

HAWASSA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF ACCOUNTING AND FINANCE



**DETERMINANTS OF NON-PERFORMING LOANS IN ETHIOPIAN
COMMERCIAL BANKS**

**A Research Submitted to Hawassa University Department of Accounting and
Finance in Partial Fulfillment of the Requirement for the Degree of Masters
of Science in Accounting and Finance**

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STATEMENT OF DECLARATION

I, Tesfaye Desta, hereby attest that the research work titled "Determinants of Non-Performing Loans: An Empirical Study on Selected Commercial Banks in Ethiopia," is an original work developed in strict accordance with the guidelines outlined by Hawassa University. I affirm that this research represents my genuine efforts, informed by a comprehensive review of existing literature and a thorough analysis of available data. Furthermore, I pledge to uphold the ethical principles inherent in the research process, ensuring full compliance with all relevant guidelines and regulations. I commit to avoiding any conflicts of interest that may compromise the objectivity or integrity of this proposal. By affixing my signature to this declaration, I reaffirm my unwavering dedication to conducting this research with honesty, integrity, and a steadfast commitment to the pursuit of knowledge. I am fully aware that any deviation from ethical standards or academic integrity may result in serious consequences, as determined by the institution or relevant authorities.

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CERTIFICATION

I, Professor Raman Kumar, hereby certify that Tesfaye has diligently pursued his research endeavor on the topic entitled "Determinants of Non-Performing Loans: An Empirical Study on Selected Commercial Banks in Ethiopia" under my attentive guidance and supervision. Throughout the duration of this project, I have closely monitored Tesfaye's progress and can confidently attest to the quality and standard of his work, which aligns with the expectations of MSc-level research.

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We, the undersigned members of the board of examiners of the final open defense by Tesfaye Desta, have read and evaluated her thesis titled “**Determinants of Non-performing Loans in Ethiopian Commercial Banks**” and examined the candidate. This is therefore to certify that the thesis has been accepted in in partial fulfillment of the requirements for the degree of masters of Science in Accounting and Finance.

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LIST OF ACRONYMS AND ABBREVIATIONS

AB: Awash Bank

ARDL: Autoregressive Distributed Lag

BOA: Bank of Abyssinia

CAR: Capital Adequacy Ratio

CBE: Commercial Bank of Ethiopia

CBO: Co-operative Bank of Oromia

CESEE: Central, Eastern, and South Eastern European

CSA: Central Statistical Agency

ECB: Ethiopian Commercial Bank

DB: Dashen Bank

GDP: Gross Domestic Product

GMM: Generalized Methods of Moments

IMF: International Monetary Fund

INFR: Inflation Rate

LTD: Loan to Deposit

MENA: Middle East and North Africa

NBE: National Bank of Ethiopia

NIB: Nib International Bank

NPL: Nonperforming Loan

OLS: Ordinary Least Squares

ROA: Returns on Asset

ROE: Return on Equity

UB: United Bank

US: United States

WB: Wegagen Bank

ZB: Zemen Bank

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Abstract

This study investigates the macroeconomic and bank-specific factors influencing non-performing loans within Ethiopian commercial banks. Employing a quantitative research approach, it selected a purposive sample of 13 commercial banks from a total of 33. Secondary data, covering the years 2014 to 2023, were gathered from audited bank financial statements, the National Bank of Ethiopia (NBE), the Central Statistical Agency (CSA), and the Ministry of Finance. To ensure data robustness, tests for heteroskedasticity, normality, serial correlation, and multicollinearity were conducted, with no violations found. Data analysis was performed using a multiple regression model and the Fixed Effect Model (FEM) for panel data regression via EViews software version 12. The study's findings indicate that Gross Domestic Product (GDP), Capital Adequacy Ratio (CAR), and Return on Equity (ROE) have a significant negative impact on NPL levels, while money supply, inflation rate, and loan growth rate positively and significantly influence NPL prevalence. Additionally, the Loan-to-Deposit Ratio (LDR) was found to have a positive but insignificant effect on NPLs. The study recommends that to reduce nonperforming loans (NPLs) in Ethiopia, efforts should focus on promoting economic growth, reducing unemployment through skill development and entrepreneurship, and maintaining stable inflation via effective monetary policies. Banks are encouraged to strengthen capital adequacy, improve credit assessment practices, enhance management efficiency, conduct regular risk assessments, and invest in financial literacy to promote responsible borrowing and reduce credit risk.

Keywords: Commercial banks, Non-performing loans, Macroeconomic factors, Bank-specific factors.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Financial institutions constitute a vital component of the financial system, comprised of various intermediaries. They are pivotal actors in a nation's economic advancement. Without a sturdy, well-rounded, and resilient financial system, achieving economic growth becomes unattainable. These institutions play a crucial role in the allocation and circulation of funds within an economy as integral parts of the financial system. Through effective resource management, they contribute to economic development and efficiency. Among them, banks stand out as the most prominent. They significantly influence the economic progress of nations worldwide. The advancement of almost every country's economy hinges on its financial system, particularly the banking sector. Thus, the economic prosperity of nations is closely intertwined with the health of their banking industry. Banks facilitate the transformation of deposits into investments and various forms of consumption. They accomplish this by aligning the needs of depositors with the credit requirements of entities such as organizations, households, and individuals. Consequently, a well-operating banking system is imperative for ensuring economic stability and fostering prosperity.

Stability in the banking industry is critical for economic growth and resilience in the face of financial crises. It serves as a framework for the economy's ongoing restructuring by reallocating financial and transferring resources to the fastest-growing industries (Chakrabarti, 2015). Banks play a critical role in the financial system's sustainability and are known as the principal source of funding in banking-centered economies (Moradi et al., 2016). They promote the free movement of capital in the economy, which helps drive economic growth. As a result, the efficiency of the banking system impacts the economy's rate of development. A bank's efficiency is measured in profitability and asset quality, like any other corporate operation (Siraj, 2013). As essential components of the financial system, banks are the most efficient means of generating credit flows in markets.

The main revenue streams for commercial banks are loans and advances. Similar to any other business, commercial banks aim to maximize their profits. Consequently, they seek to lend out as much money as possible, as this directly correlates with their earnings and overall profitability.

However, it's crucial for commercial banks to balance this pursuit of profit with prudent risk management practices. Their inherent inclination is to extend loans in secure circumstances, prioritizing safety, while concurrently striving to enhance profitability (Ul Hassan et al., 2014).

Despite the vital role commercial banks play in economic development through their prudent operations, they frequently encounter challenges stemming from their routine activities. One prevalent issue, observed in both developed and developing nations, is the occurrence of sanctioned loans that remain uncollectable. In many instances, borrowers struggle to repay the borrowed funds as per the agreed terms and within the stipulated period. Such instances result in defaults, commonly referred to as non-performing loans (NPLs), bad loans, or non-performing assets. Bad loans occur when borrowers fail to adhere to the loan terms, adversely affecting the bank's profitability and potentially leading to credit losses or, in severe cases, default. Generally, a high volume of bad loans diminishes bank equity and complicates the process of issuing new loans.

Despite numerous studies on NPLs and their determinants, there remains a gap in comprehensive research providing a detailed overview of factors influencing NPLs and offering extensive recommendations for overcoming them. Considering these factors, the primary objective of this study is to investigate the determinants affecting non-performing loans in Ethiopian commercial banks. Insights gained from understanding these factors and their implementation can benefit various stakeholders, including banks, regulators, and policymakers, enabling them to formulate targeted strategies to address NPL challenges effectively.

Ethiopia's banking regulation, as overseen by the national bank of Ethiopia (NBE) are characterized by a strong emphasis on domestic control and a gradual opening to foreign investment. While foreign banks are now allowed to operate in Ethiopia shareholding is capped at 49% to ensure local ownership. Research Gap lies in the need for studies that comprehensively analyze the impact of both macroeconomic factors and bank specific characteristics on the performance of Ethiopian Banks particularly within the regulated banking sector.

1.2 Statement of the Problem

In the current financial downturn, the role of banks has become increasingly crucial in the functioning of the money market and consequently the nation's economy. Commercial banks

heavily rely on loans as a significant portion of their assets. However, these assets are at risk until they are effectively collected. Unfortunately, in some cases, loans remain uncollectable, leading to non-performing loans (NPLs) (Kalpana and Rao, 2007). High levels of NPLs pose challenges to the banking sector's balance sheet and pose a threat to the income statement due to provisioning for loan losses, a concern observed in many economies worldwide (Kumar & Tripathi, 2012).

The immediate consequence of a significant volume of non-performing loans (NPLs) in the banking system is the risk of bank failure and economic recession. Non-performing loans are often attributed to various factors such as inadequate bank monitoring and supervision, ineffective lenders' remedies, legal infrastructure deficiencies, and ineffective debt collection measures (Adhikary, 2006, as cited in Akter & Roy, 2017). The rise in non-performing loans (NPLs) is a primary cause of declining bank profits. The inability of borrowers to repay their debts stems from factors like uneconomic utilization of loans, low per capita income, and high-interest rates. Additionally, an overly flexible credit rationing strategy may contribute to the high proportion of non-performing loans (Saba, 2012).

An increase in non-performing loans is associated with a reduction in return on assets, resulting in elevated operating expenses and diminished profitability. Therefore, regulators must prioritize monitoring bank operational efficiency ratios and capital adequacy. This entails focusing on trends in the cost-to-income ratio and evaluating the capital position of banks (Stephen Kingu et al., 2018).

However, the process of credit creation and loan disbursement exposes banks to substantial default risk, which could potentially lead to financial instability and bankruptcy due to Non-Performing Loans (NPLs). Credit risk, a crucial indicator of financial risk for commercial banks, is directly linked to the level of NPLs (Ali, 2013).

The National Bank of Ethiopia (NBE) responded to these risks by implementing restrictions, stipulating that Non-Performing Loans (NPLs) should not exceed 5% of a bank's total outstanding loans (NBE, 2012). While this regulation has led to some improvements in NPL ratios for Ethiopian commercial banks (ECBs), it has been observed that reductions in NPLs have primarily occurred through loan write-offs and restructuring rather than enhancements in credit risk management systems (Oda, 2021a). innovations 67(6)1582-1595.

According to Oda (2021b), commercial banks in Ethiopia, similar to those in other third-world countries, face significant financial challenges due to non-performing loans (NPLs). He further contends that the notable decrease in NPLs within Ethiopian commercial banks is mainly the outcome of loan write-offs and restructuring, reactive measures taken after the fact to address NPLs, rather than proactive improvements to credit risk management, measurement, and monitoring systems. Consequently, the issue of non-performing loans in Ethiopian commercial banks persists without resolution.

Numerous studies on non-performing loans have been conducted in various countries. However, their findings often do not correspond to the situation in other countries due to the multiple ways in which countries differ. For instance, the Ethiopian banking industry possesses distinct characteristics, such as regulations preventing foreign entities from acquiring shares in Ethiopian banks and the absence of a well-developed secondary market for financial instruments. Despite these unique factors, recent studies have not extensively focused on the macroeconomic and bank-specific drivers of NPLs in Ethiopian commercial banks. Previous research either concentrated solely on macroeconomic drivers or bank-specific determinants, with some studies employing similar variables while others focused on single banks, making it challenging to generalize the results to the entire banking sector. Hence, the issue of NPLs in Ethiopia remains a promising area for further research.

Furthermore, a recent study by Oda (2021) underscores the ongoing relevance of the problem of non-performing loans in Ethiopian commercial banks as a researchable theme. It suggests that subsequent researchers could conduct more extensive studies by focusing on additional determinant variables and employing advanced methods to uncover unique discoveries regarding the significant determinants of NPLs in Ethiopian commercial banks.

In addition to the changes in the country's economic growth and business environment, such as privatization of public enterprises in recent years, the banking system has also undergone transformations in various aspects, including branch expansion, organizational structure modifications, and reforms in lending policies and procedures. All these changes are directly related to the issue of loans. Based on the arguments from previous studies and the changes observed in the country, it is imperative to conduct more extensive investigations. Therefore, this

study aims to address potential research gaps by focusing on factors influencing non-performing loans in Ethiopian commercial banks.

1.3 Objectives of the Study

1.3.1 General Objective

The overarching goal of this study is to investigate the determinant factors contributing to non-performing loans (NPLs) in Ethiopian commercial banks.

1.3.2 Specific Objectives

The study aims to achieve the following specific objectives:

1. To analyze the macroeconomic determinants influencing (GDP,UN,MS,IFR)with NPLs in Ethiopian commercial banks.
2. To identify the bank-specific factors affecting (CAR,LDR,RE,LGR)with NPLs in Ethiopian commercial banks.

1.4 Research Hypotheses

Formulating hypotheses is crucial for researchers as they guide the investigation towards meaningful conclusions grounded in relevant empirical evidence (Kabir, 2016, Brooks, 2014, Kothari, 2009, Cresswell, 2013) Drawing on existing theories and empirical data, the following research alternative hypotheses have been formulated in alignment with the stated general objective.

***H1:** Gross domestic product has a negative and significant impact on the NPLs of Ethiopian commercial banks.*

***H2:** Unemployment rate has a significant and positive impact on the NPLs of Ethiopian commercial banks.*

***H3:** Money supply has a significant and positive effect on the NPLs of Ethiopian commercial banks.*

***H4:** Inflation rate has a significant and positive impact on the NPLs of Ethiopian commercial banks.*

***H5:** Capital adequacy ratio has a significant and negative impact on the NPLs of Ethiopian commercial banks.*

***H6:** Loan to deposit ratio has a positive and significant effect on the NPLs of Ethiopian commercial banks.*

H7: Return on equity has a significant and negative impact on the NPLs of Ethiopian commercial banks.

H8: Loan growth rate has a significant and positive effect on the NPLs of Ethiopian commercial banks.

