Addis Ababa University

Department of Accounting and Finance

College of Business and Economics

Determinants of Asset Quality, in Ethiopian Commercial Banks

A Thesis Submitted to Addis Ababa University Department of Accounting and Finance College of Business and Economics, in partial fulfillment of the Requirements for the Award of a master's degree in Accounting and Finance

By

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Addis Ababa, Ethiopia

Statement of Declaration

I, the under signed, declare that this thesis entitled: "The Determinants of asset quality the selected of Commercial Banks" and submitted in partial fulfillment of the requirement for the Degree of Master of Science in Accounting and Finance, is outcome of my own effort & study complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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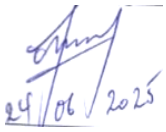
Signature: 

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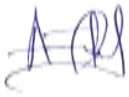
Internal examiner: Abebaw Kassie (PhD) Signature  Date 24/06/2025

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List of Acronyms

AB ⇒ ABAY BANK

ADIB ⇒ ADDIS INTERNATIONAL ABNK

AIB ⇒ AWASH INERNATIONAL BANK

ALLL ⇒ ALLOWANCE FOR LOAN AND LEASE LOSSES

BOA ⇒ BANK OF ABYSSINIA

BrIB ⇒ BERHAN INTERNATIONAL BANK

BSIZE ⇒ BANK SIZE

BUIB ⇒ BUNNA INTERNTIONAL BANK

CA ⇒ CAPITAL ADEQUACY

CBE ⇒ COMERCIAL BANK OF ETHIOPIA

CEMAC ⇒ CENTRAL-AFRICAN ECONOMIC AND MONETARY COMMUNITY

CEO ⇒ CHIEF EXECUTIVE OFFICER

CESEE ⇒ CENTRAL-EASTERN AND SOUTHERN-EASTERN EUROPR

COF ⇒ COST OF FUND

COOP ⇒ COOPERATIVE BANK OF OROMIA

DB ⇒ DASHIN BANK

FE ⇒ FIXED EFFECT

GB ⇒ GLOBAL BANK

GDP ⇒ GROSS DOMESTIC PRODUCT

GMM ⇒ GENERALIZED METHOD OF THE MOMENTS

HB ⇒ HIBRET BANK

INF ⇒ INFLATION

LDR ⇒ LOAN TO DEPOSIT RATION

LG ⇒ LOAN GROWTH

LIB ⇒ LION INTERNATIONAL BANK

NBE ⇒ NATIONAL BANK OF ETHIOPIA

NIB ⇒ NIB INTERNATIONAL BANK

NPA ⇒ NON PERFORMIN ASSET

NPL ⇒ NON PERFORMAING LOAN

NPLTA ⇒ NON-PERFORMING LOAN TO TOTAL ASSET

OIB ⇒ OROMIA INTERNATIONAL BANK

RA ⇒ RANDOM EFFECT

ROA ⇒ RETURN ON ASSET

ROE ⇒ RETURN ON EQUITY

VIF ⇒ VARIANCE INFLATION FACTOR

WB ⇒ WEGAGEN BANK

ZB ⇒ ZEMEN BANK

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Abstract

The stability and performance of the banking sector are critically influenced by the quality of its assets. This study investigates the key determinants of asset quality among commercial banks in Ethiopia. Using panel data from Sixteen Ethiopia commercial banks which are purposely selected from thirty commercial banks that operate in Ethiopia based on asset size and been established and fully start their operations before the year 2014. The period of the study has covered the year from 2014 to 2023. The study employs a quantitative research approach, incorporating fixed effects and random effects models to examine the relationship between asset quality measured primarily by the non-performing loan to total asset (NPLTR) and a set of bank-specific and macroeconomic variables.

The findings reveal that bank-specific factors such as Bank size, capital adequacy, cost of funds, return on asset and loan to deposit ratio significantly affect asset quality. Additionally, from macroeconomic variable, which is inflation, exhibit a notable influence on non-performing loans. The results indicate that high credit expansion without strict risk assessment mechanisms tends to deteriorate asset quality, while sound capital positions and efficient management improve it.

The study concludes that both internal banking practices and external economic conditions play a crucial role in determining asset quality. It recommends that Ethiopian commercial banks strengthen their credit risk management frameworks and that policymakers ensure a stable macroeconomic environment to safeguard the health of the banking sector.

Keywords: Asset quality, commercial banks, non-performing loans, determinants, Ethiopia, panel data, credit risk.

Chapter 1

1. Introduction

Under this chapter the researcher try to focuses on background of the study that gives some insight on the issues of how well-developed financial system supports economic growth, about non-performing asset and asset quality of commercial banks in Ethiopia. After giving some insight on the issues of well-developed financial system and Asset quality, statement of the problem part that can shows the direction of the study and justifies the main reason to carry out this study. Furthermore, this chapter explains the objective, significance, scope and limitation of the study. Finally, tells organization of the study with the intention to provide introductions and to set out the overall structures of the study.

2. Background of the study

A robust and efficient financial system plays a crucial role in fostering economic development by facilitating the transfer of funds from savers to borrowers (Levine, 2005). In such system, we often observe enhanced profitability, increased credit activity, and improved financial services (Beck, Demirgüç-Kunt, & Levine, 2007). Among financial institutions, commercial banks are central players, primarily engaged in lending and borrowing operations (Allen & Gale, 2004).

These banks operate by mobilizing deposits and channeling them into loans or investments. While accepting deposits typically entails minimal risk, lending exposes banks to significant credit risk due to the uncertainty of loan repayment. This credit function is fundamental to the stability of the broader financial system (podder & AlMamun, 2004; Franklin & Elena, 2008).

Globally, the banking sector is highly exposed to credit risk, particularly in the form of non-performing assets (NPAs). These NPAs are widely accepted indicator of bank's asset quality and are often linked to institutional failure (Guy & Lowe, 2011; Samad, 2012). Elevated levels of NPAs can undermine a bank's financial health, limiting its ability to support economic growth and generate sustainable revenues (Saba, Kouser & Azeem, 2012; Baselga-Pascual & Orden-Olasagasti, 2015).

NPAs and profitability are two parameters perform by banks to measure the efficiency of credit risk management (Fainstein & Novikov, 2011). Similarly, it has been reported that credit risk is

commonly measured by using gross non-performing asset to the gross loan amount (Deliset al., 2011; Tehulu & Olana, 2014).

NPA is a disease for any bank which directly affects two main components of the banks responsible for overall efficiency of any bank i.e. the liquidity and profitability. Continuously decline in profitability due to increase in NPAs would ultimately expose the viability of the bank (Swamy, 2015).

Now day's banks are very alert in extending loans because of mounting non-performing assets. High level of NPA indicates deteriorating asset quality that reduce banks strength and growth which in turn indicates fragility of financial health of banks in developed and undeveloped country. Although the banking system in Ethiopia has not been experience notable banking crises, as compare to other banks in the world but the issue concerning have come up particularly in view of the comparatively high levels of NPAs of Ethiopia banks as well as of the other countries. Therefore, there is need to empirical studies that can join the profitability analysis as well. For this purpose, it is essential to identify and understand the determinants (both macro-economic and bank specific) of NPAs. The objective of this study is to held empirical analysis of the determinants of bank asset quality management in the context of commercial bank of Ethiopia.

3. Statement of the problem

Maintaining high asset quality is essential for the stability and profitability of commercial banks. A failure in asset quality can threaten the overall health of the banking system and potential trigger financial crises, as seen during the global financial turmoil of 2007-2008. Nagle (1991) noted that deteriorating asset quality often lead to bank failures, making it critical concern for banking institutions. Similarly Streeter (2000) highlighted that asset quality is one of the key challenges faced by the bank management in the United States. With increasing scrutiny from regulators and stakeholders, effective asset quality management is now recognized as a core element of sound banking practices both domestically and internationally.

Aprio and Klingebiel (2002) emphasized that the volume of non-performing loans (NPLs) is a major indicator of banking crises in both emerging and advanced economies. As a result,

understanding the root causes of deteriorating asset quality has become a top priority for the global banking sector.

As banks grow in size, they may experience an increase in non-performing assets due to challenges in monitoring and managing large and diversified loan portfolios (Berger & Deyoung, 1997; Boudriga, Taktak, & Jellouli, 2009.

