IMPACT OF CREDIT RISK MANAGMENT OF THE PERFORMANCE ON COMMERCIAL BANKS IN ETHIOPIA

A RESEARCH PAPER SUBMITTED TO DEPARTMENT OF ACCOUNTING AND FINANCE FOR PARTIAL FULFILLMENT OF BACHELOR OF ART (BA) DEGREE IN ACCOUINTING AND FINANCE

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Statement of Declaration

I, Robel yigzaw, declare that this senior essay entitled: impact of credit risk management on the performance of commercial Banks in Ethiopia and submitted in partial fulfillment of the requirements For the Bachelor Degree of art of in Accounting and Finance, is outcome of my own effort & study and that all sources of materials used for the study have been duly acknowledged. I have produced it independently with only guidance and suggestion of my thesis Advisor Mrs Sitina Akmel (Ass.t Prof). The study complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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This paper has been submitted for examination with my approval as advisor

Full Name: Sitina Akmel /Asst .Proff / Signature_____ Date_____

Abstract

The objective of the study is to empirically examine the impact of credit risk management on the performance of commercial banks in Ethiopia, over the period of ten years (2009-2018). The empirical investigation uses the accounting measure of Return on Assets (ROA), which is the dependent variable, to represent Banks' performance while non performing loan capital adequacy, liquidity ratio, loan advance and bank size have been taken as explanatory variables independent variables to represent credit risk management . To this end linear regression models is used to measure the relative weighting of the independent variables on the banks performance (ROA). A non probability method in the form of judgmental sampling technique is employed in selecting the eight Banks into the sample and the data are sourced from the annual reports of the same banks which account for over eighty percent of the total loan and advance in the industry. The study finds that the selected variables: the capital adequacy, liquidity, loan growth and bank size have significant effect on the performance of private banks. However, a certain variation in the magnitude and direction of their effect on the selected profitability measure, Return on Asset. Based on this study it is recommended that Ethiopia banks need to develop their credit risk management capacity, there should be control over head cost related to lending and increasing loan book size without compromising the sound credit planning should be apriority task.

***Keywords**: credit risk, bank, performance, Ethiopia*

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Acronyms

AIB: Awash International Bank S.C

AB: Abay Bank S.C

BBI: Basel Committee on Banking Supervision

BOA: Bank of Abyssinia S.C

BIB: Berhan International Bank S.C

DB: Dashen Bank S.C

CBO: Cooperative Bank of Oromia S.C

DGB: Debub Global Bank: S.C

EB: Enat Bank S.C

LIB: Lion International Bank S.C

NBE: National Bank of Ethiopia

NIB: Nib International Bank S.C

OIB: Oromia International Bank S.C

ROA: Return on Asset

UB: United Bank S.C

WB: Wegagen Bank S.C

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

The diversity of the business and economic conditions has led to the development Credit risk management in a financial institution starts with the establishment of sound lending principles and an efficient framework for managing the risk. Policies, industry specific standards and guidelines, together with risk concentration limits are designed under the supervision of risk management committee (Giesecke, 2004). These policies, standards and procedures also govern how credit risk is measured, monitored, reported and controlled. As market conditions change rapidly, adequacy and effectiveness of internal controls should be reviewed at least quarterly (Machiraju, 2003). From the greatly sophisticated tools and models to measure the exposure of a financial institutions credit risks management. In case of an individual loan portfolio, the probability of default, loss given default or credit rationing are the most commonly used ones to measure the exposure to credit risk. The invention of various credit scoring models that use observed loan applicant's characteristics either to calculate a score representing the applicant 's probability of default or to sort borrowers into different risk classes bring the ability to address credit risk on a new level (Richard, 2011).

Credit risk is an investor's risk of loss arising from a borrower who does not make payments as promised. Another term for credit risk is default risk (Brown and Moles, 2012). Investor losses include lost principal and interest, reduce cash flow, and increased collection costs, which arise in a number of circumstances: consumer does not make a payment due on a mortgage loan, credit card, line of credit, or other loan, a business does not make a payment due on a mortgage, credit card, line of credit, or other loan, a business or consumer does not pay a trade invoice when due, a business does not pay an employee's earned wages when due, a business or government bond issuer does not make a payment on a coupon or principal payment when due, an insolvent insurance company does not pay a policy obligation, an insolvent bank won't return funds to a depositor, and

a government grant bankruptcy protection to an insolvent consumer or business. Adequately managing credit risk in financial institutions (FIs) is critical for the survival and growth of the FIs. In the case of banks, the issue of credit is of even of greater concern because of the higher levels of perceived risks resulting from some of the characteristics of clients and business conditions that they find themselves in. They also provide loans, credit and payment services such as checking accounts, money orders and cashier‘s checks. Banks also may offer investment and insurance products and a wide whole range of other financial services, which they were once prohibited from selling (Perro, &Ruoff, 2001).

The Basel Committee on Banking Supervision (1999) asserts that credit creation is the main income generating activity for the banks. However, this activity involves more risks to both the lender and the borrower. The risk of a trading partner not satisfy his or her obligation as per the contract on due date or anytime thereafter can greatly jeopardize the smooth functioning of a bank‘s business. On the other hand, a bank with high credit risk has high bankruptcy risk that puts the depositors in jeopardy. Among the risk that face banks, credit risk is one of great concern to most bank authorities and banking regulators. This is because credit risk is that risk that can easily and most likely prompts bank failure (Machiraju 2003).

Credit risk management is an 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 negative effects of the risk, and accepting some or all of the consequences of a particular risk. The objective of risk management is to reduce the impacts of different kinds of risks related to a pre-selected domain to the level accepted by society. It may refer to numerous types of threats caused by environment, technology, humans, organizations and politics. The purpose of this study used to understand the impact of credit risk management on financial performance of commercial banks in Ethiopia.

According to Gestel and Baesens (2009), credit risk management is a process that involves the identification of potential risks, the measurement of these risks, the appropriate treatment, and the actual implementation of risk models. It holds a positive relationship with credit monitoring,

reliability and assurance factors (Ghosh et al., 2014). All these factors play vital role in the mitigation process of credit risks where the mitigation process starts from sourcing loan applications and the loan application goes through several screening process where reliability and assurance factors are very much important with knowledge of practical world and product program to identify risks associated with loan proposals.

Banking operations are exposed to some inherent risks including borrower's outright default and unwillingness or inability to meet credit commitment. This will lead to the formation of bad loans where they are mainly the causes of bank failure. As Njankie (2009) stated, bad loans results from mismanagement because of bad lending decisions made with wrong appraisals of credit status or the repayment of non-performing loans and excessive focus on giving loans to certain customers. This will reduce their competitiveness as profitability is shrined due to the availability of bad loans. Thus effective credit risk management is very important to the survival of commercial banks as it reduces the risk of customer default and it adds the competitive advantages of the banks by enabling to depend on their capability to handle credit valuably.

The research made by Girma (2011) focuses on the risk management part and the models considered are Loan Provision to Total Asset, Loan Provision to Total Loan, NPL to Total Loan, and Loan Provisions to Non-Performing Loan. And Tseganesh (2012) investigated some of bank specific and macroeconomic factors affecting Banks liquidity and their impact on financial performance. This study will investigate on variable such as non-performing loan, capital adequacy, loan growth, liquidity ratio and bank size. Therefore, in this study one of the knowledge gaps that will be investigated such as, the study considered bank specific indicators of credit risk and their own financial performance. Therefore, this study investigates further on the area, to examine the impact of credit risk management on the performance of commercial banks.

1.2 Statement of the problem

Poor risk management gone to the accumulation of non-performing loan under which the generated profit are not only eroded through loan provision but also soundness, safety and stability of bank

While effective Credit risk management improve Credit performance through establishing appropriate Credit risk environment, maintaining Credit limit at acceptable level, undertaking sound Credit granting process, proper monitoring and controlling credit risk as well as optimizing risk-return of the bank. Therefore, it is important to examine Credit risk management system and practice of Ethiopian Commercial banks to initiate top-level management and regulatory bodies to take policy measure toward maintaining adverse effect of Credit function (Richard, 2011).

In managing credit risk, the Bank has clearly specified the processes for credit approval, which include the formulation of credit policy, the credit risk rating for customers, and the establishment of different levels of delegation of authority for credit approval depending upon the type of business and/or the size of the credit line. In considering the approval of loans in general, the Bank considers the purpose of the loan and assesses the repayment ability of the applicant; taking into account the applicant's operating cash flows, business feasibility and the capability of management, as well as collateral coverage. The Bank also performs credit reviews, which include reviewing credit risk-rating levels on a regular basis (Machiraju, 2003).

According to Kevin and Gunnar (2004) an effective credit risk management practice of commercial banks can be affected by several factors such as lack of appropriate Credit risk strategy, policy and procedures: proper understanding and identification of risk: lack of sound Credit granting process: credit administration, monitoring and reporting process.

Loans are the highest and most obvious source of credit risk; however, other sources of credit risk exist throughout the activities of a bank, including in the banking book and in the trading book, and both on and off the balance sheet. 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 transactions (Agrawal, 2001). Since exposure to credit risk continues to be the leading source of problems in banks worldwide, banks and their supervisors should be able to draw useful lessons from experiences. Banks should

now have a keen awareness of the need to identify, 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 incurred. Based on the above idea in this study had attempted to assess the impact of credit risk management on the performance of commercial banks of Ethiopia. This is because as indicated, by the above several scholars and the survey result of National Bank of Ethiopia (NBE) in (2010), such as, Even though commercial banking system in Ethiopia has been witnessing a significant expansion over the past ten years than before however banking industry still underdeveloped; in this regards the study were reveal lack of credit risk management practice were one of the major challenging factor of the sector. The survey believes that such growth should be matched with strong credit risk management practices. Accordingly, this research believes that to tackle credit risk management practice of commercial banks an academic study should focus on the area.