1.5 Scope of the Study

Given the vast array of topics and subjects within an organization, it's imperative to establish conceptual and geographical boundaries to ensure the study remains manageable and feasible. Consequently, this research will be confined to Ethiopia, specifically examining external factors influencing banks, namely macroeconomic and bank-specific determinants of non-performing loans. The study will focus on Ethiopian commercial banks, both privately and publicly owned, which are licensed and registered with the National Bank of Ethiopia. The sample includes senior commercial banks with extensive experience in lending. The study used data from the past decade, spanning from 2014 to 2023, to provide a comprehensive understanding of the factors affecting non-performing loans in Ethiopian commercial banks.

1.6 Significance of the Study

This study will hold significant implications for policymakers, commercial banks, and future research in several key ways.

Firstly, by delving into the factors influencing non-performing loans, it will empower commercial banks to devise effective management strategies. This dual-purpose approach will enhance bank performance while concurrently reducing non-performing loans, thereby fortifying the overall health of the banking sector.

Secondly, the findings will offer valuable insights for policymakers, enabling them to craft informed decisions aimed at ameliorating non-performing loans within commercial banks. By understanding the underlying factors contributing to this issue, policymakers will be able to implement targeted interventions to foster a more robust banking environment.

Lastly, this study will contribute to the existing body of literature by conducting a thorough investigation into the determinants of non-performing loans. By expanding our understanding of these factors, it will lay the groundwork for future research endeavors in this critical area of financial risk management.

1.7 Limitations of the study

This study, consistent with the observation by Brooks (2014), recognizes the practical limitation of incorporating all possible explanatory variables into a single econometric model, necessitating the inclusion of a disturbance term to account for unobserved factors. Accordingly, the analysis was confined to a selected set of macroeconomic and bank-specific variables, which may not fully capture the complexity of nonperforming loan (NPL) dynamics. Moreover, the study focused exclusively on commercial banks with a minimum of ten years of lending experience, thereby excluding newly established banks after 2014 that may still exhibit significant NPL issues. Similarly, the Development Bank of Ethiopia, despite its relevance, was not included in the investigation.

The study also did not account for time-based variations or political and institutional factors that could influence the rise or fall of NPLs. Access to more detailed borrower and institutional data was restricted due to confidentiality policies, limiting the analysis to publicly disclosed financial reports and subjective insights from bank personnel and executives. This reliance on self-reported information and secondary data may introduce bias, either intentionally or inadvertently. Additionally, constraints related to financial resources, time availability, and methodological choices—including limitations inherent in the statistical tools employed—may have influenced the robustness and generalizability of the findings. Finally, significant recent developments, such as the government's demonetization efforts and broader financial sector reforms, which are likely to impact the behavior of NPLs, were beyond the scope of this study and thus not considered in the analysis.

1.8 Organization of the Paper

This study was structured into five chapters. The first chapter discusses the background of the study, statement of the problem, research objectives and hypotheses, significance of the study, scope of the study, and organization of the study. The second chapter provides a comprehensive literature review, encompassing both theoretical and empirical literature on the subject. Chapter three outlines the methodology of the research, including the research design employed, the sampling method, data collection methods, and the data analysis technique. The fourth chapter presents the results and discussion of the study, analyzing the findings in detail. Lastly, the fifth chapter presents the conclusion and recommendations drawn from the study's findings, offering insights for future research and practical implications for policymakers and commercial banks.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical Review

Under this topic, the following theories related to banking sector activities, focusing on banks' lending and borrowing activities, were reviewed.

2.1.1 Information Asymmetry Theory

Loans and advances are key income sources for banks but also carry default risks. Effective loan management begins with careful customer selection. Banks need comprehensive client information to manage these risks. Information asymmetry in lending leads to financial inefficiency and can cause adverse selection and moral hazards (Kemei, 2014).

2.1.2 Loan Pricing Theory

Loan repayment risks are significant for banks. To mitigate these risks, banks should have robust lending policies. Interest rates must be set cautiously at the start of a banking relationship due to unknown customer behavior. High-interest rates can attract high-risk borrowers, increasing the chance of adverse selection and moral hazard (Stiglitz & Weiss, 1981; Suwanaporn & Lang, 2003).

2.1.3 Agency Theory

Developed by Ross and Mitnick in the 1960s and 1970s, this theory identifies the principal (shareholders) and agent (managers) relationship in banks. Managers may prioritize short-term gains over shareholder wealth, leading to adverse selection (Ross, 1973; Mitnick, 2014; Breuer, 2006).

2.1.4 Financial Fragility Theory

Minsky's financial instability hypothesis highlights the cyclical crises in credit markets, leading to economic downturns and increased nonperforming loans. Financial instability events, such as international debt crises and bank bankruptcies, underscore the system's vulnerability. Financial fragility refers to the financial system's inherent instability and the risks within (Minsky, 1982; Bhaduri, 2010; Wang & Li, 2019).

2.1.5 Stakeholders Theory

Freeman's 1984 theory states that business policy should balance stakeholders' interests, including investors, employees, customers, suppliers, the government, and the public. Effective

stakeholder management is crucial for long-term survival and performance, as each stakeholder provides essential resources and expects fair returns (Omwengal & Omar, 2017; Deegan, 2016; Hill & Jones, 2014; Klimczak, 2011).

2.1.6 Moral Hazard Theory

Moral hazard occurs when one party takes risks knowing another will bear the consequences, often due to asymmetrical information. In banking, borrowers might manipulate documents to appear more creditworthy, leading to high-risk loans and nonperforming loans. Banks with insufficient capital might respond to these incentives by increasing loan risks, resulting in higher nonperforming loans (Chengeta, 2007; Keeton & Morris, 1987; Rajha, 2017; Jensen & Meckling, 1976; Finkelstein, 2011; Kingu, 2018).

2.1.7 Bank Behavior Theory

Bank behavior theory explores reasons for nonperforming loans, suggesting that maintaining customer relationships through larger loans and lower rates can degrade asset quality and increase risks (Wood, 1970). Loan competition can lead banks to relax approval standards, further raising credit risks and nonperforming loans (Eaton et al., 1986).

2.1.8 Patronizing Effect Theory

This theory focuses on internal organizational issues that hinder loan collection, such as poor credit policies and follow-up methods. These internal deficiencies encourage debtors to default on loans, increasing nonperforming loans (Personal et al., 2015; Shil, 2005).

2.1.9 Risk Premium Theory

Risk premium is the difference between expected return and risk-free return, compensating investors for taking extra risk. Higher interest rates attract riskier borrowers, increasing the likelihood of loan defaults (Ewert et al., 2000).

2.1.10 Financial Accelerator Theory

This theory explains how small economic shocks can impact lending and borrowing. Asymmetric information between borrowers and lenders leads to a financial accelerator effect, where economic shocks can decrease borrowers' repayment capacity, increasing defaults (Bernanke et al., 1998).

2.1.11 Financial Intermediation Theory

Proposed in 1984, this theory highlights the role of intermediaries like banks in assessing and managing investment risks. Ineffective monitoring by these intermediaries can lead to high loan defaults (Kling, 2007; Saunders & Cornett, 2008; Nishani Ekanayake, 2018).

2.2 Nature and Definition of Nonperforming Loans

Commercial banks' primary activity is lending, which generates revenue through interest and commissions. Lending forms the core of their operations, making up a significant part of their assets and income. Effective management of loans is crucial as poor handling can lead to defaults and bank failures (Mac Donald and Koch, 2006). Banks play a vital role in the economy by providing credit, accepting deposits, mediating payments, and managing risk, which are essential for economic growth. However, high levels of bad loans can impede this function (Fredriksson, 2019). Efficient and well-managed banks can boost economic growth, while mismanaged banks can hinder it (Richard, 2011).

The performance of banks is measured by asset management and profitability. Nonperforming loans (NPLs) indicate deteriorating asset quality and profitability. Proper loan management, from applicant selection to repayment collection, is necessary to maximize profits and minimize defaults (Acaka et al., 2018; Ul Hassan et al., 2014). Reducing NPLs is crucial for economic growth as they tie up resources in unproductive areas, decreasing economic efficiency (Hou and Dickinson, 2007). Liberal credit policies can increase bad loans due to uneconomic use and high-interest rates (Saba, 2012). NPLs can reduce interest earnings, restrict investments, cause liquidity issues, and lead to bankruptcy (Stijepovi, 2014).

When borrowers fail to repay loans, it results in bad loans, impacting the bank's profitability and equity, and hindering new loans (Fredriksson, 2019). Banks' profitability depends on the efficient use of loans and advances, which are key income sources. Poor management of loans increases NPLs and reduces profitability.

Nonperforming loans are those where the principal and/or interest are overdue by 90 days or more. If a loan's servicing is past due for over 90 days, and lenders doubt full recovery, it is considered nonperforming. These loans have delayed or no payments (Waweru & Kalani, 2009; Manager, 2004). According to the International Monetary Fund, a loan is nonperforming if payments are 90 days overdue or if there is doubt about full repayment. The National Bank of

Ethiopia defines NPLs as loans where credit quality has deteriorated, affecting full collection of principals and/or interest as per the contractual terms.

2.3 Determinants of Nonperforming Loans

In the banking industry, since the last few years, mainly after the global financial crisis of 2007 to 2008, several studies have been conducted by academicians, scholars, and practitioners, paying more attention to the area of determinants of nonperforming loans. Similarly, this part of the study extensively deals with two main categories of determinants to investigate NPLs. The first factor was macroeconomic conditions, external to banks, and determines NPLs by affecting borrowers' capacity to settle their financial obligations according to a stipulated schedule and specified credit terms. The second category was related to institutions or banks' specific determinants which affect NPLs internally. Accordingly, supported by empirical evidence, this section identifies and elaborates on macroeconomic and bank-specific variables selected for the study by defining them and comparing their impacts on NPLs by referring to existing literature.

2.3.1 Macroeconomic Determinants of Nonperforming Loans

Empirical evidence from previously conducted studies shows a strong relationship between macroeconomic determinants and nonperforming loans. Likewise, for this study, after reviewing empirical studies and theories based on their importance and availability of data, the effects of four macroeconomic determinants (gross domestic product, unemployment rate, money supply, and inflation rate,) on the NPLs of commercial banks in Ethiopia will be investigated by the researcher.

2.3.1.1 Gross Domestic Product (GDP)

GDP measures the market value of a country's final products and services over a year. It's a key indicator of economic health, calculated by combining private and public consumption and investment. When GDP grows, it's seen as a sign of a country's success.

Research shows that GDP negatively influences non-performing loans (NPLs). Higher real GDP improves borrowers' repayment capabilities, increasing household incomes and business profitability. Conversely, during recessions, GDP declines, reducing borrowers' ability to repay loans. Numerous studies confirm GDP's negative impact on NPLs: Zainol et al. (2018) found a significant negative impact of GDP on NPLs in Malaysian banks Radivojevic & Jovovic (2017)

observed this effect in 25 countries. Messai & Jouini (2013) noted the same in Italy, Greece, and Spain.

In Nigeria, Omoruyi and Igbinosa (2014) found a strong negative relationship between GDP and bank NPLs. Similar results were observed in Romania (Vogiazas & Nikolaidou, 2011), and Macedonia (Kjosevski et al., 2019). Studies by Mazreku et al. (2018) and Koju et al. (2018) confirmed GDP's significant negative impact on NPLs across different regions. Thus, it is predicted that GDP will have a negative and significant influence on non-performing loans in Ethiopian commercial banks.

2.3.1.2 Unemployment Rate (UN)

Unemployment, defined as the scenario where individuals actively seeking work cannot find jobs or when people above a certain age are not employed or self-employed, often increases during economic recessions, due to globalization, international trade, policies, and technological changes. Higher unemployment logically leads to difficulties in debt repayment, resulting in increased non-performing loans (NPLs).

Most literature shows a positive association between unemployment rates and NPLs. For instance, Kjosevski et al. (2019) found that unemployment positively affects NPLs in Macedonia, and Mazreku et al. (2018) reported a similar correlation in transition countries. Studies by Meessai & Jouini (2013), Louzis et al. (2012), Kjosevski & Petkovski (2017), Chen et al. (2018), and Ikovi et al. (2015) also confirm this positive impact in various regions. However, some studies indicate a negative relationship; Berhani & Ryskulov (2014) and Amino (2018) found a negative trend between unemployment and NPLs in different contexts, while San (2016) observed a negative correlation in Albania.

Despite these exceptions, the majority of evidence supports the prediction that unemployment will positively and significantly influence the number of NPLs in Ethiopian commercial banks.

2.3.1.3 Money Supply (MS)

Money supply refers to the total stock of money available in an economy at any given time. It is commonly classified into Reserve Money (Mo), Narrow Money (M1), and Broad Money (M2). This study uses M2 as a proxy for money supply since it is the most comprehensive, including reserve money, all demand and time deposits, and resident foreign currency deposits.

An increase in money supply often indicates an expansionary monetary policy, which can lead to a rise in output and GDP. However, if the money supply exceeds the required level, it can cause inflation and other economic issues. Thus, the money supply can affect non-performing loans (NPLs) positively or negatively (Ofori-Abebrese et al., 2016).

Economic theory and various studies suggest that an excessive money supply directly influences NPLs. For instance, studies in Pakistan (Badar et al., 2013), Kenya (Ombunya, 2017), and Indonesia (Rulyasri et al., 2017) found that money supply has a significant positive effect on NPLs. However, some studies report a negative impact. Berhani & Ryskulov (2014) found that the money supply negatively influences NPLs in the Albanian banking sector. Similarly, Khemraj & Pasha (2005) and Bahruddin & Masih (2019) found varying effects of money supply on NPLs in different countries. In Malta, the money supply was found to be the sole relevant and positively determining factor for NPLs. Rifat (2017) in Bangladesh discovered that while firm-specific factors were more critical, the money supply was the only significant macroeconomic predictor of NPLs.

Previous studies in Ethiopia have not examined the influence of money supply on NPLs. Despite differing opinions on whether the relationship is positive or negative, this study predicts a positive influence of money supply on NPLs in Ethiopia due to the presence of inflationary signs.