The study findings of Erasmus (2018) also revealed that among the economic variables bank lending rate, capital adequacy ratio, Liquidity and GDP had significant impact on the quality of bank's assets whereas Deposit, return on asset (ROA), return on equity (ROE), credit growth rate, inflation, unemployment rate have no significant influences. In opposite, the study of (Louzis et al. 2010) examined the determinants of nonperforming loan in the Greek financial sector using dynamic panel data model and found as ROA and ROE had negative significant effect on asset quality. Moreover, the study result of (Solomon, 2018) shows that ROE, inflation and GDP influence the quality of bank asset

Accordingly, as per the knowledge of the researcher, most studies conducted in Ethiopian banking sector clearly failed to identify macroeconomic determinants of asset quality. In general, the lack of sufficient research and inconsistent results among the researchers on the determinants of asset quality in Ethiopia banking sector and most of the existing studies being only focused on the banks specific determinants of asset quality. Hence, the purpose of this study was to investigate the determinants of asset quality in Ethiopian commercial banks by adopting an econometrics model so as to estimate both the bank specific and macroeconomic determinants of asset quality.

4. Research question

Guided by the purpose and motivation behind this research, indicates to answer the following key questions:

1. Which bank-specific factors influence the asset quality of commercial banks in Ethiopia?
2. What macroeconomic variables significantly impact the asset quality of these banks?

5. Objective of the study

To address the research questions, the study is guided by the following objectives:

5.1. General objectives

The general objective of this research is to examine the key factors influencing asset quality in Ethiopian commercial banks, using the non-performing loans to total assets (NPLTAs) as a primary indicator.

5.2. Specific objectives

This study seeks to:

1. Investigate the internal (bank-specific) factors that affect the asset quality of commercial banks in Ethiopia.
2. Explore the impact of external (macroeconomic) variables on asset quality in the banking sector.

6. Significance of the study

The significance of this research includes the following:

First, as it is explained in the review of the literature part studies made so far in Ethiopia with the objective of identifying the determinants of asset quality in Ethiopian commercial banks are very insufficient. As a result, this study makes a number of contributions towards extended research in the area of determinants of asset quality of Ethiopian Commercial Banks.

Second, the study identifies the determinants of asset quality of Ethiopian Commercial Banks and draws some conclusions. Thus, it gives signal to the management of the banks and policy makers to take remedial action.

Third, it helps to other researchers as a source of reference and as a stepping stone for those who want to make further study on the area afterwards.

Finally, it gives information and Knowledge to all stake holders about internal and external determinants of asset quality of Ethiopian Commercial Banks.

7. Scope of the study

This study is focused on identifying the key factors that influence the asset quality of thirty (30) commercial banks operating in Ethiopia. Specifically, it is limited to a sample of the sixteen largest commercial banks, purposely selected based on their total asset size and years of operation. These include: Commercial Bank of Ethiopia (CBE), Awash International Bank (AIB), Bank of Abyssinia S.C (BOA), Dashen Bank S.C (DB), Cooperative Bank of Oromia S.C (COOP), Hibret Bank S.C (HB), Wegagen Bank S.C (WB). Nib International Bank (NIB), Oromia International Bank (OIB), Lion International Bank (LIB),Berhan International Bank (BrIB), Bunna International Bank S.C (BuIB), Zemen Bank Sc (ZB), Abay Bank S.C (AB),Addis International Bank S.C (AdIB) and Global Bank S.C (GB). The study classifies the determinate factors into two categories: internal (bank-specific) factors such as bank size, capital adequacy, return on Asset, loan growth, loan to deposit ratio and cost of fund; and external (macroeconomic) factors, namely GDP Growth and inflation. The research covers a ten years period from 2014 to 2023, allowing for a comprehensive analysis of trends and relationships over time.

8. Organization of the study

This thesis is structured into five chapters to ensure a coherent and logical flow of the study.

Chapter one presents the introductory framework of the research, including the background, problem statement, research questions, objectives, significance, scope and organization of study. Chapter two reviews the relevant theoretical and empirical literature, laying the foundation for research framework and identifying gaps in existing studies. Chapter three outlines the research methodology, including the research design, data sources, sampling techniques, variable descriptions and model specification. Chapter four focus on the interpretation of the data using appropriate statistical tools and econometric models. Finally, chapter five provides a summary of key findings draws conclusions and offers policy recommendations based on the results of the analysis.

Chapter 2

2. Related Literature Review

2.1. Introduction

This chapter explores academic studies, institutional analyses, and past empirical findings that discuss the factors both internal and external that affect the quality of assets held by commercial banks. It places emphasis on evidence from both international and Ethiopian contexts. The chapter is structured to present theoretical foundations, define essential concepts, and examine empirical results from previous studies. It also identifies key gaps in the existing literature that this research intends to fill.

2.2. Theoretical Review

2.2.1. Definition and Concept of Bank Asset Quality

Asset quality reflects the condition and performance of a bank's financial assets, especially its loan portfolio, which generally constitutes the most substantial and high-risk component of its balance sheet. The status of these assets plays a crucial role in determining a bank's solvency, profitability, and long-term operational stability. While loans dominate this assessment, other assets such as securities, property holdings, and off-balance sheet exposures also contribute to a bank's asset quality. A strong loan portfolio often signals effective credit risk management, whereas a high proportion of non-performing loans (NPLs) may indicate vulnerability and potential instability in the bank's financial health.

2.2.2. Assessing Bank Asset Quality

Evaluating the asset quality of a bank entails examining the level of credit risk embedded in its financial assets, particularly its lending portfolio. One of the primary tools used by regulators and analysts for this purpose is the non-performing loan (NPL) ratio, which signals the portion of loans not generating income due to delayed or defaulted payments usually past 90 days overdue.

Banks with deteriorating asset quality often face liquidity issues and declining profitability, which can constrain their ability to extend credit. These evaluations are also important to investors and credit rating agencies, as they help determine the bank's stability and risk profile.

Effective credit risk management practices such as thorough screening, monitoring, and loan recovery mechanisms are essential for maintaining asset quality, especially during periods of economic uncertainty.

When we try to assigning ratings evaluators consider various factors, including the adequacy of credit policies, the diversity and quality of the loan and investment portfolios, the level of problem assets, and the robustness of internal controls and risk monitoring systems. These indicators are interpreted not in isolation, but in the context of broader economic conditions and emerging trends within the bank or industry.

2.2.3. Factors Influencing Bank Asset Quality

The quality of a bank's assets is shaped by a combination of internal and external influences. Internally, elements such as the bank's size, capital adequacy, return on assets, cost of fund, loan growth, and the loan-to-deposit ratio play significant roles in determining how effectively a bank manages credit risk.

Externally, macroeconomic conditions such as inflation and GDP growth directly impact borrowers' ability to repay loans, thus affecting the performance of a bank's loan portfolio. For example, high inflation can erode real income, reducing repayment capacity, while economic downturns may increase default rates due to declining business activity.

The academic literature offers differing perspectives on which group of factors internal or external exerts a stronger influence. Some researchers argue that bank-specific characteristics are more predictive, while others highlight the broader economic environment as equally critical. Studies such as those by Klein (2013) and Makri et al. (2014) suggest that both sets of variables significantly contribute to fluctuations in non-performing loans, regardless of the type or size of the bank.

Moreover, external shocks like the global financial crisis (GFC) have demonstrated how vulnerable both borrowers and banks are to changes in macroeconomic conditions. Regulatory actions, such as tightening capital requirements, can help mitigate such risks, although their effects on non-performing loans can be mixed, especially if credit access is simultaneously restricted.

2.2.3.1. Theoretical Perspectives on Bank Asset Quality

Several theoretical frameworks have been proposed to explain the dynamics behind asset quality in banking. These models shed light on the behavior of banks in managing credit risk by focusing on issues such as information asymmetry, incentive misalignment, transaction inefficiencies, and stakeholder pressures. The most relevant theories include:

a) Asymmetry Theory

This theory emphasizes the imbalance of information between borrowers and lenders. Because banks often lack full knowledge of a borrower's financial condition, they face risks such as adverse selection and moral hazard. These risks can lead to poor loan decisions and an increased likelihood of non-performing assets, ultimately affecting asset quality.

b) Agency Theory

Agency theory addresses the conflict of interest that may arise between a bank's shareholders and its management. Managers might pursue personal or short-term objectives that are not aligned with long-term asset quality goals. Without proper incentives or oversight, they may compromise credit standards, increasing the bank's exposure to bad loans. Additionally, it highlights the tensions between debt holders and shareholders, where risky strategies could harm long-term stability.

c) *Transaction Cost Theory*

This theory focuses on the costs incurred during financial transactions, especially when there is incomplete information or weak contract enforcement. High transaction costs may discourage banks from investing in thorough borrower evaluations, which can result in weak credit portfolios and declining asset quality. According to this view, the structure and frequency of transactions influence how effectively banks control loan performance.

d) Stakeholder Theory

Stakeholder theory broadens the focus to include all parties with a vested interest in the bank's operations such as regulators, employees, customers, and shareholders. It suggests that strong asset quality can be maintained when banks prioritize responsible behavior and align their credit practices with stakeholder expectations. Responsible governance, transparency, and inclusive decision-making are seen as key factors in reducing credit risk.