Recently there are attempts being made to see the impact of credit risk on the performance of commercial banks in Ethiopia, as there is high loan provision expenses though declining, which is above the standard. However, there are no in-depth studies that have been conducted to investigate the impact of credit risk on financial performance of private commercial banks in Ethiopia. The research made by Girma (2011) focuses on the risk management part and the models considered are Loan Provision to Total Asset, Loan Provision to Total Loan, NPL to Total Loan, and Loan Provisions to Non-Performing Loan. Tseganesh (2012) investigated some of bank specific and macroeconomic factors affecting Banks liquidity and their impact on financial performance. Therefore, in this study one of theas a knowledge gap that will be investigated such as, the study considered specific indicators of credit risk and their effect financial performance. Therefore, this one of the major gaps that researcher motivated to investigate further on the area, to assess the impact of credit risk management on the performance of commercial banks.

1.3 Objective of the study

1.3.1 General Objective

The main objective of the study is to investigate the impact of credit risk management on the performance of commercial banks in Ethiopia.

1.3.2 Specific Objectives

In line with the general objective; the researcher paper assesses the following specific objectives;

- ✓ To *examines* the relationship between non-performing loan and ROA.
- ✓ To investigate the relationship between capital adequacy and ROA.
- ✓ To analyze the relationship between bank size and ROA.
- ✓ To examines the relationship between loan growth and ROA.
- ✓ To analyses the relationship between liquidity position and ROA.

1.4 Research Hypothesis

This study examined the link and impact of credit risk management practice on financial performance of commercial banks in Ethiopia. In this study, return on asset is used to measure the performance of commercial banks in Ethiopia based on financial data of each bank from 2009-2018. In addition to this, the data for the study is drawn from the audited financial statements of the banks, which disclose information about the accounting based variable to measure the operating performance and the net worth of the banks. Therefore, this study measure performance by using returns on asset. Majority the hypothesized variables in this study are modified and adopted from previously done studies based on the extent of their effect on risk management practice on financial performance of commercial banks; whereas these variables, that considers as a predictor of credit risk that affect financial performance (ROA) was non-performing loan Ratio, Capital Adequacy Ratio, Bank Asset Size, Liquidity Ratio and Loan growth that affect credit risk stability and their impact also determine financial performance of commercial banks. Accordingly, the study hypothesized the following useful areas as determinate variables (Null hypothesis).

H1. Non – Performing Loan has a negative insignificant effect on ROA.

H2. Capital Adequacy (CAP) has positive/negative significant effect on ROA.

H3. Bank Size (SIZE) a positive significant effect on ROA.

H4. Loan Growth (LA) has a positive/negative significant effect on ROA.

H5. Liquidity Position (LIQ) has a negative significant effect on ROA.

1.5 Significance of the Study

This study can help to indicating the impact of credit risk management practice on financial performance of commercial banks of Ethiopia. The main findings of the study expected to indicate the strategic intervention areas that might be improved.

- Furthermore, the study also used, as academic experience for the researcher and reference for others researchers and academicians in related area. In addition, since such investigation has policy implication, the finding of this study might be used as a directive input in developing regulatory standards regarding credit risk controlling mechanisms of commercial banks of Ethiopia.

- This study will initiate the commercial Bank management to give due emphasis on the management of the identified variables and provides them with understanding of activities that will enhance their loan performance indicate which factors more affecting the environment.

1.6 Scope of the study

This study focused on commercial banks by using panel data. Accordingly, the study limit this study the commercial banks found in Ethiopia namely, Awash international bank, bank of Abyssinia, United bank, Nib Bank, Wegagen and Dashen from medium large asset groups of the bank and Lion bank, Cooperative Bank of Oromia from small peer groups, based on their total asset. This study also specified in the issue that be discussed such as, internal (specific) factors that could arise from the banks strategies, capacity and competitiveness. The study considered panel data from (2009 – 2018).

1.7. Limitation of the study

As all research work has its own challenge, this particular project also encountered with different limitations. Firstly, the research was being entirely dependent on secondary information, Secondly, although it has been assumed to study all banks, of the 16-18 licensed banks but no complete data of all banks in Ethiopia, only some banks (8) are has a complete data (2009-2018). Finally, the study considers only clarifying impact of credit risk management on the performance of commercial banks considering dependant variable (ROA).

1.8 Organization of the proposal

This section also gives a structure of every chapter with in this proposal. The proposal consists five chapters. Chapter one introduction, it presents background of the study, statement of the problem, objective of the study, research Hypothesis, significance of the study and scope of the study. Chapter two will presents literature review, empirical review and knowledge gap.

The methodology employed, target population and sampling, data used in research, research hypothesis will be stated in chapter three and finally, description of study variables and their expected sign, this is followed by an analysis of the results and discussion part of the paper in the fourth chapter. Finally the fifth chapter presents the conclusion, summery unit and recommendation.

CHAPTER TWO

LITRATURE REVIEW

INTRODUCTION

This chapter reviews literature relating to the impact of credit risk management practice on the performance of commercial banks. The literature review has been organized in the following sections. First section covers the theoretical framework on financial credit risk management, and its impact on the banks financial performance. The second section covers risk in banks and type, process and procedures commercial banks. The last section covers the empirical studies on the relationship between risk management and financial performance of commercial banks, then the summary of the literature review including research gaps of the chapter.

2.1 Theoretical Review

2.1.1 The Concept of Credit Risk

Credit risk is defined as the potential that a bank borrower or counterparty would fail to meet its obligations in accordance with agreed terms Basel Committee on Banking Supervision (2001). The goal of credit risk management is to maximize a bank's risk-adjusted rate of return by maintaining credit risk exposure within acceptable parameters. Banks need to manage the credit risk inherent in the entire portfolio as well as the risk in individual credits or transactions. Banks should also consider the relationships between credit risk and other risks. The effective management of credit risk is a critical component of a comprehensive approach to risk management and essential to the long-term success of any banking organization (Machiraju 2003).

Increasing credit risk stifles the lending and borrowing cycle thereby bringing distress to both the banking institutions, the customers and overall to the economy as a whole, at large. Credit risk has

threatened the survival and profitability of the banking sector. The problem has also contributed to decline in economic growth for Ethiopian as businesses have faced difficulties in accessing affordable financing that is appropriately tenured to fund their operations. GarciaHerrero (2006) and Ramlall (2009) identify poor asset quality, as indicated by the high levels of non-performing loans to be responsible for low profitability for banking institutions. The negative effect of non-performing loans on bank profitability has been collaborated by Sarpong, (2011) in their research on Ghana. Bashir (2000) also confirmed that high loans to asset ratios lead to higher profitability provided the quality of the loan portfolio is good, stressing the importance of a good quality credit portfolio.

2.1.2 Credit Risk Identification

The banking industry is no doubt a regulated sector because of the riskiness of its operation. Resulting, risk management in banks is fast becoming a discipline that every participants and players in the industry need to align with (NBE, 2010). The following are one of the well-known steps of credit management practice and process:

According to Basel (2004), the management of Credit risk in banking industry follows the process of risk identification, measurement, assessment, monitoring and control. It involves identification of potential risk factors, estimate their consequences, monitor activities exposed to the identified risk factors and put in place control measures to prevent or reduce the undesirable effects. This process is applied within the strategic and operational framework of the bank.

2.1.2.1 Risk – Adjusted Performance Measures

Several risk-adjusted performance measures have been proposed (Heffernan, 2002; Kealhofer, 2003). The measures, however, focus on risk-return trade-off, which include measuring the risk inherent in each activity or product and charge it accordingly for the capital required to support it.

2.1.2.2 Establish appropriate credit processing Environment

Effective credit management involves establishing an appropriate credit risk environment; operating under a sound credit granting process; maintaining an appropriate credit administration that involves monitoring process as well as adequate ensure that there are proper and clear guidelines in managing credit risk, that is, all guidelines are properly communicated throughout the organization; and that everybody involved in CRM understand them. Considerations that form the basis for sound credit management system include: policy and strategies (guidelines) that clearly outline the scope and allocation of a bank credit facilities and the manner in which a credit portfolio is managed, that is, how loans are originated, appraised, supervised and collected The recommendation has been widely put to use in the banking sector in the form of credit assessment. According to the asymmetric information theory, a collection of reliable information from perspective borrowers becomes critical in accomplishing effective screening (Basel, 2004).

2.1.2.3 Assessment of Borrowers

The assessment of borrowers can be performed through the use of qualitative as well as quantitative techniques. One major challenge of using qualitative models is their subjective nature. However, borrower's attributes an assessed through qualitative models can be assigned numbers with the sum of the values compared to a threshold. This technique is termed as "credit scoring". The technique cannot only minimize processing costs but also reduce subjective judgments and possible biases. The rating systems if meaningful should signal changes in expected level of loan loss concluded that quantitative models make it possible to, among others, numerically establish which factors are important in explaining default risk, evaluate the relative degree of importance of the factors, improve the pricing of default risk, be more able to screen out bad loan applicants and be in a better position to calculate any reserve needed to meet expected future loan losses (Uyemura and Deventer, 2000).

2.1.2.4 Clearly established credit approval process

Clearly established process for approving new credits and extending the existing credits has been observed to be very important while managing. Further monitoring of borrowers is important as current and potential exposures change with both the passage of time and the movements in the underlying variables and are also very important in dealing with moral hazard problem. Monitoring involves, among others, frequent contact with borrowers, creating an environment that the bank can be seen as a solver of problems and trusted adviser; develop the culture of being supportive to borrowers whenever they are recognized to be in difficulties and are striving to deal with the situation; monitoring the flow of borrower's business through the bank's account; regular review of the borrower's reports as well as an on-site visit; updating borrowers credit files and periodically reviewing the borrowers rating assigned at the time the credit was granted (Donaldson, 2000; Tummala and Burchett, 2000; Mwisho, 2001;Basel, 2004; Treacy and Carey, 2004;).

2.2. Credit Risk Measurement, Monitoring and control

Since exposure to credit risk continues to be the leading source of problems in banks world-wide, banks and their supervisors should be able to draw useful lessons from past experience. Banks should have a keen awareness of the need to identify, 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 incurred as per the report issued by a committee on Banking supervision of Bank for international settlements (Agrawal (2001).

