

COLLEGE OF BUSINESS AND ECONOMICS

DETERMINANTS OF NON-PERFORMING LOANS: EVIDENCE FROM SELECTED PRIVATE COMMERCIAL BANKS IN ETHIOPIA

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DECLARATION

I, the undersigned, declared that this research project is my original work. It has not been submitted to none other than Addis Ababa University College of Business and Economics for partial fulfillment of the requirement for Degree of Masters in Business Administration in Management.

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CERTIFICATE OF APPROVAL OF THESIS

COLLEGE OF BUSINESS AND ECONOMICS

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This is to certify that the thesis prepared by **Chanyalew Debebe Damtew**, entitled **"Determinants of Non-Performing Loans (NPLs): Evidence From Selected Private Commercial Banks in Ethiopia"** and submitted in partial fulfillment of the requirements for the Degree of Masters of Business Administration in Management, complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ABSTRACT

This study investigates the determinants of non-performing loans (NPLs) in selected private commercial banks in Ethiopia using panel data from 2020–2025. Ten banks were analyzed: Awash, Dashen, Bank of Abyssinia, Cooperative Bank of Oromia, Wegagen, NIB, United, Bunna, Abay, and Zemen, yielding 60 bank-year observations. A quantitative approach was employed, applying Panel Least Squares regression with robust standard errors. Diagnostic tests confirmed the absence of multicollinearity, heteroskedasticity, autocorrelation, and violations of normality assumptions.

Results show that both bank specific and macroeconomic variables affect NPL with Net interest margin and GDP growth exert negative and significant effects on NPLs, while loan growth and loan-to-deposit ratio are positively associated. Firm size and management efficiency are insignificant, inflation is positive but insignificant, and lending rate is negative and significant. The model demonstrates strong explanatory power with $R^2 = 0.9883$.

Policy implications suggest private banks should cap annual loan growth at 20 percent and set loan-to-deposit ratio alerts at 85 percent. High net interest margin should be treated as a positive indicator. The National Bank of Ethiopia should jointly monitor loan growth, loan-to-deposit ratio, and GDP; link provisions to loan growth above 15–20 percent, and apply interest rate policy cautiously. Bank management should align incentives with NPL performance while maintaining cost control.

Keywords: *Non-Performing Loans, credit risk, commercial banks, Ethiopia, panel data, profitability, loan growth, GDP, interest rate*

CHAPTER ONE

INTRDUCTION

1.1 BACKGROUND OF THE STUDY

The banking industry plays a central role in economic growth by mobilizing resources, allocating loans, and facilitating financial intermediation. Globally, the sustainability of banks depends largely on their ability to manage risks, particularly credit risk, which arises from lending activities that form the core of commercial banking operations. Loans are the primary assets and income sources for banks, and their impairment directly undermines profitability and financial stability. Non-performing loans (NPLs), defined as loans overdue by 90 days or more, remain one of the most critical challenges facing the sector.

Recent global evidence confirms that NPL ratios are shaped by both macroeconomic conditions and bank-specific practices. Salas, Jiménez, and Saurina (2024) found that GDP growth, inflation, interest rates, loan growth, and management efficiency consistently determine NPL levels across 111 countries. Following the 2008 financial crisis, NPLs surged worldwide, declined during 2015–2018 under low interest rates, and rose again during the COVID-19 pandemic (Beck, Silva, & Wagner, 2023). In 2024, European banking data reported NPL ratios at historic lows of 2.08 percent, yet vulnerabilities remain in real estate and SME lending due to higher borrowing costs (European Banking Authority, 2024). These findings highlight that NPLs reduce profitability, constrain credit supply, and threaten systemic stability, making their management a global regulatory priority.

In Sub-Saharan Africa, NPLs are strongly linked to macroeconomic volatility. Omorokunwa and Emovon (2024) confirmed that exchange rate instability, lending rates, GDP growth, and inflation significantly affect NPL accumulation, while weak institutional frameworks exacerbate credit risk. Akuoko-Konadu (2024) further emphasized that corruption and poor judicial enforcement increase NPLs, while sustained economic growth and stronger institutional quality reduce them. These findings underscore that regional vulnerabilities—rapid credit expansion, inflationary pressures,

and governance weaknesses—make NPL management particularly challenging in developing economies.

In Ethiopia, the banking sector has expanded rapidly, with private banks increasing in number and competition intensifying. Despite directives from the National Bank of Ethiopia (NBE) aimed at strengthening credit risk management, banks continue to experience rising NPLs. Desta (2024) found that exchange rate fluctuations significantly increase NPLs, while capital adequacy, income diversification, and loan-to-asset ratios reduce them. Gudeta and Ravishankar (2026) confirmed that NPLs negatively affect profitability, reducing return on assets and eroding asset quality. Earlier studies also showed that loan growth and loan-to-deposit ratio are major drivers of NPLs, while inflation has a positive but statistically insignificant effect (Mekonnin, 2021).

This study therefore integrates eight variables—net interest margin, loan growth, loan-to-deposit ratio, firm size, management efficiency, inflation, GDP growth, and lending rate—to analyze NPL determinants in Ethiopia. Globally, these variables reflect established determinants of NPLs; regionally, they highlight vulnerabilities in Sub-Saharan Africa; and locally, they provide a structured lens for analyzing Ethiopia's banking sector. Net interest margin and GDP growth are expected to reduce NPLs, while loan growth and loan-to-deposit ratio increase them. Lending rate also reduces NPLs, though its effect must be balanced against growth. Inflation, firm size, and management efficiency show weaker or insignificant effects in Ethiopia but remain relevant for profitability and operational sustainability.

By situating Ethiopia within this global–regional–local continuum, the study contributes to understanding how universal risk factors interact with country-specific conditions to shape loan portfolio quality. This framework provides empirical evidence to help banks and regulators strengthen credit policies, improve risk management practices, and promote a more resilient financial system.

1.2 STATEMENT OF THE PROBLEM

Non-performing loans (NPLs) remain a persistent challenge in Ethiopia's banking sector, undermining profitability and financial stability despite regulatory directives from the National Bank of Ethiopia (NBE). While prior studies have examined selected determinants of NPLs, they have not provided a comprehensive framework that integrates both bank-specific and macroeconomic variables.

Evidence shows that loan growth and loan-to-deposit ratios significantly influence NPLs in Ethiopian banks (Desta, 2024; Demssie & Tilahun, 2025). Firm size has been linked to NPL reduction, while profitability measures such as ROA and ROE have been used as proxies for management efficiency (Mekonnin, 2021; Gudu, 2023). Macroeconomic factors such as inflation, GDP growth, and lending rates have also been found to affect NPL accumulation, though results are often inconsistent (Gudu, 2023; Mekonnin, 2021). Case-based evidence further confirms that NPLs erode profitability in individual banks such as Awash Bank (Gudeta & Ravishankar, 2026).

However, critical gaps remain. Net interest margin (NIM), a key profitability indicator widely recognized in global literature (Salas, Jiménez, & Saurina, 2024), has not been empirically tested in Ethiopia. Existing studies often rely on single-bank case analyses or pre-COVID datasets, failing to capture the combined impact of bank-specific and macroeconomic shocks in the post-pandemic era. Moreover, no Ethiopian study has systematically examined how these variables interact to jointly influence NPLs.

The central problem, therefore, is that Ethiopian banks face sustained pressure from NPLs without comprehensive empirical analysis of the eight critical determinants: net interest margin, loan growth, loan-to-deposit ratio, firm size, management efficiency, inflation, GDP growth, and lending rate. While each of these variables has been studied in isolation, their unique contribution lies in being analyzed together within a unified framework. This integrated approach is essential to reveal interaction effects, provide sector-wide insights, and generate evidence that can guide both bank-level credit policies and NBE regulatory directives. Addressing this problem is critical to safeguarding

profitability, strengthening risk management, and ensuring the resilience of Ethiopia's financial system.

1.3 RESEARCH QUESTIONS

The study was guided by the following central and subsidiary research questions. These questions were structured to ensure alignment with the dependent variable (NPLs), the selected bank-specific and macroeconomic determinants, and the broader research objective.

1.3.1 Central Research Question

- What are the main determinants of non-performing loans (NPLs) in selected private commercial banks in Ethiopia?

1.3.2 Specific Research Questions

- How does loan growth affect the level of non-performing loans in selected private commercial banks in Ethiopia?
- What is the impact of bank profitability, measured by Net Interest Margin on Ethiopian private commercial banks NPL ratio?
- How does bank size influence the NPL ratio in private commercial banks?
- What is the effect of management efficiency on the level of non-performing loans?
- How the loan-to-deposit ratio (LDR) affects non-performing loans in private commercial banks?
- How does inflation influence the NPL ratios of private commercial banks in Ethiopia?
- What is the effect of GDP on non-performing loans?
- How does interest rate (lending Rate) affect loan repayment performance and the probability of default in private commercial banks?

1.4 OBJECTIVES OF THE STUDY

1.4.1 General Objective

The general objective of the study was to examine the determinants of non-performing loans (NPLs) in selected private commercial banks in Ethiopia by analyzing the effects of bank-specific factors and macroeconomic variables.

1.4.2 Specific Objectives

- To evaluate the effect of loan growth on the level of non-performing loans in selected private commercial banks.
- To investigate the impact of bank profitability on non-performing loans.
- To analyze the influence of bank size on the non-performing loan ratio.
- To examine how the loan-to-deposit ratio (LDR) affects non-performing loans in private commercial banks.
- To determine the effect of management efficiency on the level of non-performing loans.
- To examine the effect of inflation on non-performing loans in the Ethiopian private banking sector.
- To determine how GDP growth influences the level of non-performing loans.
- To analyze the impact of interest rate levels on borrower repayment capacity and non-performing loans.

1.5 SIGNIFICANCE OF THE STUDY

This study is significant because it addresses a persistent challenge in Ethiopia's banking sector—non-performing loans (NPLs)—through a **novel integration of eight determinants**: **net interest margin, loan growth, loan-to-deposit ratio, firm size, management efficiency, inflation, GDP growth, and lending rate.** While each of these variables has been examined individually in prior Ethiopian or global studies, their **unique contribution lies in being analyzed together within a unified framework.**

Academic Contribution

By combining bank-specific and macroeconomic variables, this study fills a methodological gap in Ethiopian NPL research. Previous works (Mekonnin, 2021; Gudu, 2023; Demssie & Tilahun, 2025) examined subsets of these determinants, but none integrated all eight simultaneously. This holistic approach allows for the identification of **interaction effects**—for example, how loan growth interacts with inflation or how management efficiency moderates the impact of lending rates. Such insights enrich the literature on credit risk in developing economies and provide a replicable model for other emerging markets.

Practical Contribution for Banks

For Ethiopian private banks, the findings will provide actionable evidence on how internal factors (loan growth, efficiency, net interest margin, firm size) combine with external shocks (inflation, GDP growth, lending rates) to influence NPLs. This enables banks to move beyond fragmented risk assessments and adopt **comprehensive credit policies**. By understanding the joint impact of these variables, banks can strengthen portfolio management, improve profitability, and reduce vulnerability to macroeconomic volatility.

Policy Contribution for Regulators

For the National Bank of Ethiopia (NBE), the study offers empirical grounding for regulatory directives. Current NBE guidelines emphasize credit monitoring and provisioning but lack sector-wide evidence that integrates both bank-specific and macroeconomic determinants. By demonstrating how these eight variables jointly drive NPLs, the study equips regulators with a stronger basis for designing **evidence-based policies** that align with sector realities and promote financial stability.

1.6 ORGANIZATION OF THE STUDY

This research is structured in five chapters. Chapter one gives an introduction to the study including Background of the study, statement of the problem, research questions, objectives and significance of the study. Chapter two highlights the literature review while Chapter three is about research methodology. Chapter four covers major findings,

explanation of the results of the study. Chapter five will conclude and summarize the findings and also give recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter gives a wider view of the concepts and variables used in this study through past scholarly works. The scope of this chapter will cover the literature review about the relevance of non-performing loan, relevant theories, empirical findings and theoretical framework that guides this study.

2.2 CONCEPTUAL AND THEORETICAL REVIEW

2.2.1 The Concept of Non-Performing Loan

Definition of non-performing loan differs from one country to another. The classification of one particular loan as non-performing in one country does not guarantee that it will be seen as the same in another country. However, there is still some level of similarity between the definitions found internationally. The International Monetary Fund (2015) in their Compilation Guide on Financial Soundness Indicators defines non-performing loan as any loan whose interest and /or principal payments are overdue by 90 days or more. This also includes a loan where interest is capitalized, refinanced or rescheduled beyond 90 days and where interest payments are less than 90 days but there is enough indication, such as bankruptcy, that the payment cannot be fully repaid.

Similarly, the Basel Committee on Banking Supervision (2001) cited by Kargi (2011) considers a loan to be non-performing if the borrower fails to meet repayment obligation at the request of a bank, or when a borrower is in arrears by more than 90 days. All the above mentioned criteria make up a good working definition for non-performing loans, forming the basis of the rest of this study.

As per NBE Directive No. SBB/90/2024, non-performing exposures are defined as bank credit exposures which are non-performing either because they are defaulted or credit impaired under IFRS, among other factors indicating inability of full repayment of principle and interest even without collateral. They are exposures which are past due by more than 90 days, sub-standard, doubtful or loss; and overdrafts or loans which lack

fixed repayment terms and remain unpaid, exceed limit, accrue uncollected interest, remain inactive, do not have sufficient deposit balances, or record minimum debit transactions for a period of 90 consecutive days or more (NBE, 2024).

Classification of Exposures

An exposure is classified as Pass when there is no evidence of increased credit risk since its recognition. In this case, the borrower's financial status and repayment ability adequately cover the exposure, and it does not raise supervisory concerns.

