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The effect of credit risk management on the performance of Commercial Banks in Ethiopia

O impacto da gestão do risco de crédito no desempenho dos bancos comerciais na Etiópia

El efecto de la gestión del riesgo crediticio en el desempeño de los bancos comerciales en Etiopía

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Abstract: *The study investigated the impact of credit risk management on the profitability of commercial banks in Ethiopia. The research adopted explanatory research design and a quantitative approach were employed. It used descriptive and inferential statistical analyses techniques. The population of this study includes 31 commercial banks that are working in Ethiopia, from which a purposive sample of ten leading banks were selected on the basis of their branch network and operational age. The study is panel from the period between 2013 and 2023. The Random effects Generalized Least Squares model was utilized as panel data regression analysis to test the impact of credit risk management factors on bank performance. The regression result shows that Non-Performing Loans were found to have a significant negative impact on bank profitability, which implies that a high level of non-performing loans decreases bank profitability, emphasizing the importance of effective credit risk management. Conversely, and contrary to conventional assumptions, both a higher Loan to Total Asset Ratio and Loan to Deposit Ratio were unexpectedly associated with decreased profitability, suggesting an optimal threshold for lending activity exists beyond which excessive loan expansion introduces detrimental liquidity and credit risks. In alignment with established financial principles, Capital Adequacy significantly enhanced bank performance, underscoring its crucial role in providing essential buffers against losses, maintaining stability, and fostering stakeholder confidence for sustainable returns. Bank size as measured by total assets is positively related to better performance but insignificance effect on it.*

Keywords*: Credit Risk Management; Profitability; Commercial Banks.*

Resumo: *O estudo investigou o impacto da gestão do risco de crédito na rentabilidade dos bancos comerciais na Etiópia. A pesquisa adotou um delineamento explicativo e uma abordagem quantitativa, empregando técnicas de análise estatística descritiva e inferencial. A população deste estudo incluiu 31 bancos comerciais operantes na Etiópia, dos quais foi selecionada uma amostra intencional de dez bancos líderes com base em sua rede de agências e tempo de operação. O estudo consiste em um painel referente ao período entre 2013 e 2023. O modelo de Mínimos Quadrados Generalizados de efeitos aleatórios foi utilizado para a análise de regressão de dados em painel, visando testar o impacto dos fatores de gestão de risco de crédito no desempenho bancário. Os resultados da regressão demonstram que os Créditos de Liquidação Duvidosa (NPL) apresentam um impacto negativo significativo na rentabilidade bancária, o que implica que um nível elevado de inadimplência reduz a lucratividade, enfatizando a importância de uma gestão de risco de crédito eficaz. Inversamente, e contrariando as premissas convencionais, tanto o Índice de Empréstimos sobre o Ativo Total quanto o Índice de Empréstimos sobre Depósitos foram inesperadamente associados à diminuição da rentabilidade, sugerindo a existência de um limiar ideal para a atividade de crédito, além do qual a expansão excessiva de empréstimos introduz riscos prejudiciais de liquidez e de crédito. Em conformidade com os princípios financeiros estabelecidos, a Adequação de Capital aumentou significativamente o desempenho bancário, ressaltando seu papel crucial no fornecimento de margens de segurança essenciais contra perdas, na manutenção da estabilidade e no fomento da confiança das partes interessadas para retornos sustentáveis. O tamanho do banco, mensurado pelo total de ativos, relaciona-se positivamente com um melhor desempenho, porém com um efeito insignificante.*