2.2.1 Measures of Bank Performance

In many of the literature reviewed its explained that bank performance is represented mainly by quantifiable financial indicators. The literature on the determinants of bank performance has closely tied bank performance with profitability measures such as ROA, ROC and NIM. Smirlock (1985), Civelec and Al-Almi (1991), Agu (1992) and Chirwa (2001). Gilbert (1984) in a survey of

literatures argued that bank profit is an appropriate measure of bank performance and criticize average interest rate and average service charge rates as poor measures of bank performance.

However, this study is adopting empirical works of Adeusi, et al. (2013) and YousfiImane (2013). Thus, return on assets (ROA) as proxies for financial performance as dependent variable; whereas risk management practice proxy by bank specific selected factors (credit risk management, operational and liquidity risk management and external factors not included in this study. Rate of return on assets (ROA) is the most comprehensive accounting measure of bank's overall performance. Most of the bulk of studies employed ROA as profitability measure, for instance, (Izhar and Asutay, 2007) and (Flamini et al, 2009). Likewise, this also supported by (Athanasoglou et al,2008) stated that ROA is the key ratio for the evaluation of bank profitability given that ROA is not distorted by high equity multipliers, while ROE disregards the risks associated with high financial leverage. In this respect, it is rarely to find the research paper utilizes ROE as a single measure of profitability.

2.2.2 Determinants of credit risk management practice on the performance of commercial banks

In most of the literatures, there are two way and sometimes three ways of classifying the determinants of bank performance Arifin and salina(2009) cited in(Al-Tamimi, 2010; Aburime, 2005), for instance classified the determinant factors into two: bank specific (internal) and macroeconomic variables. The internal factors are individual bank characteristics which affect the bank's performance. These factors are basically influenced by the internal decisions of management and board on risk management practices. The external factors are sector wide or country wide factors which are beyond the control of the company and affect the financial performance banks. Studies (Adeusi, et al 2013 and Adedapo et.al, 2014) was attempted to integrate sector specific factors like credit risk (NPL, cost per unit to loan ratio), Capital risk (capital adequacy ratio), liquidity risk (liquidity ratio) and operational risk (ratio of operational cost) in their findings shows that, credit risk management practice negative relationship with financial performance (ROA and

ROE) and also significant impact and also the remaining factors have positive and significant impact on Nigerian commercial banks. However, these studies address risk practice determinant on financial performance include bank size and insolvency risk managements as a bank specific determinant on bank performance.

2.3 Internal factors

The internal factors are bank specific variables, which influence the performance of banks. They are termed as micro or bank-specific determinants of performance. The internal determinates originate from bank accounts (financial statements). They are factors that are influence by the bank's management decisions and policy objectives. Shareholder and managerial decisions and activities can directly influence these characteristics; hence they also differ from bank to bank (Athanasoglou, 2005 and Fredrick, 2010). In this study such internal factors of performance included capital adequacy ratio (CAP), Bank liquidity Risk (LIQ), size of bank in terms of logarithm total assets (SIZE), and Loan and advance growth (LA). Accordingly, the study identified both dependent and independent variables. Below the definition of the dependent and independent variables discussed.

2.3.1 Dependent Variables

This study is used the most comprehensive measure of banks performance to examine the impacts of risk management practice on financial performance of commercial banks in Ethiopia. In this study, return on asset is used to measure the performance of commercial banks in Ethiopia from 2009-2018. In addition to this, the data for the study is drawn from the audited financial statement of the banks which disclose information about the accounting based variable to measure the operating performance and the net worth of the banks. Therefore, this study measure performance by using accounting base variables namely returns on asset.

Return on asset is a ratio that measures company's income after tax against its total assets. The ratio considered as an indicator of how efficient a company is using its assets to generate earnings before contractual obligation must paid. In addition to this, the data for the study drawn from the financial

statement of the banks, which disclose information about the accounting based variable, which is important to measure the performance of the banks. ROA computed as: Return on Assets = EBIT/Total Asset.

2.3.2 Independent Variables

Independent variables are explanatory variables that explain the dependent variables. Independent variables included in this study are indictors of bank specific risk indicators; nonperforming loan ratio (NPLR), capital adequacy ratio (CAPR), Bank size (BAS), Loan Growth Ratio (LGR) and liquidity ratio (LIQR).

2.3.2.1 Non-Performing loan ratio (NPLR)

The non- performing loan ratio measure to capture banks' credit risk on financial performance. Credit Risk; the analysis of the financial soundness of borrowers has been at the core of banking activity since its inception. This analysis refers to what currently known as credit risk, that is, the risk that counterparty fails to perform an obligation owed to its creditor. It is called nonperforming loan, a loan considered as accredit risk as the chance that a debtor or issuer of a financial instrument whether an individual, a company, or a country will not repay principal and other investment - related cash flows according to the terms specified in a credit agreement. Inherent to banking, credit risk means that payments may be delayed or not made at all, which can cause cash flow problems and affect a bank 's profitability (Greuning and Bratanovic ,2009) It indicates how banks manage their credit risk because it defines the proportion of loan losses amount in relation to total loan amount. The less the ratio the most effective of the credit risk management practice of banks. To calculate this ratio, the researcher used data provided in the financial statements of eight commercial banks and NBE. Thus, calculation of the NPLR has accomplished in the following way: Non-performing loan ratio=Non-performing loan/total outstanding loan balance.

2.3.2.2 Liquidity Ratio (LIQR)

Liquidity risk was estimated by the ratio of liquid assets to short term customer deposits and other short term borrowing or a ratio of cash and cash equivalents over short term customer deposits and other short term borrowing. High liquidity may allow a bank to avoid costly borrowing of funds should the need for cash arise (Ommeren, 2011) and (Davydenko, 2010).Kargi (2012) studied that lack of liquidity in extreme situations can lead to the bank's insolvency. And also suggest that if the bank does not invest sufficient funding current assets, it may become illiquid which is risky. It may lose profitability some idle current assets do not earn anything. Liquidity ratio is ratio of liquid asset to customer deposits used by banks to analysis their ability to meet its obligation as and when due (Liyuqi, 2007). However, there is also an opportunity cost that banks incur by not investing the cash available to generate returns. Therefore, the sign may appear to be positive. Total deposit is calculated from the bank's balance sheets of eight commercial banks (demand, saving and fixed) and computed as follows: liquid asset/Total deposit amount.

2.3.2.3 Bank size (BAS)

Total assets of the bank measures bank size. In most of the literature, the total assets of the banks are as a proxy for bank size. However, since total assets collapsed the dependent variable in the model (ROA) it would be appropriate to take natural logarithm before including in the model to be consistent with other ratios. Among the factors identified, bank size identified as significantly affecting the performance of banks. The effect of a bank's size on performance not settled in the literature because of this, the expected sign is ambiguous. Increase in size can lead to decreasing or increase profits for banks due to the situation (Ani et.al 2012). As quoted from Kaaya and Pastory (2013), smaller banks generate less profit than larger banks. However, a larger bank with economies of scale as well as number of branch network might be able to attract better deposits. Like previous studies, this research also uses log of total asset to measure the size to the private commercial banks. The expected sign was positive and calculated as follows: *Bank size = natural logarithm of total asset (BAS*)

2.3.2.4 Capital Adequacy Ratio (CAPR)

Capital adequacy refers to the sufficiency of funds available to absorb losses to protect depositors, creditors, etc. in the interest of maintaining financial system stability. As per Basel Committee on Banking Supervision (BCBS 2004) revised framework and NBE requirement (NBE directive no SBB/9/95) capital adequacy is measured by the ratio of regulatory capital to risk-weighted assets and accordingly a minimum of 8% is required. However, the proxy for capital adequacy measurement used in this study was the ratio of total equity to total asset.

2.3.2.5 Loan and Advance growth

One of the purpose roles of banks is to offer loans to borrowers and loans serves as the main source of earnings for commercial banks. In different words, loans are the highest yielding asset on banks' balance sheet. According to Abreu and Mendes (2002) the more the banks offer loans the more they do generate revenue and more profit they make. Therefore, loans should positively affect profitability as the bank is working vigilantly and not taking excessive risk

2.4 Empirical Review

Kegniku (2018) investigated the impact of credit risk management on the performance of commercial banks in Cameroon with specific objectives of evaluating loan assessment techniques used by banks and finding out various risk management tools used to manage credit risk. In order to verify it, secondary data were used to carry out ratio analyses and trend analyses which were then correlated to the percentage changes in profits. The findings of the study indicated that the Non-Performing loans (NPL) to total loans ratio which is one of the risk management indicators is a major predicator and is significantly related to bank financial performance, followed by the loan to total deposit ratio and loans to total assets ratios that have an inverse impact on financial performance of banks.

Hamza (2017) investigated the impact of credit risk management on performance of commercial banks in Pakistan. The pooled regression had been adopted to determine the impact of credit risk

management on two performance measures. The findings revealed the fact that credit risk management was inversely associated with bank performance. For return on asset (ROA) analysis revealed that capital adequacy ratio (CAR), Loan loss provision ratio (LLPR), liquidity ratio (LR) and Non-performing loan ratio (NPLR) variables have significant impact on return on assets (ROA). The Loan loss provision ratio (LLPR), liquidity ratio (LR) and Non-performing loan ratio (NPLR) had negative while the capital adequacy ratio (CAR), loan and advances (LAR), and SIZE had positive impact on the return on assets. In relation to return on equity, the CAR, LAR and LLPR variables have significant impact on ROE. In this model the LLPR, NPLR and LR variables have negative and CAR, LAR and SIZE variables have positive impact on the dependent variable.

Nude and Okeke (2018) investigated the impact of credit risk management on the performance of deposit money banks in Nigeria using five banks that had highest asset base. Ex-post facto research design was adopted using dataset for the period 2000–2014 collected from the annual reports and financial statement of the selected deposit money banks. Three hypotheses were proposed and tested using ordinary least square regression model. The findings reveal that credit risk management had a positive and significant impact on total loans and advances, the return on asset and return on equity of the deposit money banks. The study recommended that bank managers need to put more efforts to control the non-performing loan by critically evaluating borrowers' ability to pay back. The regulator should strengthen its monitoring capacity in this regard.