2.3.1.4 Inflation Rate (IFR)

Inflation is defined as a continuous increase in the general price level of goods and services in an economy, typically measured annually by a comprehensive price index, such as the consumer price index (CPI). The CPI reflects the annual percentage change in the cost to average consumers of a basket of goods and services, adjusted at regular intervals. Literature shows mixed views on inflation's impact on non-performing loans (NPLs).

Higher inflation can decrease the real value of loans, making debt servicing easier and potentially reducing NPLs. However, inflation also reduces purchasing power, weakening borrowers' ability to repay debts and increasing NPLs. Several empirical studies confirm both positive and negative impacts of inflation on NPLs.

Radiojevic & Jovovic (2017) found that inflation positively impacts NPLs in 25 emerging nations, suggesting that the adverse effects of higher interest rates and deteriorating economic conditions outweigh any benefits to debt servicing. Conversely, Mazreku et al. (2018) found a negative impact of inflation on NPLs in transition countries, a result echoed by studies in Macedonia (Kjosevski et al., 2019), Nepal (Bhul et al., 2016), Albania (Berhani & Ryskulov, 2014), and Ethiopia (Tsige, 2013).

Further studies, such as those by Haniifah (2015) in Uganda, Washeka & Asif (2016) in SAARC countries, Kumar & Kishore (2019) in UAE, Zainol et al. (2018) in Malaysia, and Amino (2018) and Gezu (2014) in Ethiopia, found inflation to have a negative and insignificant impact on NPLs. However, Badar et al. (2013) identified inflation as a significant determinant of NPLs in Pakistani banks. Rizvi et al. (2015) reported mixed results in Pakistan, with inflation negatively correlated with NPLs from 2002–2008 but positively correlated from 2008–2011.

Inflation can reduce the real value of debt, easing repayment (Petkovski et al., 2018). Koju et al. (2018) studied 19 Asian countries and found inflation's impact on NPLs to be negative in high- and middle-income countries but positive in low-income countries. Overall, inflation rate volatility signals economic instability, reducing the purchasing power of money and incomes, and increasing NPLs by making debt repayment more difficult. Therefore, based on empirical evidence and Ethiopia's current scenario, this study predicts a positive impact of inflation on NPLs.

2.3.2 Bank Specific Determinants of NPLs

This section covers factors relating to the firm level. These determinants are more strongly connected to bank rules and regulations. Banks may define their own policies and management systems to achieve their intended goals, such as maximizing efficiency, raising profitability, and improving asset management. However, the manner in which these rules and principles are implemented is expected to have little influence on the handling and evaluation of nonperforming loans. The following four bank-specific factors were chosen for this investigation based on their impact and after reviewing previously conducted studies.

2.3.2.1 Capital Adequacy Ratio (CAR)

The capital adequacy ratio (CAR) measures a bank's available capital as a percentage of its risk-weighted credit exposures, aiming to safeguard depositors and ensure financial system stability.

According to the moral hazard hypothesis proposed by Keeton and Morris (1987), banks with low capital may take higher risks, leading to increased non-performing loans (NPLs). However, empirical studies have yielded mixed results regarding the correlation between NPLs and CAR.

Maintaining an ideal CAR enhances public trust in banks and is essential for their regular operation. A higher CAR is associated with lower investment risk and a negative relationship with NPLs, as indicated by studies such as those by Koju et al. (2018) and Makri et al. (2014). Ali (2018) found a negative association between CAR and NPLs in Bangladesh's state-owned commercial banks.

Contrary findings exist, such as those by Radojevic & Jovovic (2017), who found a positive correlation between CAR and NPL rates in developing nations. In Ethiopia, Amino (2018) found CAR to have an insignificant effect on NPLs, while Gezu (2014) observed a significant negative association. However, Argaw (2016) suggested a strong positive connection between CAR and NPLs in state-owned commercial banks.

Considering existing research and theoretical frameworks, it is predicted that CAR determinants will have a considerable negative influence on non-performing loans in Ethiopian commercial banks.

2.3.2.2 Loan to Deposit Ratio (LDR)

The loan-to-deposit ratio (LDR), also known as the liquidity ratio, measures a bank's ability to cover withdrawals with its deposits. While banks are required to maintain a minimum level of liquidity, they may choose to invest some non-lending funds in short-term securities for quick retrieval. Commercial banks typically aim for a modest LDR to sustain regular operations.

Numerous studies have shown that the liquidity ratio is a crucial determinant with a positive impact on non-performing loans (NPLs). A higher LDR suggests a risk preference and can lead to increased NPLs. For instance, Jabir & Tole (2019) found a strong positive relationship between LDR and NPLs during their study period. Similarly, studies in Macedonia (Kjosevski et al., 2019), SAARC nations (Washeka & Asif, 2016), Nigeria (Gambo et al., 2017), and Eurozone (Makri et al., 2014) revealed significant positive impacts of LDR on NPL levels.

However, Panta (2018) found a negative association between NPLs and LDR in Pakistan, while Gezu (2014) observed insignificant but positive relationships in Ethiopia. Rengasamy (2014) in

Malaysia found a positive but insignificant influence of LDR on NPLs. Considering previous empirical investigations and logical reasoning, it is predicted that the loan-to-deposit ratio will have a positive and considerable impact on NPLs in Ethiopian commercial banks.

2.3.2.3 Return on Equity (ROE)

Return on equity (ROE) serves as a vital metric for assessing a bank's financial performance and its ability to generate profits for shareholders. It indicates how efficiently a bank's management utilizes equity to generate profits from invested capital. Typically calculated by dividing net income by shareholders' equity, ROE is a key consideration for investors when deciding where to allocate their funds. Higher ROE often signifies effective management performance, thus inversely correlating with non-performing loans (NPLs).

Banks with high profitability tend to exhibit moderate risk-taking behaviors, while less profitable banks may engage in riskier operations to generate higher profits, leading to elevated NPL levels (Radivojevic & Jovovic, 2017). Empirical studies consistently demonstrate an inverse relationship between ROE and NPLs. Researchers such as Tsige (2013), Washeka & Asif (2016) in SAARC countries, Ozil (2019a) in a global sample, Gezu (2014) in Ethiopia, Ali (2014) in Bangladesh, Waqas et al. (2019) in multiple countries, and Makri et al. (2014) in the Eurozone have found ROE to negatively impact NPLs. The negative association between NPLs and ROE suggests that declining profitability ratios lead to larger NPLs, highlighting the importance of effective management in mitigating loan default risks (Makri et al., 2014). Abid et al. (2014) also found a significant inverse association between ROE and NPLs, attributing it to inefficient loan management practices.

Numerous empirical studies support these findings, indicating a statistically significant negative relationship between NPLs and ROE. Kjosevski & Petkovski (2017), Muratbek (2017), and Panta (2018) emphasized ROE as a robust indicator of management performance in generating income from shareholders' capital. Therefore, it is anticipated that ROE will have a negative and significant impact on NPLs in this study.

2.3.2.4 Loan Growth Rate (LGR)

The loan growth rate, calculated by dividing the net change in loans and advances balance of the current year by the previous year's balance, serves as a gauge for assessing the increase in loan disbursement by commercial banks. Depending on their credit policies, banks may either tighten

or loosen their lending criteria, impacting the likelihood of encountering non-performing loans (NPLs). Empirical studies have yielded differing conclusions regarding the relationship between loan growth and NPLs.

A higher loan growth rate often reflects banks' efforts to expand their market share and enhance performance in a short period, potentially leading to riskier lending practices and a higher incidence of NPLs. Jabir and Tole (2019) found a positive and significant relationship between loan growth rate and NPLs, suggesting that increased lending volumes may attract riskier clients and increase the likelihood of NPLs. Similarly, studies by Ali (2018), Bhul et al. (2016) in Nepal, Chan & Gambacorta (2016) in India, Petkovski et al. (2018) in the Czech Republic, and Washeka & Asif (2016) in Pakistan revealed a significant positive association between NPLs and bank credit growth rates.

However, some studies, such as those by Koju et al. (2018), N & A (2015), and Kjosevski et al. (2019) in the Republic of Macedonia, found a negative relationship between loan growth rate and NPLs. They suggest that stringent credit standards and effective monitoring systems can mitigate the risk of increased NPLs despite credit expansion. Additionally, Murabek (2017) found a negative and insignificant relationship, contradicting the notion that credit expansion inevitably leads to more NPLs. Bhattarai (2016) argued that increased lending operations can decrease the risk of default due to productive outcomes from extended loans. Banks that focus on credit operations and maintain robust credit monitoring systems are better equipped to manage NPLs effectively. Therefore, the researcher anticipates a positive influence of the loan growth rate on NPLs, based on theoretical foundations and empirical studies.

2.4 Provisions and Loan Classifications in Ethiopia

Ethiopian commercial banks adhere to specific loan classification and provisioning guidelines outlined by the National Bank of Ethiopia (NBE). Loans and advances, as defined by NBE (2008), encompass any financial assets resulting from direct or indirect advances, commitments to advance funds, or contractual obligations, conditioned on repayment by a borrower, typically with interest. However, accrued but uncollected interest or discounted interest are excluded from this definition.

According to NBE (2012), Ethiopian commercial banks categorize their loans into five classifications: Pass, Special Mention, Substandard, Doubtful, and Loss.

Pass: Loans fully secured by the borrower's financial capacity, ensuring repayment without criticism, irrespective of past due status.

Special Mention: Short-term loans past due for 30 days or more (but less than 90 days), and medium to long-term loans past due for 6 months or more (but less than 12 months).

Substandard: Short-term loans past due for 90 days or more (but less than 180 days), and medium to long-term loans past due for 12 months or more (but less than 18 months).

Doubtful: Short-term loans past due for 180 days or more (but less than 360 days), and medium to long-term loans past due for 18 months or more (but less than 3 years).

Loss: Short-term loans past due for 360 days or more, and medium to long-term loans past due for 3 years or more.

Nonperforming loans (NPLs) are loans or advances with deteriorated credit quality, hindering full collection according to contractual repayment terms (NBE, 2012).

Provisioning requirements mandate that Ethiopian commercial banks maintain provisions for potential loan losses, charged to provision expense in the income statement. These provisions, with a credit balance, must be sufficient to absorb potential losses in the loans portfolio. Provision percentages against the outstanding principal balance vary based on loan classification:

Table 2.1 Loan Classifications and Provisions

NO	Loan Category	Provision required
1	Pass loans	1%
2	Special mention loans	3%
3	Substandard loans	20%
4	Doubtful loans	50%
5	Loss loans	100%

Charges or reductions to the provisions for loan losses account are made through provisions in the income statement at least every calendar quarter (NBE, 2012).

2.5 Empirical Review

There has been a surging interest in studying non-performing loans and their determinants worldwide. As a result, various studies have been conducted; their findings provide vital information regarding the quality of loan portfolios and the overall fragility of banks. Many researchers perceive NPLs as a form of financial pollution that negatively impacts a country's financial system, economic development, and social welfare. Most of the time, factors contributing to nonperforming loans are classified as bank-specific and macroeconomic determinants, according to available empirical research. Regardless of their classification, some research focused on macroeconomic or bank-specific determinants, while several studies combined the above-mentioned categories of determinants together. Previously conducted studies on the factors determining NPLs by different researchers in different countries, utilizing different approaches and techniques and with varied conclusions, were thoroughly reviewed below.

The research landscape on non-performing loans (NPLs) is extensive and multifaceted, with studies from various countries employing diverse methodologies and examining a range of macroeconomic and bank-specific factors. Messai & Jouini (2013) investigated NPLs in Italy, Spain, and Greece, finding a negative correlation with real GDP rate and bank profitability but a positive correlation with unemployment rate, loan loss reserves, and real interest rate. Similarly, Mazreku et al. (2018) explored NPLs in transition countries, finding negative correlations with GDP and inflation but a positive correlation with unemployment. Kumar & Kishore (2019) studied NPLs in the UAE, finding a significant negative relationship with the liquidity ratio but insignificant relationships with other bank-specific and macroeconomic factors. Muvingi (2017) analyzed NPLs in Zimbabwean commercial banks, finding significant effects of GDP, inflation, loan-to-deposit ratio, and bank size on NPLs. Panta (2018) investigated NPLs in Nepal, finding a significant positive impact of net interest margin and a negative impact of bank size on NPLs. Washeka & Asif (2016) studied NPLs in Bangladesh and SAARC countries, finding mixed results regarding the impact of macroeconomic and bank-specific factors.

Argaw (2016) examined NPLs in Ethiopian state-owned banks, finding significant impacts of loan-to-deposit ratio, return on equity, and capital adequacy ratio. Ahmed (2017) explored NPLs in Indian banks, finding significant positive effects of gross advances and negative effects of secured loans on NPLs. Ofori-Abebrese et al. (2016) investigated NPLs in Ghana's HFC bank, finding significant impacts of loan interest rate, loan-to-asset ratio, and loan loss provision. San (2016) studied NPLs in Albania, finding negative correlations with remittances and the unemployment rate. Rajha (2017) examined NPLs in Jordanian banks, finding significant impacts of lagged NPLs, loan-to-assets ratio, economic growth, and inflation rate.

Memdani (2017) investigated NPLs in the Indian banking industry, finding mixed effects of bank-specific and macroeconomic factors. Gezu (2014) analyzed NPLs in Ethiopian commercial banks, finding significant impacts of capital adequacy ratio, lending rate, and return on assets. Haniifah (2015) studied NPLs in Ugandan banks, finding mixed effects of GDP growth rate, interest rate, and inflation rate on NPLs. Gambo et al. (2017) explored NPLs in Nigerian banks, finding significant positive impacts of loan-to-deposit ratio and bank size on NPLs. Mohanty et al. (2018) investigated NPLs in the Indian banking system, finding mixed effects of macroeconomic and bank-specific variables on NPLs. Joseph et al. (2012) analyzed NPLs in Zimbabwean banks, finding internal factors like credit policy and risk management to have limited influence, while external factors like natural disasters and government policies had a significant impact. Negera (2012) examined NPLs in Ethiopian banks, finding industry-related determinants to significantly influence NPLs. Murthy et al. (2017) studied NPLs in Malaysian banks, finding significant impacts of consumer income, economic conditions, and bank interest rates on NPLs.