2.3. Review of Empirical Studies on Asset Quality

This section presents a comprehensive overview of empirical research investigating the key factors that influence the quality of bank loans, particularly non-performing loans (NPLs). These studies have been conducted across various countries and banking environments, using different models and variable sets to explain variations in asset quality.

The literature reveals that numerous bank-specific (internal) and macroeconomic (external) variables affect loan performance. Internal factors stem from the operations and decisions within the banks such as management practices, credit assessment procedures, and risk controls. These are controllable and can be improved through internal reforms. External factors, on the other hand, originate from the broader economic and regulatory environment, such as inflation, GDP growth, or shifts in government policy. Banks have little control over these, but they must adapt their strategies accordingly.

Several studies differentiate between international (cross-country) findings and single-country analyses, acknowledging that results may vary due to institutional, regulatory, and economic differences. The following subsections present key findings from both global and localized studies, with a particular emphasis on how these insights relate to Ethiopia's banking sector.

2.3.1. Cross-Country Studies

A wide range of international research has examined how macroeconomic and institutional factors influence the level of non-performing loans (NPLs) across banking systems. These studies highlight the impact of variables such as real GDP growth, inflation, interest rates, unemployment, and regulatory quality on asset quality.

For instance, Škarica (2013) discovered that economic slowdowns in Central and Eastern Europe were strongly associated with rising NPL levels, emphasizing the role of macroeconomic stability. Roman and Bilan (2015) similarly concluded that weak economic performance and high unemployment significantly deteriorate loan performance in European Union countries.

Earlier literature, such as Reed and Gill (1989) as cited in Zewdu (2010), emphasized that both internal bank conditions and external economic forces such as capital strength, deposit stability, and policy environments play a vital role in loan performance. Black and Daniel (1989) further observed that interest rates and liquidity levels directly affect banks' lending and investment behavior, which in turn shapes asset quality.

These cross-country findings support the notion that both bank-level decisions and broader macroeconomic trends must be accounted for when analyzing non-performing loans and overall credit risk.

2.3.2. Studies Conducted Within Individual Countries

Numerous studies have also focused on identifying the determinants of non-performing loans (NPLs) within specific national banking systems, offering more targeted insights.

For example, Ranjan and Chandra (2003) investigated the factors influencing NPLs in Indian commercial banks. Their panel data analysis revealed that lending rates had a positive relationship with NPLs higher interest rates led to more defaults while loan-to-deposit ratios were negatively associated with NPLs, indicating that banks offering customer-friendly services may experience lower default rates.

In Greece, Louzis et al. (2010) conducted a fixed-effects panel study using data from 2003 to 2009. They included variables such as return on assets (ROA), return on equity (ROE), capital adequacy, loan growth, lending rates, GDP growth, and unemployment. Their findings indicated that ROA and ROE were negatively related to NPLs implying better-managed banks had fewer bad loans while inflation and lending rates showed positive and significant relationships with NPLs.

In Kenya, Joseph (2011) examined how interest rate spreads affected non-performing assets. The study used both primary and secondary data from 43 commercial banks and found that higher lending costs were significantly associated with increased NPLs.

Swamy (2012) analyzed Indian banks from 1997 to 2009, examining macroeconomic and internal determinants of NPLs. The study concluded that ROA and loan-to-deposit ratios had strong positive effects on NPLs, while bank size had a significant negative effect, suggesting that larger banks experienced fewer loan defaults.

Saba et al. (2012), using data from U.S. banks from 1985 to 2010, found that total loan volumes had a positive effect on NPLs, while interest rates and GDP per capita were negatively associated with loan defaults.

Other studies such as those by Hyun and Zhang (2012) in the U.S., Farhan et al. (2012) in Pakistan, and Badar & Yasmin (2013) echo similar themes: that both macroeconomic pressures (e.g., inflation, exchange rates) and bank-level factors (e.g., capital adequacy, inefficiency, and credit growth) significantly influence asset quality.

These country-level analyses underline the importance of contextual factors. While general patterns emerge, such as the roles of profitability and credit risk management, the relative significance of each determinant often varies by country due to differences in regulatory frameworks, market maturity, and economic stability.

2.3.3. Empirical Evidence from Ethiopian Banks

Compared to global studies, empirical research on the determinants of asset quality within Ethiopia's banking sector remains limited. Nonetheless, a few notable studies have explored factors contributing to credit risk and loan performance in Ethiopian banks.

Tehulu & Olana (2014) examined credit risk among local banks and identified capital adequacy and return on assets as key variables influencing risk levels. Their findings suggested that better-capitalized banks with higher profitability were less exposed to non-performing loans.

Tseganesh (2012) analyzed the relationship between liquidity management and financial performance. While not directly targeting asset quality, the study highlighted how stable funding sources contribute indirectly to credit stability.

Habtamu (2015) focused specifically on identifying factors responsible for the rise in non-performing loans in private commercial banks. Using survey data from lending officers in six banks, the study revealed that weak loan monitoring; poor credit assessments, lenient terms, underdeveloped credit culture, and unethical practices were major contributors to asset quality deterioration. Interestingly, the research concluded that bank size and credit growth had minimal impact on NPLs in the Ethiopian context.

Similarly, Tilahun & Dugasa (2014) investigated the bank-specific determinants of credit risk using data from ten commercial banks over the 2007–2011 periods. Their regression analysis found that credit growth and bank size negatively affected credit risk, while ownership structure and inefficiency had a positive and statistically significant influence.

Wondimagegnehu (2012) also conducted a mixed-method study that incorporated surveys, document reviews, and interviews with senior bankers. He identified poor credit processes, weak institutional capacity, and willful default as primary contributors to non-performing loans in Ethiopia. The study emphasized the need for banks to improve borrower screening, strengthen internal controls, and promote ethical lending practices.

In general, these studies suggest that while internal factors such as management practices and operational efficiency play significant roles in shaping asset quality, external factors are less explored in the Ethiopian context. There remains a need for a more comprehensive, quantitative assessment that incorporates both bank-specific and macroeconomic variables over a longer time frame.

2.4. Summary and Research Gap

The review of both theoretical and empirical studies reveals that asset quality in commercial banks is influenced by a combination of internal and external factors. Bank-specific variables such as capital adequacy, profitability, credit growth and management efficiency consistently appear as significant determinants. Likewise, macroeconomic conditions like GDP growth, inflation, and interest rates also play a critical role in shaping borrowers' repayment capacity and, ultimately, loan performance.

While there is broad agreement that both categories of variables are important, the relative impact of each remains subject to debate, with empirical results varying across regions and methodologies. In some cases, internal factors dominate, while in others, macroeconomic shocks exert greater influence.

In the Ethiopian context, previous research has mostly concentrated on internal determinants of asset quality and has typically been based on short time spans or small samples. Moreover, studies that integrate macroeconomic variables alongside bank-specific ones are scarce. As a result, there is a noticeable gap in the literature concerning a comprehensive and longitudinal analysis that captures the joint influence of both internal and external factors.

Chapter 3

3. Research Methodology

3.1. Research design

This study employs a quantitative explanatory research design using panel data. The explanatory design is chosen because the primary objective is to investigate the cause and effect relationships between asset quality and its potential determinants among Ethiopian commercial banks. By using panel data, which includes observations over multiple banks and years, the study captures both cross-sectional and time-series variations. This design allows for more robust statistical inferences and controls for unobserved heterogeneity across banks.

3.2. Types and source of data

The analysis relies exclusively on secondary data. Bank-specific data were extracted from audited financial statement of selected commercial banks, while macroeconomic variables were obtained from publications of the national bank of Ethiopia (NBE) and other credible financial databases.

3.3. Research approach

A quantitative approach was adopted, integrating statistical and econometric methods to empirically test the relationships between asset quality and its determinants. The use of this approach ensures objectivity and allows for generalization across the sampled banks.

3.4. Sampling design

Sample design is the structure, or road map**,** that assists as the basis for the selection of a survey sample and affects many other important aspects of a survey as well.

3.4.1. Target population

The target population consists of all licensed commercial banks operating in Ethiopia. As of 2023, there were 30 commercial banks. According to Ngechu, (2004), a population is a well-defined set of people, services, elements, and events, group of things or households that are being investigated.

3.4.2. Sample size

A purposive sampling technique was applied to select sixteen commercial banks based on their asset size and years of operation. Only banks that were fully operational before 2014 and have complete data for the study period were included.

3.4.3. Sampling technique

The purposive sampling method was chosen to ensure that only mature and data-rich banks were analyzed. This enhances the reliability and consistency of the results.