Embaye and Abderaman (2017) examined on the impact of credit risk management on the performance of commercial banks in Eritrea. The main indicators used in this study are Return on Assets (ROA), Non-performing Loans Ratio (NPLR), Capital Adequacy Ratio (CAR), Loan and Advances Ratio (LAR) and Loan Loss Provision Ratio (LLPR). The researchers collected data from Commercial Bank of Eritrea and Housing and Commerce Bank of Eritrea from 1998 to 2015. Descriptive and panel data regression analysis were used in order to test the relationship between the four indicators and the performance of commercial banks in Eritrea. The findings show that credit risk management was inversely associated with bank performance. The nonperforming loan, and loan and advances ratios significantly and negatively affected performance of the commercial

banks. The result indicates that loan and advances ratio is negative but statistically insignificant. There is a positive relationship between CAR and ROA. The significant positive relationship between loan loss provision and commercial banks performance in this study could indicate the presence of potential earning management activities by bank managers.

Kodithuwakku (2015) examined the adoption of credit risk management is becoming a crucial factor for every commercial bank around the world. The objective of the study was to identify the impact of credit risk management on the performance of the commercial banks in Sri Lanka. The study was based on both primary and secondary data. Primary data were collected from eight (08) commercial banks from 24 commercial banks in Sri Lanka. The sample was selected from the population based on the superior financial performance for the period under review and the availability of the consistent data over the set period. The primary data was collected mainly through an interview. The relevant authorities were interviewed personally in order to have their views on the problems and solutions. The secondary data were obtained from various sources such as Annual Reports of the selected commercial banks, relevant articles, books and magazines etc. The panel data of a five-year period from 2009 to 2013 from the selected banks were used to examine the relationship between credit risk and performances. The Return on Assets (ROA) is used as performance indicator and Loan provision to total loan (LP/TL), Loan Provision to Non-Performing Loans (LP/NPL), Loan Provision to Total Assets (LP/TA) and Non-Performing Loans/ Total Loans (NPL/TL) were used as indicators of credit risk. Further, a regression model was used to establish the relationship between amounts of loan as well as non-performing loans and profitability during the period of study by using E-views software. The result shows that non-performing loans and provisions have an adverse impact on the profitability. Therefore, the study recommended the banks to implement an effective tools and techniques to reduce the credit risk management.

Poudel (2012) examined to explore various parameters pertinent to credit risk management as it affects banks' financial performance. Such parameters covered in the study were; default rate, cost per loan assets and capital adequacy ratio. Financial report of 31 banks were used to analyse for

eleven years (2001-2011) comparing the profitability ratio to default rate, cost of per loan assets and capital adequacy ratio which was presented in descriptive, correlation and regression was used to analyse the data. The study revealed that all these parameters have an inverse impact on banks' financial performance; however, the default rate is the most predictor of bank financial performance. The recommendation is to advice banks to design and formulate Strategies that will not only minimize the exposure of the banks to credit risk but will enhance profitability.

2.5 Summary and Knowledge Gap

From the previous theoretical as well as empirical review, credit risk is affecting the performance of the Banking industry. Correspondingly, in the literature; the Bank profitability is usually expressed as a function of internal and external determinants. Various studies have been made in different countries regarding these variables. Among others, the most important internal determinants that are affecting performance include Bank Size, Non-performing loans and Loan to Total Asset (loan growth). The studies made shows consistent results with respect to loan to total asset, Non-performing loan; however, the empirical results for Bank size.

Looking into the analysis of the audited financial statements for the banks for the past consecutive ten years (2009-2018) depicts that, the maximum non-performing loan was 5.7% in 2008 which is even higher than National Bank tolerable limit of 5% and the lower being 2.4% in 2012. The loan growth has shown an increase throughout the studied years except in the year 2014, which shows a positive implication as it, is one of the major sources of revenue for the banking industry. The research made by Girma (2011) focuses on the risk management part and the models considered are Loan Provision to Total Asset, Loan Provision to Total Loan, NPL to Total Loan, and Loan Provisions to Non-Performing Loan. And Tseganesh (2012) investigated some of bank specific and macroeconomic factors affecting Banks liquidity and their impact on financial performance.Thus the research tried to examine the impact of credit risk on the profitability of Ethiopian commercial Banks and identifies the relationships between the Non-performing loans, loan growth and Bank Size with Banks Profitability. The research fills the gaps below that exist in the country; Literature gap, the studies made in the Ethiopia so far do not consider variables like Size in relation to

performance of the banks, which however were done well in different countries. The research serves as additional complement as reflecting the local banking industry context. As the research is applied one, it is further believed that such a study with recognition of these variables would contribute to policy making and devise risk mitigating mechanisms. Therefore, in this study one of the knowledge gaps that will be investigated such as, the study considered specific indicators of credit risk and their own financial performance. Therefore, this also to investigated further on the area, to assess the impact of credit risk management on the performance of commercial banks.

CHAPTER THREE

Research Methodology

Introduction

The previous chapter has indicated the literature on the determinants of bank performance and the impact of the variables on financial of banks performance.

The usefull of this chapter is to present the underlying principles of research methodology and the choice of the appropriate research method for the study. The chapter is arranged as follows. Section 3.1 research design Section, 3.2 research approach Section, 3.3 data type and sources. This is followed by population of the study considered by the research under section 3.4. Sampling Techniques and sample size is explained under section 3.5. Next, data analysis and presentation techniques are explained under in section 3.6. Finally, the model specification for the study is discussed under section 3.7.

3.1 Research Design

According to Saunders et al. (2009) there are three different types of studies which aim to answer the research objective and questions in different view. There are three different types of research design; these are explanatory, descriptive and exploratory. The main focus of an exploratory study is to a examine problems in new ways and it is a very good method to increase the understanding of a specific topic. The most common data collection methods are interviews in order to get an in depth understanding of the subject being investigated. The second type of study is according to Saunders et al. (2009) a descriptive study and it is usually used as a forerunner to the two other types of studies. The main aim of the descriptive study is to get an accurate picture of the situation that is being studied. The third type of study is explanatory which aims to examine the cause and

effect relationships between dependent and independent variables in order to detect a certain pattern. As noted by Saunders et al. (2009), explanatory research design examines the cause and effect relationships between dependent and independent variable, and then explanatory approach is the most appropriate. Therefore, this research will use the explanatory type of studies to answer the objective of the study.

3.2 Research Approach

The study is quantitative in its approach; the quantitative data research relies on the measurement and analysis of statistical data to produce quantifiable conclusions. Quantitative research is a means for testing objective theories by examining the relationship among variables. Therefore, for this study quantitative research approach is use to see the relationship between the effects of credit risk on financial performance of commercial banks in Ethiopia. The study considers bank specific affecting banks performance in Ethiopia by establishing causal relationship.

3.3 Data Type and Sources

The study used secondary data type in order to address the objective of the study. The secondary data was collected from internal and external sources. The internal source collected from audited annual financial statements of the selected commercial banks and the external sources from National bank of Ethiopia (NBE). The data were collected from 2009 to 2018. In addition, the various annual and quarterly publications of the NBE, publications (including the annual report) of the Central Statistical Authority of Ethiopia (CSA), Ministry of Finance and Economic Development (MoFED) were used. Also, references with regard to the existing commercial code of the country, Banking proclamations, various directives of the NBE were made.

3.4 Target Population

All operational commercial banks in Ethiopia considered as taken as the study population. As stated before currently there are 16 operational commercial banks in Ethiopia. According to NBE annual report (2016), Ethiopia consists of 18 Commercial banks. Commercial Bank of Ethiopia (CBE), Development Bank of Ethiopia(DBE), Dashen Bank S.C (DB), Awash International Bank S.C (AIB), Wogagen Bank S.C (WB), United Bank S.C (UB), Nib International Bank S.C (NIB), Bank of Abyssinia S.C (BOA), Lion International Bank S.C (LIB), Cooperative Bank of Oromia S.C (CBO), Berehan International Bank S.C (BIB), Buna International Bank S.C (BUIB), Oromia International Bank S.C (OIB), Zemen Bank S.C (ZB), Abay Bank(AB),Addis International Bank(ADIB),Debub Global Bank(DGB) and Enat Bank (EB). Since the study analyses more depend on the secondary data obtained from NBE annual report.

3.5 Sampling Techniques and sample size

From the target population, sample is selects based on purposive Sampling method, which is a non-probability-sampling procedure that ensures to achieve a certain goal that the study wants to address. To select sample banks the study compares commercial banks experience and asset size. In this regard Commercial Banks of Ethiopia categorized into three peer groups. It is based on the establishment period and asset sizes of the banks. Accordingly, to include both large asset and small asset banks size private commercial banks 8 of them were selects these are, Awash (AB), United (UD), Dashen (DB), Wegagen (WB), Bank of Abyssinya (BOA) and Nib Banks (NB) selected from medium peer group while, Cooperative bank of Oromia (CBO) and, Lion International (LB) Banks consider from small peer.

3.6 Methods of Data Analysis

Data analysis section of this study was mainly base on computation of financial ratio data's (risk management practice indicators) of the selected commercial banks. Moreover, the researcher compute ratios with the help of Microsoft spread sheet from balance sheet and income statements of commercial banks from 2009-2018 of the selects indicators; then processed through eviews of

statistical packages. Furthermore, processed data interpreted through descriptive statistical analysis, and correlation and regression analysis.

3.7 Model Specification

The study used return on assets (ROA) as the sole dependent variable estimate of financial performance; whereas Credit risk management practice estimate by bank specific selected factors non-performing loan ratio (NPLR), bank size (BAS), liquidity ratio (LIQR),capital ratio (CAR), Loan growth and advance (LAR) from bank specific variables. One of the main reason used rate of return on assets (ROA) as dependent financial performance, it is the most comprehensive accounting measure of a bank's overall performance. Because of this, the bulk of studies employed ROA as performance measure, for instance, (Izhar and Asutay, 2007 and Flaminietal, 2009). Additionally, this supported by empirical studies by (Athanasoglouetal. ,2008) stated that ROA is the key ratio for the evaluation of bank profitability given that ROA is not distorted by high equity multipliers, while ROE is regards the risks associated with high financial leverage. In this respect, it is rarely to find the research paper utilizes ROE as a single measure of profitability. Due to this fact, this study also adopted ROA as the only financial performance measure estimate to investigate the risk management practice and financial performance of commercial banks in Ethiopia.

