-0.2814	-0.0081	-0.6717	-0.1464	-0.2627	0.4574
<i>Oi</i>				1	-0.3451	-0.2646	-0.1439	-0.4397	0.1906	-0.6135	0.5126
<i>nplr</i>					1	0.0196	-0.0154	0.2511	0.5041	0.2259	0.1318
<i>ca</i>						1	-0.3150	0.2689	-0.3116	0.1184	-0.3234
<i>cc</i>							1	0.2167	0.4905	0.3572	-0.0164
<i>cmy</i>								1	-0.0678	0.4888	-0.6320
<i>tct</i>									1	-0.2936	0.3815
<i>acl</i>										1	-0.3573

Note: *roa* - return on assets; *roe* - return on equity; *nim* - net interest margin; *cb* - client base; *oi* - operating income; *nplr* - non performing loan ratio; *ca* - capital adequacy ratio; *cc* - credit ceiling; *cmy* - credit maturity; *tct* – type of credit; *acl* – acceptable collaterals; *pc* - procedure for credits.

Source: Author's computation (2022).

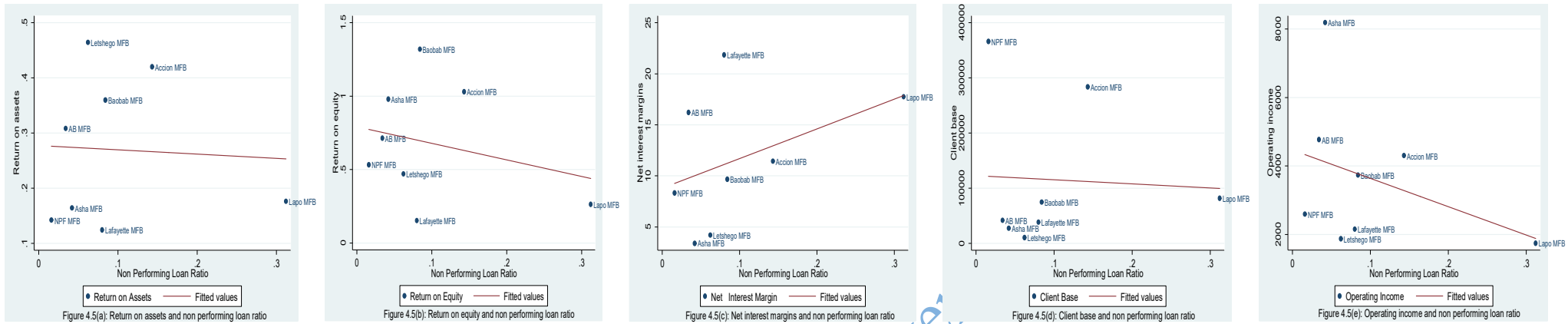


Figure 4.5(a-e): Microfinance Bank performance indices and non-performance loan ratio
Source: Author's computation (2022).

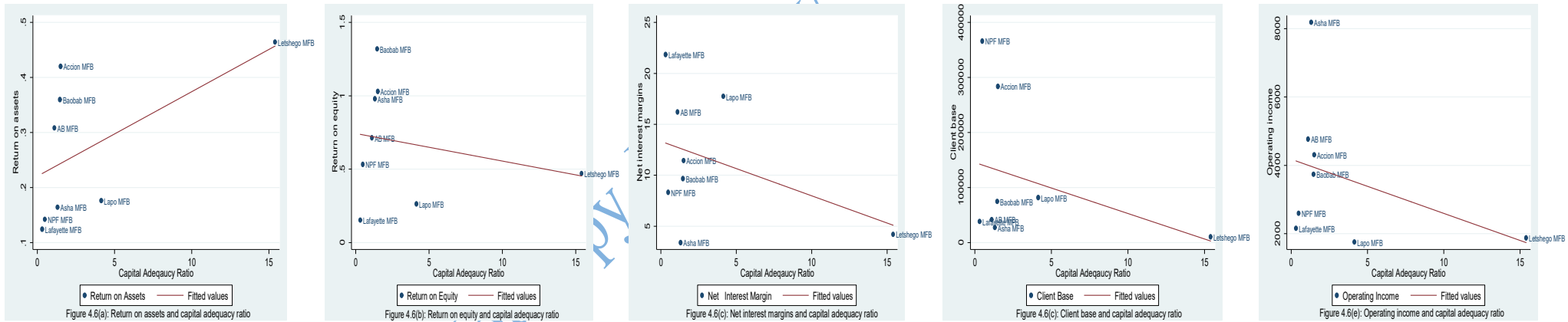


Figure 4.6(a-e): Microfinance Bank performance indices and capital adequacy ratio
Source: Author's computation (2022).

Concerning the Microfinance Bank performance variables, return on assets and return on equity are positively correlated with a weak correlation coefficient of 0.3199. The correlation matrix shows that return on asset has positive correlation with net interest margin but negatively correlated with client base and operating income. Quite the opposite, return on equity is indirectly correlated with net interest margin but directly associated with client base and operating income. A negative correlation was found between net interest margin and operating income as well as client base. The correlation coefficients of Microfinance Banks performance and other controlling variables are presented in Table 4.3. The correlation matrix table also shows the correlation coefficients among these other controlling factors of Microfinance Banks performance indices at different magnitudes and degrees. The values of the correlation coefficients revealed the absence of multi collinearity problem. Thus, the problem of multi collinearity is avoided in the empirical analysis. Nonetheless, the results of the correlation coefficients are just preliminary analyses that are being put through confirmation in the next sub-section after considering other determinants of Microfinance Banks performance.

4.2.1.2 Regression Analysis for the First Hypothesis

The panel fixed and random effects' methods were employed in estimating the panel regression models that examined the effects of non-performing loan, other factors such as credit ceiling, credit maturity, type of credit, acceptable collaterals, and procedure for credits. Also, five forms of estimated panel regression models were reported following the indicators of Microfinance Banks performance. The first and second augmented model regresses return on assets and return on equity on non-performing loan ratio and other control variables (credit ceiling, credit maturity, credit types, acceptable collateral and credit procedures)

correspondingly. The third, fourth and fifth models regress net interest margin, client base and operating income on non-performing loan ratio and other control variables (credit ceiling, credit maturity, credit types, acceptable collateral and credit procedures) respectively.

More so, the estimated coefficients between the fixed and random effects' models were compared using the Hausman test with the null hypothesis "random effects are uncorrelated with the explanatory variables". The Hausman test results presented in Table 4.4 reveals that we do reject the null hypotheses for the return on assets and net interest margin models at 5% significance levels based on the calculated Chi-Square values. The panel fixed effects is found to be appropriate for return on assets and return on equity models. However, the null hypothesis of the Hausman tests for return on equity, client base and operating income models were not rejected at 5% significance level. The panel random effect is found to be appropriate for return on assets and return on equity models. Thus, both fixed and random effects method were found to be consistent and efficient for the achieving the stated objective of this subsection.

4.2.1.3 Test of Hypothesis One (H₀₁)

Research Objective 1: To examine the effect of non-performing loan ratio on Microfinance Banks performance.

Research Question 1: What effect does non-performing loan ratio have on Microfinance Banks performance?

Research Hypothesis 1: Non-performing loan ratio have no significant effect on the Microfinance Banks performance.

Table 4.4: Panel Results of Non-Performing Loan Ratio and Microfinance Bank

Performance

Variables	Dependent Variable: Microfinance Banks' Performance				
	Return on Assets	Return on Equity	Net Interest Margin	Client Base	Operating Income
	1	2	3	4	5
Non-Performing Loan Ratio	-0.121 (0.101)	-0.311*** (0.099)	-0.217 (1.438)	-0.213** (0.098)	-0.142 (0.119)
Credit Ceiling	1.0155*** (0.2492)	0.199*** (0.066)	1.6528*** (0.3560)	-0.586*** (0.065)	0.269*** (0.079)
Credit Maturity	0.153 (0.194)	0.035 (0.023)	1.306 (2.767)	-0.101*** (0.023)	0.045 (0.028)
Type of Credit	-4.2275** (1.92399)	0.525 (0.538)	-5.21596* (2.7485)	2.737*** (0.533)	-1.014 (0.645)
Acceptable Collateral	-7.395*** (1.904)	-0.053 (0.041)	-0.1130*** (0.0272)	0.586*** (0.040)	-0.211*** (0.049)
Procedure for Credits	1.5496 (1.0178)	0.706*** (0.170)	-0.9209 (1.4540)	1.460*** (0.168)	0.794*** (0.203)
Constant	-16.2013*** (3.9787)	-4.382*** (1.018)	-26.2999*** (5.6839)	16.521*** (1.009)	3.746*** (1.221)
Within R-squared	0.480	0.1040	0.679	0.4329	0.4128
F-Statistics	3.41**	-	17.76***	-	-
Prob.(F-stat)	(0.0106)	-	(0.000)	-	-
Wald Test	-	56.67***	-	669.23***	84.52***
Prob.(Wald Test)	-	(0.000)	-	(0.000)	(0.000)
Hausman Test	14.38***	2.19	13.00**	5.02	6.75
Prob. (Hausman Test)	(0.0062)	(0.7015)	(0.0113)	(0.2850)	(0.1365)
Observations	40	40	40	40	40
Numbers of Firms	8	8	8	8	8

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.10 significance level at 1%(2.576), 5%(1.960) and 10%(1.645) respectively.

Source: Author's computation (2022) Extract from STATA output.

Interpretation

The Microfinance Banks performance models indicates that the coefficients of non-performing loan ratio are negative across all the financial indicators of Microfinance Bank performance (see Table 4.4). This suggests that non-performing loan ratio has negative effects on return on assets, return on equity, net interest margin, client base and operating income measuring the performance indicators of the selected Microfinance Banks in Nigeria. The signs of the non-performing loan ratio were in tandem with a priori expectation. However, the probability values of the t-statistics results of non-performing loan ratio was only significant statistically for return on equity and client base at 5% level, whereas the coefficients are not significant under return on assets, net interest margin and operating income models at the conventional level.

The financial implication is that as the ratio of total loans overdue or in default for more than 90 days to the total amount of loans granted falls, the microfinance firms recorded a rise in return on equity and client base respectively. This means that improvement in this type of credit quality guarantees effective and efficient usage of the Microfinance Banks' equity to generate profit. Similarly, this quality of credit assures a stable and dependable client base for Microfinance Banks. In magnitude terms, it suggests that a 10% decrease in the non-performing loan ratio will enhance Microfinance Banks performance measured by return on equity and client base by 3.11% and 2.13% respectively.

Further, this finding is also experienced when return on assets, net interest margin and operating income are used as measures of financial performance, although the parameters of non-performing loan ratio are not statistically confirmed. It therefore implies that a good quality of credit by ensuring low non-performing loan to total loans granted has the ability of

making sure an efficient and effective use of Microfinance Banks' assets to generate more profits for the industry. Also, with low non-performing loan ratio, the selected Microfinance Banks' business activities are profitable as well as the operating income. The non-performing loan ratio coefficients in models 1, 3, and 5 shows that Microfinance Banks performance measured by return on assets, net interest margin and operating income increases correspondingly by 1.21%, 2.17% and 1.42% due to a 10% fall in the non-performing loan ratio.

As for the other control variables, the parameters of credit ceiling are positive and statistically significant at 5% in return on assets, return on equity, net interest margin and operating income models but negative and significant at 5% in client base model. It implies that high credit ceiling have significant impact on financial performance of the selected Microfinance Banks in Nigeria. Likewise, the study reveals that numbers of credit procedures tends to improve Microfinance Banks performance indicators except net interest margin that was impacted negatively. The statistical significance of credit procedures was confirmed in return on equity, client base and operating income models at 5% level. It was further observed from the result that as the numbers of acceptable collateral falls, Microfinance Bank performance series such as return on assets, return on equity, net interest margin and operating income increases. It suggests that collateral credit system has a strong tie with the financial performance of Microfinance Banks in Nigeria. However, acceptable collateral positively impacted on client base for the periods understudy. Also, the indirect impact of acceptable collateral on return on equity is not statically established. The estimation result of credit types is similar to the outcomes of the acceptable collateral except its positive coefficients in return on equity model. Thus, lesser types of credit enhances Microfinance Banks performance

indices like return on assets, net interest margins and operating income. Notably, credit types have a direct and significant relationship with client base. This means that these banks increase their client base by providing varieties of credits for prospective customers to choose from. As for credit maturity, the estimation outcome shows that the selected Microfinance Banks improve their financial performance (such as return on assets, return on equity, net interest margin and operating income) as they extend the maturity periods of financial credits given to customers, albeit the coefficients are not statistically significant at 5%.

In addition, the degree of variation in return on assets, return on equity, net interest margin, client base and operating income explained by non-performing loan ratio, credit ceiling, credit maturity, credit types, acceptable collateral, and credit procedures are indicated in the adjusted within R-squared values which are relatively moderate. With both F-statistics and Wald test, the statistics suggest that the overall effects of non-performing loan on financial performance of Microfinance Banks measured by return on assets, return on equity, net interest margin, client base and operating income were significant at 5% as their probability values are less than 0.05.

Decision: The statistical significance of this model indicates that the study cannot accept the null hypothesis of this model hence the study accepted the alternate hypothesis which says that non-performing loan have significant effect on the financial performance of the selected Nigerian Microfinance Banks. This result is consistent with a priori expectation of this model. Thus, this study have achieved the objective of this model, answered the question as well as tested the related hypothesis.

4.2.2 Analysis of the Second Hypothesis

This sub-section reports the empirical results relating to the relationship among capital adequacy and Microfinance Banks performance in Nigeria.

4.2.2.1 Correlation Analysis and Scatter Plots

Table 4.5 presents the partial correlation coefficients of the variables relating to the relationship among capital adequacy and Microfinance Banks performance in Nigeria. The coefficient of correlation result shows that capital adequacy ratio is positively correlated with return on assets but negatively associated with return on equity, net interest margin, client base and operating income. Likewise, the scatter chart in Figures 4.6a-4.6e shows a graphical outlook of the coefficient of correlation of the links between capital adequacy ratio and Microfinance Banks performance. Concerning the main explanatory variables, the direct relationship found between non-performing loan ratio and capital adequacy is weak with a correlation coefficient of 0.0196.

Table 4.5: Correlation Matrix

	<i>Roe</i>	<i>nim</i>	<i>cb</i>	<i>oi</i>	<i>nplr</i>	<i>ca</i>	<i>cc</i>	<i>Cmy</i>	<i>tct</i>	<i>acl</i>	<i>pcs</i>
<i>roa</i>	0.3199	0.0471	-0.0545	-0.0044	-0.0570	0.0616	0.0222	0.0827	-0.1046	0.1537	0.0758
<i>roe</i>	1	-0.2689	0.1105	0.6168	-0.2548	-0.1676	0.0765	-0.3028	0.2026	-0.2669	0.5542
<i>nim</i>		1	-0.1092	-0.3269	0.3341	-0.2136	0.4716	0.4072	0.2130	0.4195	-0.2081
<i>Cb</i>			1	-0.0689	-0.0553	-0.2814	-0.0081	-0.6717	-0.1464	-0.2627	0.4574
<i>Oi</i>				1	-0.3451	-0.2646	-0.1439	-0.4397	0.1906	-0.6135	0.5126
<i>nplr</i>					1	0.0196	-0.0154	0.2511	0.5041	0.2259	0.1318
<i>Ca</i>						1	-0.3150	0.2689	-0.3116	0.1184	-0.3234
<i>Cc</i>							1	0.2167	0.4905	0.3572	-0.0164
<i>Cmy</i>								1	-0.0678	0.4888	-0.6320
<i>Tct</i>									1	-0.2936	0.3815
<i>Acl</i>										1	-0.3573

Note: *roa* - return on assets; *roe* - return on equity; *nim* - net interest margin; *cb* - client base; *oi* - operating income; *nplr* - non performing loan ratio; *ca* - capital adequacy ratio; *cc* - credit ceiling; *cmy* - credit maturity; *tct* – type of credit; *acl* – acceptable collaterals; *pc* - procedure for credits.

Source: Author's computation (2022).

Concerning the Microfinance Bank performance variables, return on assets and return on equity are positively correlated with a weak correlation coefficient of 0.3199. The correlation matrix shows that return on asset has positive correlation with net interest margin but negatively correlated with client base and operating income. Quite the opposite, return on equity is indirectly correlated with net interest margin but directly associated with client base and operating income. A negative correlation was found between net interest margin and operating income as well as client base. The correlation coefficients of Microfinance Banks performance and other controlling variables are presented in Table 4.5. The correlation matrix table also shows the correlation coefficients among these other controlling factors of Microfinance Banks performance indices at different magnitudes and degrees. The values of the correlation coefficients revealed the absence of multi collinearity problem. Thus, the problem of multi collinearity is avoided in the empirical analysis. Nonetheless, the results of the correlation coefficients are just preliminary analyses that are being put through confirmation in the next sub-section after considering other determinants of Microfinance Banks performance.

4.2.2.2 Regression Analysis for the Second Hypothesis

The panel fixed and random effects' methods were employed in estimating the panel regression models that examined the effects of capital adequacy, other factors such as credit ceiling, credit maturity, type of credit, acceptable collaterals, and procedure for credits. Also, five forms of estimated panel regression models were reported following the indicators of Microfinance Banks performance. The first and second augmented model regresses return on assets and return on equity on capital adequacy ratio and other control variables (credit ceiling, credit maturity, credit types, acceptable collateral and credit procedures) correspondingly. The

third, fourth and fifth models regress net interest margin, client base and operating income on capital adequacy ratio and other control variables (credit ceiling, credit maturity, credit types, acceptable collateral and credit procedures) respectively.

More so, the estimated coefficients between the fixed and random effects' models were compared using the Hausman test with the null hypothesis "random effects are uncorrelated with the explanatory variables". The Hausman test results presented in Table 4.5 reveals that we do reject the null hypotheses for the return on assets and net interest margin models at 5% significance levels based on the calculated Chi-Square values. The panel fixed effects is found to be appropriate for return on assets and return on equity models. However, the null hypothesis of the Hausman tests for return on equity, client base and operating income models were not rejected at 5% significance level. The panel random effect is found to be appropriate for return on assets and return on equity models. Thus, both fixed and random effects method were found to be consistent and efficient for the achieving the stated objective of this subsection.

4.2.2.3 Test of Hypothesis Two (H_02)

Research Objective 2: To identify effect of capital adequacy on Microfinance Banks performance.