Exposures are placed under Special Mention when there is a significant increase in credit risk. This includes situations where repayment schedules are overdue for thirty days or more but less than ninety days, or where obligations without repayment schedules remain outstanding for the same period. It also applies when balances exceed borrowing authority, interest remains unpaid, or overdraft accounts are dormant or show negative balances between one and four percent of the borrowing authority for thirty consecutive days within the last year.

The Sub-standard category applies when repayment schedules are overdue for ninety days or more but less than one hundred eighty days. It also covers overdrafts and exposures without repayment schedules that remain overdue for the same period, exceed borrower limits, or show unpaid interest. Overdraft accounts inactive for ninety days or showing debit balances between five and nineteen percent of the approved limit also falls under this classification.

Exposures are deemed Doubtful when repayment plans are overdue by one hundred eighty days but not exceeding three hundred sixty days. This includes overdrafts overdue for the same period, unpaid interest, or accounts idle for one hundred eighty days with debit balances between twenty and forty-nine percent of the approved limit.

Finally, exposures are classified as Loss when repayment schedules are overdue for three hundred sixty days or more. Loans, advances, and overdrafts without repayment schedules also fall into this category if debts remain unpaid, balances exceed approved limits, interest is delinquent, or overdraft accounts are inactive for three hundred sixty days or show debit balances of fifty percent or more of the approved limit.

According to NBE Directive No. SBB/90/2024, exposures classified as Sub-standard, Doubtful, and Loss are recognized as non-performing loans (NPLs).

Unlikely to Pay

Although the classifications for sub-standard, doubtful, and loss exposures are primarily based on days past due, banks must also assess whether there is evidence indicating that full repayment—under the original contractual terms or revised terms for restructured exposures—is unlikely without realizing collateral. In such circumstances, exposures shall be classified as non-performing regardless of the number of days past due.

The National Bank of Ethiopia (NBE) requires all banks to establish a Loan Loss Provision account, which is funded through charges to provision expenses in the income statement and maintained at a level sufficient to cover potential losses in the loan and advance portfolio. When assessing the adequacy of this provision, banks may allocate provisions to specific individual loans or advances, or to groups of loans or advances. The Loan Loss Provision account must always carry a credit balance. Any increases or decreases in this account are to be made exclusively through provision charges recognized in the income statement, and such adjustments must be recorded at least on a quarterly basis.

2.2.2 Related Theories

2.2.2.1 Credit Risk Theory

According to Credit Risk Theory, non-performing loans occur as a result of the borrower's inability to meet their repayment duties according to the terms of the contract. Lending creates credit risk for banks when they are uncertain about the ability of a potential client to generate future cash flow and be able to pay back a loan (Saunders & Cornett, 2019). Therefore, credit risk theory posits that all lending processes come with inherent risks especially if the financial institution does not conduct the proper assessments to establish the borrower's creditworthiness.

In addition, as per Credit Risk Theory, failure to perform thorough credit appraisals poses significant risks of default on loan payments since the banks may offer credit services to clients who do not have the capacity to repay. Furthermore, the risk is even bigger when the lender relies heavily on collateral than on assessing borrower's cash-flow generation capabilities (Saunders & Cornett, 2019). This implies that at the time of granting the credit facilities, the borrower appears capable but later experiences difficulties in repaying.

Another key aspect captured by credit risk theory is the significance of loan monitoring to detect early signs of borrower problems. Financial institutions face credit risks even with borrowers having good credit profiles because of the ever-changing economic, business, and personal conditions which affect borrowers (Basel Committee on Banking Supervision, 2001). Lack of monitoring can only serve as an obstacle to the detection of problems such as late payments and reduced transaction volumes that could alert the lenders that something is wrong.

Finally, inadequate credit risk management framework and internal control systems also increase the chances of experiencing losses from credit lending activities. Banks which lack sound risk policies, credit scoring models, and post-loan monitoring procedures tend to experience high cases of defaults (Saunders & Cornett, 2019). This is one of the reasons why authorities stress the need for banks to have robust risk management systems. In developing countries, credit risk is also affected by unstable economic environments, informal businesses, and lack of adequate documentation.

2.2.2.2 Information Asymmetry Theory

According to the Information Asymmetry Theory, Non-performing Loans occur due to informational inequalities existing between borrowing firms and lenders. Borrowers have more reliable and relevant information regarding their financial standing, the willingness to repay the debt, and risks associated with their businesses as compared to lenders (Stiglitz & Weiss, 1981). Informational asymmetry has several negative implications on banking transactions and plays an important role in explaining the reasons behind loan default.

In addition to other problems that come along with informational asymmetry, there are two main issues discussed under this theory. Adverse selection occurs prior to loan issuance and refers to the situation where risky borrowers have greater chances of applying for loans and getting them issued due to ineffective mechanisms of selecting customers (Stiglitz & Weiss, 1981). Consequently, banks find themselves faced with risky investments.

Moral hazard refers to behaviors of borrowers, who take risks greater than agreed on with the lender due to the understanding that some losses will be absorbed by the bank. This problem is especially acute when borrowers know that the bank does not have a good monitoring system in place or expects some flexibility on part of the financial institution (Stiglitz & Weiss, 1981). Such risky activities contribute greatly to default probability. It should be emphasized that information asymmetry is more severe in developing countries due to the absence of effective accounting standards, poor credit rating systems, and prevalence of informal economy. Due to this fact, banks cannot properly evaluate their customer risks leading to high NPL levels.

In general terms, the Information Asymmetry Theory reveals the institutional causes of NPL formation.

2.2.2.3 Agency Theory

Non-performing loans can be explained under Agency Theory because they result from the principal-agent problem. The theory posits that an agent is likely to act against the long-term goals of the firm when he has incentives to do so. In the banking sector, for instance, loan officers can approve risky loans in order to meet their performance standards, get bonuses, or create a good name for themselves in the industry, despite the high risks associated with such loans (Jensen & Meckling, 1976).

The result is poor decision-making on the part of the bank, hence leading to the accumulation of non-performing loans. Poor corporate governance further complicates this issue especially in cases where there are weak systems of accountability within institutions. Agency issues also emerge when the management focuses more on short-

term profits than sustainable growth (Jensen & Meckling, 1976). As a result, they take extreme risks which may generate revenues in the short term but eventually end up compromising the quality of their assets. Such instances were common during financial crises where reckless lending behaviors resulted in a high rate of loan defaults.

Weak internal controls and lack of effective supervision can also enable agency issues to continue unabated. The key components of agency problems include strong corporate governance, performance-based accountability, and independent risk management systems (Jensen & Meckling, 1976).

2.2.2.4 Macroeconomic Theory of Non-Performing Loans

According to the Macroeconomic Theory, non-performing loans can be attributed to macroeconomic determinants that affect the ability of the debtor to repay loans. Several macroeconomic factors, including GDP growth rate, inflation, interest rate, and unemployment rate, play an important role in determining the performance of a loan (Louzis, Vouldis, & Metaxas, 2012).

Economic contraction leads to decreased business revenues and job losses. Therefore, during such periods, the repayment capability of the debtor is weakened. Consequently, the default rate increases, leading to high non-performing loans (Louzis et al., 2012). Conversely, periods of economic expansion bring increased income levels that promote debt repayment capabilities.

Another important macroeconomic factor is the interest rate and the level of inflation in an economy. Inflation results in a decrease in the real income level, while an increase in interest rates results in higher debt servicing costs. Both situations may cause financial instability, leading to non-performing loans. The impact of macroeconomic instability is particularly severe in developing countries, which have inadequate financial buffers and, hence, are sensitive to income risks. During crises, the non-performing loan ratio tends to increase significantly.

2.2.2.5 Moral Hazard Theory

The Moral Hazard Theory postulates that NPLs are the result of opportunism of the debtors after obtaining financing because, when a debtor knows that the costs of default are not fully borne, the borrower can engage in risky behavior with the finances (Akerlof & Shiller, 2015).

This situation occurs particularly in financial systems with inefficient legal enforcement mechanisms and lax credit discipline because the borrower knows that any penalties are small, thus can engage in irresponsible borrowing behavior or default on loans in such financial systems. The same happens with banking systems where debt restructuring is conducted regularly but does not involve imposing severe discipline on debtors; thus, they may expect future loan defaults to go unnoticed. To minimize moral hazards, legal enforcement needs to be efficient, and penalties must be enforced (Akerlof & Shiller, 2015).

2.2.2.6 Life Cycle Theory

Under Life Cycle Theory, there were fears that the quality of loans declines as the borrowers experience various difficulties in finance, operations, or marketplaces. As per Berger & DeYoung (1997), loans which have been doing very well at the beginning can slowly turn into non-performing loans because of the change in economic conditions and/or the inability of the borrower to maintain discipline. It is important to note that lack of effective monitoring of a loan's entire life cycle leads to an increased chance of default. In addition, banks which do not undertake timely reviews of their loan portfolios and associated risks usually identify issues too late. Lastly, when banks grow too fast, they develop lax underwriting policies, and as a result, the level of non-performing loans becomes high during later periods. This can be attributed to the fact that when banks expand rapidly, they tend to experience poor asset quality afterwards (Berger & DeYoung, 1997).

2.2.2.7 Franchise Value Theory

Franchise value theory provides an important lens for understanding risk-taking behavior in banks. The theory posits that banks with high franchise value—defined as the present

value of expected future profits derived from reputation, customer loyalty, and regulatory protection—are less likely to engage in excessive risk-taking, since they have more to lose from jeopardizing their long-term rents (Hellmann, Murdock, & Stiglitz, 2000). Conversely, when franchise value erodes due to competition, deregulation, or macroeconomic shocks, banks may increase risk exposure, leading to higher levels of non-performing loans. Recent empirical work revisiting the franchise value hypothesis has shown mixed evidence: while franchise value can act as a stabilizing force, its erosion does not always lead to risk-taking in predictable ways (De Nicolò, 2025). In the Ethiopian context, the dominance of the top ten private banks suggests that these institutions possess relatively strong franchise value compared to newer entrants. Their reputational rents and systemic importance may encourage more prudent lending practices, whereas smaller banks with weaker franchise value may be more vulnerable to aggressive credit expansion and subsequent NPL accumulation. Thus, franchise value theory supports the rationale for focusing on the leading banks in Ethiopia, as their behavior is likely to shape overall sector stability.

2.2.2.8 Financial Intermediation Theory

Financial intermediation theory provides one of the earliest explanations, emphasizing the role of banks as intermediaries between savers and borrowers. According to Gurley and Shaw (1960), banks mobilize deposits and allocate them to productive investments, and profitability enhances their ability to monitor and screen borrowers. In this context, higher net interest margins (NIM) strengthen banks' capacity to manage credit risk, thereby reducing loan defaults.

2.2.2.9 Risk-taking Channel Theory

The risk-taking channel theory further explains the positive association between loan growth and NPLs. As highlighted by Borio and Zhu (2012), rapid credit expansion often weakens screening standards and increases default risk, particularly when banks pursue aggressive lending strategies. This theory is especially relevant in emerging economies, where regulatory frameworks may be less stringent and banks are incentivized to expand their loan portfolios quickly.

2.2.2.10 Risk-adjusted Pricing Model

Risk-adjusted pricing models provide insight into the role of lending rates in determining NPLs. Stiglitz and Weiss (1981) argue that interest rates serve as a screening mechanism: higher lending rates discourage risky borrowers and improve repayment discipline. When banks set rates according to borrower risk profiles, they can reduce adverse selection and moral hazard, thereby lowering default rates.

2.3 CAUSES OF NON-PERFORMING LOANS

Non-performing loans may be caused by borrower characteristics, specific bank weaknesses, macroeconomic conditions, as well as institutional factors. Understanding these causes is vital for mitigating credit risks and promoting financial stability. The causes of NPLs are explained below.

2.3.1 Poor Credit Appraisal and Poor Risk Assessment

Poor credit appraisal before lending is one of the leading causes of NPLs. Weak analysis of the borrowing capacity, cash flow position, as well as the credit history of customers often makes financial institutions lend to unprofitable clients who cannot service their obligations. When banks fail to carry out comprehensive investigations, credit risks escalate rapidly (Saunders & Cornett, 2019).In many cases, banks overly depend on collateral instead of analyzing the earning capacity of customers. Such practices are bound to cause loss in the event that the value of collaterals reduces or becomes difficult to realize. Poor risk assessment may also result from inefficiency of internal controls and inadequacy in staff capacities.

2.3.2 Information Asymmetry

Information asymmetry refers to the unequal access to information about credit status and risk profiles of customers, which leads to adverse selection and moral hazards, two main causes of NPLs (Stiglitz & Weiss, 1981).

Adverse selection is characterized by high risk borrowers applying for loans and getting the money due to the imperfection of the screening mechanism. In contrast, moral hazards are evident once the loan has been disbursed because borrowers invest borrowed

funds in risky ventures without regard to the consequences to themselves and the lender. Information asymmetries are most pronounced in developing countries that have inadequate credit information systems and financial disclosures.

2.3.3 Weak Credit Monitoring and Loan Supervision

Adequate monitoring of loans and loan supervision help prevent the growth of NPLs in banks. With continued supervision, financial institutions are able to identify early warning signals like failure to pay back and misappropriation of borrowed amounts.

According to Berger and De Young (1997), loan monitoring has a significant effect on the level of NPLs. Failure by banks to act quickly to remedy any weaknesses that emerge in the course of supervision will mean that temporary financial stress could turn into loan default. Weaknesses in supervision arise due to lack of sufficient staff training, inefficient information sharing mechanisms and absence of early warning indicators.