Mensah & Adjei (2015) investigated NPLs in Ghanaian banks, finding significant impacts of both bank-specific and macroeconomic variables on NPLs. John (2018) explored NPLs in Nigerian banks, finding significant associations between GDP, unemployment rate, and exchange rate with return on assets. Ul Hassan et al. (2014) assessed NPLs in Pakistani banks, finding significant impacts of bank-specific factors like credit assessment and social factors like political interference. Louzis et al. (2012) studied NPLs in the Greek banking sector, finding significant effects of macroeconomic variables and management quality on NPLs. Jameel (2014) investigated NPLs in Pakistan, finding mixed effects of GDP growth rate, loan maturity period,

and lending rates on NPLs. Amino (2018) analyzed NPLs in Ethiopian banks, finding significant impacts of trade openness, loan growth, unemployment, and exchange rate on NPLs.

Zainol et al. (2018) investigated macroeconomic factors in Malaysia, finding that GDP negatively impacts NPLs, while base lending rate and household income distribution have positive relationships with NPLs. Ouhibi and Hammami (2015) studied Southern Mediterranean countries, revealing significant impacts of variables like nominal exchange rate and gross capital formation on NPLs. Warue (2013) examined Kenyan banks, identifying poor credit risk management as a driver of NPLs. Nkusu (2011) focused on advanced economies, finding links between NPLs and macroeconomic performance. De Bock and Demyanets (2012) explored emerging nations, highlighting the importance of GDP growth rate and exchange rates in predicting NPLs. Syed (2020) investigated South Asian countries, discovering significant relationships between banking legislation, banking efficiency, and NPLs. Murumba (2013) studied Nigeria, finding a positive association between real GDP and NPLs. Mensah & Adjei (2015) analyzed Ghanaian banks, revealing negative influences of inflation and real exchange rate on NPLs but a positive impact of bank size.

Morina (2020) examined Kosovo, emphasizing the importance of interest rates and bank profitability on NPLs. Islamoglu (2015) explored Istanbul's banking sector, highlighting the effects of commercial loan interest rates and public debt/GDP ratios on NPLs. Badar et al. (2013) investigated Pakistan, finding inflation and exchange rates to be causes of NPLs. Nguyen Thi Minh (2015) analyzed Vietnamese banks, revealing the impact of loan growth and bank size on NPLs. Torun & Altay (2019) examined the Eurozone, emphasizing the influence of macroeconomic variables like inflation and unemployment on NPLs. Kuzu and Celik (2019) analyzed bank-level and macroeconomic factors, finding varying relationships between NPLs and GDP, exchange rates, and unemployment rates. Kabatas and Karamustafa (2019) studied Turkey, revealing mixed effects of variables like total equity to total assets ratio and unemployment on NPLs. In Indonesia, Khafid et al. (2020) investigated factors like capital adequacy ratio and credit risk, finding positive effects on NPLs.

Cetinkaya (2019) focused on Turkey, utilizing panel data regression to identify factors influencing NPLs, revealing positive impacts of asset profitability and bank size on NPLs, while capital adequacy ratio and return on equity had negative effects. Khan et al. (2020) investigated

Pakistan's banking sector, finding negative relationships between NPLs and operating efficiency and profitability, but insignificant effects of capital adequacy and income diversification. Wood & Skinner (2018) examined Barbados' commercial banks, highlighting significant impacts of both bank-specific factors like return on equity and macroeconomic variables like GDP growth on NPLs. Hamid & Rahma (2019) studied Bangladesh, showing strong positive relationships of interest rate spread and exchange rate with NPLs but a negative link with GDP per capita growth. Roman et al. (2015) focused on EU countries, emphasizing GDP growth, unemployment, and domestic bank credit as key predictors of NPLs. Olarewaju (2020) explored lower-middle-income African countries, finding significant impacts of variables like lagged NPLs and lending rates on NPLs. Leka et al. (2019) analyzed Albania's banking sector, showing GDP growth, monetary aggregate M2, and loan interest rates as primary drivers of NPLs. Rachman et al. (2018) investigated Indonesia, revealing negative influences of profitability and credit growth on NPLs. Vaicondam et al. (2019) explored factors in the Malaysian banking industry, indicating impacts of inflation, unemployment, and interest rates on NPLs. Szarowska (2018) studied Central and Eastern European countries, highlighting the positive influence of unemployment and negative effects of inflation and economic growth on NPLs.

Lee & Rosenkranz (2019) focused on Asia, showing contributions of macroeconomic variables and bank-specific factors to NPL accumulation. Ramesh (2019) examined Indian PSBs, finding varying impacts of factors like credit-deposit ratio and return on assets on NPLs. Nargis et al. (2019) studied an emerging economy, revealing significant impacts of unemployment, inflation, and real interest rates on NPLs. Purnamasari and Ramayanti (2019) analyzed Indonesian sharia commercial banks, showing no statistical relevance of macroeconomic variables on NPLs. Azeem et al. (2012) investigated US commercial banks, highlighting significant relationships of NPLs with real interest rates and GDP growth. Morina (2019) focused on Kosovo, emphasizing the impact of interest rates on NPLs. Islam and Nishiyama (2016) explored South Asian countries, identifying various predictors of default risk in the banking sector. Msomi (2022) studied West African countries, revealing substantial impacts of liquidity ratio, capital adequacy ratio, and inflation rate on NPLs. Bhaarathi & Thilagavathi (2018) investigated India's banks, showing different influences of factors based on ownership type. Zunić et al. (2021) examined Bosnia and Herzegovina, highlighting the effects of non-performing loans, GDP, loan loss provision, and the COVID-19 outbreak on NPLs. Sun and Purwanto (2021) explored China,

revealing impacts of bank interest rates and inflation rates on NPLs. Hada et al. (2020) studied Romania, showing significant associations between NPLs and macroeconomic variables. Ciukaj & Kil (2020) analyzed European Union nations with high NPL levels, indicating the role of macroeconomic and microeconomic factors in explaining NPLs. Kjosevski (2018) investigated the Czech Republic, revealing significant impacts of GDP growth, inflation, and unemployment on NPLs, alongside bank-specific drivers.

Amin et al. (2021) used data from 24 scheduled commercial banks in Bangladesh to study the factors of non-performing loans. Their study used panel data regression analysis to estimate pooled OLS, fixed effects, and random-effects models. Macroeconomic factors and firm-specific characteristics linked to profitability, capital strength, and efficiency are evaluated. Their findings demonstrated that while return on assets and inflation negatively impact NPL, GDP growth positively affects bad loans.

Zheng et al. (2020) investigated the impact of industry-specific and macroeconomic factors on non-performing loans (NPLs) across Bangladesh's whole banking sector. They used an autoregressive distributed lag (ARDL) model to analyze data from 1979 to 2018 and validated the results' robustness using a vector error correction (VEC) model. Their findings revealed that industry-specific and macroeconomic factors significantly impact NPLs. Bank loan growth, net operating profit, and deposit rates had statistically significant and negative effects on NPLs, but bank liquidity and lending rates were substantially and positively related to NPLs. Among macroeconomic factors, GDP growth and unemployment were negatively correlated with NPLs, but domestic credit and exchange rates were positively associated with NPLs.

Hasan (2019) researched the macroeconomic factors that influence Bangladesh's banking firms' non-performing loans (NPLs). He employed a collection of time-series data from 2000 to 2017 to uncover significant correlations between variables using the Auto-Regressive Distributed Lag (ARDL) approach. Finally, the study's findings show that macroeconomic indicators such as GDP growth and the inflation rate have little bearing on the proportion of NPLs in Bangladesh.

Appiah and Bisiw (2020) investigated credit risk factors (NPLs) in Ghana's banking industry using panel co-integration techniques. They utilized NPL as a proxy to analyze credit risk and how macroeconomic and bank-related factors impact it. Panel co-integration approaches such as Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS)

were used to evaluate balanced panel data from 16 universal banks in Ghana from 2010 to 2016. The study's findings indicated that economic development, measured by gross domestic product, has long-term impacts on nonperforming bank loans (NPLs). The results also demonstrated that a bank's capital adequacy, profitability, and liquidity were essential predictors of NPLs. However, it revealed that bank size, inflation, and interest rates had a statistically minor impact on NPLs.

Based on data from 2004 to 2016, Avetisyan (2019) studied the factors of non-performing loans in the Armenian banking industry. The Fundamentals NPL factors such as GDP, wages, interest rate, housing price, return on assets, and loan losses were investigated. According to the study, wage and interest rate increases significantly impact the amount of NPLs. Furthermore, the study discovered that problem loans were inversely related to GDP growth and bank profitability (ROA) and positively related to unemployment and house prices.

Marouf et al. (2017) investigated the key macroeconomic parameters determining credit risk in the Algerian banking sector. They used macroeconomic data from 1980 to 2014 to perform empirical analysis to achieve their goal. They also employed the Ordinary Least Squares (OLS) approach to determine what elements explain credit risk in Algeria's banking sector. They used the Granger Causality Test as well. The findings reveal that credit risk in Algerian banks was primarily described by financial development, GDP, money supply, and political stability at the macroeconomic level. Indeed, their findings indicate that NPLs were directly associated with economic development, money supply, and political stability on the one hand and adversely associated with GDP growth on the other.

Minh Long et al. (2020) investigated the factors influencing non-performing loans (NPLs) in Vietnamese commercial banks. Data from commercial banks were collected from 2008 to 2017 to answer the research question. On a panel of 200 observations, a fixed-effects model was compared to a random-effects model in their study. As a result of their findings, NPLs were positively impacted by the preceding year's lag, capital structure, and interest rate. According to the results of the fixed-effects model, NPLs were also shown to be negatively impacted by returns on assets, inflation, and credit expansion. The effects of firm size and GDP, on the other hand, were not identified in any of the models.

Kocisova and Pastyriková (2020) used a panel data model to investigate the macroeconomic and microeconomic factors of non-performing loans in European Union countries between 2005 and

2018. According to the findings of their study, the unemployment rate, gross domestic product per capita, capital adequacy, private debt ratio, nominal effective exchange rate, and net interest margin are all found to have a substantial impact on the NPLs ratio.

Lee & Rosenkranz (2019) assessed the drivers of the progression of NPLs in Asia using a dynamic panel model and showed that macroeconomic conditions and bank-specific factors, including fast credit expansion and excessive bank lending, contribute to the accumulation of NPLs. Furthermore, in their investigation, a panel vector autoregression study of the macro-financial implications of NPLs in developing Asia provides compelling evidence of NPLs' feedback effects on the real economy and financial variables. Furthermore, their analysis demonstrated that an increasing NPL ratio reduces gross domestic product growth and credit supply and raises unemployment rates.

Syed and Aidyngul's (2020) study aimed to determine how bank-specific and macroeconomic drivers influence nonperforming loans in developed and emerging nations. They employed a dynamic Generalized Method of Moments (GMM) approach from 1995 to 2019 and fixed and random testing to ensure robustness. Their findings reveal that the growth rate, inflation, interest rate, CAR, credit to deposit ratio, and bank credit to the private sector were the shared macroeconomic and bank-specific factors impacting nonperforming loans in developed and developing nations. According to their findings, household consumption, unemployment, exchange rates, ROA, bank assets to GDP, and bank lending to the government sector were macroeconomic and bank-specific factors that exclusively influenced emerging economies.

2.6 Development of Conceptual Framework

A conceptual framework is a type of analytical instrument that comes in various shapes and sizes. It may be used in multiple fields where an overall image is required. It aids in the formation of conceptual differences and the organization of thoughts. Solid conceptual frameworks capture something real to remember and apply. In other words, the researcher's synthesis of the literature on how to explain a phenomenon is represented by the conceptual framework. Given his prior knowledge of other researchers' points of view and his observations on the area of research, it maps out the activities necessary throughout the investigation. It is inescapable to construct a conceptual framework because it is needed to arrive at hypotheses and

conduct research appropriately. The conceptual framework aids in the formation of an understanding of the study's interaction between variables.

A conceptual framework, in general, consists of one or more formal theories and various concepts and empirical data from the literature. It's utilized to explain how these concepts are related to each other and the research investigation. The following diagrammatical framework was established for this study, focusing on the impact of independent variables (macroeconomic and bank-specific determinants) on the dependent variable (NPLs).