Research Question 2: What is the effect of capital adequacy on Microfinance Banks performance?

Research Hypothesis 2: Capital adequacy have no significant effect on Microfinance Banks performance.

Table 4.6: Panel Results of Capital Adequacy and Microfinance Bank Performance

Variables	Dependent Variable: Microfinance Banks' Performance				
	Return on Assets	Return on Equity	Net Interest Margin	Client Base	Operating Income
	1	2	3	4	5
Capital Adequacy Ratio	0.244* (0.128)	0.228*** (0.060)	0.6536*** (0.1828)	-0.621*** (0.060)	0.043 (0.072)
Credit Ceiling	1.0155*** (0.2492)	0.199*** (0.066)	1.6528*** (0.3560)	-0.586*** (0.065)	0.269*** (0.079)
Credit Maturity	0.153 (0.194)	0.035 (0.023)	1.306 (2.767)	-0.101*** (0.023)	0.045 (0.028)
Type of Credit	-4.2275** (1.92399)	0.525 (0.538)	-5.21596* (2.7485)	2.737*** (0.533)	-1.014 (0.645)
Acceptable Collateral	-7.395*** (1.904)	-0.053 (0.041)	-0.1130*** (0.0272)	0.586*** (0.040)	-0.211*** (0.049)
Procedure for Credits	1.5496 (1.0178)	0.706*** (0.170)	-0.9209 (1.4540)	1.460*** (0.168)	0.794*** (0.203)
Constant	-16.2013*** (3.9787)	-4.382*** (1.018)	-26.2999*** (5.6839)	16.521*** (1.009)	3.746*** (1.221)
Within R-squared	0.480	0.1040	0.679	0.4329	0.4128
F-Statistics	3.41**	-	17.76***	-	-
Prob.(F-stat)	(0.0106)	-	(0.000)	-	-
Wald Test	-	56.67***	-	669.23***	84.52***
Prob.(Wald Test)	-	(0.000)	-	(0.000)	(0.000)
Hausman Test	14.38***	2.19	13.00**	5.02	6.75
Prob. (Hausman Test)	(0.0062)	(0.7015)	(0.0113)	(0.2850)	(0.1365)
Observations	40	40	40	40	40
Numbers of Firms	8	8	8	8	8

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.10 significance level at 1%(2.576), 5%(1.960) and 10%(1.645) respectively.

Source: Author's computation (2022) Extract from STATA output.

Interpretation

Table 4.6 shows that the parameter estimates of capital adequacy ratio are positive across all the Microfinance Banks performance indicators except client base which reportedly has a negative coefficient. It implies that capital adequacy ratio has direct impacts on return on assets, return on equity, net interest margin, and operating income measuring the performance indicators of the selected Microfinance Banks in Nigeria. The signs of the capital adequacy ratio coefficients were in tandem with a priori expectation. However, client base is adversely affected by capital adequacy ratio of the selected Microfinance Banks.

It is imperative to note that the probability values of the t-statistics results of capital adequacy ratio was statistically significant in return on equity, net interest margin, and client base models at 5% level, in return on assets at 10%, whereas the coefficient was not significant in operating income model at the conventional level. Thus, as the ratio of tier 1 and tier 2 to the risk weighted assets increases, microfinance firms record a rise in return in assets, return in equity, net interest margin and operating income respectively. This means that improvement in this type of credit quality which is meant to safeguard shareholders' funds and reserves against risky assets warrant effective and efficient usage of the equity capital and assets to generate profit. Similarly, this credit quality assures a steady and reliable profitable business activities and operating income for the Microfinance Banks. This indicates low dependence of these microfinance banks on external funding for investment purposes. High preference of these banks on internal funds for asset growth leads to greater profitability and operating income as they continuously increase their capital adequacy ratio.

In magnitude terms, it suggests that a 10% increase in the capital adequacy ratio will enhance Microfinance Banks performance measured by return on asset, return on equity, net interest

margin and operating income by 2.44%, 2.28%, 6.54% and 0.43% respectively. Further, the finding shows that higher capital adequacy ratio tends to lower client base of the selected banks. It therefore means that this form of credit quality that assure profitability of these Microfinance Banks activities to a large extent failed to sustain the bank's client base. The capital adequacy ratio coefficient in model 4 shows that Microfinance Banks performance measured by client base decreases by 6.21% to a 10% rise in the capital adequacy ratio.

As for the other control variables, the parameters of credit ceiling are positive and statistically significant at 5% in return on assets, return on equity, net interest margin and operating income models but negative and significant at 5% in client base model. It implies that high credit ceiling have significant impact on financial performance of the selected Microfinance Banks in Nigeria. Likewise, the study reveals that numbers of credit procedures tends to improve Microfinance Banks performance indicators except net interest margin that was impacted negatively. The statistical significance of credit procedures was confirmed in return on equity, client base and operating income models at 5% level. It was further observed from the result that as the numbers of acceptable collateral falls, Microfinance Bank performance series such as return on assets, return on equity, net interest margin and operating income increases. It suggests that collateral credit system has a strong tie with the financial performance of Microfinance Banks in Nigeria. However, acceptable collateral positively impacted on client base for the periods understudy. Also, the indirect impact of acceptable collateral on return on equity is not statically established. The estimation result of credit types is similar to the outcomes of the acceptable collateral except its positive coefficients in return on equity model. Thus, lesser types of credit enhances Microfinance Banks performance indices like return on assets, net interest margins and operating income. Notably, credit types

have a direct and significant relationship with client base. This means that these banks increase their client base by providing varieties of credits for prospective customers to choose from. As for credit maturity, the estimation outcome shows that the selected Microfinance Banks improve their financial performance (such as return on assets, return on equity, net interest margin and operating income) as they extend the maturity periods of financial credits given to customers, albeit the coefficients are not statistically significant at 5%.

In addition, the degree of variation in return on assets, return on equity, net interest margin, client base and operating income explained by non-performing loan ratio, capital adequacy ratio, credit ceiling, credit maturity, credit types, acceptable collateral, and credit procedures are indicated in the adjusted within R-squared values which are relatively moderate. With both F-statistics and Wald test, the statistics suggest that the overall effects of non-performing loan and capital adequacy on financial performance of Microfinance Banks measured by return on assets, return on equity, net interest margin, client base and operating income were significant at 5% as their probability values are less than 0.05.

Decision: The statistical significance of this model indicates that the study cannot accept the null hypothesis of this model hence the study accepted the alternate hypothesis which says that capital adequacy have significant effect on the financial performance of the selected Nigerian Microfinance Banks. This result is consistent with a priori expectation of this model. Thus, this study have achieved the objective of this model, answered the question as well as tested the related hypothesis.

4.2.3 Analysis of the Third Hypothesis

This sub-section reports the empirical results relating to the relationship between loan loss provision to deposit ratio and Microfinance Banks performance in Nigeria.

4.2.3.1 Correlation Analysis and Scatter Plots

The partial correlation coefficients of the financial indicators involving the relationship between loan loss provision to deposit ratio and Microfinance Banks performance are reported in Table 4.7. The correlation result indicates that loan loss provision to deposit ratio negatively correlate with Microfinance Banks' performance indicators i.e. return on assets, return on equity, net interest margin, client base and operating income. It implies that a negative level of association exist between loan loss provision to deposit ratio and Microfinance Bank performance.

Equally, the findings are similar to the direction derived from the scatter plots of loan loss provision to deposit ratio and Microfinance Bank performance variables with the exception of loan loss provision to deposit ratio and return on assets which showed an upward slope. Figures 4.7a-4.7e show the scatter charts of the nexus between loan loss provision to deposit ratio and Microfinance Bank performance indicators. It is also imperative to note that a direct level of association was found between loan loss provisions to deposit ratio is negatively related to credit ceiling, types of credit, and procedures for credits while directly associated with credit maturity and numbers of acceptable collaterals.

Table 4.7: Correlation Matrix

	<i>roe</i>	<i>nim</i>	<i>cb</i>	<i>oi</i>	<i>llpdr</i>	<i>cc</i>	<i>cmy</i>	<i>tct</i>	<i>acl</i>	<i>pcs</i>
<i>roa</i>	0.3199	0.0471	-0.0545	-0.0044	-0.0938	0.0222	0.0827	-0.1046	0.1537	0.0758
<i>roe</i>	1	-0.2689	0.1105	0.6168	-0.0163	0.0765	-0.3028	0.2026	-0.2669	0.5542
<i>nim</i>		1	-0.1092	-0.3269	-0.3559	0.4716	0.4072	0.2130	0.4195	-0.2081
<i>cb</i>			1	-0.0689	-0.2158	-0.0081	-0.6717	-0.1464	-0.2627	0.4574
<i>oi</i>				1	-0.1480	-0.1439	-0.4397	0.1906	-0.6135	0.5126
<i>llpdr</i>					1	-0.2179	0.1776	-0.2310	0.0660	-0.2153
<i>cc</i>						1	0.2167	0.4905	0.3572	-0.0164
<i>cmy</i>							1	-0.0678	0.4888	-0.7320
<i>tct</i>								1	-0.2936	0.3815
<i>acl</i>									1	-0.3573

Note: *roa* - return on assets; *roe* - return on equity; *nim* - net interest margin; *cb* - client base; *oi* - operating income; *llpdr* - loan loss provision to deposit ratio; *cc* - credit ceiling; *cmy* - credit maturity; *tct* - type of credit; *acl* - acceptable collaterals; *pc* - procedure for credits.

Source: Author's computation (2022).

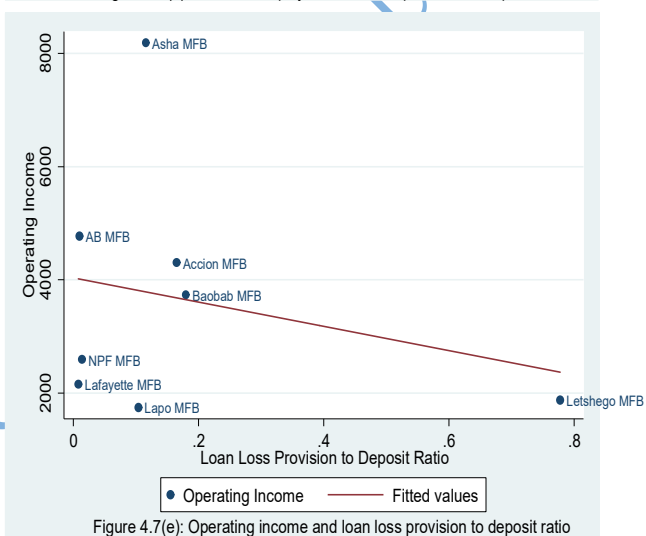
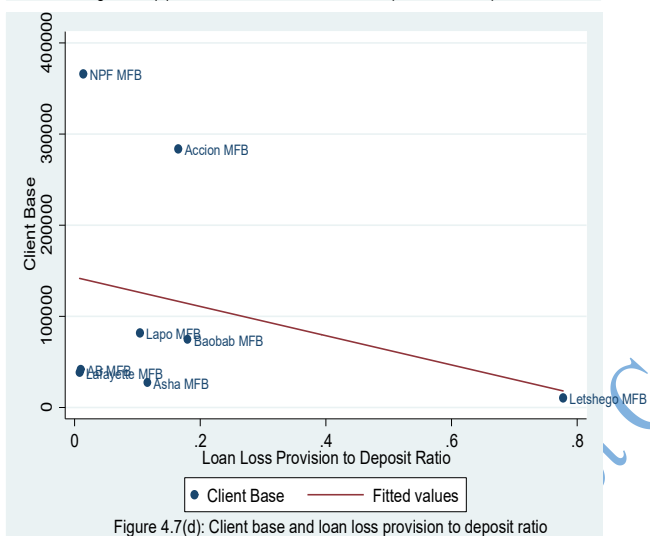
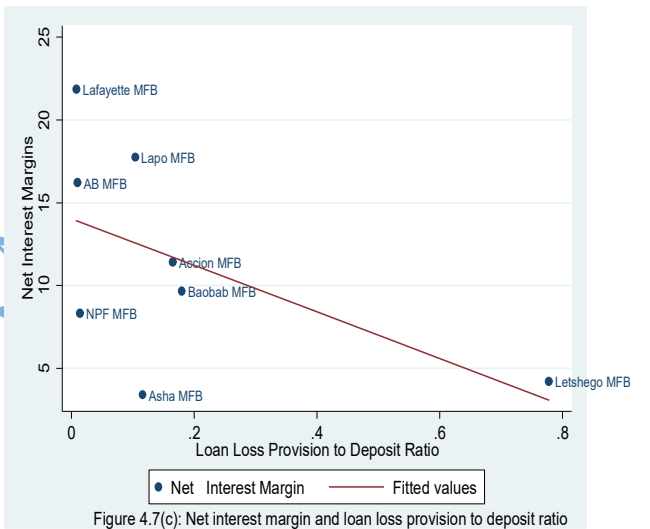
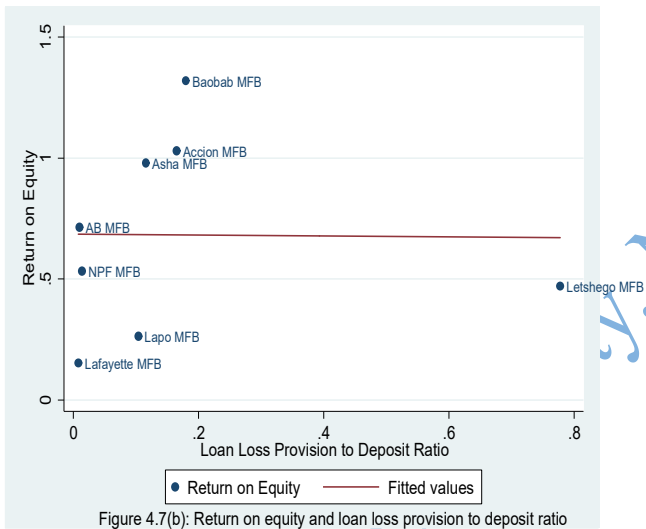
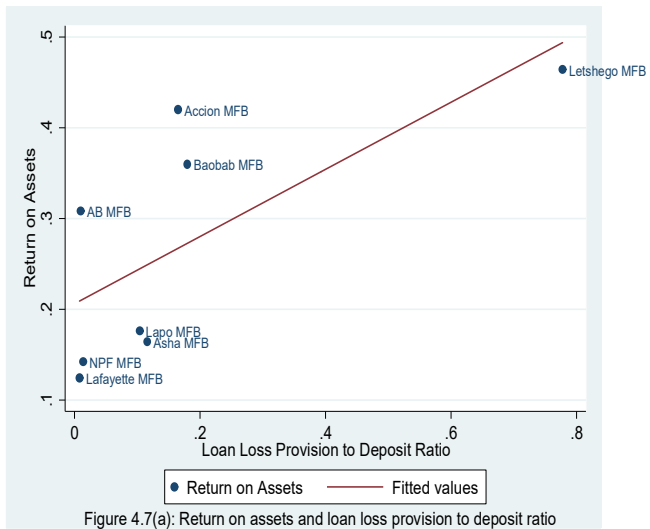


Figure 4.7(a-e): Microfinance Bank performance indices and loan loss provision to deposit ratio
 Source: Author's computation (2022).

With reference to the Microfinance Bank performance indicators, the correlation matrix showed that the positive correlation between return on assets and return on equity is weak as the correlation coefficient stands at 0.3199. Also, the correlation matrix shows that return on asset is positively correlated with net interest margin whereas its level of association with client base and operating income is negative.

In contrast, return on equity is negatively related with net interest margin but positively associated with client base and operating income. Further, a negative correlation was established between net interest margin and operating income including client base and operating income. Table 4.7 also presents the correlation coefficients of Microfinance Banks performance and other controlling variables. The correlation matrix also shows the correlation coefficients among these other controlling factors of Microfinance Banks performance indices at different magnitudes and degrees. It is important to note that these correlation coefficients indicate the absence of multicollinearity problem which is avoided in the empirical analysis. Nevertheless, the results of the correlation coefficients are just preliminary analyses that are being put through confirmation in the next sub-section after considering other determinants of Microfinance Banks performance.

4.2.3.2 Regression Analysis for the Third Hypothesis

In this section, this study employed the fixed and random effects' methods to estimate the panel regression models that examined the effect of loan loss provision to deposit ratio, other factors such as credit ceiling, credit maturity, type of credit, acceptable collaterals, and procedure for credits on microfinance banks performance. As well, the section also reported five forms of estimated panel regression models relating to microfinance banks performance series. The augmented models that incorporates Microfinance Banks performance effects

(using return on assets and return on equity) of loan loss provision to deposit ratio and other control variables (credit ceiling, credit maturity, type of credit, acceptable collaterals, and procedure for credits) are reported in Models 1 and 2. The third, fourth and fifth models capture the other measures of Microfinance Banks performance that is the net interest margin, client base and operating income models respectively.

In addition, the estimated coefficients between the fixed and random effects models were compared using the Hausman test with the null hypothesis “random effects are uncorrelated with the explanatory variables”. The study found that the Hausman test results presented in Table 4.7 reject the null hypotheses for the return on assets and net interest margin models at 5% significance levels based on the calculated Chi-Square values. The panel fixed effects estimator is appropriate for return on assets and net interest margin models. On the other hand, the null hypothesis of the Hausman tests for return on equity, client base and operating income models were not rejected at 5% significance level, indicating the appropriateness of panel random effects estimator. Both fixed and random effects model were found to be consistent and efficient for this sub-section.

4.2.3.3 Test of Hypothesis Three (H₀₃)

Research Objective Three: To investigate the the effect of relationship between loan loss provision to deposit ratio and Microfinance Banks performance.

Research Question Three: How does loan loss provision to deposit ratio affect Microfinance Banks performance?

Hypothesis Three: Loan loss provision to deposit ratio have no significant effect on the Microfinance Banks performance.