To this end, the panel model, in a functional form, is stated as follows

ROA = *f* (NPLR, CAR, LIQR, BAS, LAR, …….... (1a)

The econometric form for the model is specified as follows:

ROA Model = $\beta 0 + \beta 1 NPLR_{it} + \beta 2 LIQR_{it} + \beta 3 CAR_{it} + \beta 4 LAR_{it} + \beta 5 BAS_{it} + \mu_{it}$

Where:

i=banks, (i=1 to5) dependant variable to independent variable, t=time Period (from 2009 up to 2018)

B0=is a Constant

Bi (i=1 to 5) Variable Coefficient;

μi,t= is an error term or disturbance term

ROA = Return On Assets

NPLR= Non-Performing Loan Ratio (Computed As NPL/Total Loan Outstanding)

CAR = Capital Adequacy Ratio [Total Capital / Total Assets)

LIQR=Liquidity Ratio (Liquid Assets / Qualifying Liabilities)

BANK SIZE=Natural Logarithm of Total Assets

LR = Loan growth and Advance

CHAPTER FOUR

Data presentation and analysis

Introduction

This chapter presents the research findings on examining credit risk management on financial performance. The study was conducted on sample of eight (8) commercial banks from the period of 2009 to 2018. Balanced panel Regression analysis is used in analysis of the analytical model. Similarly, before regression model analysis, descriptive statistics analysis and correlation analysis presented along with figures and tabular forms. Finally, the overall findings of this study justified with various empirical studies done before by different author.

4.1 Results and Discussion

In the previous chapters important literatures relating to the topic were reviewed that gives adequate understanding about the topic. Meet the broad research objective and to answer research questions the research design used for this study was also discussed in the previous chapter. As stated in chapter one the broad objective of this study was to identify the impact of credit risk management on the performance of commercial banks in Ethiopia. This chapter has four sections. the first section the descriptive statistics of the dependent and independent variables are presented followed by correlation analysis under section.

The second section presents the test for the regression model. The third section results of the regression analysis are presented under section. Finally, discussions for the results of the regression analysis are made in this section.

4.1.1 Descriptive statistics

In this section the results from descriptive statistics are discussed. Generally, the data that were collected for this study were secondary in nature. The descriptive statistics was used in order to get

insight about the variables of the determinants of banks performance among the selected banks and it was used as a base to forward recommendations after determining the relationship between the variables from correlation and regression analyses. In the descriptive statistics, important observations related to the dependent and independent variables has been made. The dependent variable is performance which is measured by return on asset (ROA) and the independent variables are non-performing ratio (NPLR), Liquidity Ratio (LIQR) and Loan and advice Ratio (LAR) bank size (BAS), and capital adequacy ratio (CAR) below presents the descriptive statistics of the dependent and independent variable.

Table 4.1 Descriptive Statistics for the study variables

	ROA	**NPLR**	**CAR**	**LIQR**	**BAS**	**LAR**
Mean	0.029720	0.275573	0.133980	0.401879	4.011926	0.466658
Median	0.029373	0.165355	0.127760	0.341163	4.035870	0.463672
Maximum	0.046842	3.345630	0.201324	0.781987	4.742475	0.582663
Minimum	0.002770	-0.022010	0.079487	0.166143	2.978849	0.320683
Std. Dev.	0.007853	0.486919	0.030715	0.182951	0.370113	0.055452
Observations	80	80	80	80	80	80

Source; output EViews-8

As show in table 4.1 above, the maximum and minimum value of ROA is 0.046842 and 0.029373 respectively with a mean of 0.029720 units showing that the most profitable bank has registered 0.046842 unit profit per 1 unit of asset whereas the least profitable bank registered 0.029373 unit profit per 1 unit of asset.

Balanced data sets of 80 observations provide the basis for descriptive analysis. This study has used six variables for the analysis and interpretation, including fiver independent variables and one

dependent variable, performance measurement. As shown in the table 4.1 above, the mean value of return on assets (ROA) was around 0.029720 for sampled commercial banks in Ethiopia. This means, a one-birr investment in total assets of commercial banks generates birr 0.02970 average profits for the period of 2009-2018. The standard the above table indicates the mean, standard deviation, minimum and maximum values of variables. A standard deviation among banks in terms of profitability was 0.007853 this confirms that there were higher variations among banks' during the study period. Nonperforming loan ratios of each bank were proxy to the nonperforming loan to total loan (NPLR). The mean value of NPLR of indicates that 0.275573 at the average ratio of NPL over total Loan. The maximum amount of this ratio is 3.345630 and minimum amount is -0.022010 As banks only pass 25% in getting into the zone of weak credit risk control system (Agborade 2002), the industry in general not reaching to that stage. The standard deviation of 0.486919 is also indicating that there is that much variation among banks credit risk exposures. Capital adequacy ratio is the ratio of adjusted equity base to adjusted asset base. This is used by the central banks to secure the monies of depositors from default risks and other short falls of the banks. The accepted minimum requirement set by the Basel is 8%, however, the bank of Ghana has increased its minimum CAR to 10 % (Ghana Banking Survey, 2013). This is to ensure that depositors are highly protected. From the table, the CAR had a mean value 0f 0.1333980 with a standard deviation of 0.030715 the minimum and maximum values stood at 0.201324 and 0.079487 respectively. It can be said that the banks have the capacity to bear loss from loan granting and other failures.

The LIQR of the sampled banks had a mean of 0.401879 while their maximum and minimum values are 0.781987 & 0.166143 respectively. The ratio of loan and advance to deposit is used as a measure of credit risk. It shows the extent to which funds deposited in the banks are used in generating loans which is capitalized by default risk. On the descriptive table, the LAR of the banks under study had an average of 0.466658 with a standard deviation of 0.055452. The maximum and minimum values were 0.582663 and 0.320683 and the last is BAS, measures of total assets of banks, BAS had mean value of 4.011926 and maximum and minimum values are 4.742475 & 2.978849 respectively, suggesting that the banks pay more attention to the granting of loan facilities

which is more risky. The maximum value depicted how banks give out loan's facilities in excess of the total deposits.

4.1.2 Correlation Analysis

The importance of correlation matrix in this particular study was to show the linear association between the dependent and independent variables. As noted in Brooks (2008), correlation between two variables measures the degree of linear association between them. Values of the correlation coefficient are always range between positive one and negative one. A correlation coefficient of positive one indicates that a perfect positive association between the two variables; while a correlation coefficient of negative one indicates that a perfect negative association between the two variables. A correlation coefficient of zero, on the other hand, indicates that there is no linear relationship between the two variables.

To address the aim of the study, the Pearson correlation matrix analysis was used to determine links between risk management practice as explanatory variables (credit risk, liquidity risk, capital& debt management risk, operational risks) and financial performance of commercial banks as dependent variable (ROA) in Ethiopia. This analysis helps us to find the association or strength of relationship between explanatory and explained variable in this study.

Table 4.2 Correlation Analysis

	ROA	**NPLR**	**CAR**	**LIQR**	**BAS**	**LAR**
ROA	1.000000					
NPLR	-0.332601	1.000000				
CAR	0.367319	-0.165054	1.000000			
LIQR	0.333627	-0.267991	0.160201	1.000000		
BAS	-0.082784	0.247497	-0.381401	-0.707675	1.000000	
LAR	-0.463770	0.431271	-0.168707	-0.623008	0.446840	1.000000

Source; output of EViews 8

Accordingly; the correlation output in the above table 4.2 revealed that, positive relationship between risk management practice indicator items are capital adequacy ratio and liquidity ratio with

financial performance (ROA).Thus, their correlation coefficients are 0.367319 (CAR), 0.333627 (LIQR).This correlation infers that managing these risk indicators results in raise the banks performance in terms of return on assets. However, non-performing loan ratio, bank size, and loan and advance growth has negative correlation with return on assets of commercial banks in Ethiopia. The correlation risk indicator coefficients are -0.332601 (NPLR), - 0.082784 (BAS) and -0.463770 (LAR) This also indicates that, practicing in reduction and controlling of this risk factor, raise the performance of commercial banks (ROA) or can be maintained.

4.1.3 Results of Regression Analysis and Diagnostics test

In the linear regression model, different tests were run to form the data ready for analysis and to get reliable output from the study. These tests were expecting to check whether the ROA basic assumptions, are fulfilled when the explanatory variables are regressed against the dependent variables.