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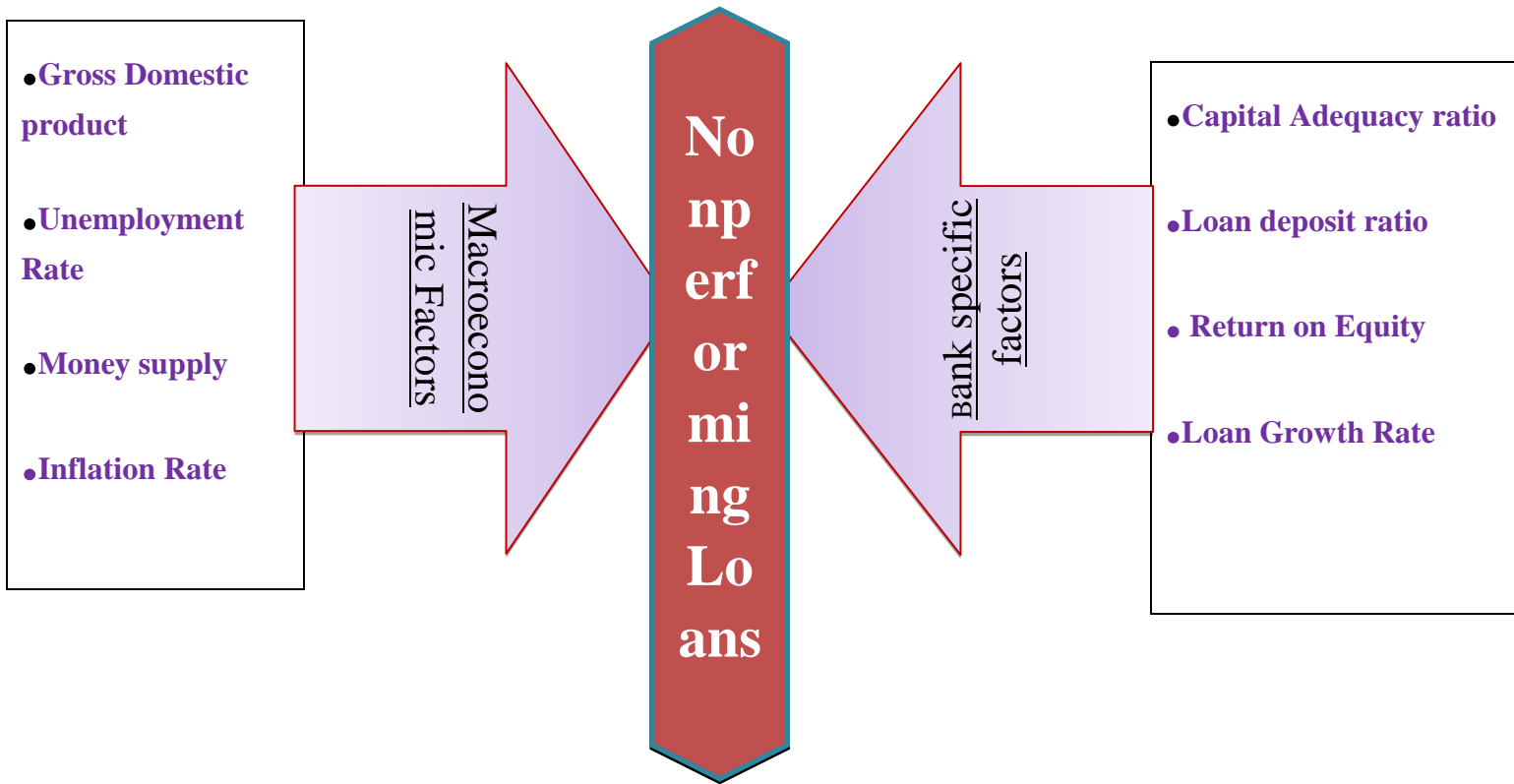


Figure2. 1 Conceptual framework of the study

Sources: *Researcher's Construct (2024)*

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Approach

The aim of this study is to investigate the factors affecting Non-Performing Loans (NPLs) of commercial banks in Ethiopia. The study used an explanatory research design, which goes beyond simply observing and describing a phenomenon to explore the reasons behind it. As discussed by Creswell (2013), explanatory research seeks to identify causal relationships among variables, explaining how and why certain variables are related and how changes in one variable may affect another. To achieve this aim, the study utilized a quantitative research approach, which is best suited for testing hypotheses and identifying factors that influence outcomes. The quantitative approach enables the study to specify and explain the relationships between variables, particularly how independent variables influence or affect the dependent variable of non-performing loans. By employing standardized measurement tools and defined data categories, the quantitative approach ensures reliable and objective measurement, minimizing bias and subjectivity in interpretation.

Quantitative research measures what happens objectively, rather than relying on subjective interpretations of events. It involves testing a sample and generalizing the findings to a larger population, thereby reducing complex problems to a manageable set of variables. This approach helps maintain impartiality and objectivity in the study's findings.

In this study, quantitative methods was used to analyze data obtained from secondary sources such as the National Bank of Ethiopia publications, reports of Minister of Finance, annual reports of commercial banks, and Central Statistical Agency reports. Quantitative designs was employed to investigate causal relationships between variables, allowing for the assessment of correlations and structured record reviews (documentary analysis) of financial information.

3.2 Population of the Study

All commercial banks, both private and public, currently operating in the country, were considered as the population for this study. According to the National Bank of Ethiopia (NBE) in

2024, the country has two publicly owned and 31 private commercial banks operating throughout the country.

3.3 Sampling Technique and Sample Size

The study utilized purposive non-probability sampling method, as it allows the researcher to use their judgment to select a sample that best meets the research objectives. The sample of Ethiopian commercial banks (ECBs) were selected based on seniority and credit disbursement share experiences.

The study used sample units from thirteen senior commercial banks out of the total of 33 commercial banks in Ethiopia. These banks include Commercial Bank of Ethiopia (CBE), Awash International Bank (AIB), Bank of Abyssinia (BOA), Cooperative Bank of Oromia (CBO), Dashen Bank (DB), Lion International Bank (LIB), United Bank (UB), Wogagen Bank (WB), Nib International Bank (NIB), Oromia International Bank (OIB), Zemen Bank (ZB), Buna International Bank (BIB) and Berhan Bank (BB) were be selected purposively. The study used panel data spanning 10 years from 2014 to 2023.

3.4 Model Specification

The study employs a multiple linear regression analysis to determine the relative importance of each independent variable in explaining the variation of Nonperforming Loans (NPLs) in Ethiopian Commercial Banks (ECBs). The general multiple regression equation used is as follows:

$$NPLs_{it} = \beta_0 + \beta_1(GDP)_t + \beta_2(UN)_t + \beta_3(MS)_t + \beta_4(IFR)_t + \beta_5(CAR)_{it} + \beta_6(LDR)_{it} + \beta_7(ROE)_{it} + \beta_8(LGR)_{it} + \varepsilon \dots \dots \dots (1)$$

Where;

NPLs_{it}: Stands for Non-Performing Loans of bank *i* at time *t*

β₀ is an intercept

β₁, β₂, β₃..... and *β₈* represent estimated coefficients.

GDP_t: Gross Domestic Product at time *t*,

UN_t: Unemployment Rate at time *t*,

MS_t: Money Supply at time *t*,

IFR_t: Inflation Rate at time *t*,

CAR_{it}: Capital Adequacy Ratio of Bank *i* at time *t*,

LDR_{it}: Loan to Deposit Ratio of Bank *i* at time *t*,

ROE_{it}: Return on Equity of Bank *i* at time *t*,

LGR_{it}: Loan Growth Rate of Bank *i* at time *t*, and ε represents error terms.

A multiple linear regression model was conducted using the Ordinary Least Squares (OLS) method with the EVIEWS 12 econometric software package. OLS was chosen because it outperform other estimators when the cross-section is small and the time dimension is short. Additionally, OLS is known to estimate the slope and intercept in a linear regression model effectively. If the Classical Linear Regression Model (CLRM) assumptions hold true, the estimation determined by OLS possess desirable properties and known as Best Linear Unbiased Estimators (Brooks, 2008).

3.5 Data Analysis

The data analysis plan should be chosen before collecting the data, and the raw data must be translated into a format that is acceptable for the needed analysis (Kothari, 2019). Data analysis using a systematic and appropriate procedure is required to provide the desired findings. To this end, for the current study, the procedures employs by the researcher in analyzing secondary data obtained from the sources mentioned above are explained as follows.

3.5.1 Secondary Data Analysis Procedures

In this study, quantitative data analysis approaches were used to explore the determinant factors of NPLs in Ethiopian commercial banks. As a result, descriptive statistics, a correlation matrix, and multiple linear regression analysis were used to examine the gathered panel data.

3.6 Explanations of Study Variables and their Expected Sign

While conducting a study supported by hypotheses testing, it is customary to predict and estimate the impact of dependent and independent variables against each other. To this end, this section entails the description of selected variables for the study along with their predicted impact. Moreover, the details of these variables' effects and their signs were extracted from

common sense, general knowledge, existing theories, and previously conducted empirical studies.

These variables are selected relatively based on their importance as well as changes undergone in the economic and business environment of the study area.

No	Variable	Notation	Explanation	Measurement	Expected sign
1	Nonperforming Loan	NPLs	Loans that are in a default or being in a default according to the contract term	By dividing individual banks' NPLs by the total gross loans and advances of the bank	
2	Gross Domestic Products	GDP	Value of final goods and services produced by a country in a specified period	Annual percentage change in the growth of GDP	-
3	Unemployment rate	UN	The situation in which a person who is actively searching for employment is unable to find work	By dividing the number of unemployed by the total labor force in a country	+
4	Money Supply	MS	An increased amount of money in circulation in a country	By measuring the increased percentage of money in circulation in a country	+
5	Inflation Rate	INF	Sustained increase in the general price level of goods and services in an economy of a country	Measured by deducting historical consumer price index from current price index and dividing by last year's consumer price index and multiplying by 100	+
6	Capital Adequacy Ratio	CAR	Measurement of a bank's available capital expressed as a percentage of a bank's risk-weighted credit	By dividing total capital by risk-weighted assets	-
7	Loan to Deposit Ratio	LDR	Measures the financial position or liquidity of a bank by comparing its total loans to total deposits for the same period.	By dividing the bank's total amount of loans by the total amount of deposits for the same period	+

8	Return on Equity	ROE	The ratio used to measure how well banks are performing in generating returns for their shareholders	By dividing net income by shareholders' equity	-
9	Loan Growth Rate	LGR	Reflects increase in credit offer of banks	Measured by dividing the net change in current year loans and advances balance over the preceding year loans and advances balance of an individual bank	+

Table 3.1 Summary of study variables

Sources: Compiled by Researcher

Note: “+” and “-” sign indicates the expected positive and negative impact of explanatory variables on the dependent variable or NPLs.

3.7 Ethical Considerations

Blumberg et al. (2005) describe ethics as a part of philosophy that deals with human conduct and directs people's norms or standards of behavior and interpersonal interactions. According to some writers, ethical considerations in research, as well as in general business, are becoming increasingly important. As a result, it's vital to grasp the fundamentals of ethical research and how they could affect a study effort. It is especially true if the study entails interacting with companies or members of the general public who behave as participants or respondents.

In addition to selecting proper research methodologies and approaches, it is critical to pay close attention to ethical considerations during the study process. Because researchers are professionals, research ethics has well-defined norms and principles that govern their behavior as a subset of applied ethics. Research ethics is critical in our day-to-day investigation endeavors, requiring that researchers maintain the dignity of their subjects and disclose their findings promptly (Fouka & Mantzourou, 2011). Ethical considerations in research are a framework of principles that steer your study designs and procedures. When gathering data from individuals, scientists and researchers must always follow a set of rules.

Anonymity is one of the most crucial issues to be considered while conducting research. Anonymity means not identifying respondents' ethnic or cultural backgrounds, not referring to

them by their names, or disclosing other sensitive information about a participant. This is why, during a study, a researcher must pledge to keep the respondent's information confidential. However, if any information must be released, the respondent's approval must be obtained. This improves the researcher's honesty by safeguarding the study subject from bodily and psychological damage as well as ensuring that the researcher does not ask embarrassing questions that might mislead or even startle the respondent (Mugenda, 2003). Accordingly, in this study regarding ethical consideration, three major issues will be duly addressed.

First, the participants' privacy and confidentiality was maintained by not disclosing their names and identities during data collection, analysis, and publication of the study results. Second, during data collection, the study ensures to obtain consent from each participant, and it was performed voluntarily. The researcher also safeguard the participants' rights and privacy. Participants were assured that the information they provide to assist the researcher kept private and was shared with anyone else, including their own staff. Finally, the researcher expressed gratitude to all organizations that provides critical data and information, as well as to all reference materials that utilized in the study.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents findings from the collected data, including descriptive analyses of variables and model specification tests like Ramsey's RESET. Key diagnostic tests for the Classical Linear Regression Model (CLRM), including checks for heteroscedasticity, normality, serial correlation, and multicollinearity, are discussed. The rationale for selecting the Ordinary Least Squares (OLS) regression model is outlined, followed by an analysis of regression results, detailing the relationships and significance levels between variables.

4.2 Descriptive Statistics

Descriptive statistics summarize the essential features of the data used in this study, presenting it in a more interpretable format. While they provide a clear, concise overview, they don't allow inferences beyond the data analyzed or enable judgments on proposed hypotheses they simply describe the data. The table below provides a summary of the mean, median, maximum, minimum, and standard deviation for all variables from thirteen senior commercial banks in Ethiopia over a 10-year period (2014–2023). Each variable includes the same number of observations, as balanced panel data were used in the study.

Table 4.1 : Summary of Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std Dev.	Observations
NPLs	5.14	5.31	7.74	0.00	1.70	130
GDP	9.77	9.91	12.55	6.81	1.52	130
UN	2.19	2.21	2.34	2.04	0.09	130
MS	8.28	8.44	9.87	7.07	0.85	130
IFR	13.45	10.13	32.01	6.65	7.93	130
CAR	8.91	9.00	13.87	7.35	0.77	130
LDR	51.43	54.46	69.89	33.33	8.38	130
ROE	48.95	46.56	73.55	23.27	11.80	130
LGR	7.57	7.57	14.56	3.00	1.77	130

Source: Audited financial statements of sampled banks, reports of NBE, MOF, & CSA compiled by the researcher via EViews 12.

The table reveals that during the study period, the Non-Performing Loans (NPLs) ratio for sampled Ethiopian commercial banks averaged 5.14%, surpassing the National Bank of Ethiopia's (NBE) 5% threshold, despite a low standard deviation of 1.7%. This highlights the

need for further research on the factors contributing to elevated NPLs, especially since larger banks undertaking extensive projects were included. Macroeconomic indicators such as GDP growth, averaging 9.77% with minimal fluctuation, and a consistent unemployment rate around 2.19%, show moderate economic stability. Meanwhile, the inflation rate (IFR) averaged 13.45%, indicating persistent inflationary pressures. The money supply (MS) steadily grew, averaging 8.28%, with low variability, reflecting a stable increase in currency circulation.

Capital Adequacy Ratio (CAR), a measure of risk-bearing capacity, had an average of 8.91%, closely aligning with the NBE's minimum 8% requirement and suggesting financial stability across the study period. The Loan-to-Deposit Ratio (LDR) averaged 51.43%, reflecting relatively high loan disbursement in relation to deposits. Banks' Return on Equity (ROE) showed a mean of 48.95%, with significant variation, indicating consistent returns but with variable performance across banks. The Loan Growth Rate (LGR) also underscores active loan portfolio expansion, further reflecting banks' responses to growing demand for credit amid economic fluctuations. Overall, these findings illustrate the interaction of macroeconomic conditions, regulatory measures, and bank-specific factors in influencing the financial landscape of Ethiopian commercial banks.