Palavras-chave: *Gestão de Risco de Crédito; Rentabilidade; Bancos Comerciais.*

Resumen: *El estudio investigó el impacto de la gestión del riesgo crediticio en la rentabilidad de los bancos comerciales en Etiopía. La investigación adoptó un diseño explicativo y se empleó un enfoque cuantitativo, utilizando técnicas de análisis estadístico descriptivo e inferencial. La población de este estudio incluye 31 bancos comerciales que operan en Etiopía, de los cuales se seleccionó una muestra intencional de diez bancos líderes en función de su red de sucursales y antigüedad operativa. El estudio es de panel para el período comprendido entre 2013 y 2023. Se utilizó el modelo de Mínimos Cuadrados Generalizados de efectos aleatorios como análisis de regresión de datos de panel para evaluar el impacto de los factores de gestión del riesgo crediticio en el desempeño bancario. El resultado de la regresión muestra que los Préstamos No Contributivos (NPL) tuvieron un impacto negativo significativo en la rentabilidad bancaria, lo que implica que un alto nivel de morosidad disminuye la rentabilidad, enfatizando la importancia de una gestión eficaz del riesgo crediticio. Por el contrario, y de forma opuesta a los supuestos convencionales, tanto el Ratio de Préstamos sobre Activos Totales como el Ratio de Préstamos sobre Depósitos se asociaron inesperadamente con una disminución de la rentabilidad, lo que sugiere la existencia de un umbral óptimo para la actividad crediticia más allá del cual la expansión excesiva de los préstamos introduce riesgos perjudiciales de liquidez y crédito. En consonancia con los principios financieros establecidos, la Adecuación de Capital mejoró significativamente el desempeño bancario, subrayando su papel crucial en la provisión de reservas esenciales contra pérdidas, el mantenimiento de la estabilidad y el fomento de la confianza de las partes interesadas para obtener rendimientos sostenibles. El tamaño del banco, medido por los activos totales, se relaciona positivamente con un mejor desempeño, pero con un efecto insignificante.*

Palabras clave: *Gestión del Riesgo Crediticio; Rentabilidad; Bancos Comerciales.*

1. Introduction

Banks are subjected to countless risks owing to the dynamic nature of their organizational structure and the complexity of the economic environment that they operate within. Banks are exposed to six main threats, as asserted by Barakova et al. (2020). Credit risk, liquidity risk, market risk, project operation risk, nominal risk, and legal risk are some of the categories that they can be categorized under (Arifaj & Baruti, 2023; Silva & Santos**,** 2021). Studies Ganem & Baidya (2011), Murcia et al., (2014), Lima et al., (2018) states that Credit risk management is an integral part of the activity of banks in the world, since it directly affects financial stability and profitability. Credit risk management involves identifying, evaluating, and hedging risks through techniques such as diversification and credit scoring models (Afriyie & Akotey, 2013; Oliveira, & Lima**,** 2020).

In Africa, the banking sector is faced with unique challenges like poor financial infrastructure and varied regulatory needs. African banks depend significantly on good credit risk management to promote stability and competitiveness. For instance, research has indicated the necessity of good risk management practices to keep the credit risk of African banks (Pesaran et al., 2006). Credit risk is still a primary concern due to aspects like the poor data system and poor financial infrastructure (Asfaw, 2015). Ethiopian banks' face challenges in the implementation of advanced risk management models due to infrastructure limitations (Mergu et al., 2022).

Credit risk management is an extremely critical component of banking operations because it directly affects commercial bank profitability and stability. Despite the significant role that credit risk management plays in commercial bank stability and profitability, evidence indicates a wide knowledge gap on how such practices influence performance. Banks in sub-Saharan Africa face major operational challenges. Limited financial infrastructure and diverse regulatory requirements are key issues (Pesaran et al., 2006). Poor credit risk management lowers profitability, weakens asset quality, and increases loan defaults. These factors can trigger financial instability (Kassahun, 2023; Asmare, 2019).

The banking sector in Ethiopia is experiencing rapid growth, yet this expansion is increasingly confronted by a complex array of limitations. In recent years, practical constraints have emerged, such as restrictions on cash withdrawals (e.g., limiting payments to not more than 10,000 Birr per customer at a time), challenges in executing real-time gross settlements (RTGS) between banks, and a general shortage of liquidity. These operational and liquidity challenges, particularly evident in the period since 2020, collectively pose significant risks to the stability and functionality of the banking sector.

Previous studies have consistently emphasized the substantial role played by credit risk in influencing financial performance. Although international studies affirm the importance of credit risk management, they reveal notable gaps in scope and integration. For example, Leigh and Xu (2025) examined monetary policy transmission in Brazil but did not incorporate micro-level credit risk proxies such as Non-Performing Loans (NPLs) or Capital Adequacy Ratio (CAR); Almeida and Sousa (2025) focused on Portuguese banks during crises, emphasizing capital adequacy and asset quality while overlooking liquidity ratios and bank size; García-Herrero and Martínez-Pería (2022) analyzed Spanish banks' resilience under TLAC requirements but left unexplored the combined role of lending ratios and capital buffers; Ndyagyenda (2020) studied Uganda's Bank of Africa with limited generalizability due to its single-bank focus; Ogundele and Nzama (2025) assessed Nigerian banks' disclosure practices without quantifying specific risk proxies; and Kingu et al. (2018) highlighted Tanzania's loan-to-deposit ratio effects but excluded other determinants and post-2018 dynamics.