4.1.3.1 Autocorrelation Test

Other Assumption of classical linear regression model is Autocorrelation. The diagnostic test for CLRM assumption of no autocorrelation was tested by this study. According to Gujarati, (2004) the assumption of no autocorrelation between the disturbances assumes The that given any two X values, Xi and Xj ($i \neq j$), the correlation between any two ui and uj($i \neq j$), is zero. According to Chris Brooks (2008) it is assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are 'autocorrelated' or that they are 'serially correlated'. This assumption was tested by Durbin Watson (DW) test of autocorrelation. Durbin--Watson (DW) is a test for first order autocorrelation -- i.e. it tests for a relationship between an error and its immediate previous value. One way to motivate the test and to interpret the test statistic would be in the context of a regression of the time *t*error on its previous value

$ut = \rho ut-1 + vt$

Where $vt \sim N(0,\sigma^2 v)$and ρ is the coefficient of autocorrelation. The DW test ststatistic has as its null and alternative hypotheses. Under the null hypothesis, the errors at time $t-1$ and t are independent

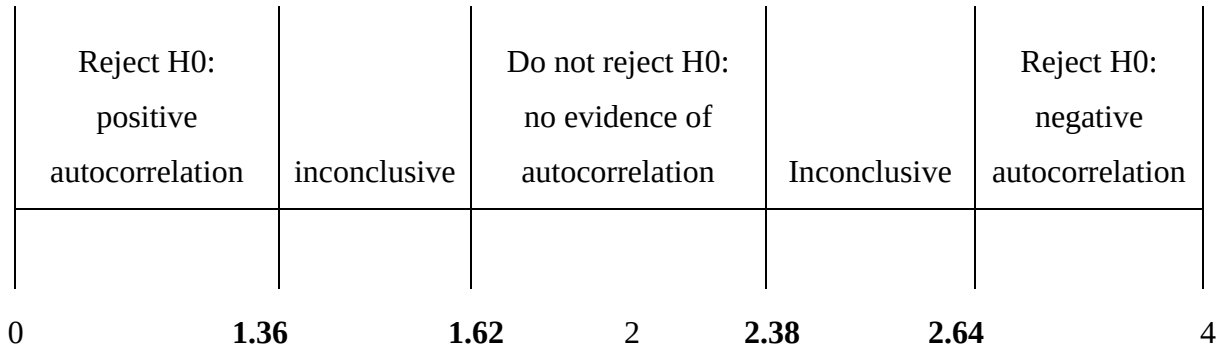
of one another (the errors at time $t-1$ and t are uncorrelated), and the alternative hypothesis says the errors at time $t-1$ and t are independent (the errors at time $t-1$ and t are serially correlated). Therefore:

$$H0: \rho = 0 \text{ (no autocorrelation)}$$

$$H1: \rho \neq 0 \text{ (autocorrelation)}$$

DW has 2 critical values: an upper critical value (dU) and a lower critical value (dL), and there is also an intermediate region where the null hypothesis of no autocorrelation can neither be rejected nor not rejected! The rejection, non-rejection, and inconclusive regions are shown on the number line in figure 4.1

Figure 4.1 Rejection, non-rejection, and inconclusive regions for DW test



According to Brooks (2008) the following is the decision rule to reject and not to reject the null hypothesis

- null hypothesis is rejected and the existence of positive autocorrelation presumed if DW is less than the lower critical value d_L;
- the null hypothesis is also rejected and the existence of negative autocorrelation presumed if DW is greater than 4 minus the lower critical value d_L;
- The null hypothesis is not rejected and no significant residual autocorrelation is presumed if DW is between the upper critical value dU and 4 minus the upper critical value dU.

- The null hypothesis is neither rejected or fails to be rejected if DW is between lower critical value dL and the upper critical value dU or if DW is in between 4 minus the upper critical value dU and 4 minus the lower critical value DL.

The DW test table value of dL,Du,4DL and 4dU at 80,and k8 foe this study is presented graphically below

Table 4.3: DW test result test of autocorrelation

Test	DW test statistics
DW result	1.58

Source: Output of Eviews 8

The DW test statistic value for models was 1.58 for a total observation of 80(8*10) were used in the model with 5 regressors. Thus the decision values for the test are d_L= 1.36, d_u = 1.62, 4.d_U = 2.38 and 4-dL= 2.64 .the DW statistics for the model is 1.58 lies between DL and which is 1.36 and dU which is 1.62 critical values. so, the null hypothesis of no autocorrelation is within the inconclusive region.therefore,there is no significance evidence for the existence of autocorrelation in the study

4.1.3.2 Multicollinearity

Correlation between independent variables is presented in table below. As shown in the tables there were fairly low data correlations among the independent variables. These low correlation coefficients indicate that, there is no problem of multicollinearity in the study. According to Brooks, 2008, in any practical context, the correlation between explanatory variables will be non-zero, although this will generally be relatively being in the sense that a small degree of association between explanatory variables will almost always occur but will not cause too much loss of precision. However, a problem occurs when the explanatory variables are very highly correlated with each other, and this problem is known as Multicollinearity. The most simple, operational

definition of unacceptable co-linearity makes no pretense to theoretical validity. An admittedly arbitrary rule of thumb is established to constrain simple correlations between explanatory variables to be smaller than 0.7 Kennedy (2008). However, according to Hair et al (2006), the correlation coefficient between independent variable should not exceed 0.9 which means coefficient of correlation less than 0.9 is acceptable. This assumption has been tested for the variables considered in the study as the independent variables. Therefore, the null hypothesis is articulated as there is no very high correlation between the independent variables. This is summarized with the alternative hypothesis as follows:

Ho: No Multicollinearity

H1: Multicollinearity

In this particular case, Table 4.4 below shows the correlation coefficient among explanatory variables in this study. The highest correlation coefficient for this study explanatory variable is -0.70 that is between BAS and LIQR, which is less than 0.9. Therefore, we fail to reject the null hypothesis of no Multicollinearity between the independent variables.

Table 4.4: Multicollinearity Test

	NPLR	**CAR**	**LIQR**	**BAS**	**LAR**
NPLR	1.000000				
CAR	-0.165054	1.000000			
LIQR	-0.267991	0.160201	1.000000		
BAS	0.247497	-0.381401	-0.707675	1.000000	
LAR	0.431271	-0.168707	-0.623008	0.446840	1.000000

Source; output of EViews 8

4.1.3.3 NORMALITY TEST

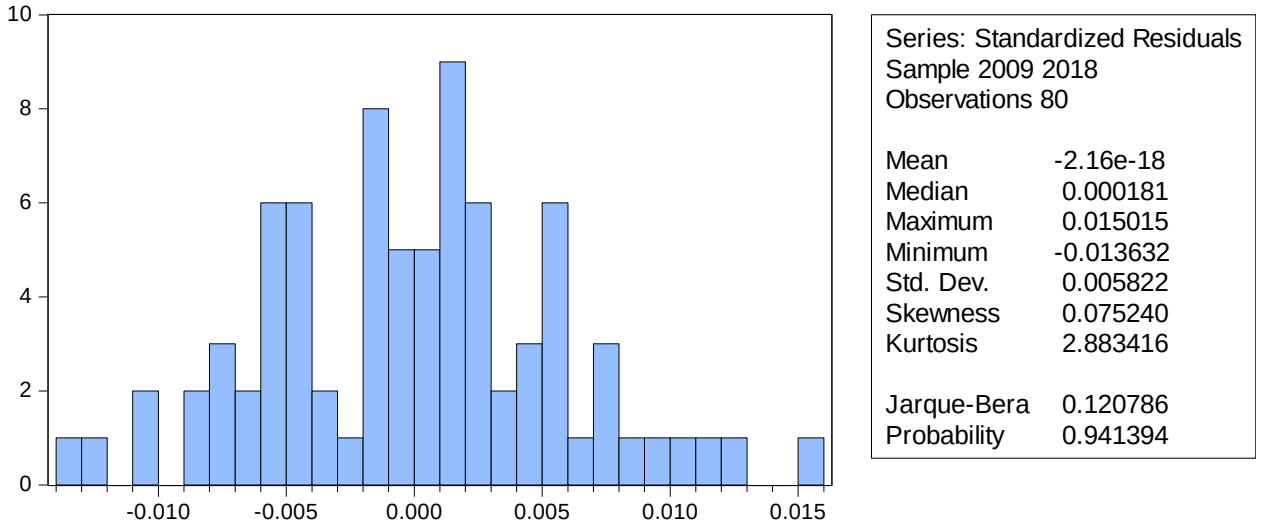
The next important diagnostic test conducted in this research is the normality assumption (i.e. the normally distributed errors). To check this normality assumption, the most commonly applied tests

is the Jarque-Bera (JB) test. This test uses the property of a normally distributed random variable that the entire distribution is characterized by the first two moments - the mean and the variance (Brooks, 2008, p.161). Normality test was applied to determine whether a data is well-modeled by a normal distribution or not. Theoretically, if the test is not significant, then the data are normal, so any value above 0.05 indicates normality. On the other hand, if the test is less than 0.05 which proves significance, then the data are non-normal. The *p*-value of the normality test should be bigger than 0.05 and Kurtosis should be around 3 for not to reject the null hypothesis of normality at the 5% significance level (Brooks, 2008). The null and alternative hypothesis for the test has indicated here under.

Ho:NormallyDistributedErrors

H1: Non-Normal Distribution Errors

Figure 4.2 Normality test



Source; output of eview 8

As shown in the histogram in the above, kurtosis is around 3 (i.e.2.883416), the Histogram statistics was significant at 5%. Hence, the null hypothesis that is the error term is normally distributed should not be rejected and the error term in all of the cases follows the normal distribution and skewed to the right.

4.1.4 Model selection test: Random versus Fixed effect

The collected data were estimated based on panel model, which includes cross sectional and time series observations. The conventional methods of panel models can classified in to fixed effects and random effects of models. The estimation technique was carried out on the basis of balanced panel data regressions

The panel model also included cross sectional for the selected commercial of bank in Ethiopia and time series for the observations of selected commercial bank for the period (2009 to 2018). The selection of panel estimator is done based on the sample determination, to use random effects model, is more appropriate if the entities in the sample have been randomly selected from the population. While, to use fixed effect model is more appropriate if the entities in the sample effectively constitutes the entire population (Brooks, 2008). On the other hand, according to Gujarati (2004), if the number of time series data is large and the number of cross-sectional units is small, there is likely to be little difference in the values of the parameters estimated by fixed effect model and random effect model.

The best alternative to make a choice between fixed effects and random effects model is conducting Hausman specification test. In this study the Hausman specification tests is utilized to decide which model is appropriate to fit the sample data. Hausman specification test is the classical test of whether the fixed or random effects model should have used.

Running a Hausman specification test at five percent level enables the researcher to choose between fixed effects and random effects models (Hausman, 1978). The hypothesis for Hausman specification test is:

Null hypothesis: Random- effect model is more appropriate

Alternative hypothesis: Fixed-effect model is more appropriate

Decision rule: if the p-value for Hausman test is less than 5%, this shows the random effects model is an appropriate than fixed effects model. According to Table below, the Hausman specification tests shows that the model has P-value of (0.6485). This indicates that the random effect model is preferred. Therefore, in this study random effect model was used to test the impact credit risk on profitability of commercial banks.