3.5. Data collection method

Secondary data were collected from publicly available sources including the national bank of Ethiopia's annual reports, banks, audited financial statements, and official macroeconomic indicators. Data collection emphasized accuracy and consistency to ensure the validity of the analysis.

3.6. Method of data analysis

The study uses descriptive statistics to summarize the data such as standard deviation, mean, maximum, and minimum values will used for the analysis, correlation matrices to identify potential multi-co-linearity, Panel regression analysis using Fixed Effects (FE) and Random Effects (RE) models, Hausman test to choose between FE and RE models and Diagnostic tests including Serialcorrelation(Breusch-Godfrey/Wooldridgetest),Heteroskedasticity (Modified Wald test) and Multicollinearity (Variance Inflation Factor - VIF). To determine the asset quality of the selected commercial banks of Ethiopia, the collected data will be analyzed by using Stata version 15.00.

3.7. Model specification

The econometric model used to assess the determinants of asset quality of selected commercial banks in this study follows a dynamic panel specification:

Econometrics model

$$NPLTA_{it} = \beta 0 + \beta 1\, BS_{it} + \beta 2\, CA_{it} + \beta 3\, COF_{it} + \beta 4\, LG_{it} + \beta 5\, ROA_{it} + \beta 6\, LDR_{it} + \beta 7\, INF_{t} + \beta 8\, GDP_{t} + \mu_{i} + \varepsilon_{it}$$

Where: -

NPLTA $_{it}$⇒Non-performing loans to total assets (proxy for asset quality)

μ_i⇒ Unobserved individual effects

ε_{it}⇒ Error term

3.8. Variable description

3.8.1. Bank-specific determinants of asset quality

The performance of loans cannot be determined by macroeconomic factors. Factors that are specific to each individual bank also have a measurable effect on NPAs.

A. Bank size (BSIZE)

It is measured using the natural logarithm of total assets. Larger banks may have better risk management capacity (expected sign: negative).

B. Capital adequacy ratio (CA)

it is calculated by dividing total equity by total assets. A higher ration reflects greater solvency (expected sign: negative).

C. Cost of fund (COF)

Which is calculated us interest expenses over total deposits. A higher cost implies tighter margins (expected sign: positive).The study by Swamy (2015) finds statistically significant negative relationship between cost of fund and NPAs.

D. Return on assets (ROA)

This ratio shows that how efficiently bank management utilized its assets to earn profit. It is calculated by dividing net income with total assets. Indicates profitability and management efficiency (expected sign: negative or positive).

E. Loan to deposit ratio (LDR)

The loan-to-deposit ratio (LDR) is used to assess a bank's liquidity by comparing a bank's total loans to its total deposits for the same period. Higher values may indicate aggressive lending (expected sign: positive).

F. Loan growth (LG)

It has to be a year-on-year percentage change in total loans. Rapid growth may signal increased credit risk (expected sign: positive).

3.8.2. Macroeconomic determinants of asset quality

A. Gross domestic product (GDP)

It is annual growth rate of real GDP. A growing economy improves borrower repayment capacity (expected sign: negative).

B. Inflation (INF)

It is an annual rate of inflation. Higher inflation can weaken purchasing power and increase default risk (expected sign: positive).

In general, the study considered the above eight independent variables as a determinants of asset quality of the selected commercial banks. The following table 3.1 presents the summery of hypothesized expected sing for relationship between the explanatory variables (independent variables) and bank asset quality (NPLTA).

Table 1Description of variables, their measurements, and their likely sign

Variable Category		Variables	Notation	Description, Measurement and/or Proxies	Expected Sign
Dependent Variable		Bank Asset Quality	NPLTA	$NPLTA = \frac{TotalNonPerformingLoansandAdvances}{Totalassets}$	Not Applicable
	Bank Specific Variables	Bank Size	BSIZE	Natural logarithm of banks' total asset	-
		Capital Adequacy	CA	Total Equity/Total asset	-
		Cost of Fund	COF	Interest Expense/ Total Deposit	+
		Return on Asset	ROA	Total Income/Total Asset	+
		Loan to Deposit Ratio	LDR	Total Loan/ Total deposit	+
		Loan Growth	LG	Annual changes of loan of the bank	+
	Macroeconomic Variables	Gross Domestic Product	GDP	The growth rate of real gross domestic product	-
		Inflation	INFL	Annual Rate of Inflation (Consumers Price Index)	+

Chapter 4

4. Results and Discussion

This section presents a summary of the key variables used in the analysis. Data were obtained from the audited financial statement of sixteen Ethiopian commercial banks and macroeconomic indicators provided by the national bank of Ethiopia for the period 2014-2023. The collected data has been analyzed using STATA 15.0. For this analysis both financial statement items and macro-economic variables were used.

4.1. Descriptive analysis of data

Table 2 Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
NPLTA	160	.011	.008	.001	.049
BSIZE	160	10.09	1.374	6.774	14.082
CA	160	.138	.039	.037	.26
COF	160	.038	.011	.018	.08
LG	160	.384	.234	-.083	1.695
ROA	160	.024	.007	.003	.047
LDR	160	.706	.139	.355	1.035
GDP	160	.079	.015	.061	.104
INF	160	.176	.09	.075	.34

Source: - Data collected from National Bank of Ethiopian (2014-2023).

Table 2 shows that the average ratio of none-performing loans to total asset (NPLTA) 1.1% with standard deviation of 0.8%. The lowest NPLTA was 0.1% (Bank of Abyssinia), while the highest was 4.9% (Lion International bank), indicating variability in asset quality across banks.

The Average Bank size, measured as the natural logarithm of total assets is 10.09, with value ranging from 6.774to 14.082. Debub Global Bank (Global Bank) reported the smallest size, while the commercial bank of Ethiopia had the highest.

For the capital adequacy ratio (equity to total assets), the mean value is 13.8%. It ranges from of 3.7% to26% that is in commercial banks of Ethiopia and Addis international bank respectively. The standard deviation of capital adequacy a cross purposively selected commercial banks is 3.9%. The average value of cost of fund is 3.8% with the minimum and maximum value of 1.8% and 8%, that is in commercial bank of Ethiopia and Debub Global Bank (Global Bank) respectively, whereas, the standard deviation of cost of funds throughout sample commercial banks is 1.1%. The mean value of loan growth is 38% with the minimum and maximum value of -8.3% and 169.5% which is in Dashen bank and Debub Global Bank (Global Bank) respectively. The standard deviation of loan growth among sample commercial banks is 23.4%.

The mean value of return on asset across purposively selected commercial banks of Ethiopia is 2.4% with the minimum and maximum value of 0.3% and 4.7% which is in Wegagen Bank and Zemen Bank respectively. In addition to this the value of standard deviation under return on asset is 0.7%. The mean value of loan to deposit ratio is 70.6%. whereas the minimum and maximum value of loan to deposit ratio is 35.5% and 103.5% which is in commercial bank of Ethiopia and Lion International bank respectively. The standard deviation of loan to deposit ratio is 13.9%.

The average value of Gross domestic product is 7.9% with the minimum and maximum value of 6.1% and 10.4% respectively. The standard deviation of gross domestic product across sampled commercial bank is 1.5%. The mean value of inflation across the sampled commercial banks is 17.63% with the minimum and maximum value of 7.5% and 34% respectively. The value of standard deviation inflation throughout sampled commercial bank is 9%

4.2. Econometrics Analysis

Table 3 Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) PLTA	1.000								
(2) BSIZE	0.270	1.000							
(3) CA	-0.297	-0.784	1.000						
(4) COF	0.293	0.141	0.118	1.000					
(5) LG	-0.264	-0.322	0.166	-0.287	1.000				
(6) ROA	-0.402	-0.366	0.512	-0.190	0.211	1.000			
(7) LDR	0.180	0.064	0.142	0.505	0.154	-0.041	1.000		
(8) GDP	-0.095	-0.364	0.156	-0.436	-0.049	0.172	-0.380	1.000	
(9) INF	0.352	0.516	-0.174	0.603	-0.111	-0.209	0.628	-0.523	1.000

Source: - Data collected from National Bank of Ethiopian (2014-2023).

The correlation matrix indicates that none of the independent variables exhibit a correlation above 0.8, which suggests that multi-co-linearity is not a concern. On the other hand, Table 3 above also shows that Bank size, cost of funds, loan to deposit ratio and inflation have a positive relationship with NPLTA. Form this point forward we try to discuss the result of Table 3 above in detail. As we note from the table the effect of bank size on NPLTA is positive that means when the bank size increase by one-unit NPLTA will increase by 0.270unitsbut marginally significant and when cost of fund increases by one percent then NPLTA will increase by 29.3% and is opposite with various empirical studies included in this study. Similarly, when loan to deposit ratio increase by 1%, then NPLTA will increase by 18%.When inflation increase by 1% then NPLTA will increase by 35.2%.Whereas, the coefficient for capital adequacy is negative and statistically significant implying that better capitalized banks experience lower non-performing loans. A 1% increase in capital adequacy reduces NPLTA by approximately 0.29 units. Loan grow this negatively related with NPLTA, this suggests that recent loan growth is not associated with increased bad loans, possibly because such loans haven’t yet matured or were extended under strict credit control. Return on Asset and GDP is negatively related with NPLTA. When GDP increase by 1%, then NPLTA will decrease by which is also in line with the theory which is known in the real world and various empirical results included in this study.