4.3 Correlation Analysis of Dependent and Explanatory Variables

Correlation is a statistical measure indicating the degree to which two or more variables are linearly related or change together. This technique describes relationships without establishing causality and explains how closely variables are linked. Correlation coefficients range from -1 to 1, with values closer to 1 or -1 signifying stronger relationships. This study employed Pearson correlation, which is the most common correlation measure, suitable here as the data were in ratio form. Pearson's coefficient ranges from 1 (perfect positive correlation) to -1 (perfect negative correlation). A value of zero indicates no association.

With a sample size over 100 (13*10 matrix), a correlation of 0.20 or more is considered statistically significant at a 5% level (Meyer et al., 2006). Importantly, correlation does not imply causation, only a linear relationship's strength between variables, as noted by Brooks (2014). The correlation coefficients among the study's dependent variable, NPLs, and explanatory variables are summarized in the following analysis.

Table 4.2: Correlation between Dependent and Independent variables

	NPLs	GDP	IFR	LDR	LGR	MS	ROE	UN	CAR
NPLs	1.000000	-0.452345	0.226863	-0.328056	0.630557	0.461534	-0.217330	0.707992	-0.125531

Source: Audited financial statements of sampled banks, reports of NBE, MOF, & CSA compiled by the researcher via EViews 12.

The table shows that Non-Performing Loans (NPLs) had statistically significant positive correlations with, Money Supply (0.4615), Inflation Rate (0.2269), Unemployment Rate (0.7080), Loan Growth Rate (0.6306), and Return on Equity (0.2173), suggesting meaningful positive linear relationships with NPLs. Conversely, NPLs exhibited statistically significant negative correlations with Gross Domestic Product (-0.4523), Capital Adequacy Ratio (-0.1255) and Loan-to-Deposit Ratio (-0.3281), indicating inverse relationships with these variables.

4.4 Test for Assumptions of Classical Linear Regression Model (CLRM)

The preceding section shows the simple descriptive statistics of the study regarding values of mean, median, standard deviation, number of observations, and values ranging from minimum to maximum over the study period, 2014 to 2023, and correlation results of dependent and explanatory variables. And this section presents the result of a detailed test carried out on the five basic assumptions of the classical linear regression model (CLRM).

Relating to classical linear regression model (CLRM), five basic assumptions; $E(u_t) = 0$, $(E(u_i^2) = \sigma_i^2)$ or $var(u_t) = \sigma^2 < \infty$, $cov(u_i, u_j) = 0$, $u_t \sim N(0, \sigma^2)$ and multicollinearity are required to be tested thoroughly. These basic assumptions suggest that the estimation procedures used, ordinary least square estimating parameters, and hypotheses testing of coefficient estimations, are undertaken reasonably (Brooks, 2014). Econometric estimation must realize and complete the fundamental and rudimentary classical linear assumptions to produce an unbiased, vigorous, reliable, and consistent outcome. These assumptions are: homoscedastic, linearity of parameters, serial correlation or autocorrelation, multicollinearity, and stochastic disturbance term or normality (Gujarati, 2004). The diagnostic tests were performed in this study to demonstrate that the data meets the basic assumptions of CLRM.

4.4.1 Test for Average Value of Error Term is Zero ($E(u_t) = 0$)

The term "error term," also known as "error of prediction" or "disturbances," represents the difference between the actual results of variables and their predicted outcomes in a model. The Classical Linear Regression Model (CLRM) assumes that the average value of the errors is zero. This assumption holds true when a constant term is included in the regression equation (Brooks, 2014). However, if the regression lacks an intercept, it can result in a non-zero error term, violating this assumption and potentially leading to undesirable results (Brooks, 2014). In this study, the inclusion of the constant term in the regression equation ensures that the assumption of a zero average error term is upheld.

4.4.2 Test for Heteroskedasticity ($E(u_i^2) = \sigma_i^2$) or Homoskedasticity

Homoscedasticity ($\text{var}(u_t) = \sigma^2 < \infty$) refers to a condition where the error terms in the population regression function are identical, independently distributed, and have equal variances with a zero mean. In contrast, heteroscedasticity ($E(u_i^2) = \sigma_i^2$) occurs when disturbances associated with each independent variable value come from distributions with different variances. This means that the variability of the response variable around the regression line is not constant. Heteroscedasticity often arises in cross-sectional data, where the scale of the dependent variable varies across observations. It is less common in time series data due to the similar magnitudes of the response and independent variable values (Mayssara A. Abo Hassanin, 2014).

According to Brooks (2014), constant error variance indicates homoscedasticity, while heteroskedasticity reflects the opposite. There are several methods to address heteroscedasticity, including the Breusch-Pagan-Godfrey Test, White's Test, Park Test, Glesjer Test, and ARCH Test. In this study, the Breusch-Pagan-Godfrey method was used to detect heteroscedasticity in the model, leading to the formulation of specific hypotheses to investigate the issue.

H0: Residuals are homoscedastic or not heteroskedastic

H1: Residuals are heteroskedastic

$\alpha = 5\%$

The decision rule states that if the P-value is less than the 5% significance level, we reject the null hypothesis (H0) and accept the alternative hypothesis. Conversely, if the P-value is greater than or equal to 5%, we fail to reject the null hypothesis.

Table 1.3: Heteroskedasticity Test Result

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.544125	Prob. F (16,113)	0.0965
Obs*R-squared	23.32346	Prob. Chi-Square (16)	0.1054
Scaled explained SS	25.82265	Prob. Chi-Square (16)	0.0566

Source: Audited financial statements of sampled banks, reports of NBE, MOFEC, & CSA compiled by the researcher via EViews 12.

The P-values from all tests presented in the table were above 5%, indicating that the variances of errors in the population regression were identically and independently distributed with equal variance, which is desirable. This result suggests that there is no evidence of a heteroskedasticity problem in the model, allowing us to retain the null hypothesis of homoscedasticity. In other words, the residuals are not heteroskedastic.

4.4.3 Test for Serial Correlation or Autocorrelation ($cov(u_i, u_j) = 0$ for $i \neq j$)

In time-based linear regression analysis, it's assumed that error terms are independent of their past values. If this condition isn't met, autocorrelation, or serial correlation, may occur, reflecting a correlation between values of the same variable across different observations. Autocorrelation indicates that error terms are not independent, contradicting the typical assumption in statistical models like linear regression, where errors are expected to be uncorrelated (Huitema & Laraway, 2016).

As Brooks (2014) highlights, autocorrelation often appears in cross-sectional data when the covariance among error terms is not zero, suggesting errors are serially correlated. In this study, the Breusch-Godfrey Serial Correlation LM Test was used to check for autocorrelation. The following hypotheses were tested to examine the presence of serial correlation in the model.

H0: There is no serial correlation problem in the model

H1: There is a serial correlation problem in the model

$\alpha = 5\%$

When it comes to the autocorrelation problem in the model, the decision rule states that if the P-value is greater than 5%, accept the null hypothesis and reject the alternative hypothesis. If the P-value and other related values are less than 5% significant, the decision criterion rejects the null hypothesis and embraces the alternative hypothesis (H1).

Table 4. 4: Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.194263	Prob. F (2,111)	0.8237
Obs*R-squared	0.453443	Prob. Chi-Square (2)	0.7971

Source: Audited financial statements of sampled banks, reports of NBE, MOF, & CSA compiled by the researcher via EViews 12.

As presented in the above table, the EViews results show F-statistics of 82.37% and a chi-squared statistic of 79.71%, both exceeding the 0.05 significance level. Since these values are higher than the threshold significance level in each instance, we cannot reject the null hypothesis, confirming that no serial correlation problem exists in the model.

Test for Normality ($ut \sim N(0, \sigma^2)$)

To meet the classical linear regression model (CLRM) assumption of normality, it is essential to verify that error terms follow a normal (bell-shaped) distribution. Before conducting regression and statistical analyses, we check that the data conforms to a normal distribution, as several parametric tests assume this as a prerequisite. Normality in this context implies that disturbances are evenly distributed, without skewness.

To assess normality, we create a histogram of disturbances and visually inspect the data for bell-curve characteristics. If residuals appear unskewed, the normality assumption is likely met. The Jarque-Bera test, commonly used to verify the normality of residuals, provides an objective method for this analysis. This test ensures the normality of error terms ($ut \sim N(0, \sigma^2)$), which is necessary to conduct reliable single or joint hypothesis tests (Brooks, 2014).

In this study, we applied the Jarque-Bera test to evaluate whether residuals follow a normal distribution in the model, formulating the following hypotheses to guide the assessment:

H0: There is no problem with residuals normal distribution

H1: There is the problem of residuals normal distribution

$\alpha = 5\%$

Decision rule: If the p-value found on the Jarque-Bera test is less than the 5% significance level, reject the null hypothesis (H0) and accept the alternative hypothesis and vice versa.

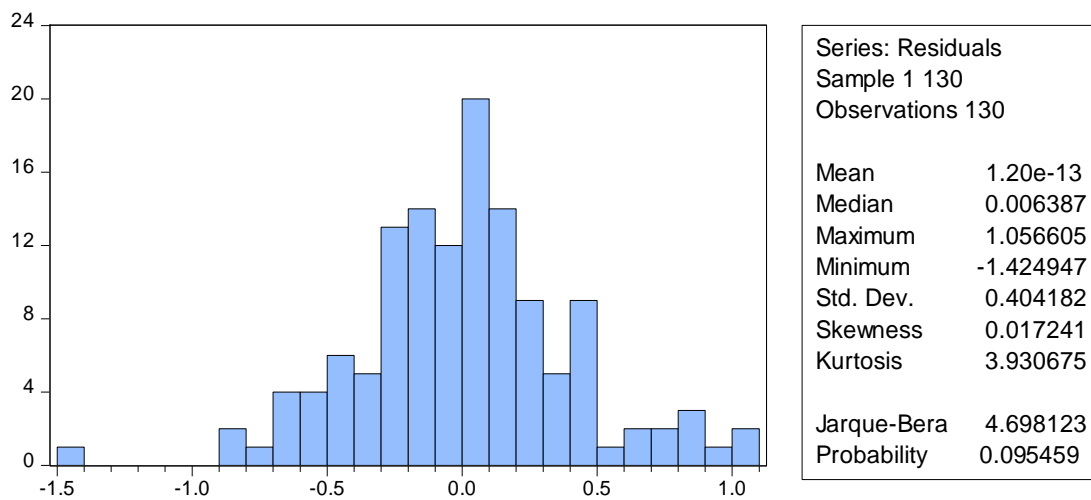


Figure 4. 1: Test for Normality

Source: Audited financial statements of sampled banks, reports of NBE, MOF, & CSA compiled by the researcher via EViews 12.

As shown in the table above, the P-value of Jarque-Bera statistics is 0.095, which is higher than the 0.05 significance level, indicating that our data was normally distributed. As a result, we do not reject the null hypothesis that residuals in the model are normally distributed.

4.4.5 Test for Multicollinearity

In regression analysis, multicollinearity occurs when explanatory variables are highly correlated, inflating variances and standard errors, raising p-values, and lowering t-statistics, which can render significant variables insignificant. Researchers suggest various thresholds for detecting multicollinearity, with correlation coefficients of 70% (Kennedy, 2008), 75% (Malhotra, 2007), 80% (Gujarati, 2004), or up to 90% (Hair et al., 2006) as indicators.

Table 4.5: Multicollinearity Test

	CAR	GDP	IFR	LDR	LGR	MS	ROE	UN
CAR	1							
GDP	0.014	1						
IFR	(0.056)	(0.099)	1					
LDR	(0.0003)	(0.286)	(0.046)	1				
LGR	0.005	0.300	0.178	(0.273)	1			
MS	0.009	0.305	0.263	(0.324)	0.385	1		
ROE	0.134	(0.162)	(0.283)	0.069	(0.078)	(0.279)	1	
UN	(0.006)	0.106	0.196	(0.032)	0.545	0.596	(0.226)	1

Source: Audited financial statements of sampled banks, reports of NBE, MOF, & CSA compiled by the researcher via EViews 12.

In this study, the correlation matrix shows no high correlation among explanatory variables, indicating that multicollinearity is not an issue, allowing for individual assessment of each variable's effect on the dependent variable.

4.5 Model Specification and Error Analysis

Model specification involves deciding which explanatory variables to include or exclude in a regression equation. This selection should be guided by empirical evidence, theory, research goals, and logical reasoning. Checking for model specification is crucial before estimation, as errors can reduce the reliability of results. Specification errors like omitting relevant variables or including irrelevant ones can lead to biased or inefficient estimates, particularly if omitted variables correlate with included ones.

To address specification issues, tests such as Adjusted R², the Recursive Residual Test, and Ramsay’s RESET Test can be used. In this study, Ramsay’s RESET Test was applied to assess nonlinearity and ensure model accuracy.

The Ramsay RESET test of the model specification was carried out based on the following hypotheses:

H0: There is no problem with the model specification

H1: There is a problem with model specification

$\alpha = 5\%$

Regarding the above formulated null and alternative hypotheses, the decision rule stipulates that we reject the null hypothesis and accept the alternative hypothesis if the P-value obtained from Ramsay’s RESET test is significant or less than 5%. In other words, reject the alternative hypothesis and accept the null hypothesis if the P-value is greater than 5%.

Table 4.6 : Model Specification test

Ramsey RESET Test			
Equation: UNTITLED			
Omitted Variables: Squares of fitted values			
	Value	df	Probability
t-statistic	0.669694	112	0.5044
F-statistic	0.448490	(1, 112)	0.5044
Likelihood ratio	0.519529	1	0.4710

Source: Audited financial statements of sampled banks, reports of NBE, MOF, & CSA compiled by the researcher via EViews 12

As indicated in the above table, the P-values were greater than the significance level of 5%, specifically 50.04% for t-statistics, 50.04% for f-statistics, and 47.10% for the likelihood ratio. So, in this study, we cannot reject the null hypothesis (H0). On the other hand, the functional form was relevant, and our model specification was correct.