Table 4.8: Panel Results of Loan Loss Provision to Deposit Ratio and Microfinance Bank Performance

Variables	Dependent Variable: Microfinance Banks' Performance				
	Return on Assets	Return on Equity	Net Interest Margin	Client Base	Operating Income
	1	2	3	4	5
Loan Loss Provision to Deposit Ratio	-0.117*** (0.026)	-0.037* (0.019)	-1.553*** (0.451)	0.028*** (0.010)	0.038 (0.034)
Credit Ceiling	6.5825*** (2.0611)	0.342*** (0.051)	11.3551*** (3.6357)	-0.164 (0.486)	0.322*** (0.067)
Credit Maturity	0.022 (0.160)	0.002 (0.078)	0.121 (2.824)	-0.035** (0.017)	0.041 (0.026)
Type of Credit	-2.7679* (1.5363)	-0.066 (1.297)	-4.6884* (2.7099)	0.976*** (0.309)	-1.775*** (0.398)
Acceptable Collateral	-4.127** (1.560)	-0.005 (0.124)	-0.6483** (0.2751)	0.404* (0.240)	-0.258*** (0.039)
Procedure for Credits	0.6553 (0.8321)	0.584** (0.230)	-2.0934 (1.4678)	1.956 (1.443)	0.749*** (0.194)
Constant	-10.4761*** (3.2855)	-0.307 (2.777)	-17.8675*** (5.7955)	11.582* (6.601)	4.138*** (0.844)
Within R-squared	0.636	0.2583	0.658	0.3746	0.4018
F-Statistics	8.96***	-	10.04***	-	-
Prob.(F-stat)	(0.0000)	-	(0.0000)	-	-
Wald Test	-	43.47***	-	35.81***	86.42***
Prob.(Wald Test)	-	(0.0000)	-	(0.0000)	(0.0000)
Hausman Test	9.24***	4.95	17.22***	6.84	6.97
Prob. (Hausman Test)	(0.0000)	(0.2929)	(0.0000)	(0.1445)	(0.1374)
Observations	40	40	40	40	40
Number of Firms	8	8	8	8	8

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.10 significance level at 1%(2.576), 5%(1.960) and 10%(1.645) respectively.

Source: Author's computation (2022) Extract from STATA output.

Interpretation

In Table 4.8, the estimated Microfinance Bank performance model revealed that the coefficients of loan loss provision to deposit ratio are negative in models 1, 2, and 3 but positive in models 4 and 5 respectively. It suggests that loan loss provision to deposit ratio has negative effects on return on assets, return on equity and net interest margin measuring the performance indicators of the selected Microfinance Banks in Nigeria. The loan loss provision ratio coefficients were not in tandem with a priori expectations in models 1-3.

Also, the probability values of the t-statistics results of loan loss provision to deposit ratio was significant statistically in return on assets, return on equity and net interest margin models at 5% level. The financial profitability implication is that as the ratio of loan loss provision to the total deposit increases, the microfinance firms recorded a fall in return on assets, return on equity and Net Interest Margin respectively. This means that an increase in loan loss provision as a ratio of total deposit affects the banks' ability to provide for other financial needs (such as new assets) that are capable of generating profit for the industry. In magnitude terms, it suggests that a 1% increase in the loan loss provision to deposit ratio will cause a decrease in Microfinance Banks performance measured by return on assets, return on equity and net interest margin by 1.17%, 0.37% and 15.53% respectively.

Furthermore, this finding shows that loan loss provision to deposit ratio positively impacted on client base and operating income of the selected Microfinance Banks in Nigeria. Their t-statistics values indicate that the direct impact of loan loss provision to deposit ratio on client base is significant statistically at 5% level, while the positive impact of loan loss provision to deposit ratio on operating income is not significant at 5% level. Thus, it means that loan loss provision to total deposit assures a stable and dependable client base for Microfinance Banks.

Also, with high loan loss provision to total deposit ratio, the selected Microfinance Banks have a promising operating income. The loan loss provision to total deposit ratio parameters in models 4 and 5 shows that Microfinance Banks performance measured by client base and operating income increases by 0.28% and 0.38% correspondingly owing to a 10% increase in the loan loss provision to total deposit ratio. Concerning the other explanatory variables, the parameters of credit ceiling are positive and statistically significant at 5% in return on assets, return on equity, net interest margin and operating income models but negative and insignificant at 5% in client base model. This means that high credit ceiling have significant impact on financial performance indicators of the selected Microfinance Banks in Nigeria except client base. In the same way, the study reveals that numbers of credit procedures improves Microfinance Banks performance indicators with the exception of net interest margin which was negatively impacted. The statistical significance of credit procedures was only confirmed in return on equity and operating income models at 5% level. Further, it was detected that as the numbers of acceptable collateral falls, Microfinance Bank performance indicators like return on assets, return on equity, net interest margin and operating income increases.

The results were statistically established in return on assets, net interest margin and operating income models at 5% significance level. This therefore suggests that collateral credit system has a strong tie with the financial performance of Microfinance Banks in Nigeria. As well, the indirect impact of acceptable collateral on return on equity is not statistically ascertained. On the contrary, acceptable collateral has positive and significant impact on client base for the periods under study at 0.1 critical level. The estimation finding of credit types is related to the outcomes of the acceptable collateral. Thus, low number of credit types enhances

Microfinance Banks performance indices such as return on assets, net interest margins and operating income. In particular, credit types have a direct and significant impact on client base. This means that the firms have higher chances of increasing their client base by providing varieties of credits for prospective customers to choose from. Regarding credit maturity, the estimation outcome shows that the selected Microfinance banks improve their finance performance (such as return on assets, return on equity, net interest margin and operating income) as they extend the maturity periods of financial credits given to customers, although not statistically significant at 5%.

Additionally, the extent of variation in return on assets, return on equity, net interest margin, client base and operating income explained by loan loss provision to total deposit ratio, credit ceiling, credit maturity, credit types, acceptable collateral, and credit procedures are presented in the adjusted within R-squared values which are relatively moderate. This indicates that loan loss provision to total deposit ratio and other explanatory variables were found to account for about 63.68%, 25.83%, 65.8%, 37.46% and 40.18% total variation in return on assets, return on equity, net interest margin, client base and operating income of the selected Microfinance Banks between 2016 and 2020. With both F-statistics and Wald test, the statistics suggest that the overall effects of loan loss provision to total deposit ratio on financial performance of microfinance banks measured by return on assets, return on equity, net interest margin, client base and operating income were significant at 5% as their probability values are less than 0.05.

Decision: The statistical significance of this model indicates that the study cannot accept the null hypothesis of this model hence the study accepted the alternate hypothesis which says that loan loss provision to total deposit ratio have significant effect on the financial performance of the selected Nigerian Microfinance Banks. This result is consistent with a priori expectation of

this model. Thus, this study have achieved the objective of this model, answered the question as well as tested the related hypothesis.

4.2.4 Analysis of the Forth Hypothesis

In this sub-section, the empirical results concerning to the effect of assets quality and leverage ratio on Microfinance Banks performance in Nigeria is reported.

4.2.4.1 Correlation Analysis and Scatter Plots

Table 4.9 presents the partial correlation coefficients of the variables relating to the relationship among assets quality, leverage ratio and Microfinance Banks performance in Nigeria. The coefficient of correlation result shows that assets quality ratio has negative level of association with return on assets and net interest margin, but was positively correlated with return on equity, client base and operating income.

Similarly, a pictorial view of the correlation coefficients is depicted in the scatter graph of the variables in Figures 4.8a-4.8e. Concerning leverage ratio, it had an indirect correlation with return on assets, return on equity and operating income but had a positive relationship with net interest margin and client base. Equally, the scatter chart in Figures 4.9a-4.9e shows a graphic outlook of the coefficient of correlation of the links between leverage ratio and Microfinance Banks performance indices. Pertaining to the main explanatory variables, the direct relationship found between assets quality ratio and leverage is weak with a correlation coefficient of 0.1879. Imperatively, the correlation table shows that assets quality ratio has an indirect association with credit ceiling, credit maturity, type of credit, and acceptable collaterals while directly related with credit procedures. Also, the correlation matrix revealed

that leverage ratio is positively related to credit ceiling, types of credit, and numbers of acceptable collaterals whilst indirectly associated with credit maturity and procedures for credits.

Table 4.9: Correlation Matrix

	<i>Roe</i>	<i>nim</i>	<i>Cb</i>	<i>oi</i>	<i>aq</i>	<i>lr</i>	<i>cc</i>	<i>cmy</i>	<i>tct</i>	<i>acl</i>	<i>pcs</i>
<i>Roa</i>	0.3199	0.0471	-0.0545	-0.0044	-0.1299	-0.3566	0.0222	0.0827	-0.1046	0.1537	0.0758
<i>Roe</i>	1	-0.2689	0.1105	0.6168	0.1315	-0.3022	0.0765	-0.3028	0.2026	-0.2669	0.5542
<i>Nim</i>		1	-0.1092	-0.3269	-0.2911	0.2810	0.4716	0.4072	0.2130	0.4195	-0.2081
<i>Cb</i>			1	-0.0689	0.3163	0.2209	-0.0081	-0.6717	-0.1464	0.2627	0.4574
<i>Oi</i>				1	0.4521	-0.1137	-0.1439	-0.4397	0.1906	-0.6135	0.5126
<i>Aq</i>					1	0.1879	-0.3881	-0.4532	-0.3933	-0.3210	0.0439
<i>Lr</i>						1	0.5704	-0.0321	0.0752	0.1412	-0.3088
<i>cc</i>							1	0.2167	0.4905	0.3572	-0.0164
<i>cmy</i>								1	-0.0678	0.4888	-0.6320
<i>tct</i>									1	-0.2936	0.3815
<i>acl</i>										1	-0.3573

Note: roa - return on assets; roe - return on equity; nim - net interest margin; cb - client base; oi - operating income; aq - asset quality ratio; lr - leverage ratio; cc - credit ceiling; cmy - credit maturity; tct - type of credit; acl - acceptable collaterals; pc - procedure for credits.

Source: Author's computation (2022).

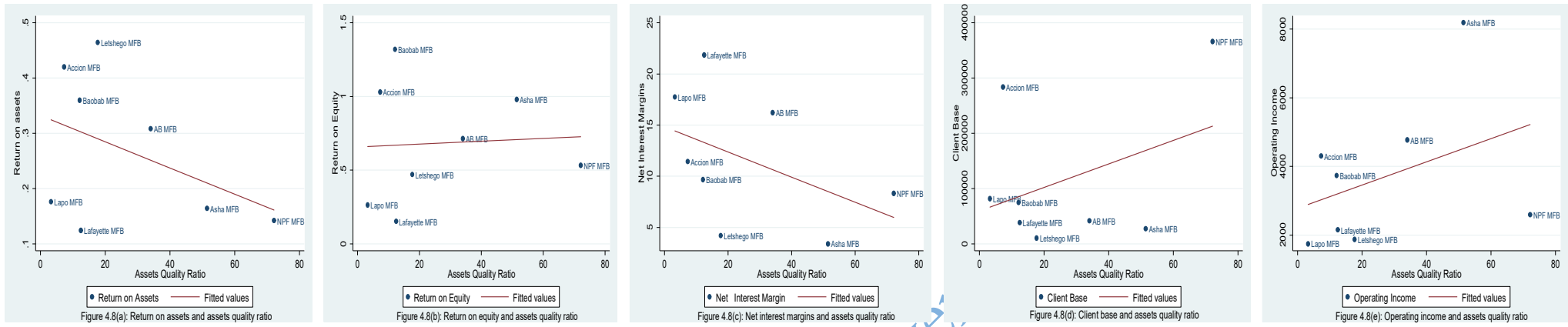


Figure 4.8(a-e): Microfinance bank performance indices and assets quality ratio
Source: Author's computation (2022).

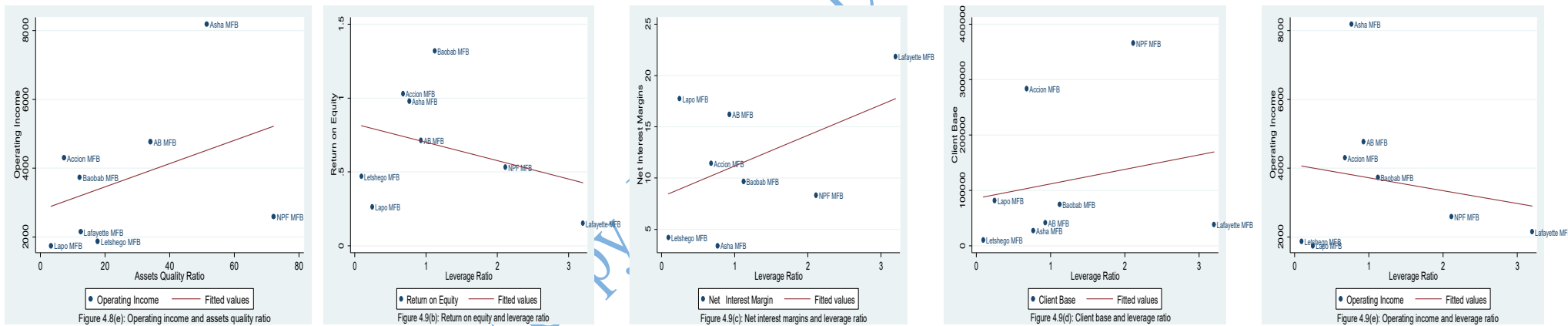


Figure 4.9(a-e): Microfinance bank performance indices and leverage ratio
Source: Author's computation (2022).

With reference to the Microfinance Bank performance variables, return on assets and return on equity are positively correlated with a weak correlation coefficient of 0.3199. The correlation matrix shows that return on asset has direct correlation with net interest margin but negatively correlated with client base and operating income. Quite the reverse, return on equity is indirectly correlated with net interest margin but directly associated with client base and operating income. A negative correlation was found between net interest margin, and client base as well as operating income.

Table 4.9 also present the correlation coefficients of Microfinance Banks performance and other controlling variables. The correlation matrix table also shows the correlation coefficients among these other controlling factors of Microfinance Banks performance indices at different magnitudes and degrees. The values of the correlation coefficients revealed the absence of multicollinearity problem. Thus, the problem of multicollinearity is avoided in the empirical analysis. Nevertheless, the results of the correlation coefficients are just preliminary analyses that are being put through confirmation in the next sub-section after considering other determinants of Microfinance Banks performance.

4.2.4.2 Regression Analysis for the Forth Hypothesis

The panel fixed and random effects' methods were employed in estimating the panel regression models that examined the effects of assets quality, leverage ratio, other microfinance firms' factors (such as credit ceiling, credit maturity, credit types, acceptable collateral and credit procedures) on Microfinance Bank performance measured by return on assets, return on equity, net interest margin, client base and operating income. As well, five forms of estimated panel regression models were estimated based on the different measures of Microfinance Bank performance.

The first and second augmented model regresses return on assets and return on equity on assets quality ratio, leverage ratio and other control variables (credit ceiling, credit maturity, credit types, acceptable collateral and credit procedures) correspondingly. The third, fourth and fifth models regress net interest margin, client base and operating income on assets quality ratio, leverage ratio and other control variables (credit ceiling, credit maturity, credit types, acceptable collateral and credit procedures) respectively.

As earlier stated in previous sub-sections, the estimated coefficients between the fixed and random effects' models were compared using the Hausman test with the null hypothesis "random effects are uncorrelated with the explanatory variables". The Hausman test results presented in Table 4.9 reveals that we do reject the null hypotheses for the return on assets and net interest margin models at 5% significance levels based on the calculated Chi-Square values. The panel fixed effects is found to be appropriate for return on assets and net interest margin models. However, the null hypothesis of the Hausman tests for return on equity, client base and operating income models were not rejected at 5% significance level. The panel random effect is found to be appropriate for return on assets and net interest margin models. As a result, both fixed and random effects method were found to be consistent and efficient for the achieving the stated objective of this sub-section.

4.2.4.3 Test of Hypothesis Forth (H₀₄)

Research Objective Four: To evaluate effect of assets quality and leverage ratio on Microfinance Banks performance.

Research Question Four: In what way does assets quality and leverage ratio affect Microfinance Banks performance?

Research Hypothesis Four: Assets quality and leverage ratio have no significant effect on the Microfinance Banks performance.

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Table 4.10: Panel Results of Assets Quality Ratio, Leverage Ratio and Microfinance Banks Performance

Variables	Dependent Variable: Microfinance Banks' Performance				
	Return on Assets	Return on Equity	Net Interest Margin	Client Base	Operating Income
	1	2	3	4	5
Assets Quality Ratio	0.103 (0.095)	0.310*** (0.094)	0.033 (1.344)	0.197** (0.096)	0.166 (0.113)
Leverage Ratio	-0.248* (0.130)	-0.227*** (0.059)	-6.737*** (1.844)	0.631*** (0.060)	-0.050 (0.071)
Credit Ceiling	10.096*** (2.5110)	0.196*** (0.066)	16.2421*** (3.5496)	-0.589*** (0.067)	0.264*** (0.079)
Credit Maturity	0.151 (0.195)	0.032 (0.023)	1.218 (2.759)	-0.103*** (0.023)	0.045* (0.027)
Type of Credit	-4.1712** (1.9555)	0.539 (0.525)	-4.9568* (2.7643)	2.688*** (0.535)	-0.897 (0.630)
Acceptable Collateral	-7.332*** (1.917)	-0.046 (0.041)	-1.1083*** (0.2709)	0.588*** (0.042)	-0.202*** (0.049)
Procedure for Credits	1.5089 (1.0236)	0.687*** (0.167)	-1.0220 (1.4469)	1.451*** (0.170)	0.792*** (0.200)
Constant	-16.107*** (4.0066)	-4.333*** (0.994)	-25.853*** (5.6638)	16.664*** (1.013)	3.648*** (1.193)
Within R-squared	0.475	0.1381	0.682	0.4193	0.3324
F-statistics	3.32**	-	7.67***	-	-
Prob.(F-statistics)	(0.0122)	-	(0.0001)	-	-
Wald Test	-	58.62***	-	64.63***	87.08***
Prob.(Wald Test)	-	(0.0000)	-	(0.0000)	(0.0000)
Hausman	14.36***	2.05	14.85***	3.20	5.03
Prob. (Hausman Test)	(0.0062)	(0.7263)	(0.0034)	(0.6104)	(0.4015)
Observations	40	40	40	40	40
Number of Firms	8	8	8	8	8

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.10 significance level at 1%(2.576), 5%(1.960) and 10%(1.645) respectively.

Source: Author's computation (2022) Extract from STATA output.

Interpretation

The estimated Microfinance Bank performance model in Table 4.10 indicates that the coefficients of assets quality ratio are positive. This means that assets quality has positive effects on return on assets, return on equity, net interest margin, client base and operating income as measurements of Microfinance Banks performance. The signs of the assets quality ratio are in tandem with theoretical expectations. Conversely, the probability values of the t-statistics results of assets quality ratio was only significant statistically for return on equity and client base at 5% level, while the coefficients are not significant under return on assets, net interest margin and operating income models at the conventional level. The inference is that as the ratio of non-performing assets to total capital investment rises, the MfBs recorded an increase in return in equity and client base respectively. It suggests that an advancement in this form of credit quality guarantees effective and efficient usage of the Microfinance Banks' equity to generate profit.