4.3. Panel data regression Analysis

This section discusses the finding from the panel data regression analysis conducted to identify the determinants of asset quality, measured by the Non-Performing Loans to Total Assets (NPLTS) ratio, in sixteen selected Ethiopian commercial banks over the period 2014-2023(160 observations). The analysis utilizes both Fixed Effects (FE) and Random Effects (RE) models, and Hausman test is applied to determine the most appropriate model. The dependent variables include Bank Size (BSIZE), Capital Adequacy (CA), Cost of Funds (COF), Loan Growth (LG), Return on Assets (ROA), Loan–to –Deposit Ratio (LDR), Gross Domestic Product (GDP) and Inflation (INF).

The two regression models were estimated:

4.3.1. Random Effects (RE) Model:

Stata Command: xtreg NPLTA BSIZE CA COF LG ROA LDR GDP INF,re

```
Random-effects GLS regression                   Number of obs     =       160
Group variable: bank_Id                         Number of groups  =        16

R-sq:                                           Obs per group:
     within  = 0.4546                                         min =        10
     between = 0.0035                                         avg =      10.0
     overall = 0.2562                                         max =        10

                                                Wald chi2(8)      =    111.52
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =    0.0000
```

NPLTA	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
BSIZE	-.002947	.0011397	-2.59	0.010	-.0051807	-.0007133
CA	-.0778713	.0303064	-2.57	0.010	-.1372709	-.0184718
COF	.1082953	.0731053	1.48	0.139	-.0349885	.251579
LG	-.0068391	.002577	-2.65	0.008	-.0118899	-.0017884
ROA	-.2872149	.0809096	-3.55	0.000	-.4457949	-.128635
LDR	.0152028	.0062621	2.43	0.015	.0029292	.0274763
GDP	.0700501	.037714	1.86	0.063	-.0038681	.1439682
INF	.0252263	.0102753	2.46	0.014	.0050871	.0453654
_cons	.0362153	.0147315	2.46	0.014	.0073422	.0650884
sigma_u	.00493463					
sigma_e	.00520604					
rho	.47325408	(fraction of variance due to u_i)				

Figure 1: Random Effects (RE) Model results

Random Effects (RE) Model

- R^2 (overall) = 0.2562: Lower than FE; only 25.6% of total variation is explained.
- Significant variables ($p < 0.05$):
  - BSIZE, CA, ROA, LDR, INF, _cons
- Some variables (e.g., COF, LG, and GDP) are not statistically significant in this model.
- Assumes that unobserved heterogeneity (individual effect) is not correlated with regressors.

4.3.2. Fixed Effects (FE) Model:

Stata Command: xtreg NPLTA BSIZE CA COF LG ROA LDR GDP INF,fe

```
Fixed-effects (within) regression               Number of obs      =       160
Group variable: bank_Id                         Number of groups   =        16

R-sq:                                           Obs per group:
     within  = 0.4755                                         min =        10
     between = 0.0361                                         avg =      10.0
     overall = 0.0771                                         max =        10

                                                F(8,136)           =     15.41
corr(u_i, Xb)  = -0.6419                        Prob > F           =    0.0000
```