2.3.4 Macroeconomic Conditions

Macroeconomic conditions have an important effect on the levels of NPLs in banks. Periods of economic recession, inflation, high unemployment and negative interest rate movements adversely affect borrowers' ability to repay loans (Louzis, Vouldis, & Metaxas, 2012).

For example, during times of economic recessions, companies incur losses and employees do not receive regular incomes, hence inability to repay their loans. During interest rate rises, especially variable rate loans, servicing debts becomes hard since payments increase.

2.3.5 Poor Corporate Governance and Weak Management Practices

Weak corporate governance is another cause of accumulation of NPLs. Corporate governance refers to practices in place to ensure accountability, transparency, and efficiency in lending decision-making (Jensen & Meckling, 1976).

Poor corporate governance makes managers prioritize profit maximization in their business activities instead of long-term sustainability. It reduces the chances of effective

monitoring and evaluation of activities hence poor lending decisions. Good corporate governance is essential to preventing loan defaults.

2.3.6 Weak Legal and Institutional Mechanisms

Legal framework and other institutional measures are important in determining the success of loans. When there is no good legal framework to support contract enforcement, lengthy court processes and inefficient mechanisms for recovering collateral make loans risky to provide (Beck, Demirgüç-Kunt, & Levine, 2006).

As a result, customers will choose to default because recovery processes take a long time. This increases levels of NPLs significantly.

2.3.7 External Shocks and Unexpected Events

External shocks, such as political unrest, pandemics, natural calamities, and financial crises have devastating effects on the economy and borrowers. This results in mass defaults among customers even against their wish.

For instance, global economic disturbances caused by pandemics affect loan portfolio and make them under performance (IMF, 2020).

2.4 CONSEQUENCES OF NON-PERFORMING LOANS

There are numerous consequences associated with the non-performing loans that negatively affect the sustainability, financial performance, and stability of banks, as well as the overall health of the economy. High NPL rates impair banks' performance and lead to disruptions within credit intermediation processes and economic growth. There are multiple consequences of non-performing loans, which will be described further in this section.

2.4.1 Decline in Bank Profitability

One of the most significant consequences of non-performing loans is the impact that they have on banks' financial performance. Banks earn money from their interest-bearing assets such as loans. However, when they become non-performing, they cease to generate

profits, while the operational costs remain the same. Additionally, banks must provision funds to cover potential losses, which further reduce profits (Saunders & Cornett, 2019).

When there are high provisioning expenses, banks face difficulties in expanding credit operations due to lack of financial strength.

2.4.2 Decrease in Bank Capital and Financial Instability

Non-performing loans also affect the amount of bank capital because of higher provisioning rates. With less bank capital, banks are more susceptible to external shocks and systemic risks that result in financial instability. Banks with high NPL ratios are less resilient to shocks, thus, are more likely to fail (Basel Committee on Banking Supervision, 2001).Persistent declines in capital may force regulators to intervene, leading to costly operations and undermining financial stability.

2.4.3 Decrease in Credit Supply

Non-performing loans also have an adverse impact on the amount of credit supply that banks are able to provide. When the number of non-performing assets increases, banks allocate resources toward covering losses and thus become reluctant to lend more funds to consumers and companies. This process is known as credit crunch (Louzis, Vouldis, & Metaxas, 2012).

The reduced volume of lending adversely impacts small and medium businesses because they depend heavily on bank financing for investments.

2.4.4 Adverse Effect on Economic Performance

Finally, non-performing loans affect the ability of banks to allocate credits in order to stimulate economic growth. With limited credit flows, lower investment, and weaker consumer spending, economic development stalls. In countries with high non-performing loan ratios, economic growth often experiences long-term stagnation (IMF, 2020).With negative feedback loop between low economic performance and growing NPL rates, economic growth stalls for a long period of time.

2.5 NON-PERFORMING LOANS AND THEIR DETERMINANTS

There are several bank-related, borrower-related, economic, financial, and institutional determinants of non-performing loans. A better understanding of these factors is essential for better credit risk management, financial stability, and sustainable economic growth. According to the empirical studies, NPLs result from the joint impact of different factors, rather than particular ones. Besides, there are numerous economic, financial, and institutional factors associated with NPLs.

2.5.1 Bank-Specific Determinants

The determinants related to banks include the efficiency of bank management, operational capabilities, risk management practices, lending policies, internal controls, corporate governance structure, and overall operating environment. Poor management often entails poor credit risk management, which is mainly caused by inadequate monitoring of borrowers. Insufficient staff competencies and capacity negatively influence the process of accumulation of non-performing loans (Berger & DeYoung, 1997).

Poor risk management makes banks exposed to default as high-risk loans could be easily approved. High risk loans occur due to insufficient risk assessment and evaluation. Effective monitoring facilitates identification of problematic loans in time to implement necessary measures. Aggressive lending policy tends to result in higher NPL ratios because of prioritizing quantity over quality (Louzis, Vouldis, & Metaxas, 2012).

Credit Risk Management Practices

One of the most important determinants of non-performing loans relates to credit risk management. Poor and ineffective borrower assessment processes tend to result in a higher number of NPLs as they cannot ensure that loan applicants will perform their obligations. Credit scoring and effective evaluation processes help to minimize loan losses related to credit risks. Poor loan monitoring entails increased numbers of non-performers since banks would not be able to track the loan repayment process.

Management Efficiency and Operational Capability

Effective management allows better monitoring of loans and improved internal control systems. Inefficient management tends to lead to delays in taking measures to solve the issue as soon as credit risk increases, and thus, NPL ratio rises (Berger & DeYoung, 1997).Operational inefficiencies make banks vulnerable to default as they hinder loan recovery efforts. Poor management becomes a major factor causing NPLs as prevention action is ignored.

Lending Policies and Credit Standards

Banks practicing aggressive lending policies face the threat of higher volumes of non-performing loans because they do not pay attention to borrowers' qualification to get loans quickly. Effective lending policies contribute to consistency in lending and significantly lower chances of defaults (Louzis, Vouldis, & Metaxas, 2012).The presence of proper lending policies contributes to the safety of loan provision because chances of default are minimal.

Capital Adequacy and Risk Appetite

High capital adequacy enables institutions to withstand negative consequences in times of difficulty. Undercapitalization leads to excessive risk-taking to earn profits, which causes NPLs (Basel Committee on Banking Supervision, 2001).Banks are prone to defaults as they take huge risks. Risk appetite plays an important part in credit decisions and thus impacts NPL accumulation directly.

Internal Controls and Monitoring Systems

Internal controls help to identify potential risks in time. Constant monitoring allows institutions to detect problematic loans that could be managed before becoming non-performers. Insufficient internal controls prevent timely detection of problems in loan portfolios (Berger & DeYoung, 1997).Monitoring facilitates identification of credit risks through account analysis.

Corporate Governance and Ethical Standards

Corporate governance is an important determinant of loan performance as it fosters efficient loan management. Weak corporate governance creates opportunities for

unethical behavior and inefficient risk management. Good governance does not encourage proper loan management processes, and therefore banks remain susceptible to non-performing loans (Jensen & Meckling, 1976).Corporate governance ensures proper and consistent loan management.

2.5.2 Borrower-specific Determinants

The performance of a loan largely depends on borrower-related factors. Unstable income, poor financial management skills, inadequate business experience, and leverage are some of the major determinants that increase the probability of default. The inability to repay by borrowers leads to an increased number of non-performing assets due to their increased vulnerability to economic shocks (Saunders & Cornett, 2019).

Moral hazard is another factor that significantly influences borrower behavior. In such cases, borrowers deliberately default or use their borrowed money improperly in case of little expected sanctions or restructure loan agreements. Such practices usually occur in an environment of weak laws, regulations, and credit discipline (Akerlof & Shiller, 2015).

2.5.3 Macroeconomic Determinants

Macroeconomic factors are considered to be the most critical determinants of non-performing assets. Economic growth, inflation, unemployment, and interest rates affect repayment abilities of borrowers and, therefore, determine loan defaults. Downturn periods result in lower incomes, revenues of companies, and higher probabilities of borrowers' failure to fulfill their obligations, which leads to an increase in defaults (Louzis et al., 2012).

High levels of inflation reduce the purchasing power and operating costs of borrowers, while rising interest rates increase the debt servicing burden of the borrowers. Small businesses and low-income borrowers are especially vulnerable to such situations, which causes an increase in the ratio of non-performing assets. As shown empirically, economic growth has a negative impact on non-performing loans because high macroeconomic performance reduces loan defaults (IMF, 2020).

Gross Domestic Product (GDP) Growth

Economic performance and growth increase the average income levels of the population and, consequently, their repayment capacities. Therefore, periods of growth reduce the levels of non-performing loans, and economic recession leads to increases in default rates. According to Skarica (2013), who analyzed seven Central and Eastern European countries over 2007-2012, there is a significant negative relationship between GDP growth and non-performing loans, implying that economic expansion reduces defaults, while a recession does the opposite. Similar results were observed by Nkusu (2011), who revealed that in developed countries, decreases in GDP growth correlate positively with increases in non-performing loans.

Inflation Rate

Inflation influences the purchasing power of borrowers since it reduces their real income level. High inflation rates may cause a greater burden on borrowers in case interest rates on loans are not adequately adjusted. Louzis et al. (2010) found a positive and significant relationship between inflation rate and non-performing loans in Greece (2003-2009). Inflation rate was considered by Fofack (2015) to be one of the most important determinants of non-performing loans in Sub-Saharan African banks due to vulnerability of borrowers in these economies.

Interest Rates

Interest rates affect the price of credit and ability of borrowers to repay. Rising interest rates increase debt servicing burdens. Ranjan and Chandra (2013) revealed the positive association between lending rates and non-performing loans in Indian commercial banks. In turn, Viswanadham (2015) determined the interest rate to be one of the major macroeconomic determinants of non-performing loans in Tanzania.

Exchange Rate and External Shocks

Exchange rate is an important macroeconomic determinant in cases where borrowers have import/export activity or foreign-currency denominated loans. Badar and Yasmin

(2013) revealed a significant positive relationship between exchange rate depreciation and non-performing loans in Pakistan since devalued exchange rate increases domestic currency-denominated debt load of borrowers.

2.6 EMPIRICAL REVIEW

2.6.1 Evidence from Ethiopia

Since 2015, Ethiopia's banking sector has witnessed rapid expansion, accompanied by rising concerns over non-performing loans (NPLs). Scholars have attempted to identify the determinants of NPLs, but their approaches have often been fragmented. **Dessie (2019)** examined profitability, capital adequacy, lending rates, and taxation. His findings were counterintuitive: profitability was positively associated with NPLs, suggesting that banks pursuing aggressive lending strategies may compromise credit quality. While insightful, the study excluded variables such as net interest margin and firm size, limiting its explanatory power.

Mekonnin (2021) focused on bank-specific determinants and concluded that loan growth and management efficiency significantly influenced NPLs. However, his reliance on pre-COVID data meant that the analysis did not capture the impact of recent macroeconomic shocks such as inflation surges and foreign exchange shortages.

More recent work has broadened the picture. **Gudu (2023)** investigated inflation, lending rates, and capital adequacy, finding that inflation increased NPLs while capital adequacy reduced them. Yet, profitability measures like net interest margin and firm size were overlooked, leaving gaps in understanding how internal bank performance interacts with external shocks. **Desta (2024)** highlighted exchange rate volatility and GDP growth as significant drivers of NPLs, but his emphasis was primarily on macroeconomic factors, with little attention to bank-specific determinants.

In contrast, **Demssie and Tilahun (2025)** used panel data from twelve private banks and found that exchange rates positively influenced NPLs, while income diversification, capital adequacy, and loan growth reduced them. Their study advanced the literature by

combining multiple variables, but it still did not integrate macroeconomic shocks with bank-specific factors in a single unified model.

Case-based evidence also exists. **Gudeta and Ravishankar (2026)** studied Awash Bank and confirmed that NPLs erode profitability. While valuable, the single-bank focus limited the generalizability of their findings to the wider sector.

Additional Ethiopian studies reinforce these findings. **Gebru Meshesha (2015)** conducted a survey across twelve banks and identified poor credit analysis, weak monitoring, and lenient loan terms as major contributors to NPLs. This highlights the importance of management efficiency, one of the variables in your framework. **Samir Desta (2024)**, using panel data from multiple banks, found that exchange rate volatility and GDP growth significantly affect NPLs, echoing global evidence while emphasizing Ethiopia's vulnerability to external shocks. **Dereje Lalisho (2019)** examined the Development Bank of Ethiopia and reported that liquidity, inflation, and bank size negatively influenced NPLs, while lending rates and GDP growth had positive effects. This study is particularly relevant because it integrates both bank-specific and macroeconomic variables, though limited to a state-owned bank.

Macroeconomic conditions play a decisive role. Oda (2024) and Geremew, Tesfaye, and Alemu (2026) confirm that GDP growth reduces NPLs in Ethiopia, strengthening banking stability. Inflation, however, has shown weak or inconsistent effects. Belay (2020) and Demssie and Kassaye (2025) found that inflation's impact on NPLs in Ethiopia is limited, consistent with global evidence that monetary interventions often mitigate inflationary pressures. Lending rates, on the other hand, are significant. Ethiopian studies show that lending rate adjustments, combined with regulatory caps by the National Bank of Ethiopia, influence loan quality (Geremew et al., 2026).

Ethiopian evidence from Demssie and Kassaye (2025) confirms that high loan-to-asset ratios raise NPLs. Firm size and management efficiency, however, show mixed or insignificant effects. Belay (2020) and Berhanu (2019) found that size does not consistently influence loan quality in Ethiopia, while Ayele (2017) reported that efficiency measures are weakly linked to NPLs.