The result from Hausman test in tables allow as to not reject the null hypothesis that random model is better in this regression analysis. This implies that a random effect model is more appropriate than fixed effect model to undertake the panel regression estimation for this stud

Table 4.5 Correlated Fixed, Random Effect-Hausman Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	3.334859	5	0.6485

4.1.5 Random Effect Regression result

This section covers a random effect model regression result to examine the impact of explanatory variables (CAR, LIQR, LAR, BAS and NPLR) on the number of active participation (ROA) on commercial banks.

Table 4.6 Regression analysis results
Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Sample: 2009 2018

Periods included: 10

Cross-sections included: 8

Total panel (balanced) observations: 80

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.019391	0.017566	-1.103893	0.2732
NPLR	-0.002446	0.001582	-1.545998	0.1264
CAR	0.111480	0.024848	4.486490	0.0000
LIQR	0.018399	0.006229	2.953789	0.0042
BAS	0.011935	0.002865	4.166290	0.0001
LAR	-0.043779	0.017032	-2.570324	0.0122

R-squared	0.450389
Adjusted R –squared	0.413253
S.E. of regression	0.006016
F-statistic	12.12813
Prob (F-statistic)	0.000000

Source; output of EViews

This analysis presents over all the empirical results of the regressions. The entire regression result was made and coefficients of the variables were estimated by EViews software version 8. In this study random Effect regression model is used. Thus, the the effect model used to examine the impact of credit risk on profitability of commercial banks in Ethiopia:

The estimation result of the panel regression model used in this study is reported in table 4.5. Accordingly, the R-squared statistics and the Adjusted-R squared statistics of the model are 0.450389 and 0 .413253 respectively. These indicate that explanatory variables included in this mode could explain variation in the dependent variable by about 45% percent and 41% percent respectively. The remaining 54 percent can take as the role of explanatory variables that are not

included in this model but that have impact on the financial reporting quality. The null hypothesis of F-statistic (the overall test of significance) that the R2is equal to zero is rejected at 1% as the p-value is sufficiently low. F-probability of 0.000 indicates that the model fit the sample data well and the explanatory variables are jointly significant level. The estimation result of the panel regression model used in this study is reported in table 4.7.

P value is significance when significance level is less than 5% and other wise is greater than 5%, then p value is insignificant. And other option of regress is coefficient of independent variables positive sign occur it is directly relate to dependent variable (ROA) ,otherwise expected it is negatively related with (ROA)

From the above regression table terms corresponding p-value of 0.0000, 0.0042, 0.0001, 0.0122 respectively from the bank specific factor CAR, LQIR, BAS and LAR have less than the selected significance levels (5%) those variables are significant in this research. Opposing NPLR did not show any significant impact on the level of ROA of commercial banks in Ethiopia from year 2009-2018.

4.1.5 Discussion on Regression Results

4.1.5.1 The impact of non-performing loans on profitability

The non- performing loan ratio measure to capture banks' credit risk on financial performance. Credit Risk; the analysis of the financial soundness of borrowers has been at the core of banking activity since its inception. This analysis refers to what currently known as credit risk, that is, the risk that counterparty fails to perform an obligation owed to its creditor. It is called nonperforming loan, a loan considered as accredit risk as the chance that a debtor or issuer of a financial instrument whether an individual, a company, or a country will not repay principal and other investment -related cash flows according to the terms specified in a credit agreement. Inherent to banking, credit risk means that payments may be delayed or not made at all, which can cause cash flow problems and affect a bank 's profitability (Greuning and Bratanovic ,2009) It indicates how banks manage their credit risk because it defines the proportion of loan losses amount in relation to total loan amount. The less the ratio the most effective of the credit risk management practice of banks.

The coefficient -0.002446 implies that the one birr increased on NPLR has a 0.002446 unit change on profitability but in opposite direction. This finding matches with the researcher expectation. From the result, nonperforming loans is negatively related with profitability measured by ROA. Thus a percentage increase in nonperforming loan reduce profitability 0.2446%, all other things being equal. Based on the result obtained in the regression table one of the bank specific factor which is affect the credit risk is NPLR that has no significant impact on the profitability (0.1264) of the commercial banks (ROA).

4.1.5.2 Liquidity ratios

Liquidity risk was estimated by the ratio of liquid assets to short term customer deposits and other short term borrowing or a ratio of cash and cash equivalents over short term customer deposits and other short term borrowing. High liquidity may allow a bank to avoid costly borrowing of funds should the need for cash arise (Ommeren, 2011) and (Davydenko, 2010).Kargi (2012) studied that lack of liquidity in extreme situations can lead to the bank's insolvency. And also suggest that if the bank does not invest sufficient funding current assets, it

may become illiquid which is risky. It may lose profitability some idle current assets do not earn anything. Liquidity ratio is ratio of liquid asset to customer deposits used by banks to analysis their ability to meet its obligation as and when due (Liyuqi, 2007). However, there is also an opportunity cost that banks incur by not investing the cash available to generate returns. The result of the regression analysis in Table shows that there is a positive impact and significant relationship between liquidity ratio (LIQR) and profitability as measured by Return on Asset (ROA). This implies that for each percentage increase in liquidity ratio, there is an increase in profitability by 0.018399. The finding in this study suggests that an increase in liquidity will result increase the profitability of commercial banks. This finding can be possible if we consider that when liquidity is effectively and efficiently managed i.e. when a commercial bank is able to meet its financial obligations timely and without incurring extra costs. It can also avoid any extra cost of obtaining liquid assets to bridge the liquidity short fall. From the result, nonperforming loans is negative related with profitability measured by ROA. Thus a percentage increase in liquid asset to total asset increase profitability by1.8399%, all other things being equal. Based on the result obtained in the regression table one of the bank specific factor which is affect the credit risk is LIQR that has a significant impact on the profitability (0.0042) of the commercial banks (ROA).

4.1.5.3 The Impact of Loans and Advance Ratio (LAR)

One of the major roles of banks is to offer loans to borrowers and loans serve as one of the sufficient sources of earnings for commercial banks. In other words, loans represent one of the largest yielding assets on banks' balances sheet. It is prudent for commercial banks to offer more loans but effective measures have to be put in place to ensure loan quality in order to avoid large number of defaults and ensure consistency in profitability. Loans and advances are taken as one of credit risk indicator because bank loans are relatively illiquid (Nawaz et al., 2012) and subject to higher default risk than other bank asset. Ogboi et al (2013) in the study on the impact of credit risk management and capital adequacy on the financial performance of commercial banks in Nigeria came out that loan and advances had a negative impact on profitability. This research produced the reverse of Ogboi el al (2013). The results indicated a negative relationship with

ROA and profitability this may be as a result of the interest earning on these loan facilities made available to deficit units.

The coefficient- 0.043779 implies that the one birr increased on LA has a 0.043779 unit increase on profitability. From the result, loan and advance is negatively related with profitability measured by ROA. Thus, a percentage increase in loan and advance will reduce profitability by4.3779%, all other things being equal. Based on the result obtained in the regression table one of the bank specific factor which is affect the credit risk is LAR that has a significant impact on the profitability 0.0122 of the commercial banks (ROA).

4.1.5.4 Capital Adequacy Ratio (CAR)

Capital adequacy refers to the efficiency of funds available to absorb losses to protect depositors, creditors, etc. in the interest of maintaining financial system stability. As per Basel Committee on Banking Supervision (BCBS 2004) revised framework and NBE requirement (NBE directive no SBB/9/95) capital adequacy is measured by the ratio of regulatory capital to risk-weighted assets and accordingly a minimum of 8% is required.

Based on the findings in the regression table, capital adequacy has the positively and statistically significant impact on ROA that determines the risk-taking behavior of banks. This study identifies statistically significant and positive impact of capital adequacy ratio on ROA. This positive sign shows there is a direct relationship between capital adequacy ratio and ROA.

The coefficient 0.111480 implies that the one birr increased on CAR has 0.111480 unit on profitability same direction. This finding matches with the researcher expectation. From the result, nonperforming loans is positive related with profitability measured by ROA. Thus, a percentage increase in capital adequacy ratio will increase profitability by 11.148%, all other things being equal. Based on the result obtained in the regression table one of the bank specific factor which is affect the credit risk is that has a significant impact on the profitability (0.0000) of the commercial banks (ROA).

4.1.5.5 Bank Size (BAS)

Total assets of the bank measures bank size. In most of the literature, the total assets of the banks are as a proxy for bank size. However, since total assets collapsed the dependent variable in the model (ROA) it would be appropriate to take natural logarithm before including in the model to be consistent with other ratios. Among the factors identified, bank size identified as significantly affecting the performance of banks. The effect of a bank's size on performance not settled in the literature because of this, the expected sign is ambiguous. Increase in size can lead to decreasing or increase profits for banks due to the situation (Ani et.al 2012). As quoted from Kaaya and Pastory (2013), smaller banks generate less profit than larger banks. However, a larger bank with economies of scale as well as number of branch network might be able to attract better deposits

This study identifies statistically significant and positive impact of bank size on ROA. This positive sign shows there is a direct relationship between bank size and ROA.

The coefficient 0.011935 implies that the one birr increased on BAS has a 0.011935 unit on profitability. Thus, a percentage increase in bank will increase profitability by 1.1935%, all other things being equal. Based on the result obtained in the regression table one of the bank specific factor which is affect the credit risk is that has significant impact on the profitability (0.0001) of the commercial banks (ROA).