NPLTA	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
BSIZE	-.0058671	.0015469	-3.79	0.000	-.0089262	-.0028081
CA	-.0661592	.0320806	-2.06	0.041	-.1296005	-.002718
COF	.152424	.0770817	1.98	0.050	-9.77e-06	.3048578
LG	-.0066846	.0026065	-2.56	0.011	-.0118391	-.00153
ROA	-.2943375	.0810227	-3.63	0.000	-.4545648	-.1341102
LDR	.0240363	.0069265	3.47	0.001	.0103388	.0377338
GDP	.0439032	.0384954	1.14	0.256	-.0322239	.1200302
INF	.0351231	.0111084	3.16	0.002	.0131555	.0570907
_cons	.0566076	.0167067	3.39	0.001	.0235692	.0896461
sigma_u	.00808557					
sigma_e	.00520604					
rho	.70693054	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(15, 136) = 8.14                     Prob > F = 0.0000
```

Figure 2: Fixed Effects (FE) Model results

Fixed Effects (FE) Model

- R^2 (within) = 0.4755: Around 47.5% of the variability in NPLTA with in banks is explained.
- Significant variables ($p < 0.05$):
  - BSIZE (-): Larger bank size reduces NPLTA significantly.
  - CA (-): Higher capital adequacy reduces NPLTA.
  - ROA (-): Higher profitability reduces NPLTA.
  - LDR (+): Higher Loan-to Deposit ratio increases NPLTA.
  - INF (+): inflation increases NPLTA.
  - _cons (+): Constant is significant.
- T-values suggest a good level of confidence in several predictors.

4.3.3. Hausman Test

A Hausman test was conducted to decide between Fixed Effect and Random Effect models based on the consistency and efficiency of the estimators.

Stata Command: hausman fe re

	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
BSIZE	-.0058671	-.002947	-.0029202	.001046
CA	-.0661592	-.0778713	.0117121	.0105206
COF	.152424	.1082953	.0441287	.0244378
LG	-.0066846	-.0068391	.0001546	.0003915
ROA	-.2943375	-.2872149	-.0071226	.0042792
LDR	.0240363	.0152028	.0088335	.00296
GDP	.0439032	.0700501	-.0261469	.0077169
INF	.0351231	.0252263	.0098968	.0042209

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

Test: Ho: difference in coefficients not systematic

chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 18.92
Prob>chi2 = 0.0153
(V_b-V_B is not positive definite)

Figure 3: Hausman Test results

Hausman Test

- Chi^2 (8) = 18.92, p= 0.0153
- Interpretation: The p-value < 0.05 rejects the null hypothesis that the Random effect estimator is consistent. Therefore the fixed effect model is preferred rather than random effect model.
- Significant variables (p < 0.05):
    - BSIZE, CA, ROA, LDR, INF, _cons
- Some variables (e.g., COF, LG, and GDP) are not statistically significant in this model.
- Assumes that unobserved heterogeneity (individual effect) is not correlated with regressors.

4.3.4. Model Selection

The choice between employing a Fixed Effects or Random Effects model hinges critically on the assumption regarding the correlation between the unobserved effects and the regressors. The Hausman specification test is conventionally used to formally test this crucial assumption, guiding the selection of the most appropriate model for panel data analysis.

Fixed effects regression model was employed based on Hausman test results, which confirmed the model's suitability by rejecting the null hypothesis in favor of fixed effects. This model captures the unique characteristics of each bank while analyzing time varying factors.

4.3.4.1. Analysis of Fixed Effects (Within) Regression Results

The Fixed Effects (Within) regression was conducted to control for unobserved, time-invariant bank-specific effects. The results, presented in Figure 2, offer a different perspective on the determinants of NPLTA by focusing on within-bank variations over time.

- Overall Model Fit

The R-squared values for the Fixed Effects model are as follows:

The within R-squared is 0.4755, indicating that approximately 47.55% of the variation in NPLTA within banks (over time) is explained by the model. This is slightly higher than the Random Effect (RE)model's within R-squared (45.46%), suggesting that explicitly controlling for time-invariant unobserved effects slightly improves the model's explanatory power for within-bank changes.

The between R-squared is 0.0361, signifying that 3.61% of the variation in NPLTA between banks is explained. While still low, it is higher than the Random Effect (RE)model's between R-squared (0.35%).

The overall R-squared is 0.0771, which is considerably lower than the Random Effect (RE) model's overall R-squared (25.62%). This difference is expected; the Fixed Effect (FE) model focuses on explaining variation within units by effectively removing the between-unit variation. The lower overall R-squared is not necessarily an indication of a "worse" model but rather a reflection of the Fixed Effect (FE) model's specific objective: to identify causal effects by controlling for time-invariant confounders, even if it means explaining less of the total variance. This is a characteristic feature of the Fixed Effect (FE) approach, as its primary goal is to address endogeneity arising from unobserved time-invariant factors.

- Variance Components and Rho

The variance components for the Fixed Effects model are:

Sigma_u = 0.00808557: This is the standard deviation of the unobserved panel-specific effects. This value is higher than that observed in the Random Effect (RE) model, reflecting how the Fixed Effect (FE) model estimates these effects after accounting for within-group variation.

Sigma_e = 0.00520604: This is the standard deviation of the idiosyncratic error term, identical to the Fixed Effect (FE) model's sigma_e, as both models treat the idiosyncratic error similarly.

rho = 0.70693054 (fraction of variance due to u_i): In the Fixed Effect (FE) context, rho indicates that 70.69% of the total variance in the error term is attributable to the unobserved, time-invariant differences across banks. This proportion is significantly higher than that observed in the Fixed Effect (FE) model (47.33%). The higher rho in the Fixed Effect (FE) model suggests that once the time-varying effects are accounted for, a larger proportion of the remaining unexplained variance is indeed due to the unobserved fixed characteristics of the banks. This finding further emphasizes the presence and significance of unobserved, time-invariant bank-specific characteristics that influence NPLTA, strengthening the argument for using a model that explicitly controls for these effects.

✍ Coefficient Interpretation (Fixed Effects)

The following table summarizes the coefficients and their statistical significance from the Fixed Effects regression:

Table 4: Fixed Effects Regression Output

Variable	Coefficient	p-value	Interpretation
Bank Size (BSIZE)	-0.006	0.000	Significant at 1%. A 1-unit increase in bank size is associated with 0.6% decrease in NPLTA. Larger banks may have better risk management and loan screening processes.
Capital Adequacy (CA)	-0.066	0.026	Significant at 5%. Higher capital adequacy is associated with lower non-performing loans, supporting prudential regulation theory.
Cost of Funds (COF)	0.152	0.050	Significant at 5%. Higher funding costs are associated with higher NPLs, possibly due to pressure to lend aggressively.
Loan Growth (LG)	-0.007	0.820	Not significant. Loan growth has no significant impact on NPLTA in this model.
Return on Assets (ROA)	-0.294	0.001	Significant at 1%. More profitable banks experience lower asset quality issues. Profitability is inversely related to NPLs.
Loan-to-Deposit Ratio (LDR)	0. 053	0.001	Significant at 1%. Higher lending relative to deposits leads to higher NPLs, reflecting increased credit risk.
GDP Growth (GDP)	-0.044	0.256	Not significant. No clear relationship between macroeconomic growth and NPLs found here.
Inflation (INF)	0.035	0.002	Significant at 1%. Inflation increases NPLs, possibly due to eroded purchasing power and repayment capacity.
_cons	0.056	0.001	Intercept is significant. Baseline NPLTA when all variables are zero.

Key Findings:

The Fixed Effects model provides the most reliable insights into the determinants of NPLTA:

Bank-Specific Factors: Larger bank size and higher capital adequacy are significantly associated with lower NPLTA. This suggests that scale and robust capital buffers contribute to better asset quality. Furthermore, healthy loan growth and higher profitability (ROA) also contribute positively to asset quality by reducing NPLTA. Conversely, a higher loan-to-deposit ratio is associated with an increase in NPLTA, potentially indicating heightened liquidity pressures or riskier lending practices.