4.6 Model Selection for Panel Data Regression

Model selection in panel data analysis requires evaluating potential models to identify the most suitable fit for the data. In this study, three models were considered: the Common Effect Model, also called the Pooled Least Square (PLS) Model; the Fixed Effect Model (FEM); and the

Random Effect Model (REM). The Common Effect Model assumes homogeneity across all observations, pooling the data without accounting for individual differences among entities. Given the distinct characteristics of each bank in this study, the PLS model was unsuitable and thus excluded.

The Fixed Effect Model (FEM) and Random Effect Model (REM) both accommodate individual characteristics of each entity. The FEM, also known as the Least Squares Dummy Variable (LSDV) approach, captures specific, unobserved individual traits that do not vary over time. The REM, also termed the Error Component Model (ECM) or Generalized Least Square (GLS), assumes random sampling of cross-sectional units and accounts for these differences stochastically. To determine the most appropriate model between FEM and REM, the Hausman test was applied. This test evaluates whether individual effects are better treated as fixed or random.

Since the sample in this study was not randomly selected, the Fixed Effect Model was deemed the most appropriate. FEM effectively captures individual-specific characteristics, making it suitable for examining the unique, non-random attributes of each bank. Consequently, the regression results based on the FEM approach are presented in Table 4.7, reflecting the model's effectiveness in capturing bank-specific differences.

4.7 Result of Regression Analysis

As indicated in chapter three, the study utilized the following empirical model to estimate the impact of explanatory variables against response or the dependent variable (NPLs).

$$NPLs_{it} = \beta_0 + \beta_1(GDP)_t + \beta_2(UN)_t + \beta_3(MS)_t + \beta_4(IFR)_t + \beta_5(CAR)_{it} + \beta_6(LDR)_{it} + \beta_7(ROE)_{it} + \beta_8(LGR)_{it} + \varepsilon \dots \dots \dots (1)$$

Where;

NPLs_{it}: Stands for Non-Performing Loans of bank *i* at time *t*

β₀ is an intercept

β₁, β₂, β₃..... and *β₈* represent estimated coefficients.

GDP_t: Gross Domestic Product at time *t*,

UN_t : Unemployment Rate at time t ,

MS_t : Money Supply at time t ,

IFR_t : Inflation Rate at time t ,

CAR_{it} : Capital Adequacy Ratio of Bank i at time t ,

Table 4.7: Regression Output of Fixed Effect Model

Dependent Variable: NPLs				
Method: Panel Least Squares				
Date: 11/04/24 Time: 20:45				
Sample: 2014 2023				
Periods included: 10				
Cross-sections included: 13				
Total panel (balanced) observations: 130				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-386.0491	63.97209	-6.034648	0.0000
GDP	-0.464390	0.099327	-4.675355	0.0000
UN	155.7506	24.98979	6.232568	0.0000
MS	0.379785	0.072963	5.205186	0.0000
IFR	0.036186	0.009469	3.821526	0.0002
CAR	-0.115347	0.054567	-2.113860	0.0370
LDR	0.015063	0.007227	2.084141	0.0697
ROE	-0.008888	0.004112	-2.161303	0.0330
LGR	0.103791	0.031909	3.252700	0.0016
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.889657	Mean dependent var	7.734615	
Adjusted R-squared	0.859067	S.D. dependent var	1.170353	
S.E. of regression	0.439362	Akaike info criterion	1.386754	
Sum squared resid	19.49694	Schwarz criterion	2.026435	
Log-likelihood	-61.13901	Hannan-Quinn criter.	1.646678	
F-statistic	29.08326	Durbin-Watson stat	2.176588	
Prob(F-statistic)	0.000000			

Source: Audited financial statements of sampled banks, reports of NBE, MOF, & CSA compiled by the researcher via EViews 12.

4.8 Interpretations of Corresponding Results

Table 4.7 in the EViews output is divided into three main sections. The upper section outlines the primary inputs for the regression, including the chosen method, number of cross-sections, observations, period, sample size, and the response variable influenced by explanatory variables. The middle section provides specifics on each explanatory variable, listing constants, coefficients, standard errors, t-statistics, and p-values to indicate the impact and significance of each variable. The bottom section presents summary statistics such as R-squared, adjusted R-squared, and F-statistics, which evaluate the model's overall fit and explanatory power.

4.8.1 Interpretation and Discussion of R- Squared (R²)

R-squared, or the coefficient of multiple determinations, measures how well the explanatory variables collectively explain the variation in the dependent variable, serving as an indicator of the model's goodness of fit. Its value ranges from 0 to 100%, with values closer to 100% suggesting a stronger fit. In this study, the R-squared value was 88.96%, indicating that 88.96% of the variation in non-performing loans (NPLs) among Ethiopian commercial banks from 2014 to 2023 was explained by the included variables. The remaining 11.04% represents variations due to factors not captured in the model. According to some literature, an R-squared above 60% suggests a well-fitting model, validating further analysis. Thus, the model's R-squared confirms its suitability for this study.

4.8.2 Interpretation and Discussion of Adjusted R-Squared

Adjusted R-squared is a refined version of R-squared that accounts for the inclusion of non-significant predictors in a regression model. Typically, it is slightly lower than R-squared, reflecting whether additional predictors improve model accuracy. In this study, the adjusted R-squared was 85.90%, which is positive and lower than the R-squared. This value suggests that 85.90% of the variability in non-performing loans (NPLs) among Ethiopian commercial banks can be explained by the combined macroeconomic and bank-specific variables in the model, while the remaining 14.10% is likely due to other factors not included.

4.8.3 Interpretation and Discussion of F- Statistics

F-statistics assess the overall significance of the regression model, indicating how well the model fits the data. A value above the 5% significance level is generally considered relevant. In this study, the F-statistics value was 29.08%, exceeding the 5% threshold, indicating that the model is significant. Additionally, the corresponding p-value for the F-statistics was 0.000000, which is well below the 5% level, suggesting that the independent variables jointly exert a strong influence on the dependent variable, non-performing loans (NPLs).

Another important statistic reported in the EViews output is the Durbin-Watson statistic, which tests for serial correlation in the residuals. According to Brooks (2014), a Durbin-Watson value close to 2.0 indicates no serial correlation, while values closer to 0 suggest potential serial correlation issues. In this study, the Durbin-Watson value was 2.1, indicating that there is no problem with serial correlation in the model.

4.9 Discussions and Interpretations of Regression Results

This section discusses the coefficients of independent variables and their effects on the dependent variable, non-performing loans (NPLs). As shown in Table 4.7, the explanatory variables, including the unemployment rate (UN), money supply (MS), inflation rate (IFR), loan-to-deposit ratio (LDR), and loan growth rate (LGR), have positive coefficients of 155.75, 0.37, 0.036, 0.015, and 0.105, respectively. These positive coefficients indicate that as these variables increase, NPLs also rise correspondingly. In contrast, the other explanatory variables exhibit negative coefficients, suggesting an inverse relationship with NPLs. Specifically, an increase in gross domestic product (GDP), capital adequacy ratio (CAR), and return on equity (ROE) is associated with a decrease in NPLs, with coefficient estimates of -0.46, -0.11, and -0.008, respectively. This implies that improvements in these negative determinants are likely to reduce non-performing loans in Ethiopian commercial banks.

4.10 Hypotheses Testing

Hypothesis testing is a technique that enables researchers to evaluate assumptions about population parameters systematically. It serves as a method for testing claims or ideas related to a specific group or population. In this study, the coefficients of explanatory variables and their impacts on the dependent variable, non-performing loans (NPLs) of Ethiopian commercial

banks, were previously discussed. This section further explores the hypotheses presented in Chapter One, analyzing the effects of explanatory variables on NPLs in greater detail. Additionally, the statistical findings of this study are compared with existing empirical evidence to draw meaningful conclusions about the relationships observed.

4.10.1 Non-Performing Loans and Gross Domestic Products

H1a: Gross domestic product has a negative and significant impact on the NPLs of Ethiopian Commercial Banks.

As shown in Table 4.7 of the fixed effect regression model results, gross domestic product (GDP) has a negative coefficient of -0.464390, indicating a significant inverse relationship with non-performing loans (NPLs). This relationship is statistically significant with a p-value of 0.0000, supporting the hypothesis that GDP negatively impacts NPLs. Specifically, a 1% change in GDP leads to a 46.43% opposite change in NPL levels.

The negative association between GDP and NPLs suggests that economic growth enhances borrowers' repayment capacities. Higher GDP typically results in increased business profitability and job opportunities, reducing the likelihood of loan defaults. Conversely, during economic downturns, declining GDP negatively affects borrowers' ability to repay their loans, leading to higher NPLs.

These findings align with previous research, including Zainol et al. (2018) in Malaysia, Radivojevic & Jovovic (2017), Meessai & Jouini (2013) in Italy, Greece, and Spain, Oboriyi and Igbiosa (2014) in Nigeria, Vogiazas & Nikolaidou (2011) in Romania, and Mazreku et al. (2018) and Kjosevski et al. (2019) in Nepal. These studies consistently indicate that GDP growth is a crucial determinant of NPL levels, highlighting the importance of economic performance in influencing loan repayment behavior.

4.10.2 Non-Performing Loans and Unemployment Rate

H1b: The unemployment rate has a significant and positive impact on the NPLs of Ethiopian commercial banks.

The regression results indicate that the unemployment rate has a significant positive impact on non-performing loans (NPLs) in Ethiopian commercial banks, with a coefficient estimate of 155.75 and a highly significant p-value of 0.0000 at the 1% significance level. This suggests that as unemployment to 1557.5% rises, NPLs also increase, supporting the hypothesis that unemployment is a key determinant of NPL levels.

When individuals are unemployed, they lack the income necessary to meet their financial obligations, leading to higher rates of loan defaults. Rising unemployment not only affects individual incomes but also reduces consumer demand for products, which can adversely impact businesses, leading to decreased revenues and further financial instability.

This finding is consistent with previous studies, such as those by Kjosevski et al. (2019) in Macedonia, Mazreku et al. (2018), Berhani & Ryskulov (2014), and Messai & Jouini (2013) across Spain, Greece, and Italy. These studies also report a positive and significant relationship between unemployment and NPLs. However, it contradicts Amino (2018), who found a negative impact of unemployment on NPLs.

4.10.3 Non-Performing Loans and Money Supply

H1c: Money supply has a significant and positive effect on NPLs of Ethiopian commercial banks.

The regression results indicate that the money supply has a positive coefficient estimate of 0.37 and a statistically significant p-value of 0.000, demonstrating a significant impact on non-performing loans (NPLs) in Ethiopian commercial banks. This supports the hypothesis that changes in the money supply directly influence NPL levels. Specifically, a 1% increase in the money supply results in a 37.97% increase in NPLs, all else being equal.

An increase in the money supply typically promotes economic growth by enhancing borrowing capacity and spending. However, excessive money supply can lead to inflation, diminishing purchasing power and ultimately hindering borrowers' ability to meet their financial obligations. As a result, this imbalance may contribute to higher rates of NPLs.

This finding aligns with several studies that report a positive relationship between money supply and NPLs, including research by Ofori-Abebrese et al. (2016), Badar et al. (2013) in Pakistan, Ombunya (2017) in Kenya, and Rulyasri et al. (2017) in Indonesia. Conversely, it contradicts findings from Berhani & Ryskulov (2014) in Albania, Khemraj & Pasha (2005) in Iran, Rifat (2017), and Bahruddin & Masih (2019), who observed a negative association between money supply and NPLs.

4.10.4 Non-Performing Loans and Inflation Rate

H1d: *The inflation rate has a significant and positive impact on the NPLs of Ethiopian commercial banks.*

The regression analysis indicates that the inflation rate has a positive coefficient estimate of 0.036186, with a statistically significant p-value of 0.0002. This suggests that inflation significantly impacts non-performing loans (NPLs) in Ethiopian commercial banks, confirming the study's hypothesis. Specifically, a 1% increase in the inflation rate results in a 3% increase in NPLs.

Theoretical explanations for this positive relationship include increased demand, reduced production, and excess money circulation, which can devalue currency. While inflation can reduce the real value of outstanding debts, excessive inflation negatively affects borrowers' ability to meet financial obligations. Higher inflation increases the cost of living, diminishes purchasing power, and leads to higher interest rates, making debt repayment more challenging.

Consistent with this study, previous research has identified a significant positive relationship between inflation and NPLs, including findings from Radivojevic & Jovovic (2017) in 25 emerging nations, Rizvi et al. (2015) in Pakistan, and Gjini & Koprencka (2018). However, contrary findings exist in studies by Mazreku et al. (2018), Kjosevski et al. (2019), and others, which report a negative association between inflation and NPLs.

4.10.5 Non-Performing Loans and Capital Adequacy Ratio

H1e: *The capital adequacy ratio has a significant and negative impact on the NPLs of Ethiopian commercial banks.*

The regression analysis reveals a negative coefficient estimate of -0.115347 for the capital adequacy ratio (CAR), with a statistically significant p-value of 0.0370 at the 5% significance level. This indicates that the CAR inversely affects non-performing loans (NPLs) in Ethiopian commercial banks, supporting the study's hypothesis. Specifically, a 1% change in the CAR leads to an 11.53% change in NPLs in the opposite direction, suggesting that as banks increase their capital, NPLs decrease.

The CAR measures a bank's capital relative to its risk-weighted assets, ensuring that banks can absorb losses. In Ethiopia, the National Bank of Ethiopia mandates a minimum CAR of 8% to enhance banking stability and protect depositors. The negative relationship observed may imply that well-capitalized banks are better positioned to manage risks and are less likely to engage in risky lending practices, leading to lower NPLs.