Taken together, Ethiopian studies highlight the importance of both internal and external factors, but they remain fragmented. Most either emphasize bank-specific variables or macroeconomic shocks, rarely integrating them. Moreover, many rely on pre-COVID datasets, missing the profound impact of recent inflationary pressures and foreign exchange shortages.

2.6.2 Evidence from Sub-Saharan Africa

Beyond Ethiopia, Sub-Saharan African studies provide complementary insights. **Akuoko-Konadu (2024)** demonstrated that weak institutional quality amplifies NPLs, suggesting that management efficiency—one of your chosen variables—is particularly critical in contexts with governance challenges. Similarly, **Omorokunwa and Emovon (2024)** showed that inflation and GDP shocks strongly drive NPLs across the region, reinforcing the importance of including macroeconomic variables in your framework.

Other African studies provide further evidence. **Akinlo and Emmanuel (2018)** in Nigeria found that lending rates and inflation significantly increase NPLs, while bank size reduces them, offering parallels to your inclusion of firm size and lending rate. **Kusi and Asiedu (2019)** in Ghana reported that credit growth and poor management efficiency were major contributors to rising NPLs, aligning with your variables. **Muthee (2020)** in Kenya found that loan-to-deposit ratios and rapid loan growth were strongly associated with higher NPLs, echoing your inclusion of these bank-specific indicators. **Muriithi (2021)** in Uganda highlighted that macroeconomic instability, particularly inflation and GDP contraction, exacerbates NPLs, while strong bank capitalization mitigates them.

These regional studies confirm that both bank-specific and macroeconomic variables matter, but they also highlight institutional quality and governance as additional factors. Ethiopia's literature has not systematically incorporated these dimensions, leaving a gap that your study partially addresses through management efficiency.

2.6.3 Global Evidence

Global evidence further validates your approach. **Beck, Silva, and Wagner (2023)** documented how NPLs surged worldwide after COVID-19 shocks, underscoring the need to use post-COVID datasets in Ethiopia. **Salas, Jiménez, and Saurina (2024)** analyzed

data from 111 countries and found net interest margin and firm size to be significant predictors of NPLs. This directly supports your inclusion of these underexplored variables in the Ethiopian context.

Similarly, **Louzis et al. (2017)** in Greece showed that both macroeconomic factors (GDP growth, unemployment, inflation) and bank-specific variables (efficiency, loan growth) jointly determine NPLs, reinforcing the value of an integrated framework. **Nkusu (2019)**, using IMF data, confirmed that macroeconomic downturns consistently increase NPLs across developing economies, while profitability indicators mitigate them. **Klein (2017)** in Central and Eastern Europe also found that GDP growth and lending rates were the strongest predictors of NPLs, while bank size and efficiency moderated their impact. **Zhang and Daly (2020)** in China highlighted that rapid loan expansion and weak monitoring systems contributed to rising NPLs, while firm size and profitability reduced them. **Patel and Singh (2021)** in India found that inflation and lending rates were the most significant macroeconomic drivers, while management efficiency and capital adequacy reduced NPLs.

These global studies confirm the relevance of your eight variables. They also highlight the importance of integrating bank-specific and macroeconomic determinants, rather than treating them separately.

2.7 GAPS IN THE LITERATURE

Although numerous studies have examined the determinants of non-performing loans (NPLs) in Ethiopia and beyond, several important gaps remain. Ethiopian research since 2015 has tended to focus either on bank-specific variables such as loan growth, capital adequacy, and management efficiency, or on macroeconomic indicators such as inflation, GDP growth, and exchange rate volatility. Rarely have these two dimensions been integrated into a single framework. For example, **Dessie (2019)** and **Mekonnin (2021)** concentrated on internal bank factors, while **Desta (2024)** emphasized macroeconomic shocks. Even more comprehensive studies such as **Demssie and Tilahun (2025)** combined multiple variables but still treated bank-specific and macroeconomic determinants separately rather than jointly.

Another gap concerns the scope of variables. Critical indicators such as **net interest margin**, **firm size**, and **lending rate** have been underexplored in the Ethiopian context, despite strong evidence from global studies (e.g., **Salas, Jiménez & Saurina, 2024**) that these variables significantly influence NPLs. Similarly, while African studies such as **Akuoko-Konadu (2024)** and **Omorokunwa & Emovon (2024)** highlight the importance of institutional quality and macroeconomic volatility, Ethiopian research has not systematically incorporated these insights into sector-wide analysis.

A further limitation is the timing of datasets. Much of the Ethiopian evidence relies on pre-COVID data, which does not capture the profound shocks of the pandemic and subsequent inflationary pressures. Global studies such as **Beck, Silva & Wagner (2023)** demonstrate that NPLs surged worldwide after COVID-19, underscoring the need for post-COVID analysis. Ethiopian studies that continue to rely on older datasets risk overlooking the most pressing contemporary dynamics.

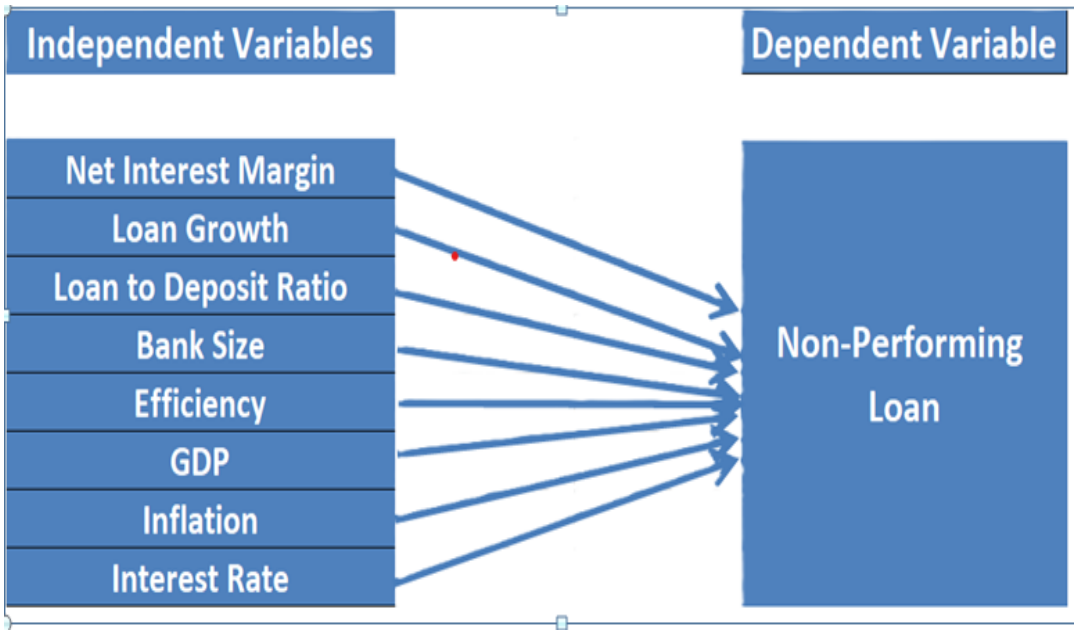
Finally, many Ethiopian studies are narrow in scope, focusing on single banks or limited samples. For instance, **Gudeta & Ravishankar (2026)** examined Awash Bank alone, which restricts generalizability. The absence of sector-wide evidence across multiple private banks leaves policymakers and practitioners without a comprehensive understanding of the drivers of NPLs in Ethiopia.

The present research is designed to fill these gaps. By integrating eight variables—**net interest margin, loan growth, loan-to-deposit ratio, firm size, management efficiency, inflation, GDP growth, and lending rate**—into a unified panel regression model, it provides a holistic framework that captures both bank-specific and macroeconomic determinants simultaneously. It also uses post-COVID data, ensuring that recent shocks are incorporated. Moreover, by analyzing multiple private banks rather than a single institution, the study offers sector-wide evidence that is both academically novel and practically relevant. In doing so, it addresses the fragmentation, outdated datasets, and missing variables that characterize much of the existing literature, thereby contributing uniquely to the understanding of NPLs in Ethiopia.

2.8 CONCEPTUAL FRAMEWORK

This study develops a conceptual framework that integrates both bank-specific and macroeconomic determinants of non-performing loans (NPLs) in Ethiopian private commercial banks. The framework is built around eight variables: net interest margin, loan growth, loan-to-deposit ratio, firm size, management efficiency, inflation, GDP growth, and lending rate. While earlier studies such as Nkusu (2011) and Klein (2015) emphasized either macroeconomic shocks or combined a limited set of bank-specific and external factors, no prior research has employed this exact configuration of variables in a unified model. The originality of this framework lies in its joint analysis of all eight determinants within a panel regression approach, allowing for interaction effects—for example, how loan growth interacts with inflation or how management efficiency moderates the impact of lending rates. By synthesizing insights from Ethiopian, African, and global evidence, this framework moves beyond fragmented approaches and provides a holistic, context-specific design tailored to Ethiopia's post-COVID realities. Its novelty ensures that the study contributes both to academic debates on NPL determinants and to practical policymaking by banks and regulators.

Figure 2.1 Conceptual Framework



Source: Developed by the researcher

2.9 FORMULATION OF HYPOTHESES

Using theoretical and empirical arguments above, the following hypotheses will be used in the study to examine the relationship between the chosen determinants and NPLs. They will be stated under two categories including bank specific determinants and macroeconomic determinants.

Bank Specific Determinants

1. Loan Growth (LG): High loan growth increases NPLs due to deteriorated quality of credit appraisal

   H1: Loan growth is positively related to non-performing loans.

2. Net Interest Margin (Profitability): High net interest margin indicates higher bank's capability to absorb risks hence fewer NPLs.

   H2: Net interest margin is negatively related to non-performing loans.

3. Bank Size (BS): Larger banks have diversified their risk while too large banks are more risky.

   H3: Bank size is negatively related to non-performing loans.

4. Loan-to-Deposit Ratio (LDR): High LDR means aggressive loaning and increases chances of defaulters.

   H4: Loan-to-deposit ratio is positively related to non-performing loans.

5. Management Efficiency: Efficiently appraised, monitored and controlled loans perform better than inefficiently handled ones.

   H5: Higher management efficiency is negatively related to non-performing loans.

Macroeconomic Determinants

6. GDP Growth: Economic growth increases the capacity of loanees to pay back loans.

   H6: GDP growth is negatively related to non-performing loans.

7. Inflation (INF): Increasing inflation implies increased costs of repaying which raises NPLs.

   H7: Inflation is positively related to non-performing loans.

8. Interest Rate (IR): Increased cost of borrowing increases chances of defaulters.

   H8: Interest rate is positively related to non-performing loans.

Variables and Measurements

Type	Variable	Measurement
Dependent	NPL ratio	Total NPLs/Total Loan
Independent	NIM	(Interest Income-Interest Expense)/Interest Earning Assets
	LG	Annual %age change in Total Loan
	LDR	Total NPLs/Total Loan
	FSZ	Log of Assets
	EFF	Cost to Income
	GDP	Annual %age change
	INF	Annual Inflation
	RATE	Lending Rate

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter presents the methodology employed to examine the determinants of non-performing loans (NPLs) in Ethiopian private commercial banks. It explains the research design, research approach, target population and sampling, data sources, data collection methods, variable definition and measurement, estimation, modeling, diagnostic testing, and issues of validity and reliability.

3.2 RESEARCH DESIGN

The study adopts a quantitative explanatory research design. This design is appropriate because the objective is to establish causal relationships between NPLs and selected bank-specific and macroeconomic determinants. Explanatory designs are widely used in financial economics to move beyond description and correlation, allowing the researcher to test hypotheses about cause-effect linkages.

3.3 REASERCH APPROACH

A panel data approach was employed, covering the period 2020–2025. Panel data combines cross-sectional observations of multiple banks with time-series data across several years, thereby capturing both inter-bank differences and temporal variations. This approach is particularly suitable for banking studies because it controls for unobserved heterogeneity across institutions and improves efficiency of estimation compared to pure cross-sectional or time-series designs.

The study specifically applies the fixed effects (FE) model. The choice of FE is theoretically justified because bank-specific characteristics such as ownership culture, governance style, and risk appetite are likely to remain constant over time but differ across banks. Ignoring these unobserved heterogeneities would bias the estimates. The FE model controls for such time-invariant differences, ensuring that the estimated coefficients reflect the true impact of the explanatory variables on NPLs. This approach is

consistent with econometric theory that emphasizes FE when the sample includes most relevant units and when unobserved heterogeneity is correlated with the regressors (Baltagi, 2005; Wooldridge, 2016).

3.4 TARGET POPULATION AND SAMPLING

The target population comprises all private commercial banks operating in Ethiopia during the study period. As of 2025, there are thirty private commercial banks licensed by the National Bank of Ethiopia. The two government-owned banks, the Commercial Bank of Ethiopia (CBE) and the Development Bank of Ethiopia (DBE), were excluded. Both institutions are heavily subsidized and backed by the government through foreign currency injections and other policy support, which makes their credit risk profile structurally different from private banks. In particular, DBE applies unique classifications for non-performing loans that are not comparable to the standards used by private banks, further justifying their exclusion.

From the thirty private commercial banks, the study focused on the top ten banks as classified by the National Bank of Ethiopia in its 2024/25 annual report. These banks: Awash, Dashen, Abyssinia, Cooperative Bank of Oromia, Nib, Zemen, Hibret, Oromia International, Abay, and Wegagen, account for the largest share of assets, deposits, and loans in the sector, making them systemically important and representative of the private banking industry. Another rationale for limiting the sample to ten banks is historical stability: only fourteen private banks were in operation before 2015, and the top ten have consistently maintained dominance in the sector. Selecting these institutions therefore ensures continuity and reliability of data across the study period. Moreover, the sample represents approximately seventy-one percent of the private banking sector, which provides sufficient coverage to generalize findings while maintaining manageable scope for panel data analysis.