Equally, this quality of credit (non-performing assets to total capital investment ratio) assures a stable and dependable client base for Microfinance Banks. In magnitude terms, it shows that a 10% increase in the non-performing assets to total capital investment ratio drive Microfinance Banks performance measured by return on equity and client base by 3.10% and 1.973% respectively. More so, this finding also revealed that return on assets, net interest margin and operating income responds positively to changes in assets quality ratio, albeit the coefficients of assets quality ratio are not statistically significant. This implies that a viable ratio of non-performing assets to total capital investments ensures an efficient and effective use of microfinance banks' assets towards generating more profits for the industry.

Also, with a sizable amount of non-performing assets to total capital investments, the selected microfinance firms' business activities are profitable as well as the operating income. The non-performing assets to total capital investments coefficients in models 1, 3, and 5 shows that Microfinance Banks performance measured by return on assets, net interest margin and operating income increases respectively by 1.03%, 0.33% and 1.66% to a 10% rise in the non-performing loan ratio. Table 4.10 shows that the parameter estimates of leverage ratio are negative across all the Microfinance Banks performance indicators except client base which reportedly has a positive coefficient. This implies that leverage ratio has an indirect impact on return on assets, return on equity, net interest margin, and operating income used measurements of financial performance for the selected Microfinance Banks in Nigeria. The signs of the leverage ratio coefficients were in tandem with a priori expectation. However, client base is positively affected by leverage ratio of the selected Microfinance Banks.

It is imperative to note that the probability values of the t-statistics results of leverage ratio was statistically significant in return on equity, net interest margin, and client base models at 5% level, in return on assets at 10%, whereas the coefficient was not significant in operating income model at the conventional level. Thus, as the ratio of total debt to owners' equity decreases, microfinance firms record a rise in return in assets, return in equity, net interest margin and operating income respectively. This means that an improvement in the amount of funds and assets employed as collateral to creditors warrant effective and efficient usage of the equity capital and assets to generate profit. Equally, firms with low leverage ratio have high tendency of a steady and reliable profitable business activities and operating income. The banks' ability to secure their debt portfolio will lead to a greater profitability and operating income as they maintain the leverage ratios. This suggests that a 10% decrease in leverage

ratio will enhance Microfinance Banks performance measured by return on asset, return on equity, net interest margin and operating income by 0.25%, 0.23%, 6.74% and 0.05% respectively. Further, the finding shows that high leverage ratio tends to cause a rise in client base of the selected banks. It therefore means that this form of credit quality which assure profitability to some extent drives the microfinance firms' client base. The leverage ratio coefficient in model 4 shows that Microfinance Banks performance measured by client base increases by 0.63% to a 1% rise in the leverage ratio. In respect of the control variables, the parameters of credit ceiling are positive and statistically significant at 5% in return on assets, return on equity, net interest margin and operating income models but negative and significant at 5% in client base model. This further implies that high credit ceiling have significant impact on financial performance of the selected Microfinance Banks in Nigeria. Also, the study reveals that numbers of credit procedures tends to improve Microfinance Banks performance indicators except net interest margin which had a negative coefficient. The statistically significance of credit procedures was confirmed for return on equity, client base and operating income at 5% level.

It was observed from the result that as the numbers of acceptable collateral falls, Microfinance Bank performance indicators such as return on assets, return on equity, net interest margin and operating income increases. It suggests that collateral credit system has a strong tie with the financial performance of Microfinance Banks in Nigeria. However, the table showed that acceptable collateral positively impacted on client base for the periods understudy. Also, the indirect impact of acceptable collateral on return on equity is not statically established. Similarly, the estimation result of credit types is the same as the estimation outcomes of the acceptable collateral. Explicitly, a decrease in the numbers of credit types will enhance

microfinance banks performance indices like return on assets, net interest margins and operating income.

Remarkably, credit types have a direct and significant relationship with client base. This means that these banks increase their client base by providing varieties of credits for prospective customers to choose from. Concerning credit maturity, the estimation outcome shows that the selected Microfinance Banks improve their financial performance (such as return on assets, return on equity, net interest margin and operating income) as they extend the maturity periods of financial credits given to customers, albeit the coefficients are not statistically significant at 5%.

The joint effects of the variables were also examined using both F-statistics and Wald test. It was found that the overall effects of assets quality and leverage ratio on Microfinance Banks performance measured by return on assets, return on equity, net interest margin, client base and operating income were significant at 5% as their probability values are less than 0.05. In addition, the degree of variation in Microfinance Banks performance measured by return on assets, return on equity, net interest margin, client base and operating income indicated that the adjusted within R-squared values are relatively moderate. This indicates that assets quality, leverage ratio, credit ceiling, credit maturity, credit types, acceptable collateral, and credit procedures were found to account for about 47.5%, 13.81%, 68.2% 41.93% and 33.24% of the total variation in return on assets, return on equity, net interest margin, client base and operating income of the selected Nigerian Microfinance Banks between 2016 and 2020 respectively.

Decision: The statistical significance of this model indicates that the study cannot accept the null hypothesis of this model hence the study accepted the alternate hypothesis which says that

assets quality and leverage ratio have significant effects on the financial performance proxied by return on assets, return on equity, net interest margin, client base and operating income of the selected Nigerian Microfinance Banks. This result is consistent with a priori expectation of this model. Thus, this study have achieved the objective of this model, answered the question as well as tested the related hypothesis.

4.2.5 Analysis of the Fifth Hypothesis

This sub-section reports the empirical results with reference to the effect of joint predictors of credit risk management practices on Microfinance Banks performance in Nigeria. An index was generated for the composite of credit risk management components to capture the joint effect of credit risk management predictors on Microfinance Banks performance. Afterward, a robustness check was conducted by incorporating all the predictors of credit risk management practices into the Microfinance Banks performance indicators.

4.2.5.1 Principal Component Analysis

An index of credit risk management practices is generated from its five components that is non-performing loan ratio, capital adequacy ratio, loan loss provision to deposit ratio, assets quality ratio, and leverage ratio. The result of the principal component is presented in Table 4.11 for credit risk management practices.

Table 4.11: Principal Component Analysis

Components Credit Risk Management		Eigenvalues	Proportion (%)	Cumulative (%)
<i>NPLR</i>	1	3.0699	0.6140	0.6140
CAR	2	1.4081	0.2816	0.8956
LLPTDR	3	0.5181	0.1036	0.9992
AQR	4	0.0038	0.0008	1.0000
LR	5	0.0001	0.0000	1.0000

Source: Author's computation (2022).

The table shows that the index created from the first five principal components of the indicators of credit risk management practices explain a substantial percentage of the total variance in the original data. From the result of the principal component analysis, it is only their first component that recorded Eigen high values of 3.0699 for credit risk management practices. The components account for 61.4% of the total variance in the original data of credit risk management practices.

4.2.5.2 Correlation Analysis and Scatter Plots

Table 4.12 presents the partial correlation coefficients of the variables relating to the relationship between credit risk management predictors and Microfinance Banks performance in Nigeria. The coefficient of correlation result shows that credit risk management index has negative level of association with Microfinance Banks' performance indices (such as return on equity, net interest margin, client base and operating income) except return on assets which has a positive correlation coefficient. A pictorial view of the correlation coefficients is depicted in the scatter graph of the variables in Figures 4.10a-4.10e.

Non-performing loan ratio has direct association with net interest margin, whereas, it has an indirect correlation with return on asset, return on equity, client base and operating income. As

for capital adequacy ratio, it positively correlated with return on assets but negatively associated with return on equity, net interest margin, client base and operating income. Loan loss provision to deposit ratio has negative correlation with all the indicators of Microfinance Banks performance. For assets quality ratio, it is negatively related with return on assets and net interest margin but positively associated with return on equity, client base and operating income.

The correlation matrix indicate that leverage ratio has an indirect relationship with return on asset, return on equity and operating income whereas it directly correlates with net interest margin and client base. As earlier depicted, the scatter charts of these financial indices are presented in Figures 4.5a-4.5e, 4.6a-4.6e, 4.7a-4.e, 4.8a-4.8e, and 4.9a-4.9e. Concerning the main explanatory variables, their correlation coefficients are equally reported.

Table 4.12: Correlation Matrix

	<i>roe</i>	<i>Nim</i>	<i>cb</i>	<i>Oi</i>	<i>nplr</i>	<i>ca</i>	<i>llpdr</i>	<i>aq</i>	<i>lr</i>	<i>crmi</i>	<i>cc</i>	<i>Cmy</i>	<i>tct</i>	<i>acl</i>	<i>pcs</i>
<i>roa</i>	0.320	0.047	-0.054	-0.004	-0.057	0.062	-0.094	-0.130	-0.357	0.167	0.022	0.083	-0.105	0.154	0.076
<i>roe</i>	1	-0.269	0.111	0.617	-0.255	-0.168	-0.016	0.131	-0.302	-0.046	0.076	-0.303	0.203	-0.267	0.554
<i>nim</i>		1	-0.109	-0.327	0.334	-0.214	-0.356	-0.291	0.281	-0.084	0.472	0.407	0.213	0.419	-0.208
<i>cb</i>			1	-0.069	-0.055	-0.281	-0.216	0.316	0.221	-0.302	-0.008	-0.672	-0.146	0.263	0.457
<i>oi</i>				1	-0.345	-0.265	-0.148	0.452	-0.114	-0.286	-0.144	-0.440	0.191	-0.714	0.513
<i>nplr</i>					1	0.020	-0.043	-0.564	-0.346	0.675	-0.015	0.251	0.504	0.226	0.132
<i>ca</i>						1	0.900	-0.118	-0.434	0.573	-0.315	0.269	-0.312	0.118	-0.323
<i>llpdr</i>							1	-0.160	-0.380	0.566	-0.218	0.178	-0.231	0.066	-0.215
<i>aq</i>								1	0.188	-0.636	-0.388	-0.453	-0.393	-0.321	0.044
<i>lr</i>									1	-0.738	0.570	-0.032	0.075	0.141	-0.309
<i>cm</i>										1	-0.210	0.300	0.209	0.126	0.052
<i>cc</i>											1	0.217	0.490	0.357	-0.016
<i>cmy</i>												1	-0.068	0.489	-0.732
<i>tct</i>													1	-0.294	0.382
<i>acl</i>														1	-0.357

Note: *roa* - return on assets; *roe* - return on equity; *nim* - net interest margin; *cb* - client base; *oi* - operating income; *nplr* - non performing loan ratio; *ca* - capital adequacy ratio; *llpdr* - loan loss provision to deposit ratio; *aq* - assets quality ratio; *lr* - leverage ratio; *crmi* - credit risk management index; *cc* - credit ceiling; *cmy* - credit maturity; *tct* – type of credit; *acl* – acceptable collaterals; *pc* - procedure for credits.

Source: Author's computation (2022).

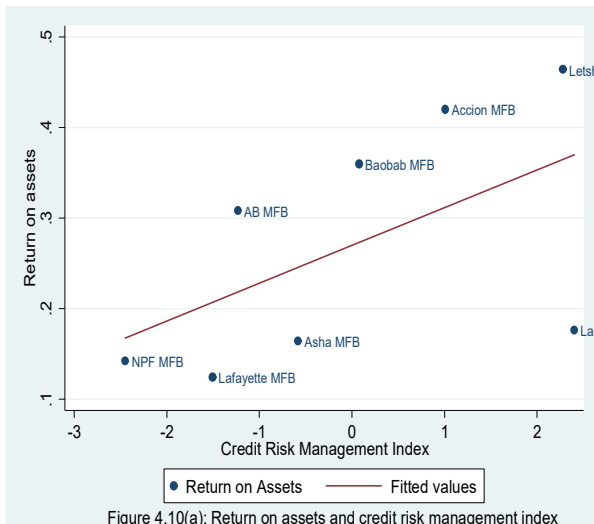


Figure 4.10(a): Return on assets and credit risk management index

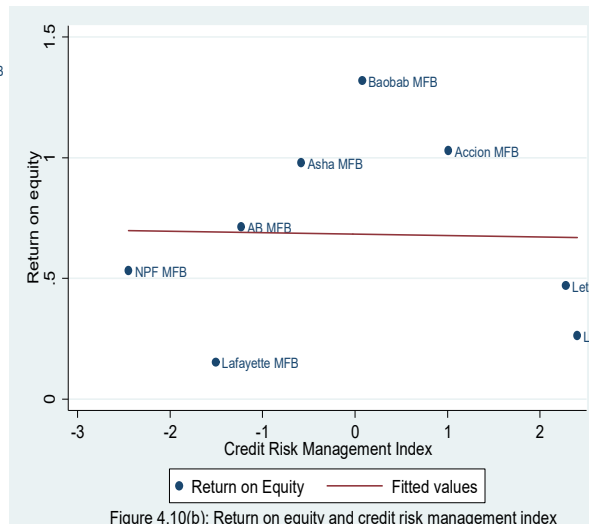


Figure 4.10(b): Return on equity and credit risk management index

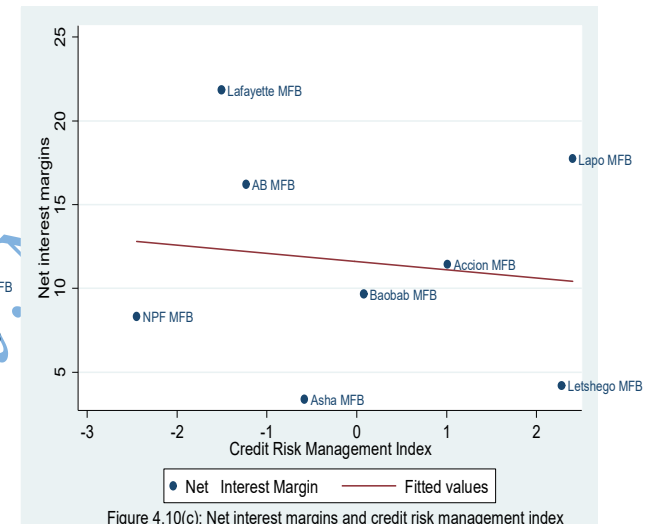


Figure 4.10(c): Net interest margins and credit risk management index

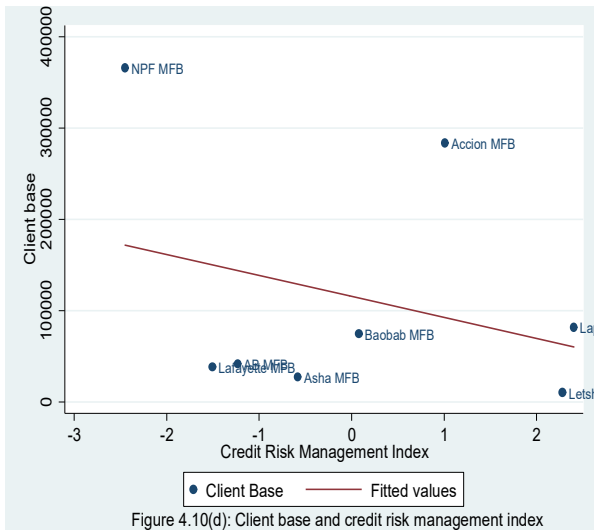


Figure 4.10(d): Client base and credit risk management index

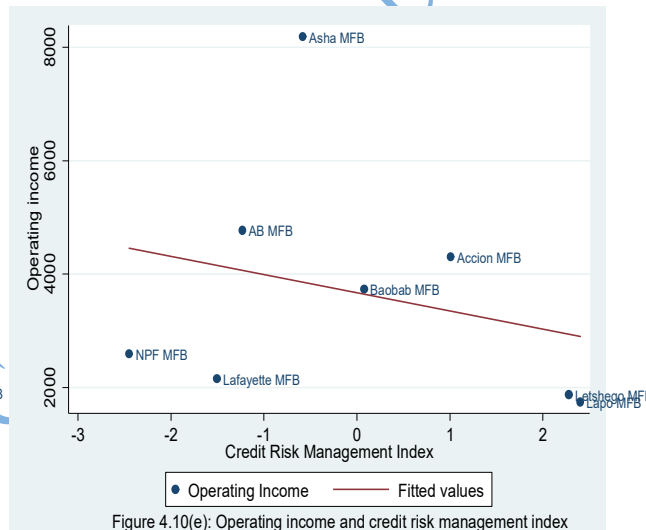


Figure 4.10(e): Operating income and credit risk management index

Figure 4.10(a-e): Microfinance Bank performance indices and credit risk management index
 Source: Author's computation (2022).

As to the Microfinance Bank performance variables, return on assets and return on equity are positively correlated with a weak correlation coefficient of 0.3199. The correlation matrix shows that return on asset has positive correlation with net interest margin but negatively correlated with client base and operating income. On the contrary, return on equity is indirectly correlated with net interest margin but directly associated with client base and operating income. A negative correlation was found between net interest margin and client base as well as operating income.

The correlation coefficients of Microfinance Banks performance and other controlling variables are presented in Table 4.12. The correlation matrix table also shows the correlation coefficients among these other controlling factors of Microfinance Banks performance indices at different magnitudes and degrees. The values of the correlation coefficients revealed the absence of multicollinearity problem. Thus, the problem of multicollinearity is avoided in the empirical analysis. Nevertheless, the results of the correlation coefficients are just preliminary analyses that are being put through confirmation in the next sub-section after considering other determinants of Microfinance Banks performance.

4.2.5.3 Regression Analysis for the Fifth Hypothesis

In this section, this study employed both the fixed effects and the random effects approaches to estimate the panel regression models that investigate the effect of joint predictors of credit risk management practices on Microfinance Banks performance. Other controlling variables considered were credit ceiling, credit maturity, types of credit, acceptable collateral and procedures of credits. Also, this sub-section reported five forms of estimated panel regression models. The first and second augmented model regresses return on assets and return on equity on non performing loan ratio, capital adequacy ratio, loan loss provision to deposit ratio, assets

quality ratio, leverage ratio and other control variables (credit ceiling, credit maturity, credit types, acceptable collateral and credit procedures) correspondingly. The third, fourth and fifth models regress net interest margin, client base and operating income on non performing loan ratio, capital adequacy ratio and other control variables (credit ceiling, credit maturity, credit types, acceptable collateral and credit procedures) respectively.