These findings align with previous studies, such as those by Keeton & Morris (1987), Rahman et al. (2017), Ghosh (2019), Makri et al. (2014), and Ali (2018), which highlight the negative impact of CAR on NPLs. However, they contrast with findings from Jovovic (2017), Kjosevski et al. (2019), and Sirak (2016), who reported a positive relationship between CAR and NPLs.

4.10. 6 Non-Performing loans and Loan to Deposit Ratio

H1f: The loan to deposit ratio has a positive and significant effect on the NPLs of Ethiopian commercial banks.

The loan-to-deposit ratio (LDR), an indicator of a bank's ability to fund withdrawals, shows a positive coefficient estimate of 0.015063 and a statistically significant p-value of 0.0697. at the 5% significance level. This indicates that the LDR positively and insignificantly impacts non-performing loans (NPLs) in Ethiopian commercial banks

Ethiopian banks often maintain high LDRs, driven by competition and the desire to maximize profitability through lending. While a low LDR suggests underutilization of deposits, a higher ratio indicates more lending, which can lead to a greater incidence of NPLs as banks may extend credit to lower-quality borrowers to capitalize on idle funds.

The findings opposes several studies, including those by Jabir & Tole (2019), Kjosevski et al. (2019), Washeka & Asif (2016), Gambo et al. (2017), and Asfawesen (2017), all of which report a positive and significant relationship between LDR and NPLs. However, they align with the

findings of Rengasamy (2014) and Gezu (2014), who found a positive but insignificant influence, as well as Panta (2018), who reported a negative impact.

4.10.7 Non-Performing Loans and Return on Equity

H1g: Return on equity has a significant and negative impact on the NPLs of Ethiopian commercial banks.

The regression analysis indicates that return on equity (ROE) has a negative coefficient estimate of -0.00888 with a statistically significant p-value of 0.0330 at the 5% significance level. This suggests that ROE negatively impacts the level of non-performing loans (NPLs) held by Ethiopian commercial banks during the study period, supporting the hypothesis that ROE significantly influences NPLs.

The results imply that a 1% change in ROE leads to a corresponding change of 0.008888 in NPLs in the opposite direction. In other words, as ROE increases, NPLs decrease, and vice versa. While both ROE and return on assets (ROA) serve as indicators of a bank's profitability, the study suggests that ROE has a weaker effect on NPLs compared to ROA.

The negative relationship between ROE and NPLs can be attributed to effective management within the Ethiopian banking industry. Higher ROE reflects profitability and efficient management, indicating that banks are effectively using equity contributions to generate additional profits. This efficient management may lead to lower levels of risky operations, resulting in fewer NPLs. Moreover, a stable and rising ROE over time suggests that banks are skilled at enhancing shareholder value by strategically reinvesting earnings to boost profitability.

These findings align with previous studies by Makri et al. (2014), Waqas et al. (2019), Ali (2014), Gezu (2014), Washeka & Asif (2016), Ozil (2019a), Radivojevic & Jovovic (2017), Abid et al. (2014), Muratbek (2017), and Kjosevski & Petkovski (2017), all of which reported a significant negative influence of ROE on NPL levels.

4.10.8 Non-Performing Loans and Loan Growth Rate

H1h: Loan growth rate has a significant and positive effect on the NPLs of Ethiopian commercial banks.

The study finds a positive and substantial influence of loan growth on non-performing loans (NPLs) in Ethiopian commercial banks. The regression analysis shows that the loan growth rate has a coefficient estimate of 0.103791, with a statistically significant p-value of 0.0016, indicating significance at the 1% level. This result confirms the study's hypothesis that an increase in loan growth is positively correlated with the level of NPLs.

Specifically, a 1% change in the loan growth rate results in a 10.37% change in NPLs in the same direction, assuming all other variables remain constant. This highlights loan growth as one of the strongest predictors of NPLs in Ethiopian commercial banks during the study period.

The positive relationship can be attributed to the current economic development focus in Ethiopia, where there is a heightened demand for credit from state-owned and private enterprises. As commercial banks respond to this demand by extending more loans, the risk of NPLs increases. This is partly due to the challenges associated with asymmetric information or adverse selection that can arise during rapid loan growth.

Although Ethiopian commercial banks have implemented stringent loan disbursing procedures and maintain effective customer follow-up mechanisms, the push for industrialization requires substantial funding from financial institutions. This necessity for significant loans across various sectors means that banks inevitably carry a higher volume of NPLs as they expand their lending portfolios.

The findings of this study align with previous research indicating a positive link between loan growth and NPLs, as supported by the works of Ali (2018), Jabir & Tole (2019), Bhul et al. (2016), Petkovski et al. (2018), Chavan & Gambacorta (2016), and Washeka & Asif (2016). Conversely, some studies, including those by Koju et al. (2018), N & A (2015), Amino (2018), Kjosevski et al. (2019), Muratabek (2017), and Rachman et al. (2018), reported a negative impact of loan growth on NPLs, which contrasts with the findings of this study.

4.11 Summary of Explanatory Variables

To summarize the actual results and the predicted influence of the explanatory factors on the response variable (non-performing loans, NPLs) in Ethiopian commercial banks (ECBs), the table below can be structured. This table includes the coefficient estimates, p-values, and the

significance levels for each variable, along with a note on whether the hypotheses were supported or not.

Table 4.8: Summary of Explanatory Variables

Hypothesis	Independent Variable	Expected Sign	Actual Sign	Supported/Not Supported	Significance Level
H1	Gross Domestic Product	Negative & Significant	Negative & Significant	Supported	1%
H2	Unemployment Rate	Positive & Significant	Positive & Significant	Supported	1%
H3	Money Supply	Positive & Significant	Positive & Significant	Supported	1%
H4	Inflation Rate	Positive & Significant	Positive & Significant	Supported	1%
H5	Capital Adequacy Ratio	Negative & Significant	Negative & Significant	Supported	5%
H6	Loan to Deposit Ratio	Positive & Significant	Positive & Insignificant	Not Supported	10%
H7	Return on Equity	Negative & Significant	Negative & Significant	Supported	5%
H8	Loan Growth Rate	Positive & Significant	Positive & Significant	Supported	1%

Source: Own computation

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CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The preceding chapter presents the results and outcomes derived from the data collected as previously outlined. In this chapter, we have thoroughly examined the descriptive statistics of all explanatory variables alongside the dependent variable utilized in this study. We also conducted model specification tests and discussed the regression results obtained from the model computation, focusing on the direction and strength of the associations between the independent and dependent variables. This chapter aims to summarize the primary findings revealed through the analysis of the regression model and to provide precise suggestions or recommendations based on these findings.

5.2 Conclusion

The overall objective of this study was to investigate the determinant factors influencing nonperforming loans (NPLs) in Ethiopian commercial banks. To achieve this broad objective, a quantitative research methodology was employed, incorporating a survey design alongside a systematic evaluation and review of relevant documents.

The literature indicates that the causes of NPLs have been examined in various countries, revealing that both internal and external factors often determine banks' NPL levels. Internal determinants refer to characteristics that distinguish individual banks, typically linked to their specific policy choices. In contrast, external determinants are independent of bank management and represent the external environment affecting loan quality. Consequently, this study considered both macroeconomic variables and industry-related, or bank-specific factors after a thorough review of prior research conducted by scholars in various countries. Based on the study's primary objective, eight hypotheses were formulated.

A purposive sampling technique was employed to select thirteen Ethiopian commercial banks with strong credit histories. Panel data (secondary) were collected for the years 2014 to 2023 from the financial statements of the sampled banks, as well as from reports published by the National Bank of Ethiopia, the Ministry of Finance, and the Central Statistical Agency.

To evaluate the hypotheses, quantitative research techniques were utilized. Descriptive statistics and multiple linear regression analysis were applied to examine the quantitative data, with the analysis and discussion organized according to the study's hypotheses and primary objectives.

To ensure adherence to the assumptions of the Classical Linear Regression Model (CLRM), the gathered data were tested for heteroscedasticity, multicollinearity, normality, and linearity. The results indicated no violations of these assumptions. Ramsay's RESET test was conducted to assess model specification, confirming that the functional form was appropriate and the model specification was correct.

All macroeconomic and bank-specific explanatory factors were included in a multiple regression model to evaluate their influence on nonperforming loans. The regression equation was calculated using the fixed-effect model, with parameters estimated via Ordinary Least Squares (OLS) techniques.

The descriptive analysis revealed that the average NPL ratio for the selected Ethiopian commercial banks from 2014 to 2023 was 5.14%, which is nearly aligned with the Basel standard and the industry benchmark of 5% set by the National Bank of Ethiopia (NBE).

The empirical results, as expressed by the R-Squared value, indicate that 88.96% of the variation in non-performing loans (NPLs) of Ethiopian commercial banks (ECBs) over the study period from 2014 to 2023 was explained by the explanatory variables included in the model. The remaining 11.04% of changes in NPLs could be attributed to other independent variables that were not included in the model.

One macroeconomic factor examined in this study is the growth of gross domestic product (GDP), which negatively influenced the level of nonperforming loans held by ECBs from 2014 to 2023. This suggests that increases in real GDP correlate with a decrease in the likelihood of loan defaults, as robust positive GDP growth generally leads to higher income levels, improving borrowers' ability to service their debts.

Conversely, unemployment had a favorable impact on the prevalence of NPLs, as an increase in the number of unemployed individuals in a country signifies economic insufficiency. Consequently, individuals may lack a reliable income source to meet their financial obligations,

contributing to the rise of nonperforming loans. In this study, the unemployment rate emerged as the most critical and significant determinant of NPLs, with a positive coefficient estimate of 155.75.

Another macroeconomic variable analyzed was the money supply, which was found to have a significant and positive influence on the NPLs of ECBs. This indicates that high inflation levels lead to an excess of money in the economy, which in turn reduces the purchasing power of money. As borrowers' ability to meet financial obligations diminishes, this results in an increase in nonperforming loans.

The study also indicates a significant and positive influence of the inflation rate on NPLs. While inflation can reduce the real value of debt and facilitate repayment for debtors, rising prices of goods and services increase the cost of living, hinder economic development, and raise the likelihood of loan defaults.

Among bank-related variables, the capital adequacy ratio demonstrated a significant coefficient estimate at the 5% significance level, exerting a negative impact on the NPLs of ECBs. This relationship suggests that an increase in capital enhances the bank's ability to absorb financial shocks, with high capital adequacy reflecting efficient management and overall financial health.

The loan-to-deposit ratio, which measures a bank's capacity to meet client withdrawals and its liquidity by comparing total loans to total deposits, was also addressed. This study found that this ratio has a positive yet insignificant influence on nonperforming loans.

Another bank-specific determinant examined was return on equity (ROE), which measures financial performance by dividing net income by shareholders' equity. The results indicated that ROE has a negative and statistically significant impact on the volume of NPLs in Ethiopian commercial banks during the 2014 to 2023 period. This negative effect implies that higher profitability and effective management exist regarding the funds invested by shareholders in Ethiopian commercial banks.

Additionally, the findings revealed that the loan growth rate was a crucial driver of NPLs in ECBs throughout the study period. It was shown to have a positive and significant impact on NPLs, indicating that an increase in loan disbursement heightens the risk of nonperforming

loans. This is attributed to the somewhat expedited loan disbursement practices of ECBs to meet market demand.

5.3 Recommendations

Recommendations or suggestions are an essential part of the study since they specify particular actions or directions that may be followed based on the study's results. To this end, the following possible and potential suggestions and recommendations were made and forwarded based on the study's findings.

Strengthening Economic Growth: To mitigate the impact of nonperforming loans (NPLs), it is crucial for Ethiopian policymakers to focus on strategies that enhance real GDP growth. This can be achieved by promoting investment in various sectors of the economy, creating job opportunities, and fostering a favorable business environment. Increased economic activity will improve borrowers' income levels, thereby reducing the likelihood of loan defaults.

Addressing Unemployment: Since unemployment significantly influences the prevalence of NPLs, targeted initiatives to reduce joblessness should be prioritized. Programs aimed at skill development, vocational training, and entrepreneurship support can help boost employment rates, ensuring that more individuals have stable incomes to meet their financial obligations.

Monitoring Money Supply and Inflation: The findings suggest a strong relationship between money supply, inflation, and NPLs. Regulatory authorities should implement effective monetary policies to manage money supply and control inflation levels. Keeping inflation in check will help maintain the purchasing power of borrowers and support their ability to service debts.

Enhancing Capital Adequacy: Banks should focus on improving their capital adequacy ratios to strengthen their resilience against financial shocks. This can involve retaining a higher percentage of earnings, which can enhance the bank's ability to absorb potential losses and manage risk effectively.

Revising Loan Disbursement Practices: Commercial banks should reassess their loan disbursement practices to ensure a more cautious and thorough evaluation of borrower

creditworthiness. Implementing stricter credit appraisal processes can help minimize the risk of loan defaults, particularly during periods of rapid loan growth.

Promoting Efficient Management: Banks should strive for improved management practices to boost return on equity (ROE). Effective management can enhance profitability, which in turn will reduce the level of NPLs. Regular training and development programs for bank staff can ensure that they are equipped with the skills necessary for sound credit management.

Conducting Regular Risk Assessments: Continuous monitoring and assessment of both macroeconomic and bank-specific factors that influence NPLs are essential. Regular risk assessments will enable banks to proactively identify and address potential issues before they escalate into significant problems.

Enhancing Customer Education: Financial institutions should invest in educating customers about responsible borrowing and financial management. By improving financial literacy among borrowers, banks can help ensure that individuals understand their repayment obligations, which can lead to a reduction in NPLs.

“Future research should investigate the impact of political instability on the accumulation of non-performing loans (NPLs) in the banking sector political instability, including domestic conflicts and geopolitical risks can negatively impact the financial well being of firms and individuals ultimately leading to increased NPLs.” Political instability can lead to market disruptions ,reducing investment and capital inflows which negatively impacts economic growth and the ability of borrowers to repay loans.

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