Table 4.7 summery of hypothesized and actual impact

No	**Independent variables**	**Variable standard**	**Expected effect**	**Actual impact**
1	Non-performing loan ratio(NPLR)	Non-performing / Total outstanding loan	Negative	Negative / insignificant
2	Capital Adequacy ratio(CAR)	Total equity / Total asset	Positive/ Negative	Positive /significant
3	Liquidity ratio(LIQR)	Liquid asset / Total deposit	Negative	Positive /significant

		amount		
4	Bank size(BAS)	Natural logarithm of asset	Positive/ Negative	Positive / significant
5	Loan and Advance Growth	Total loan / Total deposit	Negative	Negative / significant

CHAPTER FIVE

Conclusion and Recommendation of the study

The previous chapter presented the results and discussion, while this chapter deals with the conclusions and recommendations based on the findings of the study. Accordingly, this chapter is organized into three sub-sections. The first section presents the summary, second conclusions and the third presents the recommendations

5.1 Summery unit

The central objective of this study was to examine the impact of credit risk on performance of commercial banks in Ethiopia based on panel data of eighty observations were selected using available data covering from the period 2009 to 2018. To achieve the intended objective, the study used secondary data sources. The secondary data was used based on the audited financial statements of the bank and basically the balance sheet and income statements of commercial bank are used. The data was analyzed by using random effect model, EView software.

Based on the finding of regression result indicated that all independent significant effect on the level of return on asset. Nonperforming loans insignificant which is also a determinant of credit risk indicated. From the regression result NPLR is a impact on performance. Banks generate loans from the deposits received from customers therefore the banks inability to recover these loans will mean that the little profit made will be used to serve the withdrawal needs of their customers.

5.2 Conclusion of the study

The explanatory variable credit risk indicator of Non – Performing Loan (NPL), bears a statistically at 1% significance level and it has a strong negative relationship with the profitability of commercial banks. The negative coefficient of this indicated the existence of an inverse relationship between profitability and non-performing loans. Performance of commercial banks in the same fashion, liquidity risk management practice had statistically positive impacts on financial performance of commercial banks in Ethiopia (ROA).This due to holding of excessive liquid assets above the standards. The variable capital adequacy, as expected, is

positive and statistically significant determinants of profitability for ROA model at 5% significance level. Therefore, it is concluded that with high capital ratio tend to earn more profit through translating then safety advantage into profit. The size of capital provides financial flexibility for bank and financial institution. It identifies which financing options are available for the entity. Hence, capital adequacy is one of the main determinants factor for the profitability of commercial banks in Ethiopia. The study result with related to explanatory variables of Loan Growth (LA) has negative relationship with profitability of the studied banks at 1% significance level. The factor of growth of loans is related with banks profitability. The main source of income for banks is loans and advances. Therefore, the higher the growth of gross loans the more capable a bank is in transforming deposits into loans and increasing its profits. The finding suggests that loan is one of the main income sources for banks from the interest income from loans and advances collected from its customers. This implies providing banking service in Ethiopia is becoming costly from time to time and the fact negatively influence profitability of commercial banks. The study found that bank size positively influences profitability at 5% significance level. This indicates the smaller the bank is the lower the profitability and vice versa. Large banks have more advantages as compared to their smaller rivals and have a stronger bargaining capability and making it easier for them to get benefits from specialization and from economies of scale and scope.

5.2 Recommendations

Based on the above conclusion, Ethiopian banks need to develop their credit risk management capacity the high level of provision held for poorly performing assets mainly loans and advances is affecting the profitability of Banks. Hence, improving performance require to institute a strong credit risk management system that can efficiently identify bankable borrowers and a system that can monitor their performance after the loan is granted. In addition, the regulatory framework should support and make sure banks to have strong credit risk management practice. This can be done though strengthening the internal risk management system to assist the identification, measurement and monitoring of credit risk as well as directing the supervision focus towards credit risk. The size of large banks needs to be positively to optimal levels- Even if it's significant, bank size appears to positively correlate with profitability. Large banks capacity to

provide efficient banking services should be the area that needs to be focused on. Ethiopian Banks should consider internal variables in their strategy design.

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Appendix

Descriptive Statistics

	ROA	NPLR	CAR	LIQR	BAS	LAR
Mean	0.029720	0.275573	0.133980	0.401879	4.011926	0.466658
Median	0.029373	0.165355	0.127760	0.341163	4.035870	0.463672
Maximum	0.046842	3.345630	0.201324	0.781987	4.742475	0.582663
Minimum	0.002770	-0.022010	0.079487	0.166143	2.978849	0.320683
Std. Dev.	0.007853	0.486919	0.030715	0.182951	0.370113	0.055452
Skewness	-0.767713	4.296792	0.458926	0.542103	-0.655430	-0.190557
Kurtosis	4.640151	24.50327	2.214476	1.948092	3.431823	2.884179
Jarque-Bera	16.82542	1787.467	4.865007	7.606718	6.349427	0.528872
Probability	0.000222	0.000000	0.087817	0.022296	0.041806	0.767639
Sum	2.377568	22.04580	10.71838	32.15031	320.9541	37.33262
Sum Sq. Dev.	0.004872	18.73014	0.074530	2.644213	10.82172	0.242921
Observations	80	80	80	80	80	80

Correlation

	ROA	NPLR	CAR	LIQR	BAS	LAR
ROA	1.000000	-0.332601	0.367319	0.333627	-0.082784	-0.463770
NPLR	-0.332601	1.000000	-0.165054	-0.267991	0.247497	0.431271
CAR	0.367319	-0.165054	1.000000	0.160201	-0.381401	-0.168707
LIQR	0.333627	-0.267991	0.160201	1.000000	-0.707675	-0.623008
BAS	-0.082784	0.247497	-0.381401	-0.707675	1.000000	0.446840
LAR	-0.463770	0.431271	-0.168707	-0.623008	0.446840	1.000000

random effect/fixed effect

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	3.334859	5	0.6485

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

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
NPLR	-0.002204	-0.002446	0.000001	0.7490
CAR	0.095936	0.111480	0.001561	0.6940
LIQR	0.018395	0.018399	0.000018	0.9993
BAS	0.012692	0.011935	0.000015	0.8440
LAR	-0.047595	-0.043779	0.000027	0.4624

Cross-section random effects test equation:
Dependent Variable: ROA
Method: Panel Least Squares
Date: 01/01/21 Time: 12:44
Sample: 2009 2018
Periods included: 10
Cross-sections included: 8
Total panel (balanced) observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.018630	0.027201	-0.684878	0.4958
NPLR	-0.002204	0.001755	-1.255666	0.2136
CAR	0.095936	0.046673	2.055488	0.0437
LIQR	0.018395	0.007541	2.439310	0.0174
BAS	0.012692	0.004796	2.646351	0.0101
LAR	-0.047595	0.017806	-2.672891	0.0094

Effects Specification

Cross-section fixed (dummy variables)

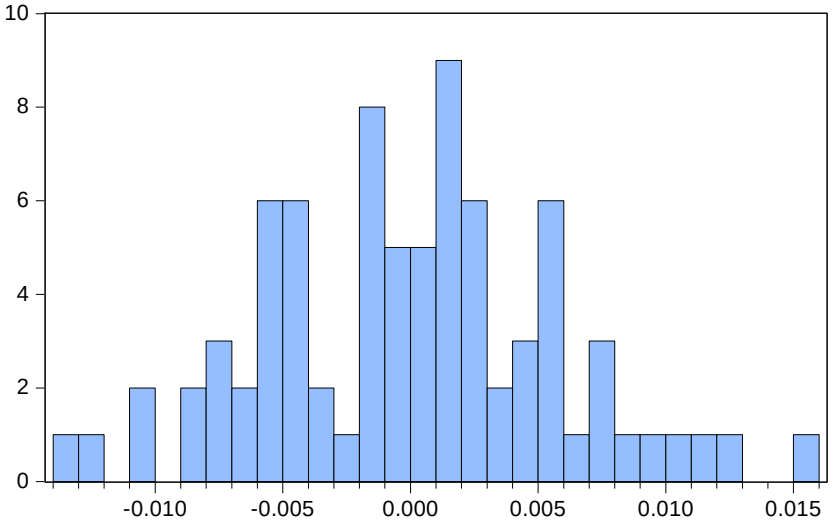
R-squared	0.482087	Mean dependent var	0.029720
Adjusted R-squared	0.389326	S.D. dependent var	0.007853
S.E. of regression	0.006137	Akaike info criterion	-7.201254
Sum squared resid	0.002524	Schwarz criterion	-6.814175
Log likelihood	301.0502	Hannan-Quinn criter.	-7.046063

			1.64657
F-statistic	5.197105	Durbin-Watson stat	5
Prob(F-statistic)	0.000004		

Multicollinearity

	NPLR	CAR	LIQR	BAS	LAR
NPLR	1.000000	-0.165054	-0.267991	0.247497	0.431271
CAR	-0.165054	1.000000	0.160201	-0.381401	-0.168707
LIQR	-0.267991	0.160201	1.000000	-0.707675	-0.623008
BAS	0.247497	-0.381401	-0.707675	1.000000	0.446840
LAR	0.431271	-0.168707	-0.623008	0.446840	1.000000

Normality



Series: Standardized Residuals
Sample 2009 2018
Observations 80

Mean	-2.16e-18
Median	0.000181
Maximum	0.015015
Minimum	-0.013632
Std. Dev.	0.005822
Skewness	0.075240
Kurtosis	2.883416
Jarque-Bera	0.120786
Probability	0.941394

Regression

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 01/01/21 Time: 12:43
Sample: 2009 2018
Periods included: 10
Cross-sections included: 8
Total panel (balanced) observations: 80
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.019391	0.017566	-1.103893	0.2732
NPLR	-0.002446	0.001582	-1.545998	0.1264
CAR	0.111480	0.024848	4.486490	0.0000
LIQR	0.018399	0.006229	2.953789	0.0042

BAS	0.011935	0.002865	4.166290	0.0001
LAR	-0.043779	0.017032	-2.570324	0.0122

Effects Specification		
	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	0.006137	1.0000

Weighted Statistics			
		Mean dependent var	0.029720
R-squared	0.450389		
Adjusted R-squared	0.413253	S.D. dependent var	0.007853
S.E. of regression	0.006016	Sum squared resid	0.002678
F-statistic	12.12813	Durbin-Watson stat	1.580007
Prob(F-statistic)	0.000000		

Unweighted Statistics			
		Mean dependent var	0.029720
R-squared	0.450389		
Sum squared resid	0.002678	Durbin-Watson stat	1.580007