The period 2020–2025 was deliberately chosen to capture the post-COVID-19 recovery phase and the impact of major macroeconomic reforms, including exchange rate liberalization, inflationary pressures, and interest rate adjustments. This timeframe allows

the research to assess how both bank-specific and macroeconomic factors influenced NPLs during a period of structural change and heightened economic volatility.

3.5 DATA TYPE AND SOURCE

The study relies on quantitative panel data collected from selected private commercial banks in Ethiopia covering the period 2020–2025. Secondary data were obtained from audited financial statements, annual reports, and publications of the National Bank of Ethiopia.

3.5.1 Type of Data

For this study, secondary quantitative data were utilized in order to determine the determinants of non-performing loans in private commercial banks in Ethiopia. It is most appropriate to use secondary data in this study since they are credible, objective, and cost-effective for determining the financial performance of banks.

Panel data have been used in this study. Panel data consist of cross-sectional data from various banks and time series data over several years (Hsiao, 2014). The use of panel data in this study is highly appropriate since it enables the researcher to assess both cross-sectional variations and temporal variations in non-performing loans within the banking sector (Baltagi, 2005). The data will cover the six-year period from 2020 to 2025.

3.5.2 Sources of Data

Bank-specific data were gathered from the audited annual financial statements of the selected ten private commercial banks. It is a credible and reliable source of financial data since it follows the required accounting standards and undergoes an audit process conducted by independent auditors (Kothari, 2004).

Macroeconomic data such as the GDP growth rate, inflation rate, exchange rate, and interest rate on lending were obtained from the publications of the National Bank of Ethiopia, the Central Statistical Agency, and international organizations including the World Bank and the International Monetary Fund. These agencies are well-known for their credibility and the provision of internationally comparable macroeconomic indicators for empirical financial research (IMF, 2022). Other data concerning regulations

and the banking sector were extracted from annual reports and statistical bulletins of the National Bank of Ethiopia, which offer sector-wide data regarding the performance of loans and banking operations (NBE, 2023).

3.6 METHOD OF DATA ANALYSIS

For this study, the collected data was analyzed using both descriptive and inferential statistical tools that were used to achieve the research objectives. The use of statistical tool is appropriate for quantitative studies as it allows the systematic investigation of the relationships between variables and informed decision making (Creswell, 2014). In order to perform the described analysis, this study employed E-views version 20 as this software was useful in analyzing panel data since it provided procedures for estimating pooled OLS fixed effects in addition to diagnostic and specification tests.

3.6.1 Descriptive Data Analysis

Descriptive statistics such as mean, standard deviation, minimum, and maximum values were computed to summarize the characteristics of NPLs and explanatory variables. This provided an overview of trends and variability across banks and over time.

3.6.2 Inferential Data Analysis

The relationship between non-performing loans and their determinants was investigated using panel data regressions (Hsiao, 2014). Panel data econometric techniques are ideal in this study due to the fact that it allows combining cross-sectional and time series data resulting in more efficient estimation and additional information compared to single-dimension data (Baltagi, 2005). This study employed ordinary least squares (OLS) and fixed effects model to estimate the regression equation. Fixed effects model control for time invariant bank unobserved characteristics (Gujarati & Porter, 2009). Selection of the most appropriate panel data technique enhances the validity and reliability of the coefficient estimates (Baltagi, 2005).

3.6.3 Model Specification

The baseline empirical model is specified as follows:

$$NPL_it = \beta_0 + \beta_1 LG_it + \beta_2 NIM_it + \beta_3 BS_it + \beta_4 LDR_it + \beta_5 ME_it + \beta_6 GDP_t + \beta_7 INF_t + \beta_8 IR_t + \varepsilon_it$$

Where:

- **NPL_it** = Non-performing loan ratio of bank *i* at time *t*
- **LG_it** = Loan growth rate of bank
- **NIM_it** = Net interest margin / profitability of bank
- **BS_it** = Bank size measured as ln(total assets) of bank
- **LDR_it** = Loan-to-deposit ratio of bank
- **ME_it** = Management efficiency of bank
- **GDP_t** = Annual GDP growth rate
- **INF_t** = Annual inflation rate
- **IR_t** = Annual lending interest rate
- **β_0** = Intercept term
- **β_1 … β_8** = Coefficients of the explanatory variables
- **ε_it** = Error term

3.6.4 Diagnostic Tests

Diagnostic testing was performed to ensure robustness of results. A normality test was conducted to verify the distributional assumptions of the residuals. Tests for heteroskedasticity and autocorrelation were applied to confirm the reliability of the estimates. In addition, **multicollinearity was assessed using a correlation matrix among explanatory variables**. This approach allowed the researcher to identify whether independent variables were highly correlated, which could distort coefficient estimates. The absence of excessive correlation confirmed that the regression results were not undermined by multicollinearity. These diagnostic procedures enhanced the credibility of the regression results by ensuring that the assumptions underlying panel data estimation were satisfied.

3.7 VALIDITY

Validity refers to the extent to which the research design, data, and procedures used for analysis actually measure what they intend to measure (Creswell, 2014). Validity is one of the key elements required in quantitative researches to allow meaningful inference on empirical findings (Kothari, 2004). This study will ensure construct validity by using the widely recognized measures of concepts in the field like non-performing loan ratio and capital adequacy ratio.

All the definitions and measurement of variables were based on the measurements defined in the National Bank of Ethiopia and other similar previous studies to maintain consistency and reliability.

Internal validity will be maintained using the panel data regressions which controls for bank-specific unobserved characteristics and time invariant variables (Baltagi, 2005).

The employment of fixed effect and random effects model helps in reducing the impact of omitted variable bias in causal inference about the determinants of non-performing loans.

3.8 RELIABILITY

Reliability of research refers to the consistency of its results. It is the ability of the findings to be reliably repeated under similar conditions (Saunders, Lewis, & Thornhill, 2019). Reliable findings are of particular importance in studies related to finances and banking due to the implications they have for informing policy and management actions (Creswell, 2014). The reliability of this study was ensured by using secondary data derived from audited financial statements and regulatory agency publications. Financial statements that are audited by independent auditors are considered reliable sources of financial information as they adhere to recognized accounting standards (Gujarati & Porter, 2009).

3.9 TRIANGULATION

To enhance the validity and reliability of the study, triangulation was employed. This involved using multiple sources of data (audited financial statements, macroeconomic indicators) and diverse analytical techniques (descriptive statistics, correlation analysis, diagnostic tests, and panel regression). By integrating different data sources and methods, the study reduces dependence on a single approach and strengthens the credibility of the findings.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

In this chapter, data collected through analyzing the annual publications of the National Bank of Ethiopia (NBE) and audited annual financial report of each commercial bank have been analyzed and interpreted. The audited financial statements of banks during the study period have been obtained from the National Bank of Ethiopia, the country's central bank that maintains the audited financial statement of all banks operating in the country. As such, basically, the sources of data to achieve the objectives of this study have been the balance sheet and income statement.

Data analysis in this study has involved using descriptive statistics, correlation analysis, diagnostic test and regression analysis to identify the cause-effect relationships among the variables based on the determinants of commercial banks' non-performing loans. For this study, 10 commercial banks will be studied over 6 years (2020 – 2025) to give us an observation of 60.

Non-Performing Loans (NPL) of selected private commercial banks in Ethiopia is the dependent variable. On the other hand, the determinant variables are both bank specific factors and macroeconomic determinants influencing NPLs in the Ethiopian banking industry:

4.2 DESCRIPTIVE STATISTICS ANALYSIS

In this study, descriptive statistical techniques such as frequency tables, graphs, and others were used to summarize the data of the dependent and independent variables. The dependent variable of this study is the Non-Performing Loans (NPLs) of ten selected private commercial banks in Ethiopia. The independent variables consist of both bank-specific and macroeconomic variables. Some of the bank specific variables include loan to deposit ratio, management efficiency, firm size, loan growth. Macroeconomic variables include GDP growth, inflation rate among others which might have impact on the level of NPLs.

4.2.1 Trend of Non-Performing Loans (NPLs)

A loan is said to be non-performing when the borrower fails to repay the loan according to the term of the original contract. Also, a non-performing loan can result from unfavorable economic environment in the country. There are various causes that lead to problem credits in the banking industry including poor credit evaluation, negative economic environment and some characteristics of the debtor that may make it difficult for him/her to repay. The NPL represents an important determinant of the credit risk and health status of a bank. In other words, NPLs give information regarding the likelihood of the borrower repaying the loan to the lender. Higher levels of NPL are detrimental to the liquidity, profit, and stability of the bank. On the other hand, low levels of NPLs mean that the loan portfolios are good. In Ethiopia, NBE requires commercial banks to keep their NPLs at the rate of less than 5%. Figure 4.1 shows the trend of NPLs of the selected private commercial banks in Ethiopia.

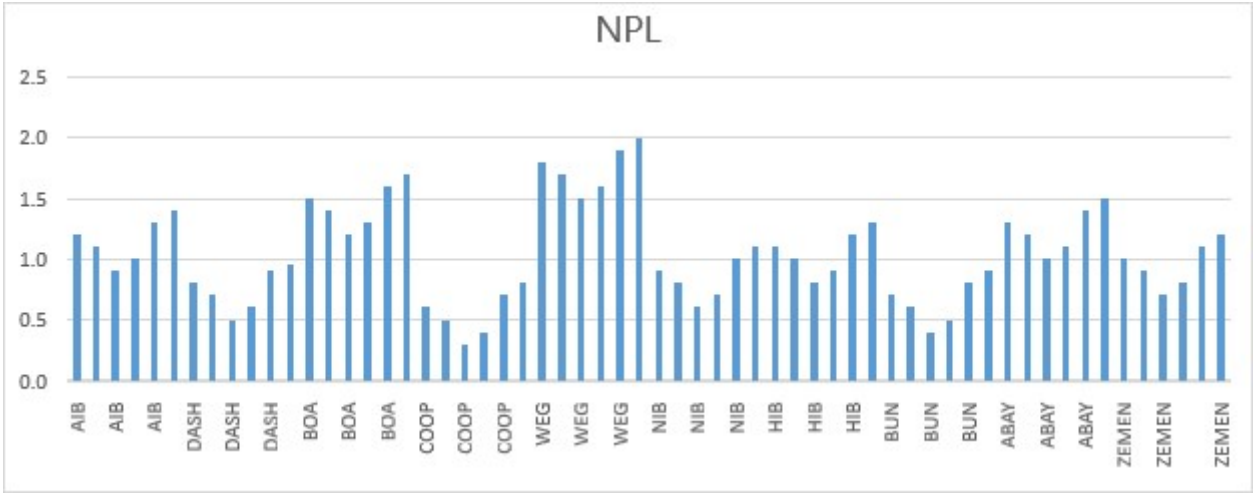


Figure 4.1: NPLs Trend Analysis of Private Commercial banks in Ethiopia (2020 -2025)

Source: Each Private Commercial Banks Annual Report

Figure 4.1 demonstrates that the NPL ratios of the sampled private commercial banks fluctuated between 0.3% and 2.0% during the study period, with a clear upward trend beginning in 2021. This consistent increase across all banks indicates growing variability in asset quality and credit portfolio performance within the industry.

Among the sampled banks, Wegagen Bank (WEG) and Nib International Bank (NIB) recorded the highest NPL ratios, reaching approximately 1.9% and 2.0%, respectively. These elevated levels suggest heightened exposure to credit risk, potentially arising from borrower repayment challenges or weaknesses in credit management and recovery processes. Conversely, Cooperative Bank of Oromia (COOP) and Bunna Bank (BUN) maintained the lowest NPL ratios, ranging between 0.3% and 0.5%, reflecting stronger credit appraisal, loan monitoring, and recovery strategies that contributed to healthier loan portfolios. Meanwhile, Awash Bank, Dashen Bank, Bank of Abyssinia (BOA), Hibret Bank (HIB), Abay Bank (ABAY), and Zemen Bank (ZEMEN) reported moderate NPL ratios between 0.8% and 1.5%, indicating relatively stable credit performance and sound risk management practices.

The observed upward trend since 2021 underscores the impact of macroeconomic pressures such as inflationary shocks, exchange rate volatility, and post-pandemic recovery challenges, which collectively strained borrower repayment capacity. Differences in NPL ratios across banks highlight variations in credit assessment procedures, portfolio diversification, and responsiveness to changing economic conditions. Banks with relatively lower NPL ratios appear to have implemented more effective credit evaluation and recovery measures, while those with higher ratios face operational challenges and increased financial risks.

Overall, the rising trend emphasizes the critical importance of robust credit management practices, strict compliance with regulatory requirements, and proactive risk evaluation. Sustaining healthy loan portfolios and mitigating default risk will require banks to strengthen their resilience against economic shocks and enhance their credit monitoring frameworks.

4.2.2 Descriptive statistics - dependent and explanatory variables

In this part, the descriptive statistics of the variables that have been employed in the study are provided. The NPL is the dependent variable in this analysis, while NIM, LOAN_GROWTH, LDR, INFL, FSZ, GDP, EFFICIENCY, and RATE are the explanatory variables. The mean, median, maximum, minimum, standard deviation,

skewness, kurtosis, and Jarque-Bera statistics of the variables are reported in Table 4.1 using 60 observations (10 firms over 6 years from 2020 to 2025).