Meanwhile, the estimated coefficients between the fixed and random effects' models were compared using the Hausman test with the null hypothesis "random effects are uncorrelated with the explanatory variables". The study found that the Hausman test results presented in Table 4.12a reject the null hypotheses for the return on assets and net interest margin models at 5% significance levels based on the calculated Chi-Square values, thereby supporting the fixed effects approach. On the other hand, the null hypothesis of the Hausman tests for return on equity, client base and operating income models were not rejected at 5% significance level, indicating the appropriateness of random effects. As for Table 4.10b, panel fixed effects estimator is found appropriate for ROA, net interest margin and client base models whereas panel random effects is best for ROE and operating income models. Thus, both fixed and random effects model were found to be more consistent and efficient for this sub-section.

4.2.5.4 Test of Hypothesis Five (H₀₅)

Research Objective Five: To determine the effect of joint predictors of credit risk management practices on Microfinance Banks performance.

Research Question Five: In what way do joint predictors of credit risk management practices affect Microfinance Banks performance?

Hypothesis Five: Joint predictors of credit risk management practices have no significant effect on the Microfinance Banks performance.

Table 4.12a: Panel Fixed Effects Results of the Effects of Joint Predictors of Credit Risk Management Practices on Microfinance Banks Performance

Variables	Dependent Variable: Microfinance Banks' Performance				
	Return on Assets	Return on Equity	Net Interest Margin	Client Base	Operating Income
	1	2	3	4	5
Credit Risk Management Index	-0.169** (0.080)	-0.062 (0.064)	-0.840 (1.358)	-0.381*** (0.071)	-0.003 (0.044)
Credit Ceiling	0.8412*** (0.2488)	0.227*** (0.046)	14.1703*** (4.2405)	-0.482*** (0.142)	0.284*** (0.079)
Credit Maturity	0.151 (0.195)	-0.006 (0.091)	-1.831 (3.331)	-0.131*** (0.050)	0.039 (0.027)
Type of Credit	-4.8429** (1.8769)	0.310 (1.622)	-6.9910** (3.1996)	3.203*** (0.858)	-1.603*** (0.471)
Acceptable Collateral	-5.679*** (1.869)	0.038 (0.153)	-0.8877*** (0.3186)	0.577*** (0.083)	-0.241*** (0.045)
Procedure for Credits	1.1866 (1.0209)	0.546*** (0.075)	-1.3788 (1.7404)	1.357*** (0.381)	0.756*** (0.202)
Constant	-13.287*** (3.9706)	0.395 (3.446)	-22.2705*** (6.7689)	14.750*** (1.812)	4.471*** (0.993)
Within R-squared	0.441	0.1438	0.5087	0.1198	0.0703
F-statistics	4.07***	-	4.49***	-	-
Prob.(F-statistics)	(0.0039)	-	(0.0030)	-	-
Wald Test	-	22.17***	-	119.19***	82.06***
Prob.(Wald Test)	-	(0.0000)	-	(0.0000)	(0.0000)
Hausman	17.84***	3.74	15.18***	8.52	8.44
Prob.(Hausman)	(0.0013)	(0.4421)	(0.0043)	(0.0743)	(0.0781)
Observations	40	40	40	40	40
Number of Firms	8	8	8	8	8

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.10 significance level at 1%(2.576), 5%(1.960) and 10%(1.645) respectively.

Source: Author's computation (2022) Extract from STATA output.

Interpretation

The estimation outcomes of the effects of joint predictors of credit risk management practices on Microfinance Banks performance is reported in Tables 4.12a-b. Following the credit risk management index coefficient presented in Table 4.12a, it shows that the composite index have a negative relationship with all the Microfinance Banks performance indicators (i.e. return on assets, return on equity, net interest margin, client base and operating income). The parameter estimators of credit risk management index are only significant at 5% level in return on assets and client base respectively.

However, the indirect impact of credit risk management index on return on equity, net interest margin and operating income is not statistically significant at the conventional level. This implies that low credit risk improves return on asset and client base of Microfinance Banks, whereas its adverse effect on return on equity, net interest margins and operating income is not statistically established. The coefficients for the microfinance performance measured by return on assets, return on equity, net interest margin, client base and operating income increases by 1.69%, 0.62%, 8.4%, 3.81% and 0.03% attributable to a 10% decrease in credit risk index.

Augmenting all the predictors of credit risk management practices into a single model as reported in Table 4.12b, capital adequacy ratio and leverage ratio have negative effect on return on equity, client base and operating income. This shows that low capital adequacy ratio and leverage ratio cause an increase in return on equity, client base and operating income of Microfinance Banks. Meanwhile, the direct and indirect effects of capital adequacy ratio and leverage ratio on return on assets and net interest margin respectively are not statistically significant. Loan loss provision to deposit ratio positively affects return on equity, client base and operating income but influences return on assets and net interest margins negatively. This

means that increasing ratio of loan loss provision to total deposit lead to a rise in return on equity, client base and operating income. Conversely, the rise in loan loss provision to deposit ratio result to a decline in return on assets and net interest margin. As regards non-performing loan ratio and assets quality ratio, their impact on Microfinance Banks performance indicators (return on assets, return on equity, net interest margin, client base and operating income) are statistically insignificant at the conventional level.

Concerning the other controlling variables, the parameters of credit ceiling are positive and statistically significant at 5% in return on assets, return on equity, net interest margin and operating income models but negative and significant at 5% in client base model. This means that high credit ceiling have significant impact on financial performance indicators of the selected Microfinance Banks in Nigeria except client base. In the same way, the study reveals that the numbers of credit procedures improves Microfinance Banks performance indicators with the exception of net interest margin which was negatively impacted. The statistical significance of credit procedures was only confirmed in return on equity and operating income models at 5% level.

Furthermore, it was detected that as the numbers of acceptable collateral falls, Microfinance Bank performance indicators like return on assets, net interest margin and operating income increases. The results were statistically established in return on assets, net interest margin and operating income models at 5% significance level. This therefore suggests that collateral credit system has a strong tie with the financial performance of Microfinance Banks in Nigeria. As well, the direct impact of acceptable collateral on return on equity is not statically ascertained. Meanwhile, acceptable collateral has positive and significant impact on client base for the periods understudy at 0.1 critical level. The estimation finding of credit types is related to the

outcomes of the acceptable collateral. Thus, low number of credit types enhances Microfinance Banks performance indices such as return on assets, net interest margins and operating income.

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Table 4.12b: Panel Fixed Effects Results of the Effects of Joint Predictors of Credit Risk Management Practices on Microfinance Banks Performance

Variables	Dependent Variable: Microfinance Banks' Performance				
	Return on Assets	Return on Equity	Net Interest Margin	Client Base	Operating Income
	1	2	3	4	5
Non-Performing Loan Ratio	0.067 (0.455)	-0.151 (0.625)	-2.949 (7.308)	-0.668 (0.426)	0.732 (0.706)
Capital Adequacy Ratio	4.409 (3.416)	-6.593* (3.599)	-24.257 (54.861)	-13.479*** (3.196)	-8.460** (4.069)
Loan Loss Provision to Deposit Ratio	-0.124*** (0.035)	0.062* (0.034)	-0.996* (0.569)	0.085** (0.033)	0.080** (0.038)
Assets Quality Ratio	0.037 (0.418)	0.260 (0.594)	-3.567 (6.706)	-0.570 (0.391)	0.983 (0.672)
Leverage Ratio	4.404 (3.478)	-6.833* (3.630)	-29.714 (55.855)	-13.584*** (3.254)	-8.503** (4.104)
Credit Ceiling	8.1427*** (2.4913)	0.224*** (0.065)	12.321*** (4.0010)	-2.9432 (2.3309)	0.290*** (0.074)
Credit Maturity	0.034 (0.170)	0.042* (0.024)	-0.152 (2.724)	-0.140 (0.159)	0.049* (0.027)
Type of Credit	-3.4220* (1.8127)	0.709 (0.520)	-2.9494 (2.9113)	3.9457** (1.6960)	-0.807 (0.588)
Acceptable Collateral	-5.289** (1.920)	-0.044 (0.040)	-0.7745** (0.3083)	2.778 (1.796)	-0.188*** (0.046)
Procedure for Credits	1.1335 (0.9453)	0.673*** (0.169)	-2.0167 (1.5182)	0.2804 (0.8844)	0.718*** (0.191)
Constant	-12.981*** (3.9717)	-4.998*** (1.074)	-19.6061*** (6.3785)	4.3909 (3.7159)	3.214*** (1.214)
R-squared	0.668	0.1117	0.741	0.853	0.2654
F-Statistics	4.44***	-	8.42***	7.16***	-
Prob.(F-Statistics)	(0.0017)	-	(0.0001)	(0.0002)	-
Wald Test	-	68.93	-	-	115.78
Prob.(Wald Test)	-	(0.0000)	-	-	(0.0000)
Hausman Test	14.97**	5.60	18.11***	14.80**	10.53
Prob.(Hausman Test)	(0.0105)	(0.3466)	(0.0028)	(0.0112)	(0.0614)
Observations	40	40	40	40	40
Number of Firms	8	8	8	8	8

Note: Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$ significance level at 1%(2.576), 5%(1.960) and 10%(1.645) respectively.

Source: Author's computation (2022) Extract from STATA output.

In particular, credit types have a direct and significant impact on client base. This means that the banks have higher chances of increasing their client base by providing varieties of credits for prospective customers to choose from. As regards credit maturity, the estimation outcome shows that the selected Microfinance Banks improve their finance performance (such as return on assets, return on equity, net interest margin and operating income) as they extend the maturity periods of financial credits given to customers, although not statistically significant at 5%.

In assessing the overall fitness of the estimated panel regression models, the adjusted within R-squared results on Table 4.12a-b reveal that with the consideration of the predictors of credit risk management practices along with other firms' factors (credit ceiling, credit maturity, credit types, acceptable collateral and credit procedures) account for a sizeable variation in the financial performance of Microfinance Banks between 2016 and 2020. The overall effects of predictors of credit risk management practices on Microfinance Banks performance measured by return on assets, return on equity, net interest margin, client base and operating income were statistically significant at 5% with the results of both F-statistics and Wald test as their probability values are less than 0.05.

Decision: The statistical significance of this model indicates that the study cannot accept the null hypothesis of this model hence the study accepted the alternate hypothesis which says that the predictors of credit risk management practices have significant effect on Nigerian Microfinance Banks performance measured by return on assets, return on equity, net interest margin, client base and operating income. This result is consistent with a priori expectation of

this model. Thus, this study have achieved the objective of this model, answered the question as well as tested the related hypothesis.

4.3 Discussion of Findings

4.3.1 Effect of Non-Performing Loan Ratio on Microfinance Banks Performance

The findings show that non-performing loan ratio has significant impact on return on equity and client base used as measurements of Microfinance Bank performance in Nigeria. This falls within the theoretical expectations of existing studies and theories. This means that the microfinance banks recorded a rise in return on equity and client base as the ratio of total loans overdue or in default for more than 90 days to the total amount of loans granted falls. This further indicates that an improvement in non-performing loan ratio of Microfinance Banks guarantees effective and efficient usage of the Microfinance Banks' equity to generate profit. Also, it assures a stable and dependable client base for Microfinance Banks. The research outcome is consistent with the results of a study conducted for Microfinance Banks in Nigerian banks within the periods of 2006 and 2012 using student t-test and correlation analysis, which argued that return on equity significantly responds to non-performing loan¹. Likewise, it aligns with the research outcomes of an indirect and significant relationship between non-performing loan ratio and return on equity of 22 banks in Ghana between 2005 and 2010². A research study also affirmed a significant link between non-performing loan and return on equity of some selected commercial banks in Nigeria from 2000 to 2013³. The result complies with the result on universal banks' profitability in Ghana within 200:Q1-2014:Q4 which was negatively and significantly influenced by non-performing loan ratio⁴.

At the same time, studies conducted for Nigerian Banks affirmed that low level of non-performing loans enhances the performance of banks, most especially in the long run⁵. A study

that employs both descriptive and regression analysis asserted that non-performing loans have a negative effect on profitability of some selected commercial banks⁶. A scholar also found that non-performing loans is among the factors influencing the profitability of 30 listed commercial banks on the Dhaka Stock Exchange market⁷. It was also evidenced that low non-performing loans increase business profitability of 7 joint ventures of Nepalese banking industry within the periods, 2006-2017⁸.

Past studies also affirmed to the inverse link between non-performing loan and profitability in Tanzania and Ghana^{9,10}. Using a cross-section of 18 Nigerian commercial banks from 2014:Q1-2018:Q4, a study also confirmed that low profitability resulted from higher rate of non-performing loans¹¹. Meanwhile, the findings that low non-performing loan ratio has the capability of improving the other three financial performance indicators like return on assets, net interest margin and operating income is not statistically established. This also aligns with the existing result of an insignificant relationship between non-performing loan ratio and return on assets¹. This goes against the study that argued a significant negative relationship between non-performing loan and return on assets^{2,3}. This contradicts the results for banks in Bangladesh and Nigeria using vector autoregressive and multiple regression analysis respective that non-performing loans had negative effect on return on assets^{12,13}.

4.3.2 Effect of Capital Adequacy on Microfinance Banks Performance

The findings show that capital adequacy ratio is positively influence financial performance indicators but the statistically impact was confirmed for return on assets, return on equity and net interest margin. Specifically, it implies an improvement in credit quality that safeguards shareholders' funds and reserves against risky assets affirm effective and efficient usage of the equity capital and assets to generate profit. In summary, capital adequacy play a key role in

the improving bank profitability. The findings aligns with the previous studies that assert that capital adequacy influences bank performance positively^{14,15,16,17,18,19}. Specifically, it complies with a study that argued that capital adequacy positively influences bank performance in 15 Nigerian banks from 2008 to 2012¹⁴.

Also, two different studies affirmed the positive links between capital adequacy and bank performance in Nigeria^{16,18}. The findings of this study however contradict the results of a study conducted for some selected Ghanaian banks within 2005-2011 that found an inverse relationship between capital adequacy and bank profitability²⁰. Another study documented in Kenya also claimed that capital adequacy negatively influences bank profitability²¹.

4.3.3 Effect of Loan Loss Provision to Deposit Ratio on Microfinance Banks Performance

The empirical result showed that loan loss provision to deposit ratio negatively influence return on assets, return on equity and net interest margin used as measurements of the selected Microfinance Banks performance in Nigeria. It implies that increasing loan loss provision to total deposit affects the banks' ability to provide for credit and other financial needs (such as acquisition of new assets) that are capable of generating profit for the industry. This is evidenced as the study showed a positive effect of loan loss provision to deposit ratio on operating income, albeit not statistically significant at 5% level. This shows there is evidence of loan loss provisions enhancing the selected banks' operating income but it fails to impact profitable business activities of the Microfinance Banks in Nigeria.

The findings affirm the result of an existing study conducted for 6 largest banks listed on the Nigerian stock market for the period of 1999-2013 that found an adverse link between loan loss provisions and return on assets²². However, the study showed that increasing the ratio of

loan loss provisions to total deposit tends to improve the Microfinance Banks' client base. This shows that customers' confidence are built and retained over time as there is provision for expected loan loss over total deposit made to these banks. Thus, a stable and dependable client base for Microfinance Banks is assured owing to an increasing loan loss provision to total deposit.

4.3.4 Effect of Assets Quality and Leverage Ratio on Microfinance Banks Performance

The empirical findings established that assets quality has positive effects on all the performance indicators of Microfinance Banks performance in Nigerian for the periods understudy. The study was only able to establish that assets quality influences return on equity and client base positively and significantly over the periods of 2016 and 2020. The direct effect of assets quality on return on assets, net interest margin and operating income was not statistically established. Apparently, with direct and significant effects of assets quality on client base and return on equity, the study affirmed that assets quality positively impacted the performance of the selected Microfinance Banks in Nigeria. This aligns with the results of two scholars that concluded that asset quality directly influences bank performance in Nigeria²³.

Likewise, another study conducted for 43 banks in Kenya for the periods of 2006-2013 found that banks performance is positively influenced by asset quality²⁴. Some studies also claimed that there is a positive level of association between assets quality and bank performance^{25,26,27}. The estimation results of some existing studies contradicts the empirical results of this study as they argued that assets quality have an adverse effect on bank profitability and performance^{28,29,30,31,32,33,34}. To mention a few, a study conducted for 55 banks in Turkey from 2005 to 2016 showed an inverse relationship between assets quality and bank profitability²⁸.

Also, two researchers found that assets quality has a negative impact on banks profitability in India within the periods 2005-2014²⁹.

Furthermore, the study found that leverage ratio has indirect effects on the selected Nigerian Microfinance Banks performance indicators i.e. return on assets, return on equity, net interest margin, and operating income. Thus, as total debt to owners' equity decreases, it implies that Microfinance Banks record a rise in return in assets, return in equity, net interest margin and operating income respectively. It suggests that an improvement in the amount of funds and assets employed as collateral to creditors warrant effective and efficient usage of the equity capital and assets to generate profit.

Equally, banks with low leverage ratio have high tendency of a steady and reliable profitable business activities and operating income. The banks' ability to secure their debt portfolio will lead to a greater profitability and operating income as they maintain the leverage ratios. The result aligns with the stands of some studies that leverage had a negative and significant effect on financial performance^{35,36,37}. The empirical result contradicts the findings of past studies that there is no negative and significant relationship between leverage and financial performance^{38,39,40}. Meanwhile, the result shows that high leverage ratio tends to cause a rise in client base of the selected banks which implies that this form of credit quality which assure profitability to some extent drives the microfinance firms' client base.

4.3.5 Effect of Joint Predictors of Credit Risk Management Practices on Microfinance Banks Performance

The study found that credit risk management composite index had a negative relationship with all the microfinance performance indicators (i.e. return on assets, return on equity, net interest margin, client base and operating income) but the statistical significance of the index was only

established on return on assets and client base. The implication is that low credit risk improves return on asset and client base of microfinance banks, whereas its adverse effect on return on equity, net interest margins and operating income is not statistically established. This implies that the controls of credit risk by the Microfinance Banks guarantee more effective and efficient usage of these banks' equity to generate profit and the client base.

The results further affirmed that low capital adequacy ratio and leverage ratio cause an increase in return on equity, client base and operating income of Microfinance Banks. Comparing the results with past studies, capital adequacy and leverage influence bank performance^{15,17,18,19,35,36,37}.