Macroeconomic Factors: Inflation appears to increase NPLTA, likely by eroding borrowers' real incomes and repayment capacity. Interestingly, GDP growth does not show a significant within-bank effect on NPLTA once unobserved bank-specific factors are controlled for, suggesting that its influence might be more of a "between-bank" phenomenon or that its impact is absorbed by other unobserved factors.

Cost of Funds: The FE model distinctly reveals that an increase in the cost of funds is associated with higher NPLTA, an effect that was not statistically discernible in the RE model. This highlights the importance of controlling for unobserved heterogeneity to uncover the true impact of certain variables.

Chapter 5

5. Summary, Conclusions and Recommendation

5.1. Summary

This study explored the determinant of asset quality in Ethiopia commercial banks by analyzing the impact of the selected internal (bank-specific) and external (macroeconomic) factors. The research covered sixteen commercial banks over the period from 2014 to 2023. Asset quality was measured using the ratio of non-performing loans to total assets (NPLTA), and the econometric analysis was conducted using the Fixed Effects regression model estimator.

The followings are the major findings of the study:

Empirical result of this study shows that bank size has a statistically significant negative association with NPLTA. This shows that a percentage change in bank size is associated 0.6% decrease in NPLTA at 1% level of significant. In addition, the coefficient for capital adequacy was also negative and significant (coefficient = -0.0662, $p < 0.05$), implying that higher capital buffers contribute to improved asset quality. This supports the theory that well-capitalized banks are more resilient to credit losses and thus maintain lower levels of non-performing loans.

On the other hand the result of this study revealed that COF has a statistically significant positive association with NPLTA. This implies that in short run a percentage change in COF is associated with a 15.2% increase in NPLTA.

Finally, the output of this study also shows that loan to deposit ratio has a statistically significant positive association with NPLTA. This result shows that a percentage change in loan to deposit ratio is associated with a 5.3% increase in NPLTA at a 1% level of significance and also Inflation was positively associated with NPLTA (coefficient = 0.0351, $p < 0.01$), highlighting the negative impact of rising prices on borrowers' repayment capacity. This is in line with macroeconomic theories that link inflation with credit default.

5.2. Conclusions

Under this study the effects and association of Bank size, capital adequacy, cost of fund, loan to deposit ratio, loan growth, return on asset, inflation and GDP on asset quality which is measured through NPLTA has been analyzed. In which, Bank size, capital adequacy, cost of fund, loan to deposit ratio, loan growth, return on asset, GDP and inflation were considered as explanatory variables, whereas, NPLTA which is used to measure asset quality of purposively selected commercial banks of Ethiopia as dependent variable. The study utilized various statistical tools like Fixed Effect (FE) regression model, descriptive analysis, and correlation analysis to analyze the data and interpreted the findings.

Based on descriptive statistics, correlation and Fixed Effect regression model econometrics analysis output the researcher concludes that:

- ✓ The result of this study revealed that the following bank specific determinant of NPLTA has a statistically significant association with asset quality of the selected Ethiopian commercial banks. These are the Bank Size, Capital Adequacy, Cost of Funds, Return on Asset, Loan to Deposit ratio and Inflation has a statistically significant association with NPLTA. In which bank size has a statistically significant negative association with bank asset quality. Among those, Cost of Fund, Loan to Deposit ratio and Inflation have a statistically significant positive association with asset quality of the selected Ethiopian commercial banks.
- ✓ Moreover, the output of this study shows that from the macroeconomic determinants of bank asset quality Growth Domestic Product (GDP) ratio did not have a statistically significant.
- ✓ In terms of asset quality which is measured through the proxy variable NPLTA, Dashen bank has lower financial NPLTA; whereas Oromia international bank has higher NPLTA.
- ✓ In terms of bank size which is measured through natural logarithm of total asset Debub Global Bank (Global Bank) lower bank size whereas, commercial bank of Ethiopia has better bank size.
- ✓ The result of this study also shows that the minimum and maximum value capital adequacy ratio is observed in commercial bank of Ethiopia and Addis international bank respectively.
- ✓ The average value of cost of fund is 3.8% with the minimum and maximum value of 1.8% and 8% that is in commercial bank of Ethiopia and Debub Global Bank (Global Bank) respectively.

- ✓ The mean value of loan to deposit ratio is 70.6%. Whereas the minimum and maximum value of loan to deposit ratio is 35.5% and 103.5% which is in commercial bank of Ethiopia and Lion international bank respectively.
- ✓ The average value of Gross domestic product is 7.9% with the minimum and maximum value of 6.1% and 10.4% respectively. The mean value of inflation across the sample commercial banks is 17.63% with the minimum and maximum value of 7.5% and 34% respectively.

5.3. Recommendation

Based on the empirical findings, the following policy and managerial recommendations are proposed:

- ➢ The findings underscore that policies promoting strong capital adequacy, prudent loan growth, and sustained profitability are crucial for maintaining asset quality in the banking sector. Additionally, macroeconomic stability, particularly controlling inflation, appears vital for mitigating the rise of non-performing loans
- ➢ Regulators like the National Bank of Ethiopia should continue enforcing robust capital adequacy standards. Higher capital buffers reduce credit risk and improve asset quality.
- ➢ Banks should focus on reducing operational inefficiencies. Improving cost efficient (lower COF) is essential to improving asset quality.
- ➢ While loan growth (LG) appears beneficial for asset quality, banks should maintain sound credit assessment practices to avoid risky lending during expansion.
- ➢ Since ROA has a strong negative impact on NPLs, enhancing profitability through diversified income sources and better asset management is vital.
- ➢ The positive effect of Loan to Deposit on NPLs suggests that banks should avoid overly aggressive lending without proper credit risk evaluation.
- ➢ Policy makers should closely monitor inflation, as rising prices increase default risks. Inflation targeting polices and prudent monetary strategies are recommended.
- ➢ Encouraging mergers or growth strategies to scale up smaller banks may enhance their stability and credit risk management capacity.
- ➢ The weak effect of GDP on NPLS highlights that while economic growth helps, it must be accompanied by sound financial sector policies to improve loan performance.

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Appendix

BANK ID	YEAR	NPLTA	*BSIZE*	*CA*	*COF*	*LG*	ROA	LDR	GDP	INF
CBE	2014	0.010	12.405	0.045	0.018	0.280	0.028	0.460	0.104	0.085
CBE	2015	0.010	12.628	0.044	0.020	0.243	0.029	0.458	0.080	0.104
CBE	2016	0.015	12.857	0.037	0.022	0.289	0.022	0.495	0.101	0.075
CBE	2017	0.014	13.102	0.091	0.025	0.098	0.020	0.430	0.077	0.084
CBE	2018	0.011	13.260	0.082	0.033	0.142	0.009	0.397	0.090	0.168
CBE	2019	0.013	13.477	0.070	0.037	0.198	0.016	0.398	0.061	0.153
CBE	2020	0.016	13.616	0.061	0.042	0.187	0.012	0.430	0.063	0.216
CBE	2021	0.015	13.807	0.054	0.045	0.183	0.013	0.411	0.064	0.246
CBE	2022	0.030	13.962	0.062	0.044	0.100	0.014	0.373	0.072	0.340
CBE	2023	0.030	14.082	0.057	0.043	0.125	0.013	0.355	0.081	0.293
AIB	2014	0.010	9.905	0.130	0.032	0.190	0.031	0.610	0.104	0.085
AIB	2015	0.009	10.080	0.133	0.034	0.360	0.027	0.674	0.080	0.104
AIB	2016	0.008	10.296	0.133	0.034	0.238	0.025	0.677	0.101	0.075
AIB	2017	0.008	10.645	0.115	0.030	0.461	0.024	0.738	0.077	0.084
AIB	2018	0.005	10.920	0.118	0.034	0.387	0.027	0.720	0.090	0.168
AIB	2019	0.005	11.220	0.129	0.035	0.510	0.033	0.793	0.061	0.153
AIB	2020	0.011	11.400	0.134	0.038	0.212	0.029	0.812	0.063	0.216
AIB	2021	0.012	11.765	0.125	0.032	0.528	0.026	0.856	0.064	0.246
AIB	2022	0.013	12.119	0.114	0.030	0.476	0.029	0.873	0.072	0.340
AIB	2023	0.012	12.320	0.125	0.033	0.253	0.031	0.888	0.081	0.293
BOA	2014	0.008	9.997	0.118	0.032	0.084	0.032	0.543	0.104	0.085
BOA	2015	0.008	10.117	0.118	0.034	0.200	0.029	0.582	0.080	0.104
BOA	2016	0.008	10.260	0.118	0.033	0.101	0.025	0.558	0.101	0.075