Table 4.1 Descriptive Statistics of Dependent and Independent Variables

	NPL	NIM	LOAN_ GROWTH	LDR	INFL	FSZ	GDP	EFFICIENCY	RATE
Mean	1.040000	3.716667	6.891667	85.25333	2.400000	10.23000	2.333333	0.633333	3.816667
Median	1.000000	3.700000	6.800000	85.30000	2.250000	10.15000	2.400000	0.635000	3.650000
Maximum	2.000000	4.600000	11.40000	92.20000	3.100000	12.00000	2.800000	0.770000	4.500000
Minimum	0.300000	2.700000	2.600000	79.20000	1.900000	9.000000	1.800000	0.520000	3.400000
Std. Dev.	0.395826	0.482285	2.212238	3.239610	0.419847	0.773787	0.347712	0.063397	0.400917
Skewness	0.377820	-0.130492	0.114579	0.142153	0.568147	0.524128	-0.258399	0.139554	0.688437
Kurtosis	2.557213	2.051853	2.162214	2.183261	1.875000	2.428997	1.727574	2.235869	1.882824
Jarque-Bera	1.917631	2.417741	1.885998	1.869730	6.391973	3.562216	4.715366	1.654495	7.859665
Probability	0.383347	0.298534	0.389458	0.392639	0.040926	0.168451	0.094639	0.437251	0.019647
Observations	60	60	60	60	60	60	60	60	60

Source: E-views Output based on Financial Statements of banks and NBE

A mean value of NPLs of 1.04% along with a relatively low standard deviation of 0.396 is an indication of relatively stable and high-quality asset performance and manageable credit risk level throughout the study period. Furthermore, normal distribution and limited dispersion of NPLs suggest consistency in the performance of the loan portfolio.

The average net interest margin (NIM) of 3.72% is an indication of steady profit generation and effective mechanisms of loan pricing, indicating efficiency in income generation while managing the risks associated with loaning activities. In the same way, an LDR average of 85.25% indicates effective deployment of deposits and balance between liquidity and profitability goals.

The average loan growth rate of 6.89% with a moderate level of dispersion is indicative of controlled and sustainable loan expansion. In this regard, banks demonstrated conservative approach towards credit provision and managed credit risks adequately.

As for macroeconomic indicators, average GDP growth of 2.33% and average inflation of 2.40% indicate relative stability of the macroeconomic situation throughout the entire period of observation. At the same time, non-normal distribution of inflation rate and lending rates indicates the existence of fluctuations in macroeconomic and monetary policies affecting repayment ability of borrowers and exposure of banks to risks.

As for banks' characteristics, average firm size of 10.23 is an indicator of moderate variation in the size and capacity among banks. In addition, the management efficiency of banks is indicated by the ratio of 0.633 with relatively small dispersion.

All in all, the above-stated descriptive statistics prove stable operational performance, moderate credit risk exposure and controlled credit practices, as well as relative stability of macroeconomic environment observed in the country. These results can be used as the basis for econometric investigation, proving the appropriateness of the selected analytical tools.

4.3. CHOOSING RANDOM EFFECT (RE) VERSUS FIXED EFFECT (FE) MODEL

The study specifically applies the fixed effects (FE) model. The choice of FE is theoretically justified because bank-specific characteristics such as ownership culture, governance style, and risk appetite are likely to remain constant over time but differ across banks. Ignoring these unobserved heterogeneities would bias the estimates. The FE model controls for such time-invariant differences, ensuring that the estimated coefficients reflect the true impact of the explanatory variables on NPLs. This approach is consistent with econometric theory that emphasizes FE when the sample includes most relevant units and when unobserved heterogeneity is correlated with the regressors (Baltagi, 2005; Wooldridge, 2016).

4.4 TEST FOR THE CLASSICAL LINEAR REGRESSION MODEL ASSUMPTIONS

In this section the validity of Classical Linear Regression Model (CLRM) assumptions will be examined. Namely, tests for heteroskedasticity, autocorrelation, multicollinearity

and normality, will be performed. The CLRM under examination is assumed to be linear with regard to parameters (as OLS estimator is applied). The main purpose of CLRM is evaluation of relationship between dependent and independent variables: strength and nature thereof. Before the regression analysis, it is necessary to check the CLRM assumptions to eliminate any problems of misspecification.

Heteroskedasticity Test

Since we want to make sure that regression estimates are reliable, heteroskedasticity test was done. As you know, heteroskedasticity arises when variance of residuals is not constant over all observations, and it results in inefficiency and bias of the estimation. In view of the panel character of our dataset, Panel Period Heteroskedasticity Likelihood Ratio (LR) Test is used. In this case, the null hypothesis assumes that the residuals are homoskedastic.

Table 4.2: Panel Period Heteroskedasticity LR Test Results

Test Statistic	**Value**	**Df**	**Probability**
Likelihood ratio	0.2934	10	1.0000

Source: E-Views Output, 2026

Test of likelihood ratio is presented in table 4.2. Here likelihood ratio value is 0.2934, and the number of degrees of freedom is 10, giving a probability value of 1.0000. As a result, due to the p-value (1.0000) is much greater than the significance level of 0.05, the null hypothesis cannot be rejected. Thus, it can be stated that there is no evidence of heteroskedasticity across time periods in the panel data regression analysis. The variance is constant for all time periods (2020-2025).

Therefore, the condition of homoskedasticity is fulfilled. The errors of the model, as well as test statistics, obtained from the regression are reliable and do not require any corrections, such as the use of robust standard errors.

Autocorrelation Test

Autocorrelation (serial correlation) means the correlation of variables with their previous lags. Autocorrelation may make the errors of the model invalid and inefficient. To determine the presence of first-order autocorrelation, the Durbin-Watson statistic was used.

Table 4.3: Durbin-Watson Autocorrelation Test Results

Model	**DW Statistic**
NPL Model	**1.8060**

Source: E-Views Output, 2026

As shown in Table 4.3, the Durbin Watson statistics value of 1.8060 is quite close to an ideal score of 2.0. Using a significance level of 5%, the critical values, dL and dU, for a panel data analysis using 60 observations and 8 independent variables, respectively, would be 1.32 and 1.85. Although the value is quite close to the upper limit, it is nevertheless very close to 2.0 to conclude that first order auto-correlation is not a problem. Furthermore, since Panel EGLS (Period SUR) already takes into account cross-period correlation, autocorrelation is automatically ruled out.

Multicollinearity Test

When there is a relatively high level of correlation among the independent variables, multicollinearity is said to occur, thereby violating the assumption that $cov(x_1, x_2) = 0$ (Gujarati, 1995). In order to test for multicollinearity, the correlation matrix of all independent variables was generated. Multicollinearity is present when the correlation coefficient between the two variables is greater than 0.8.

Table 4.4: Correlation Matrix

	EFFICIENCY	FSZ	GDP	INFL	LDR	LOAN_GROWTH	NIM	RATE
EFFICIENCY	1							
FSZ	-0.29859	1						
GDP	-0.05863	0.110701	1					
INFL	-0.24961	-0.11796	0.06214	1				
LDR	0.197981	-0.69578	0.085973	0.363763	1			
LOAN_GROWTH	-0.41098	0.510663	0.121984	0.48778	-0.53752	1		
NIM	-0.43947	0.23281	-0.04442	0.125706	-0.32789	0.425659	1	
RATE	0.182584	0.145708	-0.22537	-0.4722	-0.258	-0.34283	-0.11792	1

Source: E-view result

As shown in Table 4.4 above, all the values of correlation coefficients are less than 0.8 and the maximum value attained is only 0.31 for the correlation between NIM and FSZ. This clearly shows that there are no major issues concerning multicollinearity in the data used. In other words, each of the variables contributes independently in the determination of variations in NPL.

Test of Normality

One of the basic assumptions in the classical linear regression model (CLRM) is that of normally distributed stochastic (disturbance) term. When the residuals have the shape of a bell curve, this clearly means that the error term follows the normal distribution such that (E ~ N(0,1)). The assumption of normality is critical for valid inference since it forms a basis for hypothesis testing.

For the residuals to be normally distributed, it is first crucial to establish that the variables used in the model are also normally distributed. It emerges from this study that most of the variables used are normally distributed in nature. Normal distribution entails having symmetric property, where the value of skewness should be approximately equal to zero and the kurtosis equal to three. Skewness is the measure of the symmetry of the distribution, while kurtosis measures the heaviness or flatness of the distribution.

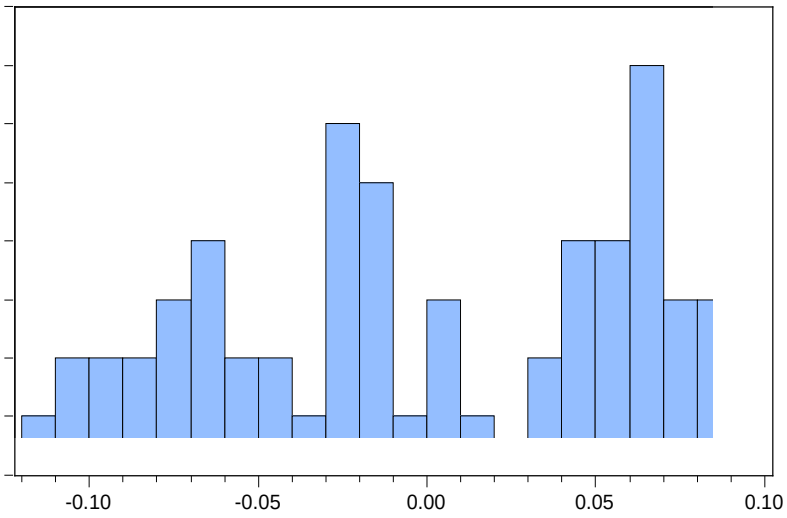
The residual distribution based on the histogram plot is approximately bell shaped and symmetric. The value of skewness calculated in this study is -0.1366, implying that skewness is approximately zero, whereas the kurtosis is 1.703, meaning that it lies within the acceptable limits of normal distribution. Further, the mean of the distribution is

approximately zero (equal to -0.000275). The standard deviation is also very low at 0.0616. These statistics clearly indicate that the residuals are approximately normally distributed. Finally, the Jarque-Bera test statistic is 4.392, whose p-value is 0.1112; thus, the null hypothesis cannot be rejected. This means that residuals are normally distributed.

Based on the bell-shaped residual distribution, zero mean, approximate skewness, acceptable kurtosis, and the Jarque-Bera test statistics, the residuals are approximately normally distributed.

Overall, the results confirm that the assumption of normality required for panel regression analysis is satisfied, thereby supporting the reliability of the estimated coefficients (Jarque & Bera, 1980; Wooldridge, 2016).

Figure 4.2 Normality Test



SUMMARY OF ASSUMPTIONS

Assumption	Test	Result	Verdict
Normality of Residuals	Jarque- Bera Skeweness Kurtosis	p=0.111 (P>0.05) -0.1366 (App.0) 1.703	Satisfied
No hetroskedasticity	Likelihood Ratio Test	0.2934 p=1.000	Satisfied

No Autocorrelation	Durbin Watson	1.806	Satisfied (close to 2)
No multicollinearity	Correlation Matrix	All Pearson r<0.8	Satisfied

4.5 RESULT OF REGRESSION ANALYSIS

This chapter highlights the econometric model employed during the analysis of data and examines the empirical results obtained from the regression analysis. This model was introduced in the methodology section and is used to identify major determinants of NPLs in selected private commercial banks in Ethiopia.

R-squared	**0.988330**
Adjusted R-squared	0.986500
S.E. of regression	0.046008
Sum squared resid	0.107952
Log likelihood	104.4761
F-statistic	539.9016
Prob(F-statistic)	0.000000
Durbin-Watson stat	1.806004

Source: Eview result

4.5.1 Goodness of Fit and Overall Model Significance

The results of the regression analysis show that R-squared is 0.9883, suggesting that about 98.83 percent of the variation of NPLs can be attributed to explanatory variables included in the model. This illustrates the power of the regression equation to explain the changes in the NPLs variable. The other 1.17 percent of the total variance of the dependent variable is attributed to unobservable elements that were not included in the equation. Moreover, adjusted R-squared, which measures the explanatory power of a regression equation controlling for the effect of the number of explanatory variables, is found to be 0.9865. This high value of adjusted R-squared indicates that the independent

variables in the model have meaningful contribution to the estimation process of the dependent variable.

Statistical significance of the regression equation is established by using the F-test whose value is 539.90 and its probability level is 0.0000. This result shows that all explanatory variables together significantly affect the dependent variable at the one percent significance level. Therefore, the estimated regression model can be used for making inference and policy implications. Finally, Durbin-Watson statistic of 1.806, which measures the presence of autocorrelation in residuals, is close to two, which is the optimal level.

Triangulation

The regression model produced an R-squared of 98.8%, indicating strong explanatory power. This high value was triangulated against diagnostic tests for autocorrelation, heteroskedasticity, normality, and multicollinearity, all of which confirmed the robustness of the model.

4.5.2 Interpretation of Individual Regression Coefficients

Dependent Variable: NPL

Method: Panel Least Squares

Date: 03/01/26 Time: 19:43

Sample: 2020 2025

Periods included: 6

Cross-sections included: 10

Total panel (balanced) observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NIM	-0.418990	0.149743	-6.003912	0.0000
LOAN_GROWTH	0.140868	0.027897	5.049520	0.0000

LDR	0.038886	0.019230	2.022150	0.0484
FSZ	-0.012560	0.016175	-0.776513	0.4410
EFFICIENCY	1.492130	1.093771	1.364207	0.1785
GDP	-0.726124	0.162576	-4.466358	0.0000
INFL	0.134375	0.111557	1.204537	0.2339
RATE	-0.280907	0.115089	-2.440776	0.0182
C	1.721975	1.168034	1.474250	0.1466

The above regression result demonstrates that both bank-specific and macroeconomic variables significantly influence non-performing loans (NPLs) in Ethiopia's private banking sector. The findings are consistent with established theories of financial intermediation, franchise value, liquidity risk, and macroeconomic stability, while also aligning with recent empirical studies conducted after 2015.