Also, loan loss provision to deposit ratio positively affecting return on assets, client base and operating income and negatively influencing return on assets and net interest margins means that increasing ratio of loan loss provision to total deposit lead to a rise in return on assets, client base and operating income. This aligns with the findings of previous studies that loan loss provision negatively and significantly influencing return on assets²². As regards non-performing loan ratio and assets quality ratio, their impact on Microfinance Banks performance indicators (return on assets, return on equity, net interest margin, client base and operating income) are statistically insignificant at the conventional level.

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Chapter Five

Conclusion

5.1 Summary of Findings

This study examined effect of credit risk management practices on performances of selected Microfinance Banks in Nigeria. Chapter one focused on background to the study, while chapter two was dedicated to the review of the relevant body of knowledge that are closely associated to the study. Chapter three explained a detailed sequence of methods and procedures implemented in the study, while data collected via field survey are presented, analyzed, and interpreted with the aids of basic descriptive and parametric inferential statistics in chapter four. Chapter five discussed summary of findings and a few logical conclusions were drawn to proffer solutions to the problems highlighted in chapter one of the study. Finally, recommendations are made, while research for further studies into the topic is identified.

In testing the formulated hypotheses of the study, items manifesting credit risk management (Non-performing loan ratio, capital adequacy, loan loss provision to deposit ratio, assets quality, and leverage ratio) was regressed on Microfinance Banks performance items. Findings based on the study revealed that Microfinance Banks performance models indicates that the coefficients of non-performing loan ratio are negative across all the financial indicators of Microfinance Bank performance while capital adequacy ratio are positive except for client base which was negative. Equally, items demonstrating Loan loss provision to deposit ratio were regressed on Microfinance Banks performance items. The findings based on the survey further revealed that

loan loss provision to deposit ratio has negative effects on return on assets, return on equity and net interest margin measuring the performance indicators of the selected Microfinance Banks in Nigeria. The loan loss provision ratio coefficients were not in tandem with a priori expectations in models 1-3. Similarly, Items demonstrating assets quality and leverage ratio were regressed on Microfinance Banks performance items. Based on the result, it further shows that the coefficients of assets quality ratio are positive. This means that assets quality has positive effects on return on assets, return on equity, net interest margin, client base and operating income as measurements of Microfinance Banks performance in Nigeria. The signs of the assets quality ratio are in tandem with theoretical expectations.

In a similar manner, the parameter estimates of leverage ratio shows negative across all the Microfinance Banks performance indicators except client base which reportedly has a positive coefficient. This implies that leverage ratio has an indirect impact on return on assets, return on equity, net interest margin, and operating income used measurements of financial performance for the selected Microfinance Banks in Nigeria. The signs of the leverage ratio coefficients were in tandem with a priori expectation.

Furthermore, items demonstrating Joint predictors of credit risk management practices was regressed on Microfinance Banks performance items, the findings from the survey equally revealed that the credit risk management index coefficient shows that the composite index have a negative relationship with all the microfinance performance indicators (i.e. return on assets, return on equity, net interest margin, client base and operating income). The parameter estimators of credit risk management index are only significant at 5% level in return on assets and client base respectively. However, the indirect impact of credit risk management index on return on equity, net interest margin and operating income is not statistically significant at the

conventional level. This implies that low credit risk improves return on asset and client base of Microfinance Banks, whereas its adverse effect on return on equity, net interest margins and operating income is not statistically established.

Augmenting all the predictors of credit risk management practices into a single model shows that capital adequacy ratio and leverage ratio have negative effect on return on equity, client base and operating income. This shows that low capital adequacy ratio and leverage ratio cause an increase in return on equity, client base and operating income of Microfinance Banks. Meanwhile, the direct and indirect effects of capital adequacy ratio and leverage ratio on return and net interest margin respectively are not statistically significant.

Loan loss provision to deposit ratio positively affects return on assets, client base and operating income but influences return on assets and net interest margins negatively. This means that increasing ratio of loan loss provision to total deposit lead to a rise in return on assets, client base and operating income. Conversely, the rise in return on assets, client base and operating income ratio result to a decline in return on assets and net interest margin. As regards non-performing loan ratio and assets quality ratio, their impact on Microfinance Banks performance indicators (return on assets, return on equity, net interest margin, client base and operating income) are statistically insignificant at the conventional level.

Other practical findings from the study revealed the following:

- i. The client base of microfinance banks has increased tremendously over the years from its introduction in 2007. This goes to achieve one of the major objectives of the introduction of microfinance sector which is to reach more bankable individuals especially in the rural areas.

- ii. Non-performing loans ratio of the banks is generally higher than the set threshold of 5% by the regulatory authorities.
- iii. Positive values of net interest margins and other performance indicators proves that Microfinance Bank business activities are profitable, which is necessary to ensure sustainability of the sector.

The above have dire consequences on Microfinance Banks performance. Poor understanding of credit risk management practices can in no small measure affect Microfinance Bank performance if not completely liquidation of any bank that fails to pay adequate attention to credit risks in its business.

5.2 Conclusion

This study investigated the effect of Credit Risk Management Practices on Performance of Selected Microfinance Banks in Nigeria. This study, therefore, concluded that Credit Risk Management Practices had a negative effect on the performance of Microfinance Banks in Nigeria. It was revealed that all the proxies of Credit Risk Management Practices (non-performing loan ratio, loan loss provision to deposit ratio, leverage ratio) contributed negatively to Microfinance Bank performance in Nigeria, while Assets Quality ratio and Capital Adequacy ratio has a positive effect on Microfinance Bank performance in Nigeria.

The study also revealed how poor understanding of credit risk management practices can be a stressor that can in no small measure result to Microfinance Bank liquidation. This study increased the understanding of credit risk management practices and its consequences. The results of this thesis showed that credit risk management practices has a broader consequence for both the banks, regulator and customer in general.

5.3 Recommendations

Due to the findings from this research work, the following are under listed recommendations to all stakeholders in the Microfinance banking sector in Nigeria:

- i. Management of microfinance banks need to pay adequate attention to understand and improve its credit risk management practices to ensure reduction in its non performing loan ratio to its lowest possible level in order to avoid the negative impact on its performance.
- ii. The shareholders and the Board of Directors should ensure that maximum attention is paid to their oversight function in order to put the management on their toes to avoid erosion of capital as a result of wrong credit risk management practices. This is necessary to ensure adequate capital is available for the day to day business activities of Microfinance Banks.
- iii. The regulatory framework need to be more dynamic and monitored to ensure Microfinance Banks do not waste away customers deposits on provision for loan losses. Nigeria Deposit Insurance Corporation (NDIC) in particular need to step up their regulatory activities in this respect to protect customers deposits.
- iv. The managers of Microfinance Banks are hereby advised to maintain a healthy leverage ratio that would deliver maximum benefits to their investors.
- v. All stakeholders of the microfinance industry should focus on the objective of the setting up of Microfinance Banks and avoid credit risk practices that may have damaging effect on the whole economy in the long run.

5.4 Contribution to Knowledge

This study has contributed to the literature in the area of accounting by exploring the separate effect of non-performing loan ratio, loan loss provision to deposit ratio, leverage ratio, assets quality ratio and capital adequacy ratio (predictors of credit risk management) on Microfinance Bank performance; which were measured using return on assets, return on equity, net interest margin, client base and operating income which has not been previously examined in a like manner particularly with respect to Microfinance Banks in Nigeria.

This study also empirically revealed the effect of the joint predictors of credit risk management on performance of Microfinance Banks in Nigeria thereby expanding the understanding of microfinance banks' management of their risk portfolios.

5.5 Area for Further Studies

One important limitation of this study is the inability of the researcher to capture all the predictors of credit risk management such as Bank Size, Gross Domestic Product growth rate, Interest rate, Liquidity Ratio and non-financial indices such as outreach, sex and marital status of clients vis-a-vis the effect on Microfinance Banks. These were not considered in the current study, further studies can be considered in this direction. It is also necessary that further research can examine comparative study of effect of credit risk management practices among Microfinance Banks and Deposit Money Banks in Nigeria in order to arrive at a more comprehensive framework on the research study.

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Appendix

Appendix I: Data

S/N	Bank Name	Year	1	2	3	4	5	6	7	8	9	10
			Non Performing Loan Ratio	Capital Adequacy Ratio	Loan Loss Provision to Deposit Ratio	Leverage Ratio	Assets Quality Ratio	Return on Assets	Return on Equity	Net Interest Margin	Client Base	Operating Income
1	ACCION MFB	2016	0.16	1.67	0.23	0.60	6.12	0.47	1.11	12.87	245,094	3,526
		2017	0.13	1.63	0.22	0.61	7.83	0.47	1.14	16.61	282,057	4,152
		2018	0.13	1.64	0.10	0.61	8.14	0.42	1.07	10.69	263,885	4,576
		2019	0.12	1.31	0.15	0.77	8.69	0.43	1.08	10.84	345,178	5,306
		2020	0.18	1.25	0.14	0.80	5.66	0.31	0.74	6.14	283,520	3,952
2	ASHA MFB	2016	0.04	1.30	0.04	0.77	28.50	0.09	0.55	2.46	12,189	3,736
		2017	0.09	1.20	0.12	0.83	10.88	0.13	0.83	2.89	28,726	5,429
		2018	0.02	1.35	0.03	0.74	62.41	0.23	1.47	4.43	30,772	10,953
		2019	0.01	1.38	0.05	0.72	135.4	0.21	1.20	3.99	32,132	11,705
		2020	0.05	1.31	0.34	0.77	20.10	0.16	0.85	3.25	31,298	9,089
3	BAOBAB MFB	2016	0.08	3.47	0.00	0.29	13.25	1.01	1.91	24.62	42,105	3,850
		2017	0.08	1.80	0.03	0.55	12.20	0.36	0.86	12.03	63,128	1,909
		2018	0.08	0.44	0.10	2.27	12.37	0.12	0.99	3.59	78,342	3,652
		2019	0.09	0.75	0.50	1.34	11.24	0.16	1.43	4.17	98,219	4,130
		2020	0.09	0.86	0.27	1.16	11.60	0.15	1.41	3.93	89,630	5,117
4	LAFAYETTE MFB	2016	0.08	0.33	0.01	3.06	12.11	0.16	0.19	26.67	25,962	1,925
		2017	0.08	0.34	0.01	2.93	11.80	0.14	0.17	25.58	32,970	2,114
		2018	0.08	0.30	0.01	3.38	13.07	0.08	0.10	17.05	37,737	1,421

		2019	0.07	0.29	0.00	3.42	13.61	0.14	0.17	25.09	43,883	2,784
		2020	0.09	0.31	0.01	3.21	11.75	0.10	0.13	14.88	50,352	2,519
5	LAPO MFB	2016	0.28	4.86	0.04	0.21	3.63	0.13	0.24	16.43	32,522	787
		2017	0.34	4.75	0.04	0.21	2.95	0.16	0.22	19.29	64,899	1,189
		2018	0.36	4.09	0.10	0.24	2.81	0.17	0.24	17.43	92,141	1,561
		2019	0.29	3.67	0.18	0.27	3.49	0.21	0.32	18.31	110,700	2,476
		2020	0.29	3.32	0.16	0.30	3.40	0.21	0.30	17.27	108,428	2,733
6	LETSHEGO MFB	2016	0.04	35.62	1.68	0.03	25.50	0.20	0.41	5.58	5,338	1,611
		2017	0.05	17.36	1.04	0.06	20.28	0.20	0.46	4.79	5,426	1,782
		2018	0.09	7.56	0.73	0.13	11.31	0.19	0.53	4.16	12,844	2,064
		2019	0.08	9.87	0.40	0.10	12.92	0.19	0.51	3.19	16,007	2,043
		2020	0.05	6.58	0.04	0.15	18.58	1.54	0.44	3.31	12,844	1,893
7	NPF MFB	2016	0.01	0.66	0.01	1.52	77.08	0.13	0.36	8.06	300,000	1,574
		2017	0.02	0.51	0.02	1.96	52.38	0.14	0.50	8.19	325,000	2,287
		2018	0.03	0.44	0.02	2.25	35.21	0.14	0.54	6.88	380,000	2,530
		2019	0.01	0.47	0.01	2.13	99.83	0.15	0.58	8.54	401,000	2,895
		2020	0.01	0.37	0.01	2.71	96.34	0.15	0.68	9.95	425,000	3,677
8	AB MFB	2016	0.04	1.32	0.02	0.76	27.93	0.37	0.85	19.29	26,532	3,845
		2017	0.05	1.21	0.01	0.83	18.41	0.33	0.75	25.65	34,614	4,197
		2018	0.03	1.12	0.01	0.89	36.19	0.26	0.62	12.80	38,967	4,139
		2019	0.02	1.10	0.00	0.91	48.38	0.28	0.65	13.46	51,652	5,118
		2020	0.03	0.79	0.01	1.26	39.31	0.30	0.70	9.85	55,641	6,557

Source: Annual Reports

Continuation of datasets

S/N	Bank Name	Year	11	12	13	14	15
			Credit Ceiling	Credit Maturity	Types of Credits	Acceptable Collateral	Procedure for Credits
1	ACCION MFB	2016	₦150,000 for Personal loans. No limit for other loans	1 - 12 months	Personal loans; SME Capital Loans; Assets Loans, Hmoe Loans; Group Loans	Guarantor & Assets Financed	Be in business for 1 at least 1 year; Opertaing in the same loccation for at least 6 months; 20% savings required; Apply on line
		2017					
		2018					
		2019					
		2020					
2	ASHA MFB	2016	₦1 million	1 - 10 months	Small loans for Females; Small Business loans for Females; Individual Loans	Non	Apply on line; Contact nearest Branch. Group responsible for recommending members
		2017					
		2018					
		2019					
		2020					
3	BAOBAB MFB	2016	₦50 Million	1 - 24 months	Micro loan; SME Loan; Group loan; Assets Finance Loan	Guarantor & Assets Financed	On line applicatio; Visit nearest branch
		2017					
		2018					
		2019					
		2020					
4	LAFAYETTE MFB	2016	₦75 million	6 - 24 months	Personal loan; Business loan; Group loan	Guarantor & Assets Financed	Opean an Account; No savings required
		2017					
		2018					
		2019					
		2020					
5	LAPO MFB	2016	₦5 million	1 - 24 months	SME Loan; Agric Loan; Regular loan;	2 Guarantors and assets	Open Savings account, Apply

		2017			Education loan; Public Sector Loan; Group loan; Housing loan	financed	online; visit nearest branch
		2018					
		2019					
		2020					
6	LETSHEGO MFB	2016	₦3 million	1 - 24 months	Payroll loan; Personal loan; SME loan; Education loan	Guarantor and assets financed	Apply online.
		2017					
		2018					
		2019					
		2020					
7	NPF MFB	2016	₦5 million	1 - 12 months	Salary Account loan; Agric loan; Transport Business loan; LPO Financing Loan	Guarantor and Assets financed	Police Officers - Serving & Retired, Apply online; Visit nearest Branch
		2017					
		2018					
		2019					
		2020					
8	AB MFB	2016	₦20 million	6 - 24 months	Micro loan; SME loan; Housing loan	Guarantor and Assets financed	Apply online; Visit nearest branch
		2017					
		2018					
		2019					
		2020					

Source: Annual Reports

Appendix II: Objective One

```
. xtset c_id year
    panel variable: c_id (strongly balanced)
    time variable: year, 2016 to 2020
    delta: 1 unit
```

```
. xtreg roa nplr ca cc cmy tct acl pcs, fe
```

```
Fixed-effects (within) regression      Number of obs   =    40
Group variable: c_id                  Number of groups =     8
```

```
R-sq:                                Obs per group:
  within = 0.4802                      min =          5
  between = 0.0435                     avg =         5.0
  overall = 0.0103                     max =          5
```

```
corr(u_i, Xb) = -1.0000                F(7,25)        =    3.30
                                        Prob > F       =    0.0126
```

roa	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
nplr	-.1205923	.10063	-1.20	0.242	-.3278438	.0866591
ca	.2437365	.1279435	1.91	0.068	-.0197681	.507241
cc	10.15502	2.492182	4.07	0.000	5.022273	15.28776
cmy	.1525082	.193726	0.79	0.439	-.2464779	.5514943
tct	-4.227533	1.923987	-2.20	0.037	-8.190058	-0.265008
acl	-7.395031	1.903884	-3.88	0.001	-11.31615	-3.473908
pcs	1.549597	1.017828	1.52	0.140	-5.466576	3.645852
_cons	-16.2013	3.978716	-4.07	0.000	-24.39561	-8.006977

```
sigma_u | 15677.283
sigma_e | .20694266
rho | 1 (fraction of variance due to u_i)
```

```
F test that all u_i=0: F(7, 25) = 3.41          Prob > F = 0.0106
```

```
. estimates store fixed
. xtreg roa nplr ca cc cm y tct acl pcs, re
```

```
Random-effects GLS regression           Number of obs   =       40
Group variable: c_id                   Number of groups =        8
```

```
R-sq:                                Obs per group:
  within = 0.0140                      min =          5
  between = 0.9760                     avg =         5.0
  overall = 0.2235                     max =          5
```

```
corr(u_i, X) = 0 (assumed)             Wald chi2(7)    =       9.21
                                         Prob > chi2    =     0.2380
```

roa	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
nplr	-.054372	.0893135	-0.61	0.543	-.2294234	.1206793
ca	.1430788	.0545209	2.62	0.009	.0362198	.2499377
cc	.0995646	.0595896	1.67	0.095	-.0172289	.2163581
cm y	-.0067547	.0208168	-0.32	0.746	-.0475549	.0340455
tct	-.1367515	.4852582	-0.28	0.778	-1.08784	.8143371
acl	-.0125899	.0367815	-0.34	0.732	-.0846804	.0595005
pcs	.0389323	.1530281	0.25	0.799	-.2609973	.3388618
_cons	-1.467469	.919135	-1.60	0.110	-3.26894	.3340027
sigma_u	0					
sigma_e	.20694266					
rho	0 (fraction of variance due to u_i)					

```
. hausman fixed ., sigmamore
```