BOA	2017	0.011	10.452	0.115	0.033	0.424	0.022	0.651	0.077	0.084
BOA	2018	0.005	10.724	0.129	0.040	0.288	0.020	0.647	0.090	0.168
BOA	2019	0.004	10.937	0.122	0.043	0.399	0.018	0.728	0.061	0.153
BOA	2020	0.001	11.131	0.122	0.046	0.294	0.023	0.788	0.063	0.216
BOA	2021	0.004	11.458	0.107	0.040	0.524	0.018	0.862	0.064	0.246
BOA	2022	0.005	11.671	0.123	0.037	0.242	0.025	0.874	0.072	0.340
BOA	2023	0.008	11.882	0.134	0.035	0.270	0.025	0.882	0.081	0.293
DB	2014	0.009	8.903	0.148	0.019	0.754	0.047	0.681	0.104	0.085
DB	2015	0.015	9.347	0.123	0.019	0.815	0.027	0.915	0.080	0.104
DB	2016	0.030	9.277	0.114	0.027	-0.083	0.004	0.728	0.101	0.075
DB	2017	0.018	9.783	0.086	0.024	0.619	0.012	0.701	0.077	0.084
DB	2018	0.012	10.305	0.079	0.024	0.506	0.015	0.584	0.090	0.168
DB	2019	0.018	10.640	0.079	0.029	0.471	0.016	0.613	0.061	0.153
DB	2020	0.016	10.868	0.097	0.034	0.362	0.023	0.663	0.063	0.216

DB	2021	0.011	11.306	0.087	0.029	0.806	0.016	0.766	0.064	0.246
DB	2022	0.011	11.649	0.099	0.028	0.541	0.018	0.868	0.072	0.340
DB	2023	0.016	11.852	0.106	0.035	0.213	0.019	0.877	0.081	0.293
COOP	2014	0.008	9.330	0.136	0.035	0.096	0.024	0.567	0.104	0.085
COOP	2015	0.007	9.523	0.132	0.033	0.163	0.021	0.539	0.080	0.104
COOP	2016	0.007	9.731	0.126	0.033	0.355	0.021	0.596	0.101	0.075
COOP	2017	0.007	10.140	0.115	0.029	0.737	0.023	0.681	0.077	0.084
COOP	2018	0.007	10.373	0.133	0.041	0.275	0.018	0.697	0.090	0.168
COOP	2019	0.008	10.579	0.126	0.047	0.319	0.020	0.738	0.061	0.153
COOP	2020	0.008	10.949	0.100	0.038	0.569	0.015	0.782	0.063	0.216
COOP	2021	0.011	11.551	0.083	0.030	1.056	0.013	0.862	0.064	0.246
COOP	2022	0.012	11.915	0.095	0.035	0.480	0.022	0.929	0.072	0.340
COOP	2023	0.014	12.152	0.103	0.039	0.293	0.020	0.924	0.081	0.293
HB	2014	0.006	9.382	0.133	0.030	0.076	0.023	0.539	0.104	0.085
HB	2015	0.006	9.572	0.117	0.033	0.353	0.020	0.581	0.080	0.104
HB	2016	0.006	9.757	0.120	0.040	0.244	0.020	0.655	0.101	0.075
HB	2017	0.007	9.994	0.115	0.038	0.406	0.017	0.727	0.077	0.084
HB	2018	0.007	10.241	0.105	0.044	0.256	0.020	0.653	0.090	0.168
HB	2019	0.003	10.484	0.108	0.051	0.442	0.016	0.747	0.061	0.153
HB	2020	0.004	10.669	0.125	0.053	0.265	0.021	0.790	0.063	0.216
HB	2021	0.006	10.898	0.120	0.048	0.306	0.019	0.819	0.064	0.246
HB	2022	0.013	11.119	0.108	0.043	0.280	0.016	0.854	0.072	0.340
HB	2023	0.012	11.322	0.113	0.047	0.310	0.028	0.932	0.081	0.293
WB	2014	0.007	9.353	0.186	0.027	-0.018	0.028	0.549	0.104	0.085
WB	2015	0.007	9.526	0.176	0.029	0.340	0.026	0.625	0.080	0.104
WB	2016	0.008	9.692	0.173	0.031	0.237	0.023	0.689	0.101	0.075
WB	2017	0.007	9.950	0.160	0.033	0.360	0.025	0.740	0.077	0.084
WB	2018	0.010	10.218	0.140	0.037	0.450	0.029	0.734	0.090	0.168
WB	2019	0.012	10.301	0.144	0.044	0.093	0.021	0.699	0.061	0.153
WB	2020	0.012	10.550	0.134	0.041	0.441	0.022	0.788	0.063	0.216
WB	2021	0.032	10.588	0.126	0.047	0.151	0.003	0.867	0.064	0.246
WB	2022	0.032	10.672	0.130	0.053	0.109	0.013	0.893	0.072	0.340
WB	2023	0.030	10.887	0.129	0.046	0.319	0.015	0.933	0.081	0.293
NIB	2014	0.011	9.282	0.183	0.023	0.216	0.028	0.697	0.104	0.085
NIB	2015	0.008	9.492	0.164	0.031	0.267	0.025	0.716	0.080	0.104
NIB	2016	0.009	9.670	0.159	0.032	0.093	0.025	0.616	0.101	0.075
NIB	2017	0.008	9.953	0.141	0.032	0.424	0.021	0.663	0.077	0.084
NIB	2018	0.008	10.192	0.127	0.041	0.259	0.019	0.634	0.090	0.168
NIB	2019	0.006	10.426	0.131	0.044	0.419	0.021	0.703	0.061	0.153

NIB	2020	0.005	10.656	0.136	0.051	0.327	0.025	0.766	0.063	0.216
NIB	2021	0.005	10.900	0.131	0.047	0.337	0.022	0.792	0.064	0.246
NIB	2022	0.007	11.027	0.132	0.051	0.142	0.022	0.791	0.072	0.340
NIB	2023	0.007	11.252	0.129	0.055	0.367	0.020	0.906	0.081	0.293
OIB	2014	0.005	8.724	0.122	0.020	0.582	0.025	0.513	0.104	0.085
OIB	2015	0.006	9.163	0.104	0.020	0.858	0.023	0.595	0.080	0.104
OIB	2016	0.008	9.331	0.117	0.025	0.103	0.014	0.563	0.101	0.075
OIB	2017	0.008	9.698	0.102	0.025	0.365	0.018	0.535	0.077	0.084
OIB	2018	0.004	10.077	0.109	0.027	0.628	0.031	0.586	0.090	0.168
OIB	2019	0.009	10.367	0.117	0.031	0.497	0.023	0.658	0.061	0.153
OIB	2020	0.007	10.429	0.136	0.045	-0.005	0.025	0.627	0.063	0.216
OIB	2021	0.020	10.638	0.131	0.041	0.482	0.021	0.750	0.064	0.246
OIB	2022	0.017	10.860	0.131	0.039	0.247	0.023	0.739	0.072	0.340
OIB	2023	0.016	11.088	0.132	0.044	0.326	0.024	0.785	0.081	0.293
LIB	2014	0.006	8.192	0.174	0.028	0.185	0.027	0.581	0.104	0.085
LIB	2015	0.008	8.676	0.140	0.024	0.843	0.026	0.646	0.080	0.104
LIB	2016	0.011	9.002	0.132	0.027	0.525	0.024	0.693	0.101	0.075
LIB	2017	0.010	9.303	0.132	0.027	0.275	0.024	0.638	0.077	0.084
LIB	2018	0.013	9.569	0.126	0.036	0.351	0.027	0.650	0.090	0.168
LIB	2019	0.011	9.923	0.126	0.037	0.568	0.026	0.723	0.061	0.153
LIB	2020	0.015	10.367	0.110	0.038	0.650	0.020	0.748	0.063	0.216
LIB	2021	0.034	10.380	0.113	0.060	0.172	0.010	0.882	0.064	0.246
LIB	2022	0.049	10.403	0.116	0.068	0.108	0.008	0.980	0.072	0.340
LIB	2023	0.044	10.480	0.122	0.072	0.112	0.014	1.035	0.081	0.293
BrIB	2014	0.007	7.942	0.197	0.030	0.210	0.016	0.589	0.104	0.085
BrIB	2015	0.006	8.336	0.174	0.024	0.605	0.025	0.620	0.080	0.104
BrIB	2016	0.008	8.881	0.147	0.025	0.976	0.037	0.709	0.101	0.075
BrIB	2017	0.007	9.258	0.180	0.030	0.419	0.031	0.702	0.077	0.084
BrIB	2018	0.009	9.552	0.157	0.038	0.349	0.023	0.662	0.090	0.168
BrIB	2019	0.010	9.861	0.146	0.040	0.421	0.024	0.683	0.061	0.153
BrIB	2020	0.009	9.969	0.160	0.049	0.245	0.026	0.766	0.063	0.216
BrIB	2021	0.028	10.201	0.139	0.046	0.401	0.007	0.821	0.064	0.246
BrIB	2022	0.037	10.406	0.135	0.048	0.244	0.014	0.852	0.072	0.340
BrIB	2023	0.034	10.715	0.112	0.047	0.303	0.011	0.855	0.081	0.293
BuIB	2014	0.005	8.010	0.172	0.026	0.432	0.027	0.632	0.104	0.085
BuIB	2015	0.006	8.412	0.151	0.026	0.799	0.030	0.699	0.080	0.104
BuIB	2016	0.009	8.828	0.141	0.032	0.511	0.027	0.686	0.101	0.075
BuIB	2017	0.009	9.192	0.138	0.034	0.432	0.021	0.707	0.077	0.084
BuIB	2018	0.008	9.474	0.152	0.039	0.312	0.024	0.698	0.090	0.168

BuIB	2019	0.009	9.582	0.177	0.042	0.193	0.032	0.782	0.061	0.153
BuIB	2020	0.011	9.845	0.163	0.039	0.397	0.023	0.834	0.063	0.216
BuIB	2021	0.014	10.164	0.147	0.044	0.581	0.026	0.894	0.064	0.246
BuIB	2022	0.013	10.437	0.149	0.048	0.413	0.026	0.951	0.072	0.340
BuIB	2023	0.013	10.745	0.140	0.053	0.345	0.020	0.950	0.081	0.293
ZB	2014	0.032	8.275	0.167	0.038	0.044	0.047	0.472	0.104	0.085
ZB	2015	0.026	8.492	0.157	0.036	0.597	0.031	0.597	0.080	0.104
ZB	2016	0.020	8.906	0.136	0.038	0.491	0.027	0.620	0.101	0.075
ZB	2017	0.020	9.177	0.136	0.040	0.222	0.026	0.568	0.077	0.084
ZB	2018	0.014	9.433	0.140	0.043	0.254	0.022	0.509	0.090	0.168
ZB	2019	0.011	9.595	0.159	0.046	0.491	0.033	0.669	0.061	0.153
ZB	2020	0.009	9.825	0.169	0.041	0.276	0.040	0.688	0.063	0.216
ZB	2021	0.009	10.133	0.178	0.039	0.437	0.038	0.751	0.064	0.246
ZB	2022	0.008	10.467	0.178	0.035	0.502	0.042	0.797	0.072	0.340
ZB	2023	0.009	10.774	0.177	0.037	0.486	0.038	0.863	0.081	0.293
AB	2014	0.006	8.070	0.141	0.025	0.749	0.018	0.593	0.104	0.085
AB	2015	0.006	8.430	0.156	0.030	0.568	0.027	0.646	0.080	0.104
AB	2016	0.007	8.730	0.155	0.031	0.332	0.024	0.645	0.101	0.075
AB	2017	0.006	9.070	0.150	0.032	0.382	0.020	0.631	0.077	0.084
AB	2018	0.008	9.419	0.146	0.038	0.393	0.026	0.634	0.090	0.168
AB	2019	0.008	9.623	0.163	0.040	0.285	0.033	0.665	0.061	0.153
AB	2020	0.007	9.914	0.153	0.035	0.524	0.025	0.730	0.063	0.216
AB	2021	0.010	10.309	0.141	0.034	0.715	0.028	0.843	0.064	0.246
AB	2022	0.010	10.614	0.144	0.035	0.338	0.023	0.833	0.072	0.340
AB	2023	0.010	10.916	0.139	0.038	0.373	0.028	0.887	0.081	0.293
AdIB	2014	0.004	7.141	0.250	0.032	0.558	0.035	0.645	0.104	0.085
AdIB	2015	0.005	7.447	0.260	0.037	0.510	0.034	0.695	0.080	0.104
AdIB	2016	0.005	7.809	0.258	0.040	0.378	0.033	0.680	0.101	0.075
AdIB	2017	0.006	8.136	0.222	0.039	0.487	0.027	0.696	0.077	0.084
AdIB	2018	0.004	8.347	0.214	0.046	0.301	0.027	0.692	0.090	0.168
AdIB	2019	0.005	8.615	0.202	0.053	0.302	0.029	0.678	0.061	0.153
AdIB	2020	0.005	8.778	0.209	0.055	0.300	0.033	0.751	0.063	0.216
AdIB	2021	0.005	9.091	0.183	0.057	0.302	0.031	0.722	0.064	0.246
AdIB	2022	0.009	9.286	0.201	0.054	0.352	0.032	0.791	0.072	0.340
AdIB	2023	0.009	9.442	0.205	0.057	0.237	0.018	0.839	0.081	0.293
DGB	2014	0.004	6.774	0.207	0.023	1.695	0.021	0.541	0.104	0.085
DGB	2015	0.003	7.042	0.191	0.025	0.253	0.015	0.414	0.080	0.104
DGB	2016	0.006	7.164	0.249	0.029	0.768	0.040	0.687	0.101	0.075
DGB	2017	0.007	7.632	0.205	0.028	0.325	0.025	0.555	0.077	0.084

DGB	2018	0.008	8.090	0.209	0.037	0.990	0.033	0.734	0.090	0.168
DGB	2019	0.009	8.610	0.181	0.041	0.551	0.038	0.696	0.061	0.153
DGB	2020	0.006	8.963	0.169	0.047	0.844	0.025	0.855	0.063	0.216
DGB	2021	0.007	9.361	0.152	0.060	0.853	0.017	0.962	0.064	0.246
DGB	2022	0.009	9.553	0.155	0.074	0.132	0.020	0.863	0.072	0.340
DGB	2023	0.006	9.844	0.157	0.080	0.453	0.028	0.967	0.081	0.293