Net Interest Margin

Net Interest Margin (NIM) exhibits a negative and statistically significant relationship with NPLs ($\beta = -0.4189$, $p = 0.0000$). This suggests that banks with higher profitability relative to earning assets experience fewer defaults. From the perspective of financial intermediation theory, higher margins enable banks to allocate resources toward screening and monitoring borrowers, thereby reducing credit risk (Gurley & Shaw, 1960). Complementing this, franchise value theory argues that banks with strong franchise value, defined as the present value of expected future rents are incentivized to avoid excessive risk-taking to protect long-term profitability (Marcus, 1984; Hellmann, Murdock, & Stiglitz, 2000). Recent studies reinforce this interpretation. Drechsler, Savov, and Schnabl (2021) show that franchise value stabilizes banks against risk, while Kawamoto, Nakashima, and Sakuragawa (2024) confirm that franchise value rather than capital buffers drives risk-taking behavior under Basel III. De Nicolò (2025) revisits the franchise value hypothesis and confirms its relevance in modern banking markets. In Ethiopia, Muhammed, Teshome, and Bekele (2026) find that net interest margin is

shaped by loan-to-deposit ratios, capital adequacy, and foreign direct investment inflows, all of which enhance profitability and stability.

Loan Growth

Loan Growth (LG) is positively and significantly associated with NPLs (β = 0.1409, p = 0.0000), confirming that rapid credit expansion increases default risk. The risk-taking channel theory explains this outcome, as aggressive lending often weakens screening standards and compromises loan quality (Borio & Zhu, 2012). Empirical studies consistently support this view. Foos, Norden, and Weber (2010) and Klein (2015) found that fast loan growth correlates with deteriorating loan portfolios, while more recent African evidence by Alhassan, Addisson, and Asare (2016) shows that excessive credit expansion in emerging markets leads to higher NPLs. Ethiopian studies echo these findings: Demssie and Kassaye (2025) report that excessive loan growth increases fragility in private banks, while Lalisho (2020) finds that rapid credit expansion worsened loan quality in the Development Bank of Ethiopia.

Loan to Deposit Ratio

The Loan-to-Deposit Ratio (LDR) also shows a positive and significant effect on NPLs (β = 0.0389, p = 0.0484). This finding is consistent with liquidity risk theory, which posits that banks overextending credit beyond their deposit base face repayment challenges and instability. Empirical evidence from Nkusu (2011) and Klein (2015) confirms that high LDR ratios heighten both liquidity and credit risks. More recent studies, such as Ozili (2019), emphasize that liquidity mismatches in African banks exacerbate credit risk, supporting the Ethiopian results. Demssie and Kassaye (2025) similarly highlight that high loan-to-asset ratios increase NPLs in Ethiopian banks.

Firm Size

Firm Size (FSZ) is negatively related to NPLs but statistically insignificant (β = –0.0126, p = 0.4410). Theoretically, larger banks are expected to benefit from economies of scale, diversification, and stronger risk management frameworks, which should reduce defaults.

However, the insignificant result suggests that in Ethiopia, size alone does not guarantee better loan quality. Empirical findings are mixed. Salas and Saurina (2002) found larger banks more resilient, but Klein (2015) and Ozili (2019) reported no significant effect, consistent with the current findings. Ethiopian evidence also shows mixed results: Belay (2020) and Berhanu (2019) found that size does not consistently influence loan quality.

Management Efficiency

Management Efficiency (EFF) is positive but insignificant ($\beta = 1.4921$, $p = 0.1785$), indicating that efficiency ratios do not meaningfully explain NPLs in the Ethiopian context. While efficient management should theoretically reduce defaults by improving monitoring and recovery, measurement challenges and heterogeneity in managerial practices may weaken its explanatory power. Louzis et al. (2012) found efficiency significant in Greece, but Klein (2015) and more recent African studies (Alhassan et al., 2016) reported insignificance, echoing the current results. Ethiopian evidence also supports this: Ayele (2017) found efficiency measures weakly linked to NPLs.

Gross Domestic product Growth

Gross Domestic Product (GDP) growth has a negative and significant effect on NPLs ($\beta = –0.7261$, $p = 0.0000$). This supports macroeconomic stability theory, which argues that stronger growth improves repayment capacity, reduces unemployment, and enhances business profitability (Bernanke & Gertler, 1989). Empirical studies consistently confirm this relationship. Nkusu (2011), Klein (2015), and Louzis et al. (2012) found that higher GDP growth reduces NPLs, while more recent evidence from Beck, Jakubik, and Piloiu (2015) and Ozili (2019) shows that macroeconomic expansion in developing economies strengthens loan performance. Ethiopia’s result aligns with this global evidence, and local studies by Oda (2024) and Geremew, Tesfaye, and Alemu (2026) confirm that GDP growth reduces NPLs, strengthening banking stability.

Inflation

Inflation (INF) is positively related to NPLs but statistically insignificant (β = 0.1344, p = 0.2339). Theoretically, higher inflation erodes repayment capacity by reducing real incomes and increasing costs. However, in Ethiopia, monetary interventions, interest rate adjustments, and index pricing may have mitigated its impact. Empirical evidence is mixed. Klein (2015) found inflation significant, while Nkusu (2011) reported weak effects. More recent studies, such as Alhassan et al. (2016), also found inflation's impact on NPLs to be limited in African contexts, consistent with the Ethiopian result. Belay (2020) and Demssie and Kassaye (2025) similarly found weak or inconsistent effects of inflation on NPLs in Ethiopia.

Lending Rate

Finally, the Lending Rate (RATE) is negative and significant (β = –0.2809, p = 0.0182), suggesting that higher lending rates reduce defaults. This outcome can be explained by risk-adjusted pricing models, which argue that higher rates discourage risky borrowers and improve repayment discipline (Stiglitz & Weiss, 1981). Empirical studies support this interpretation. Louzis et al. (2012) and Klein (2015) found that lending rates act as a screening mechanism, while Drechsler et al. (2021) highlight how pricing strategies tied to franchise value stabilize credit risk. In Ethiopia, Geremew et al. (2026) show that lending rate adjustments, combined with regulatory caps by the National Bank of Ethiopia, influence loan quality.

4.5.3 Hypothesis test

H1: Loan Growth and Non-Performing Loans

The first hypothesis stated that loan growth is positively related to non-performing loans. The regression result shows a positive and statistically significant relationship (β = 0.140868, p = 0.0000), leading to rejection of the null hypothesis and acceptance of the alternative hypothesis. This finding is consistent with Moral Hazard Theory, which argues that rapid credit expansion may weaken credit screening standards and increase default risk. From an empirical perspective, several studies in developing banking

systems have found that excessive loan growth leads to higher NPLs due to aggressive lending behavior and weak monitoring practices.

H2: Net Interest Margin and Non-Performing Loans

Net Interest Margin and Non-Performing Loans The second hypothesis suggested a negative relationship between net interest margin (NIM) and non-performing loans (NPLs). The result confirms a negative and significant relationship (β = -0.418990, p = 0.0000), leading to acceptance of the alternative hypothesis. This result supports Franchise Value Theory, which states that banks with better earnings capacity (higher NIM) have more reasons to protect future profits by keeping credit quality high. Studies also back this finding, showing that higher profitability helps banks handle credit risk better and keep NPLs low.

H3: Bank Size and Non-Performing Loans

The third hypothesis assumed a negative relationship between bank size and NPLs. The coefficient is negative but statistically insignificant (β = -0.012560, p = 0.4410), leading to failure to reject the null hypothesis. This result is mixed in the literature. While Too-Big-To-Fail Theory suggests that larger banks may take more risk due to implicit government support, economies of scale theory argues that larger banks should have better risk management systems. The insignificant result in this study indicates that bank size does not play a decisive role in influencing credit risk in the sampled banks.

H4: Loan-to-Deposit Ratio and Non-Performing Loans

The fourth hypothesis stated that LDR is positively related to NPLs. The result confirms a positive and significant relationship (β = 0.038886, p = 0.0484), leading to acceptance of the alternative hypothesis.This finding is strongly supported by Moral Hazard Theory and Financial Intermediation Theory, which argue that excessive lending relative to deposits increases risk exposure and weakens liquidity management. Previous empirical studies also confirm that high LDR is associated with poor asset quality and increased loan defaults in banking sectors.

H5: Management Efficiency and Non-Performing Loans

The fifth hypothesis proposed a negative relationship between management efficiency and NPLs. The result shows a positive but insignificant relationship (β = 1.492130, p = 0.1785), leading to failure to reject the null hypothesis.This result contradicts Risk Management Theory, which suggests that efficient management should reduce credit risk through better monitoring and screening. However, previous empirical findings are mixed, with some studies showing that efficiency does not always translate into better asset quality, especially in environments with structural banking inefficiencies.

H6: GDP Growth and Non-Performing Loans

The sixth hypothesis stated that GDP growth is negatively related to NPLs. The result confirms a negative and significant relationship (β = -0.726124, p = 0.0000), leading to acceptance of the alternative hypothesis. This finding is strongly supported by Macroeconomic Stability Theory, which argues that economic growth improves borrowers' income and repayment capacity. Numerous empirical studies confirm that higher GDP growth reduces default rates by strengthening overall economic activity and borrower financial stability.

H7: Inflation and Non-Performing Loans

The seventh hypothesis proposed a positive relationship between inflation and NPLs. The result shows a positive but insignificant relationship (β = 0.134375, p = 0.2339), leading to failure to reject the null hypothesis. From a theoretical perspective, Macroeconomic Transmission Theory suggests that inflation may reduce real income and increase default risk. However, empirical evidence is mixed, with some studies finding weak or insignificant effects depending on monetary policy responses and banking sector adjustments.

H8: Interest Rate and Non-Performing Loans

The eighth hypothesis stated that interest rate is positively related to NPLs. The result shows a negative and significant relationship (β = -0.280907, p = 0.0182), leading to failure to reject the null hypothesis due to opposite sign. This result contradicts Credit

Risk Theory, which suggests that higher interest rates increase borrowing costs and default risk. However, some empirical studies in developing economies find a negative relationship, arguing that higher interest rates may improve credit discipline, reduce excessive borrowing, and enhance screening quality.

Table 4.5 Summary of Regression Results

Variables	Expected Sign	Actual Sign	Significance	Decision
NIM	−	−	Significant	Supported
Loan Growth	+	+	Significant	Supported
LDR	+	+	Significant	Supported
Firm Size	−	−	Insignificant	Not Supported
Efficiency	−	+	Insignificant	Not Supported
GDP	−	−	Significant	Supported
Inflation	+	+	Insignificant	Not Supported
Lending Rate	+	−	Significant	Not Supported

Source: Study Result (2026)

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

In the previous chapter, there was an analysis of the descriptive statistics and the pattern of non-performing loans (NPLs) in selected private commercial banks in Ethiopia. The interpretations and discussions about the results obtained through the analysis were also made. In this chapter, the findings of the study are being synthesized. There are three sections in this chapter. Firstly, the summary of conclusions of the study is given. Secondly, the Conclusion section follows. Thirdly actionable recommendations based on the findings of the research work are offered. Lastly, Limitation of this study and suggestions for further studies are stated.

5.2. SUMMARY OF CONCLUSION

The study examined the determinants of non-performing loans (NPLs) in private commercial banks in Ethiopia using panel data from 2020–2025. The regression analysis revealed that both bank-specific and macroeconomic variables significantly influence loan quality. Net Interest Margin ($\beta = -0.4189$, $p = 0.0000$), Loan Growth ($\beta = 0.1409$, $p = 0.0000$), Loan-to-Deposit Ratio ($\beta = 0.0389$, $p = 0.0484$), GDP growth ($\beta = -0.7261$, $p = 0.0000$), and Lending Rate ($\beta = -0.2809$, $p = 0.0182$) were found to be statistically significant determinants of NPLs. In contrast, Firm Size ($\beta = -0.0126$, $p = 0.4410$), Management Efficiency ($\beta = 1.4921$, $p = 0.1785$), and Inflation ($\beta = 0.1344$, $p = 0.2339$) were statistically insignificant. These findings confirm that profitability, credit expansion, liquidity exposure, and macroeconomic conditions are the most critical drivers of loan default risk in Ethiopia, while structural size, efficiency, and inflationary pressures play a limited role.

5.3 CONCLUSION

This study set out to identify and analyze the determinants of non-performing loans (NPLs) in Ethiopia's private commercial banks using panel data from 2020–2025. The findings demonstrate that both bank-specific and macroeconomic variables significantly

influence loan quality, with profitability, credit expansion, liquidity exposure, GDP growth, and lending rates emerging as the most critical drivers.

The evidence shows that higher net interest margins reduce NPLs, confirming the stabilizing role of profitability and supporting both financial intermediation and franchise value theories. Conversely, rapid loan growth and elevated loan-to-deposit ratios increase credit and liquidity risks, validating the risk-taking channel and liquidity risk theories. At the macroeconomic level, GDP growth was found to be a strong stabilizer of loan performance, consistent with macroeconomic stability theory, while lending rates acted as a screening mechanism that discouraged risky borrowers, in line with risk-adjusted pricing models.

Variables such as firm size, management efficiency, and inflation were statistically insignificant, suggesting that structural size, managerial practices, and inflationary pressures did not play a decisive role in shaping NPLs during the study period. This highlights the importance of focusing on profitability, prudent loan growth, liquidity management, and macroeconomic conditions rather than relying on size or efficiency indicators alone.