	---- Coefficients ----			
	(b) fixed	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
nplr	-.1205923	-.054372	-.0662203	.0865874
ca	.2437365	.1430788	.1006577	.1484654
cc	10155.02	.0995646	10154.92	3080.757
cm y	.1525082	-.0067547	.1592629	.2385715
tct	-4227.533	-.1367515	-4227.397	2378.372
acl	-7.395031	-.0125899	-7.382441	2.353234
pcs	1549.597	.0389323	1549.558	1258.206

b = consistent under Ho and Ha; obtained from xtreg

Appendix III: Objective Two

```
. xtset c_id year
      panel variable: c_id (strongly balanced)
      time variable: year, 2016 to 2020
      delta: 1 unit
```

```
. xtreg roa llpdr cc cmy tct acl pcs, fe
```

```
Fixed-effects (within) regression      Number of obs   =    40
Group variable: c_id                  Number of groups =     8
```

```
R-sq:                                Obs per group:
  within = 0.6363                      min =          5
  between = 0.0431                     avg =         5.0
  overall = 0.0102                      max =          5
```

```
corr(u_i, Xb) = -1.0000                F(6,26)        =    7.58
                                      Prob > F        =    0.0001
```

roa	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
llpdr	-.116705	.0255749	-4.56	0.000	-.169275	-.0641351
cc	6.582473	2.061077	3.19	0.004	2.345868	10.81908
cmy	.0221367	.1601167	0.14	0.891	-.306988	.3512614
tct	-2.76789	1.536293	-1.80	0.083	-5.925785	.3900045
acl	-4.127064	1.55961	-2.65	0.014	-7.332889	-.921239
pcs	0.655249	0.832094	0.79	0.438	-1.055145	2.365644
_cons	-10.47606	3.285483	-3.19	0.004	-17.22946	-3.722649
sigma_u	10.169641					
sigma_e	.16974427					
rho	1	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(7, 26) = 8.96          Prob > F = 0.0000
```

```
. estimates store fixed
```

```
. xtreg roa llpdr cc cmy tct acl pcs, re
```

```
Random-effects GLS regression      Number of obs   =    40
Group variable: c_id              Number of groups =     8
```

```
R-sq:                                Obs per group:
  within = 0.4370                      min =          5
```


Group variable: c_id

Number of groups = 8

R-sq:

within = 0.2079
between = 0.2064
overall = 0.1653

Obs per group:

min = 5
avg = 5.0
max = 5

corr(u_i, Xb) = -1.0000

F(6,26) = 1.14
Prob > F = 0.3691

roe	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
llpdr	-.0543508	.0313	-1.74	0.094	-.1186888	.0099871
cc	-155.0194	2522.459	-0.06	0.951	-5340.008	5029.969
cmv	-.2000487	.1959596	-1.02	0.317	-.6028494	.202752
tct	632.4782	1880.199	0.34	0.739	-3232.326	4497.282
acl	1.258299	1.908736	0.66	0.516	-2.665165	5.181762
pcs	-395.1953	1018.362	-0.39	0.701	-2488.469	1698.079
_cons	2180.043	40209.53	0.05	0.957	-80471.83	84831.92
sigma_u	265.79416					
sigma_e	.20774229					
rho	.99999939 (fraction of variance due to u_i)					

F test that all u_i=0: F(7, 26) = 8.22 Prob > F = 0.0000

. estimates store fixed

corr(u_i, X) = 0 (assumed) Wald chi2(6) = 35.81
 Prob > chi2 = 0.0000

cb	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
llpdr	.0280071	.0103343	2.71	0.008	-.0706464	.1266605
cc	-.1638458	.4861939	-0.34	0.736	-1.116768	.7890768
cmy	-.0347275	.0169568	-2.05	0.038	-.3670758	.2976207
tct	.9763623	.3084698	3.17	0.000	-5.069535	7.022259
acl	.4039196	.2401579	1.68	0.091	-.1647794	.9726185
pcs	1.956064	1.442978	1.36	0.175	-.8721198	4.784248
_cons	11.58197	6.600595	1.75	0.079	-1.354959	24.5189
sigma_u	.73438952					
sigma_e	.20891336					
rho	.92513408 (fraction of variance due to u_i)					

. hausman fixed ., sigmamore

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	.	Difference	S.E.
llpdr	.0502815	.0280071	.0222744	.0180402
cc	1663.903	-.1638458	1664.066	4309.104
cmy	-.0923276	-.0347275	-.0576001	.2886324
tct	1471.255	.9763623	1470.279	3211.933
acl	-.4984907	.4039196	-.9024103	3.247749
pcs	1680.399	1.956064	1678.442	1739.663

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic
 $\chi^2(4) = (b-B)'[(V_b-V_B)^{-1}](b-B)$
 = 6.84
 Prob>chi2 = 0.1445

. xtreg oi llpdr cc cmy tct acl pcs, fe

Fixed-effects (within) regression Number of obs = 40
 Group variable: c_id Number of groups = 8


```

tct | -1.774678 .3982505 -4.46 0.000 -2.555235 -.9941213
acl | -.2575157 .0387891 -6.64 0.000 -.3335409 -.1814905
pcs | .7491119 .1935209 3.87 0.000 .369818 1.128406
_cons | 4.138326 .8438571 4.90 0.000 2.484396 5.792255

```

```

-----+-----
sigma_u |      0
sigma_e | .25176677
rho |      0 (fraction of variance due to u_i)
-----+-----

```

. hausman fixed ., sigmamore

```

-----+-----
---- Coefficients ----
|      (b)      (B)      (b-B)      sqrt(diag(V_b-V_B))
|      fixed      .      Difference      S.E.
-----+-----
llpdr | .0093543 .0375579 -.0282035 .0378793
cc | 9.974643 .322309 9.652334 4076.133
cmy | -.1577163 .0413024 -.1990187 .315611
tct | 4478.316 -1.774678 4480.091 3038.282
acl | 1.242706 -.2575157 1.500222 3.084152
pcs | -779.0728 .7491119 -779.8219 1645.609
-----+-----

```

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

```

chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
         = 6.97
Prob>chi2 = 0.1374

```

Appendix IV: Objective Three

```
. xtset c_id year
      panel variable: c_id (strongly balanced)
      time variable: year, 2016 to 2020
      delta: 1 unit
```

```
. xtreg roa aq lr cc cmy tct acl pcs, fe
```

```
Fixed-effects (within) regression      Number of obs   =   40
Group variable: c_id                  Number of groups =    8
```

```
R-sq:                                Obs per group:
  within = 0.4745                      min =          5
  between = 0.0434                     avg =         5.0
  overall = 0.0103                     max =          5

corr(u_i, Xb) = -1.0000                F(7,25)        =    3.23
                                      Prob > F        =    0.0141
```

roa	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
aq	.102942	.095083	1.08	0.289	-.0928851	.2987691
lr	-.2484288	.130451	-1.90	0.068	-.5170977	.0202401
cc	10.09547	2.510975	4.02	0.000	4.924026	15.26692
cmy	.1512317	.1951565	0.77	0.446	-.2507006	.553164
tct	-4.171181	1.955451	-2.13	0.043	-8.198507	-.1438544
acl	-7.331699	1.916526	-3.83	0.001	-11.27886	-3.384539
pcs	1.508893	1.023554	1.47	0.153	-.5991556	3.616941
_cons	-16.1072	4.006589	-4.02	0.000	-24.35893	-7.85548

```
sigma_u | 15587.592
sigma_e | .20807322
rho | 1 (fraction of variance due to u_i)
```

```
F test that all u_i=0: F(7, 25) = 3.32          Prob > F = 0.0122
```

```
. estimates store fixed
```

```
. xtreg roa aq lr cc cmy tct acl pcs, re
```

```
Random-effects GLS regression      Number of obs   =   40
Group variable: c_id              Number of groups =    8
```

```
R-sq:                                Obs per group:
```


. xtreg roe aq lr cc cmy tct acl pcs, re

Random-effects GLS regression

Number of obs = 40

Group variable: c_id

Number of groups = 8

R-sq:

within = 0.1381
 between = 0.8324
 overall = 0.6469

Obs per group:

min = 5
 avg = 5.0
 max = 5

Wald chi2(7) = 58.62

corr(u_i, X) = 0 (assumed)

Prob > chi2 = 0.0000

roe	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
aq	.3098523	.0944987	3.28	0.001	.1246382	.4950664
lr	-.2268599	.0593201	-3.82	0.000	-.3431252	-.1105945
cc	.1958053	.0656692	2.98	0.003	.0670961	.3245146
cmy	.0323244	.0226532	1.43	0.154	-.0120749	.0767238
tct	.5387949	.5252795	1.03	0.305	-.4907339	1.568324
acl	-.0458276	.0411894	-1.11	0.266	-.1265575	.0349022
pcs	.6866952	.1668307	4.12	0.000	.3597129	1.013677
_cons	-4.332558	.9944393	-4.36	0.000	-6.281623	-2.383493

sigma_u	0
sigma_e	.20564681
rho	0 (fraction of variance due to u_i)

. hausman fixed ., sigmamore

	---- Coefficients ----			
	(b) fixed	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
aq	.119779	.3098523	-.1900733	.0864709
lr	-.1762377	-.2268599	.0506222	.1654221
cc	2031.566	.1958053	2031.37	3382.65
cmy	-.1289265	.0323244	-.1612509	.2619266
tct	-234.6561	.5387949	-235.1949	2634.278
acl	-.7781088	-.0458276	-.7322812	2.581512
pcs	163.1011	.6866952	162.4144	1378.876

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

xtreg cb aq lr cc cmy tct acl pcs, re

Random-effects GLS regression

Number of obs = 40

Group variable: c_id

Number of groups = 8

R-sq:

within = 0.4193

between = 0.9955

overall = 0.9528

Obs per group:

min = 5

avg = 5.0

max = 5

Wald chi2(7) = 64.63

corr(u_i, X) = 0 (assumed)

Prob > chi2 = 0.0000

cb	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
aq	.1969053	.0962341	2.05	0.041	.00829	.3855206
lr	.6306445	.0604095	10.44	0.000	.5122441	.7490449
cc	-.5887935	.0668751	-8.80	0.000	-.7198663	-.4577206
cmy	-.1028971	.0230692	-4.46	0.000	-.1481118	-.0576824
tct	2.688115	.5349256	5.03	0.000	1.63968	3.73655
acl	.5877656	.0419458	14.01	0.000	.5055533	.6699779
pcs	1.451376	.1698944	8.54	0.000	1.118389	1.784363
_cons	16.66369	1.012701	16.45	0.000	14.67883	18.64855
sigma_u	0					
sigma_e	.21086635					
rho	0 (fraction of variance due to u_i)					

. hausman fixed ., sigmamore

	---- Coefficients ----			
	(b) fixed	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
aq	-.0681424	.1969053	-.2650477	.0880589
lr	.1811315	.6306445	-.449513	.1684599
cc	-178.5312	-.5887935	-177.9424	3444.769
cmy	-.1466506	-.1028971	-.0437536	.2667366
tct	2004.065	2.688115	2001.377	2682.654
acl	1.222182	.5877656	.6344161	2.628919
pcs	1231.585	1.451376	1230.134	1404.198

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

xtreg roa cm cc cmy tct acl pcs, re

Random-effects GLS regression

Number of obs = 40

Group variable: c_id

Number of groups = 8

R-sq:

within = 0.1374

between = 0.7075

overall = 0.1016

Obs per group:

min = 5

avg = 5.0

max = 5

Wald chi2(6) = 1.79

corr(u_i, X) = 0 (assumed)

Prob > chi2 = 0.9378

roa	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
cm	.0346642	.0408332	0.85	0.396	-.0453675	.1146959
cc	.0497651	.0754577	0.66	0.510	-.0981292	.1976595
cmy	.0002566	.0259755	0.01	0.992	-.0506543	.0511676
tct	-.3962471	.4513619	-0.88	0.380	-1.2809	.4884059
acl	-.0094174	.0435145	-0.22	0.829	-.0947043	.0758695
pcs	.0694115	.1950979	0.36	0.722	-.3129735	.4517964
_cons	-.2111376	.9519038	-0.22	0.824	-2.076835	1.65456
sigma_u	.07021541					
sigma_e	.21039626					
rho	.10021394 (fraction of variance due to u_i)					

. hausman fixed ., sigmamore

	---- Coefficients ----			
	(b) fixed	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
cm	-.1685949	.0346642	-.203259	.0922475
cc	8412.227	.0497651	8412.177	3149.401
cmy	.1511034	.0002566	.1508467	.2460183
tct	-4842.884	-.3962471	-4842.488	2376.364
acl	-5.678667	-.0094174	-5.66925	2.365645
pcs	1186.638	.0694115	1186.568	1292.569

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

. xtreg roe cm cc cmy tct acl pcs, re

Random-effects GLS regression

Number of obs = 40

Group variable: c_id

Number of groups = 8

R-sq:

within = 0.1438

between = 0.3185

overall = 0.2625

Obs per group:

min = 5

avg = 5.0

max = 5

Wald chi2(6) = 22.17

corr(u_i, X) = 0 (assumed)

Prob > chi2 = 0.0000

roe	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
cm	-.0616011	.0643364	-0.96	0.338	-.1876981	.064496
cc	.2274241	.0456515	4.98	0.000	.0525502	.6800167
cmy	-.0055591	.0907405	-0.06	0.951	-.1834072	.1722891
tct	.3097548	1.622127	0.19	0.849	-2.869555	3.489065
acl	.0379628	.1532328	0.25	0.804	-.2623679	.3382935
pcs	.5460678	.0751707	7.26	0.000	-.9272502	2.019386
_cons	.395359	3.445546	0.11	0.909	-6.357788	7.148506
sigma_u	.64959784					
sigma_e	.21444552					
rho	.90172992 (fraction of variance due to u_i)					

. hausman fixed ., sigmamore

	---- Coefficients ----			
	(b) fixed	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
cm	-.090055	-.0616011	-.0284539	.0461933
cc	665.9141	-.0227424	665.9369	2472.615
cmy	-.1399286	-.0055591	-.1343696	.1717241
tct	-371.6107	.3097548	-371.9205	1865.698
acl	.5627625	.0379628	.5247997	1.851266
pcs	-148.3222	.5460678	-148.8682	1014.804

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

. xtreg cb cm cc cmy tct acl pcs, re

Random-effects GLS regression

Number of obs = 40

Group variable: c_id

Number of groups = 8

R-sq:

within = 0.1198

between = 0.9886

overall = 0.9197

Obs per group:

min = 5

avg = 5.0

max = 5

Wald chi2(6) = 119.19

corr(u_i, X) = 0 (assumed)

Prob > chi2 = 0.0000

cb	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
cm	-.3811704	.071041	-5.37	0.000	-.5204083	-.2419325
cc	-.4823232	.1420427	-3.40	0.001	-.7607218	-.2039246
cmy	-.1309248	.0504222	-2.60	0.009	-.2297505	-.0320992
tct	3.202882	.8584135	3.73	0.000	1.520422	4.885342
acl	.5765655	.0827628	6.97	0.000	.4143533	.7387777
pcs	1.356805	.3812993	3.56	0.000	.6094718	2.104138
_cons	14.74991	1.812394	8.14	0.000	11.19768	18.30213
sigma_u	.15490183					
sigma_e	.21644269					
rho	.33870545 (fraction of variance due to u_i)					

. hausman fixed ., sigmamore

	---- Coefficients ----			
	(b) fixed	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
cm	.0634864	-.3811704	.4446567	.1110861
cc	850.8177	-.4823232	851.3	4116.527
cmy	-.1478453	-.1309248	-.0169205	.3193981
tct	2335.318	3.202882	2332.115	3106.104
acl	.1914706	.5765655	-.3850948	3.091508
pcs	1450.978	1.356805	1449.621	1689.495

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

. xtreg oi cm cc cmy tct acl pcs, re

Random-effects GLS regression

Number of obs = 40

Group variable: c_id

Number of groups = 8

R-sq:

within = 0.0793

between = 0.9826

overall = 0.7132

Obs per group:

min = 5

avg = 5.0

max = 5

Wald chi2(6) = 82.06

corr(u_i, X) = 0 (assumed)

Prob > chi2 = 0.0000

oi	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
cm	-.0029898	.0438265	-0.07	0.946	-.0888882	.0829086
cc	.284249	.0790378	3.60	0.000	.1293378	.4391603
cmy	.03868	.0268897	1.44	0.150	-.0140227	.0913828
tct	-1.603147	.4710956	-3.40	0.001	-2.526477	-.6798161
acl	-.240699	.0454117	-5.30	0.000	-.3297044	-.1516937
pcs	.7558997	.2015272	3.75	0.000	.3609137	1.150886
_cons	4.470566	.9931422	4.50	0.000	2.524043	6.417089
sigma_u	0					
sigma_e	.25126957					
rho	0 (fraction of variance due to u_i)					

. hausman fixed ., sigmamore

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	.	Difference	S.E.
cm	-.0385412	-.0029898	-.0355514	.1218758
cc	-277.4591	.284249	-277.7433	4043.371
cmy	-.1677881	.03868	-.2064681	.3164668
tct	4474.37	-1.603147	4475.973	3050.904
acl	1.489164	-.240699	1.729863	3.037317
pcs	-824.3737	.7558997	-825.1296	1659.47

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic


```

acl | -5.289412  -.0237237  -5.265688  2.414036
pcs |  1133.532   -.054508   1133.587   1188.899

```

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic

```

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
        =      14.96
Prob>chi2 =      0.0105
(V_b-V_B is not positive definite)

```

```
. xtreg roe nplr ca llpdr aq lr cc cmy tct acl pcs, fe
```

```

Fixed-effects (within) regression          Number of obs   =      40
Group variable: c_id                       Number of groups =       8

```

```

R-sq:                                     Obs per group:
  within = 0.3801                          min =           5
  between = 0.0106                         avg =          5.0
  overall = 0.0085                         max =           5

```

```

corr(u_i, Xb) = -1.0000                    F(10,22) =      1.35
                                           Prob > F   =      0.2665

```

```

-----+-----
      roe |      Coef.   Std. Err.      t    P>|t|   [95% Conf. Interval]
-----+-----
nplr |  1.013339   .5159729    1.96  0.062   -0.0567229   2.083402
ca |  .4899955   3.873509    0.13  0.900   -7.543171   8.523162
llpdr | -.0408632   .040184   -1.02  0.320   -1.241997   .0424733
aq |  1.014164   .4734935    2.14  0.044   .0321985   1.99613
lr |  .3924426   3.943687    0.10  0.922   -7.786263   8.571148
cc |  1591.92    2824.96     0.56  0.579   -4266.688   7450.528
cmy | -1530198    .1923316   -0.80  0.435   -.5518912   .2458516
tct | -187.3797   2055.511   -0.09  0.928   -4450.248   4075.489
acl | -1514826    2.176715   -0.07  0.945   -4.665713   4.362748
pcs | -58.30297   1071.917   -0.05  0.957   -2281.324   2164.718
_cons | -25649.13   45036.17   -0.57  0.575   -119048.4   67750.16
-----+-----

```