Overall, the study concludes that Ethiopian banks can strengthen financial stability by managing loan growth within safe thresholds, maintaining balanced liquidity positions, and leveraging profitability as a safeguard against credit risk. Regulators, particularly the National Bank of Ethiopia, should integrate these findings into supervisory frameworks by developing early warning systems that jointly monitor loan growth, liquidity ratios, and macroeconomic trends. By aligning bank management practices and regulatory oversight with these evidence-based insights, Ethiopia’s banking sector can reduce NPLs, enhance resilience, and contribute more effectively to sustainable economic growth.

5.4 RECOMMENDATIONS

Based on the regression results, beta coefficients provide clear evidence of how specific bank-specific and macroeconomic variables drive changes in non-performing loans. The following recommendations are therefore grounded in statistical outcomes, ensuring that policy and management actions directly address the most significant risk factors.

For Private Commercial Banks

Private banks should adopt prudent lending and monitoring practices to minimize non-performing loans (NPLs).

First, annual loan growth should be capped at **20%**. The regression results show that loan growth has a positive and significant effect on NPLs ($\beta = 0.14087$, $p = 0.0000$). Moving from 10% growth (a safe threshold) to 20% growth increases NPLs by 1.41 percentage points. If the baseline NPL ratio is 5% (the National Bank of Ethiopia's requirement), the new NPL ratio would rise to 6.41%, representing a 28% increment. This demonstrates that unchecked loan expansion directly undermines loan quality.

Second, banks should set a **Loan-to-Deposit Ratio (LDR) alert at 85%**. The regression shows that LDR is positively and significantly associated with NPLs ($\beta = 0.03888$, $p = 0.0484$). An increase from 70% (safe threshold) to 85% raises NPLs by 0.58 percentage points. When LDR exceeds 85%, banks face heightened liquidity and credit risks, making it essential to monitor loan disbursement relative to deposit mobilization.

For the National Bank of Ethiopia (NBE)

The regulator should strengthen its supervisory framework by integrating beta-based early warning systems.

First, NBE should establish **joint monitoring of loan growth, LDR, and GDP trends**. Given the model's explanatory power ($R^2 = 98.8\%$), these three variables capture most of the variation in NPLs. Monitoring loan growth above 20%, LDR above 85%, and falling GDP together would provide an effective early warning system.

Second, NBE should **link loan loss provisions to loan growth**. With loan growth significantly increasing NPLs ($\beta = 0.14087$, $p = 0.0000$), banks should be required to set aside additional provisions when annual loan growth exceeds 15–20%. This would ensure that rapid credit expansion is matched with adequate buffers.

Third, NBE should **not flag high NIM as a risk indicator**. The regression shows that NIM reduces NPLs ($\beta = -0.41899$, $p = 0.0000$). High profitability strengthens franchise

value and reduces credit risk, so supervisory frameworks should recognize NIM as a stabilizing factor.

Finally, NBE should **use interest rate policy cautiously**. Lending rates are negatively and significantly associated with NPLs (β = –0.28091, p = 0.0182), meaning higher rates reduce defaults in the short term. However, excessive reliance on rate hikes may harm economic growth. Interest rate adjustments should therefore be complemented with macro prudential measures rather than used in isolation.

For Bank Management

Credit Performers should align internal incentives and operational practices with credit quality rather than loan volume.

Loan officers' performance incentives should be tied to NPL ratios rather than the sheer volume of loans disbursed. The regression confirms that loan growth significantly increases NPLs (β = 0.14087, p = 0.0000). Aligning incentives with loan quality would discourage reckless expansion and promote sustainable lending.

Although management efficiency was statistically insignificant in the regression (β = 1.4921, p = 0.1785), cost control remains important for profitability. Even if efficiency does not directly reduce NPLs, prudent management practices contribute to overall financial stability.

5.5 LIMITATIONS AND SUGGSTION FOR FUTURE WORK

Although this study provides valuable insights into the determinants of non-performing loans (NPLs) in Ethiopia's private commercial banks, several limitations should be acknowledged. First, the analysis was restricted to ten private banks over a six-year period (2020–2025). While this dataset was balanced and statistically robust, it may not fully capture variations across all banks, including state-owned institutions such as the Commercial Bank of Ethiopia, which dominate the sector. Second, the study relied on secondary data, which may be subject to reporting inconsistencies or differences in accounting practices across banks. Third, the econometric model employed was static panel least squares, which, although effective, does not fully address potential

endogeneity or dynamic interactions between variables. For example, loan growth and NPLs may influence each other simultaneously, a relationship better captured by dynamic panel models such as the Generalized Method of Moments (GMM). Fourth, the study focused primarily on quantitative indicators and did not incorporate qualitative aspects such as governance quality, borrower behavior, or regulatory enforcement, which may also shape loan performance. Finally, the study period coincided with significant macroeconomic shocks, including inflationary pressures and foreign exchange shortages, which may have influenced the results in ways not fully accounted for in the model.

Suggestion for future research

Future studies should expand the scope of analysis to include both private and public banks, thereby providing a more comprehensive picture of the Ethiopian banking sector. Extending the time horizon beyond 2025 would also allow researchers to capture long-term trends and the impact of ongoing financial reforms. Methodologically, future work could employ dynamic panel models such as GMM to address endogeneity and better capture the bidirectional relationship between loan growth and NPLs. Researchers may also consider incorporating qualitative dimensions, such as management practices, governance structures, and borrower characteristics, to complement quantitative findings. Additionally, comparative studies across countries in Sub-Saharan Africa could provide regional insights into how macroeconomic shocks and regulatory frameworks influence NPLs. Finally, future research should explore the role of digital banking, financial technology innovations, and credit scoring technologies in shaping loan quality, as these factors are becoming increasingly relevant in Ethiopia’s evolving financial landscape.

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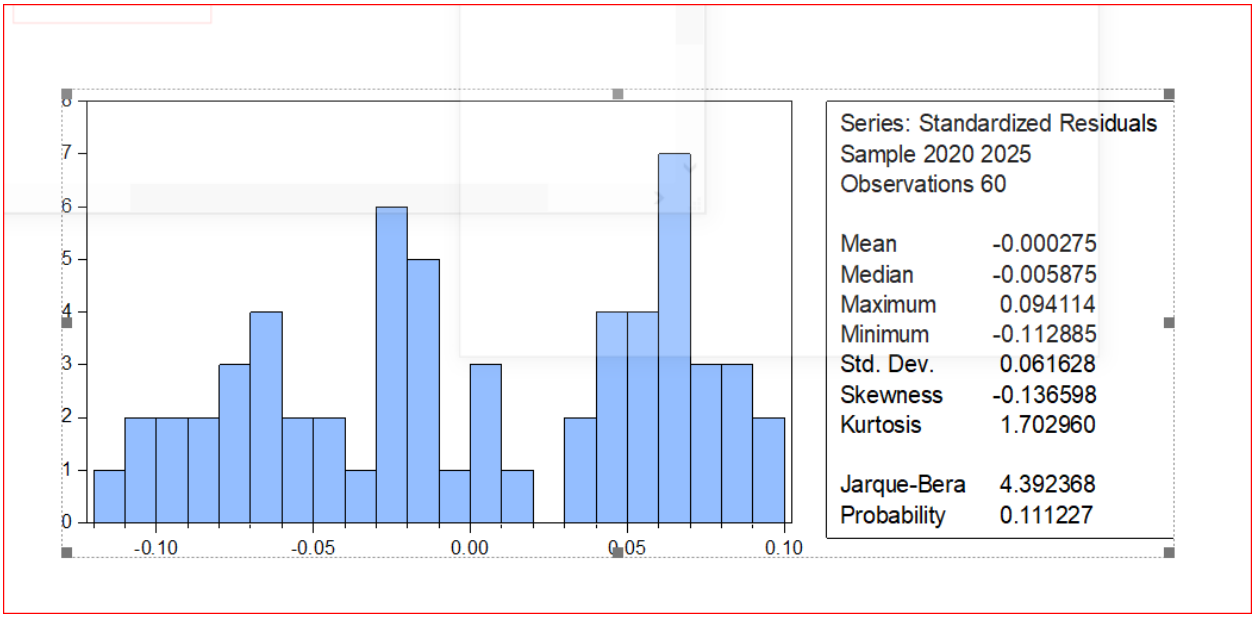
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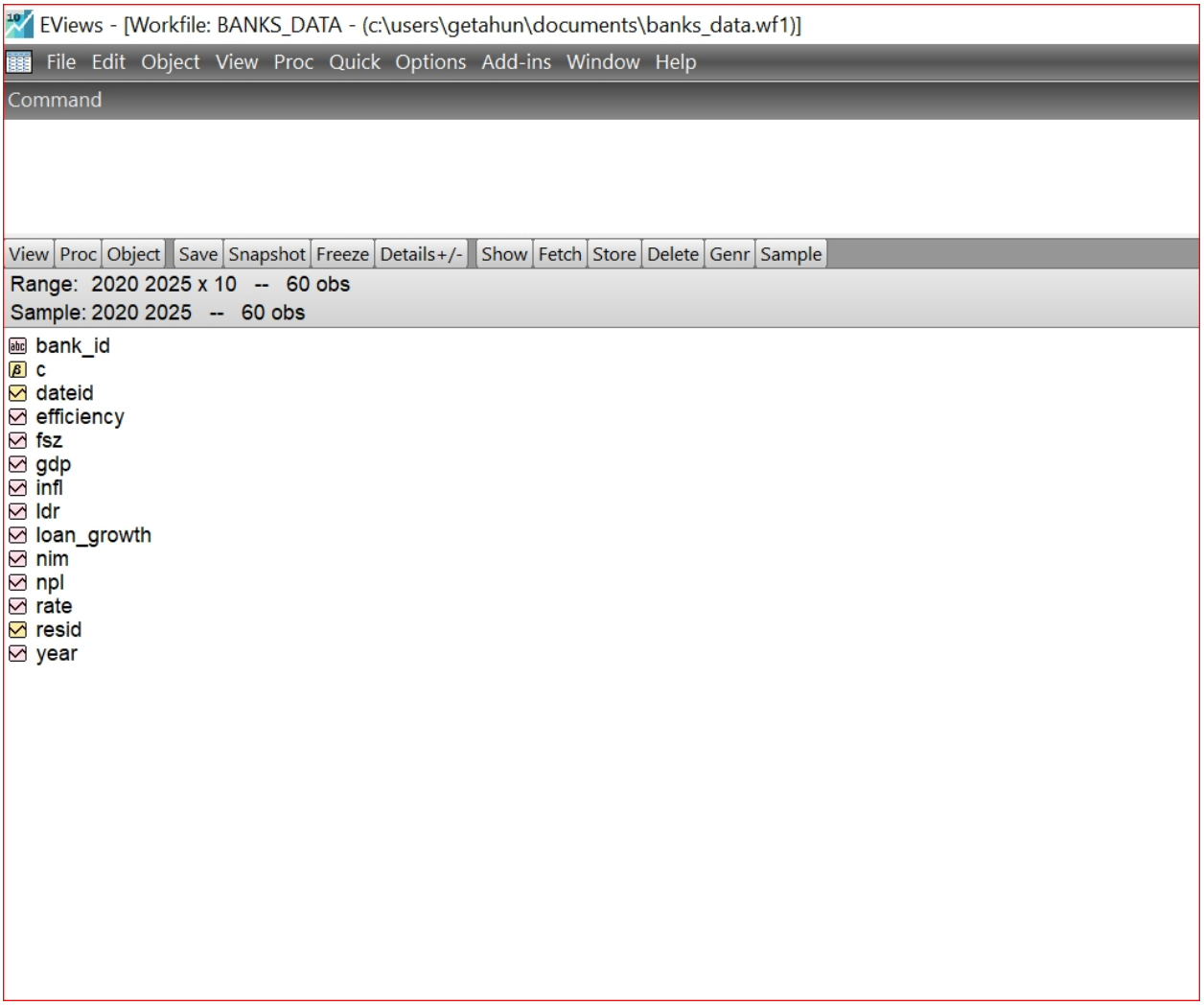
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7. APPENDIX


8
7
6
5
4
3
2
1
0
-0.10
-0.05
0.00
0.05
0.10
Series: Standardized Residuals
Sample 2020 2025
Observations 60
Mean -0.000275
Median -0.005875
Maximum 0.094114
Minimum -0.112885
Std. Dev. 0.061628
Skewness -0.136598
Kurtosis 1.702960
Jarque-Bera 4.392368
Probability 0.111227



Dependent Variable: NPL

Method: Panel Least Squares

Date: 03/01/26 Time: 19:43

Sample: 2020 2025

Periods included: 6

Cross-sections included: 10

Total panel (balanced) observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NIM	-0.418990	0.149743	-6.003912	0.0000
LOAN_GROWTH	0.140868	0.027897	5.049520	0.0000
LDR	0.038886	0.019230	2.022150	0.0484
FSZ	-0.012560	0.016175	-0.776513	0.4410
EFFICIENCY	1.492130	1.093771	1.364207	0.1785
GDP	-0.726124	0.162576	-4.466358	0.0000

INFL	0.134375	0.111557	1.204537	0.2339
RATE	-0.280907	0.115089	-2.440776	0.0182
C	1.721975	1.168034	1.474250	0.1466

R-squared	0.988330	Mean dependent var	1.039167
Adjusted R-squared	0.986500	S.D. dependent var	0.395964
S.E. of regression	0.046008	Akaike info criterion	-3.182536
Sum squared resid	0.107952	Schwarz criterion	-2.868384
Log likelihood	104.4761	Hannan-Quinn criter.	-3.059654
F-statistic	539.9016	Durbin-Watson stat	1.806004
Prob(F-statistic)	0.000000		