```

sigma_u | 2492.9782
sigma_e | .19977793
rho | .99999999 (fraction of variance due to u_i)

```

```

-----+-----
F test that all u_i=0: F(7, 22) = 4.40          Prob > F = 0.0034

```

```
. estimates store fixed
.
. xtreg roe nplr ca llpdr aq lr cc cmy tct acl pcs, re
```

```
Random-effects GLS regression           Number of obs   =       40
Group variable: c_id                   Number of groups =        8
```

```
R-sq:                                Obs per group:
  within = 0.1117                      min =          5
  between = 0.9092                     avg =         5.0
  overall = 0.7039                      max =          5
```

```
corr(u_i, X) = 0 (assumed)             Wald chi2(10)   =    68.93
                                         Prob > chi2     =    0.0000
```

roe	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
nplr	-.1509588	.6247626	-0.24	0.809	-1.375471	1.073553
ca	-6.592899	3.598759	-1.83	0.067	-13.64634	.4605394
llpdr	.0615986	.0339568	1.81	0.070	-.0049556	.1281528
aq	.2595368	.5941775	0.44	0.662	-.9050298	1.424103
lr	-6.833133	3.629949	-1.88	0.060	-13.9477	.2814361
cc	.2239847	.0653056	3.43	0.001	.095988	.3519814
cmy	.0418267	.0240085	1.74	0.081	-.0052291	.0888825
tct	.7086084	.5199256	1.36	0.173	-.310427	1.727644
acl	-.0442065	.0404765	-1.09	0.275	-.1235389	.0351259
pcs	.6726092	.1690628	3.98	0.000	.3412523	1.003966
_cons	-4.997769	1.073664	-4.65	0.000	-7.102112	-2.893426
sigma_u	0					
sigma_e	.19977793					
rho	0 (fraction of variance due to u_i)					

```
. hausman fixed ., sigmamore
```

	----- Coefficients -----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	.	Difference	S.E.
nplr	1.013339	-.1509588	1.164298	.3076742
ca	.4899955	-6.592899	7.082894	3.792373
llpdr	-.0408632	.0615986	-.1024618	.0422913
aq	1.014164	.2595368	.7546272	.2353182
lr	.3924426	-6.833133	7.225576	3.893071
cc	1591.92	.2239847	1591.696	3812.875
cmy	-.1530198	.0418267	-.1948465	.2584792

```

tct | -187.3797   .7086084   -188.0884   2774.342
acl |  -1514826   -.0442065   -1.1072761   2.937654
pcs |  -58.30297   .6726092   -58.97558   1446.777

```

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic

```

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
          =          5.60
Prob>chi2 =          0.3466
(V_b-V_B is not positive definite)

```

```
. xtreg nim nplr ca llpdr aq lr cc cmy tet acl pcs, fe
```

```

Fixed-effects (within) regression      Number of obs   =      40
Group variable: c_id                  Number of groups =       8

```

```

R-sq:                                Obs per group:
  within = 0.7413                      min       =       5
  between = 0.4195                      avg       =      5.0
  overall = 0.2887                      max       =       5

```

```

corr(u_i, Xb) = -1.0000                F(10,22)       =       6.30
                                          Prob > F        =      0.0002

```

```

-----+-----
      nim |   Coef.   Std. Err.   t   P>|t   [95% Conf. Interval]
-----+-----
nplr | -2.94911   7.307788   -0.40  0.690   -18.10454   12.20632
ca | -24.25698  54.86099   -0.44  0.663   -138.0317   89.51776
llpdr | -9957366   .569131   -1.75  0.094   -2.176042   .1845689
aq | -3.567422  6.706148   -0.53  0.600   -17.47512   10.34028
lr | -29.71377  55.85493   -0.53  0.600   -145.5498   86.12226
cc | 12.32058   4.001026    3.08  0.005    4.02296    20.6182
cmy | -1.1523571  2.724017   -0.06  0.956   -5.801622   5.496908
tet | -2.949345  2.911246   -1.01  0.322   -8.986898   3.088209
acl | -7744492   .3082908   -2.51  0.020   -1.413805   -1.350931
pcs | -2.01673   1.51817   -1.33  0.198   -5.165222   1.131762
_cons | -19.60607  6.378529   -3.07  0.006   -32.83433   -6.377812
-----+-----

```

```

sigma_u | 192840.63
sigma_e | 2.8294799
rho | 1 (fraction of variance due to u_i)

```

```

-----+-----
F test that all u_i=0: F(7, 22) = 8.42                Prob > F = 0.0001

```

```
. estimates store fixed
.
. xtreg nim nplr ca llpdr aq lr cc cmy tct acl pcs, re
```

```
Random-effects GLS regression           Number of obs   =       40
Group variable: c_id                   Number of groups =        8
```

```
R-sq:                                Obs per group:
  within = 0.2593                      min =         5
  between = 0.9529                     avg =        5.0
  overall = 0.7032                      max =         5
```

```
Wald chi2(10) = 68.72
corr(u_i, X) = 0 (assumed)             Prob > chi2    = 0.0000
```

nim	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
nplr	4.353863	10.95196	0.40	0.691	-17.11159	25.81932
ca	107.2224	63.08552	1.70	0.089	-16.42297	230.8677
llpdr	-3.182892	.5952567	-5.35	0.000	-4.349573	-2.01621
aq	-3.742959	10.41581	-0.04	0.971	-20.78891	20.04032
lr	107.2852	63.63227	1.69	0.092	-17.43173	232.0022
cc	.3103442	1.144794	0.27	0.786	-1.933412	2.5541
cmy	-.0617499	.4208644	-0.15	0.883	-.8866289	.7631292
tct	-.5900026	9.11419	-0.06	0.948	-18.45349	17.27348
acl	.3098465	.7095444	0.44	0.662	-1.080835	1.700528
pcs	-1.161541	2.963636	-0.39	0.695	-6.970161	4.647079
_cons	10.83292	18.82111	0.58	0.565	-26.05578	47.72163
sigma_u	0					
sigma_e	2.8294799					
rho	0 (fraction of variance due to u_i)					

```
. hausman fixed ., sigmamore
```

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	.	Difference	S.E.
nplr	-2.94911	4.353863	-7.302973	5.393466
ca	-24.25698	107.2224	-131.4794	66.47952
llpdr	-.9957366	-3.182892	2.187155	.7413582
aq	-3.567422	-3.742959	-3.193126	4.125081
lr	-29.71377	107.2852	-136.999	68.24475


```

    aq | .6348385 .6013603 1.06 0.303 -.6123064 1.881983
    lr | -2.788757 5.008678 -0.56 0.583 -13.17612 7.598605
    cc | 1334.547 3587.839 0.37 0.713 -6106.177 8775.27
    cmy | -.0892523 .2442707 -0.37 0.718 -.5958387 .4173342
    tct | 3685.755 2610.601 1.41 0.172 -1728.299 9099.81
    acl | -.0708885 2.764536 -0.03 0.980 -5.804185 5.662408
    pcs | -521.7831 1361.388 -0.38 0.705 -3345.13 2301.564
    _cons | -24824.4 57198.17 -0.43 0.669 -143446.1 93797.35

```

```

-----+-----
sigma_u | 2428.6654
sigma_e | .2537279
rho | .99999999 (fraction of variance due to u_i)

```

F test that all u_i=0: F(7, 22) = 2.84 Prob > F = 0.0287

. estimates store fixed

. xtreg oi nplr ca llpdr aq lr cc cmy tct acl pcs, re

Random-effects GLS regression Number of obs = 40
Group variable: c_id Number of groups = 8

R-sq: Obs per group:
 within = 0.2654 min = 5
 between = 0.9932 avg = 5.0
 overall = 0.7997 max = 5

Wald chi2(10) = 115.78
corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000

```

-----+-----
    oi |   Coef.   Std. Err.   z   P>|z|   [95% Conf. Interval]
-----+-----
    nplr | .7320439   .7064035   1.04  0.300   -1.6524816   3.116569
    ca | -8.460383   4.069027   -2.08  0.038   -16.43553   -4.852365
    llpdr | .080114   .0383942   2.09  0.037   .0048628   .1553651
    aq | .9834341   .6718217   1.46  0.143   -.3333123   2.300181
    lr | -8.50326   4.104293   -2.07  0.038   -16.54753   -.4589939
    cc | .2903563   .0738394   3.93  0.000   .1456337   .4350789
    cmy | .048956   .0271458   1.80  0.071   -.0042489   .1021608
    tct | -.8066295   .5878669   -1.37  0.170   -1.958827   .3455684
    acl | -1.876249   .0457657   -4.10  0.000   -.2773241   -.0979257
    pcs | .7181975   .1911551   3.76  0.000   .3435405   1.092854
    _cons | 3.214437   1.213965   2.65  0.008   .8351088   5.593765

```

```

-----+-----
sigma_u | 0
sigma_e | .2537279

```

rho | 0 (fraction of variance due to u_i)

. hausman fixed ., sigmamore

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	.	Difference	S.E.
nplr	.4885648	.7320439	-.2434791	.3478795
ca	-2.658066	-8.460383	5.802317	4.287941
llpdr	.0484264	.080114	-.0316876	.0478177
aq	.6348385	.9834341	-.3485956	.2660684
lr	-2.788757	-8.50326	5.714503	4.401799
cc	1334.547	.2903563	1334.256	4311.123
cmv	-.0892523	.048956	-.1382082	.292256
tct	3685.755	-.8066295	3686.562	3136.88
acl	-.0708885	-.1876249	.1167364	3.321532
pcs	-521.7831	.7181975	-522.5013	1635.835

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(5) &= (b-B)'[(V_b-V_B)^{-1}](b-B) \\ &= 10.53 \end{aligned}$$

$$\text{Prob}>\text{chi2} = 0.0614$$

(V_b-V_B is not positive definite)

. xtreg roa crmi inf crmi_inf cc cmy tct acl pcs, re

Random-effects GLS regression Number of obs = 40
 Group variable: c_id Number of groups = 8

R-sq: Obs per group:
 within = 0.0674 min = 5
 between = 0.8223 avg = 5.0
 overall = 0.1075 max = 5

Wald chi2(8) = 3.74
 Prob > chi2 = 0.8801
 corr(u_i, X) = 0 (assumed)

roa	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
crmi	.082684	.1781605	0.46	0.643	-.2665041	.4318721
inf	.003444	.0225944	0.15	0.879	-.0408402	.0477282
crmi_inf	-.0023052	.0127962	-0.18	0.857	-.0273853	.0227748
cc	.0694014	.0650809	1.07	0.286	-.0581548	.1969576
cmy	-.0017887	.0219906	-0.08	0.935	-.0448896	.0413122
tct	-.5049072	.3870279	-1.30	0.192	-1.263468	.2536535
acl	-.019965	.0373294	-0.53	0.593	-.0931293	.0531992
pcs	.0557631	.1646046	0.34	0.735	-.2668559	.3783821
_cons	-.4729912	.8348369	-0.57	0.571	-2.109241	1.163259
sigma_u	0					
sigma_e	.19825797					
rho	0 (fraction of variance due to u_i)					

. hausman fixed ., sigmamore

	(b) fixed	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
crmi	-.3035676	.082684	-.3862516	.1097858
inf	.0485644	.003444	.0451204	.0243716
crmi_inf	.007437	-.0023052	.0097423	.0089589
cc	8697.172	.0694014	8697.103	3840.749
cmy	.2339063	-.0017887	.235695	.2739457
tct	-4463.158	-.5049072	-4462.654	2719.565
acl	-5.823748	-.019965	-5.803783	2.909687
pcs	1503.628	.0557631	1503.572	1374.204


```
. xtreg oi crmi inf crmi_inf cc cmy tct acl pcs, re
```

```
Random-effects GLS regression           Number of obs   =    40
Group variable: c_id                   Number of groups =     8
```

```
R-sq:                                     Obs per group:
  within = 0.3228                          min =          5
  between = 0.9927                         avg =         5.0
  overall = 0.8143                         max =          5
```

```
Wald chi2(8) = 135.94
corr(u_i, X) = 0 (assumed)                Prob > chi2    = 0.0000
```

oi	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
crmi	.0709176	.181542	0.39	0.696	-.2848981	.4267334
inf	-.0941459	.0230232	-4.09	0.000	-.1392706	-.0490212
crmi_inf	-.0030294	.0130391	-0.23	0.816	-.0285855	.0225267
cc	.3237278	.0663161	4.88	0.000	.1937506	.453705
cmy	.0309636	.022408	1.38	0.167	-.0129553	.0748825
tct	-1.810177	.3943738	-4.59	0.000	-2.583135	-1.037218
acl	-.2607476	.0380379	-6.85	0.000	-.3353005	-.1861947
pcs	.707815	.1677288	4.22	0.000	.3790726	1.036557
_cons	5.329461	.8506822	6.26	0.000	3.662155	6.996768
sigma_u	0					
sigma_e	.24853168					
rho	0	(fraction of variance due to u_i)				

```
. hausman fixed ., sigmamore
```

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	.	Difference	S.E.
crmi	.1572584	.0709176	.0863408	.1118696
inf	-.0314215	-.0941459	.0627244	.0248342
crmi_inf	-.014053	-.0030294	-.0110236	.0091289
cc	-1563.916	.3237278	-1564.24	3913.647
cmy	-.2765841	.0309636	-.3075477	.2791452
tct	4744.828	-1.810177	4746.638	2771.182
acl	2.426624	-.2607476	2.687371	2.964914
pcs	-1162.977	.707815	-1163.685	1400.287

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(4) &= (b-B)'[(V_b-V_B)^{-1}](b-B) \\ &= 7.35 \\ \text{Prob}>\text{chi2} &= 0.1185 \\ &(\text{V}_b\text{-V}_B \text{ is not positive definite}) \end{aligned}$$

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Bio –Data

A. Personal Data

- (1) **Full Name:** Stephen Kayode **ADEKUNLE**
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- Date and Place of Birth:** July 31, 1962
- (3) **Nationality:** Nigerian
- (4) **Name of Next of Kin:** Mrs. Adepeju Adekunle
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(B) Educational Background

Educational Institutions Attended with Dates and Qualification:

- i. **Primary Education:**
Bode Ijaye Baptist Primary School, Abeokuta. 1970 - 1973
- ii. **Secondary Education:**
Agunbiade Victory High School, Magbon, Abeokuta. 1973 - 1979
- iii. **Higher Education Institution:**
Ogun State Polytechnic, Abeokuta 1981 - 1986
University of Lagos, Akoka, Lagos 1999 – 2004
The Hague University, Den Haag, The Netherlands 2008 - 2010

(C) Working Experience with Dates :

- 2021 – date LIVINGSTONE TECHNOLOGIES LIMITED (Nigeria)
Chairman/Managing Director
- 2017 – 2021 REDEEMER’S COLLEGE OF TECHNOLOGY & MAGT.
(Nigeria)
Lecturer 1 Department of Business Administration

2011 – 2017	LIFEGATE MICROFINANCE BANK LTD (Nigeria) Managing Director
2007 – 2011	RCCG NETHERLANDS MISSION (Netherlands) Regional Accountant
2006 - 2007	STALLION HOME SAVINGS & LOANS LTD (Nigeria) General Manager
1998 – 2006	VONO PRODUCTS PLC (Nigeria) Commercial Director
1991 – 1998	PEAK MERCHANT BANK LIMITED (Nigeria) Head of Accounts
1988 – 1991	MIDLAND GALVANISHING PRODUCTS LIMITED (Nigeria) Accountant
1986 - 1987	CATHOLIC DIOCESE OF ILORIN (Nigeria) Class Teacher
1983 - 1984	OGUN STATE TEACHING SERVICE COMMISSION (Nigeria) Class Teacher – Orile Ilugun Comprehensive High School

(D) Awards and Fellowships (if any):

2010	Best Result in Master Class (MAAC), The Hague University, Den Haag.
2007	Best Student in Business Administration (HND), Ogun State Polytechnic, Abeokuta.

(E) Membership of Academic Professional Bodies:

i.	The Institute of Chartered Accountants of Nigeria	1991
ii.	Nigerian Institute of Management	1992
iii.	The Chartered Institute of Bankers of Nigeria	2012
iv.	Chartered Institute of Taxation	2020
v.	Association of Forensic Accounting Researchers	2020
vi.	Chartered Institute of Strategic Management, Nigeria	2021

(F) Publication if Any

1. Scholarly Articles:

- i. Promoting Sustainability of Microfinance in Nigeria: The Role of Human Resources Management and Employee Capacity Enhancement. 5th Conference on Microfinance and Enterprise Development. August 2019.
- ii. Productive and Decent Work for all: Implication for inclusive and Sustainable Economic Growth in Sub-Saharan African Countries. Applied Research Conference in Africa. August 2019.
- iii. Infrastructural Development, Poverty and Environmental Degradation: Sustainable Development in Nigeria. 1st International Conference, School of Management & Business Studies, Yaba College of Technology. October 2019.
- iv. Re-visiting the Nexus between Economic Growth and Terrorism. Journal of Advanced Research in Dynamic and Control Systems (SCOPUS Indexed). December 2019.
- v. Taxation and Economic Growth: Evidence from Nonlinear Model in Nigeria. TEST Engineering & Management (SCOPUS Indexed). December 2019.
- vi. Does Commercial Banking Activities Exert on Agricultural Growth in Nigeria? Evidence from ARDL Framework. Academic Journal of Interdisciplinary Studies (SCOPUS Indexed). December 2019.
- vii. Revisiting the Stock Market Efficiency: Evidence from Nonlinear Unit Root Estimates. Journal of Advanced Research in Dynamic and Control Systems (SCOPUS Indexed). December 2019.
- viii. Entrepreneurship Education: An Imperative Tool for Job Creation and Economic Growth in Nigeria. 4th Covenant University Conference on Entrepreneurship 2020. June 2020.
- ix. Impact of Microfinance Banking System on Grass Root Poverty Alleviation in Developing Economies; A case study of Nigeria. Academic Journal of Current Research. December 2020.

Signature

Date

The University Compliance Certificate

This is to certify this thesis by Stephen Kayode ADEKUNLE with matric number LCU/PG/001155 in the department of Management and Accounting, Lead City University, Ibadan, is in Full compliance with the approved University format and style.

Signature

Date

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