Studies such as Engidawork (2014), Million et al. (2015), Biruk (2018), Hiwot (2019), Zelalem (2020), Costa & Carvalho**,** (2019), Muhidin, (2016), Kassahun, (2023), Asmare (2019),

and Dereje & Dviyang (2022) have explored this relationship, often utilizing such variables as Non-Performing Loans (NPLs), loan-to-asset ratios, capital adequacy, and bank size, with Return on Assets (ROA) or Return on Equity (ROE) being the corresponding measures of performance. Despite these useful contributions, there are some gaps in the existing literature. Firstly, most of the studies, including Engidawork (2014), Million et al. (2015), Hiwot (2019), Zelalem (2020), Muhidin, (2016), Kassahun, (2023), Asmare (2019), and Dereje & Dviyang (2022), are mostly reporting years ending before 2019 or 2020. This creates a critical lacuna in understanding the impact of credit risk management in the recent years (after 2020), a period when there were titanic economic transformations, regulatory reforms, and new commercial banks that entered the Ethiopian market. Second, while other studies employ a range of variables, the particular combination of credit risk management proxies Non-Performing Loan-to-Loan Ratio (NPLR), Total Loans to Total Asset Ratio (TLTAR), Total Loan to Deposit Ratio (TLTDR), Capital Adequacy Ratio (CAD), and Bank Size or Total Asset (TA) has not been properly examined together with so recent and extensive panel data. Further, studies like Hiwot (2019) focus on one bank, robbing the industry of generalizability.

This study, therefore, aims to address such gaps that have been identified by quantitatively examining the effect of credit risk management on the performance of Ethiopian commercial banks. Specifically, it expands the focus to a recent and well-documented period, 2013-2023, capturing today's challenges and innovations in the banking sector in Ethiopia.

2. Literature review

2.1. Theoretical Literature Review

Credit risk management remains central to the performance of commercial banks, as recent studies emphasize the balance between risk and profitability. The risk return tradeoff theory continues to be validated in modern banking contexts, showing that banks must carefully weigh lending aggressiveness against asset quality to sustain profitability. For instance, Navas et al., (2020) demonstrated that efficient risk return management significantly enhances bank performance, while Handorf (2025) highlighted that dynamic portfolio adjustments are essential for mitigating loan losses. These findings confirm that the classical tradeoff remains relevant but must be interpreted through contemporary regulatory and market conditions.

Similarly, asymmetric information and liquidity preference theories provide critical insights into credit risk management. Brighi and Mussoni (2025) found that information asymmetries in bank firm relationships often lead to credit rationing, while Selcuk (2025) showed that adverse selection continues to constrain lending efficiency. Liquidity preference theory has also been reaffirmed; with Bakala (2024) and Lee (2025) demonstrating that aggressive lending without adequate liquidity buffers exposes banks to crises that undermine profitability. Together, these updated perspectives illustrate that while the foundational theories remain valid; their application in modern banking requires adaptation to evolving financial environments. These theories describe why banks need to ensure that profitability is not compromised with risk and liquidity protection. Modern studies on these theories, while affirming their continued applicability, identify emerging aspects. For instance, according to the European Central Bank (2024), higher interest rates and bankruptcy incidences led to an enhanced credit risk environment for euro area banks, supporting both risk-return duality and also revealing country-specific patterns according to sectors. In similar studies, Almeida and Sousa (2025) examined Portuguese banks in the context of both the sovereign debt crisis and the COVID-19 pandemic, establishing that while capital adequacy and asset quality persisted as drivers of profitability, these were supportive of the liquidity preference theory. These observations further establish that these traditional theories continue to describe banking behavior, although needing calibration in response to macroeconomic disturbances and regulatory changes.

Outside the European context, Latin American studies can also contribute meaningfully to the theoretical realm. In the IMF study conducted on Brazil, Leigh and Xu (2025) found the transmission channel in monetary policymaker effects on bank loans in Brazil to have a strong impact on bank lending rates. Spanish studies have stressed the significance of capital adequacy and liquidity reserves in countering risks associated with the occurrence of the TLAC in times of stress in the financial markets. Therefore, both the risk/return theory and the preference theory emphasize its validity. In this manner, the universality of the classical theories becomes established and necessarily adapted according to the regional context. This particular research can be seen to make a fresh start by integrating the Ethiopian, European, and Latin American contexts.

2.2. Empirical Literature Review

Currently, recent global research exemplifies the importance of credit risk management in bank performance in both developed and emerging countries. In particular, Almeida and Sousa (2025) investigated Portuguese banks during the COVID-19 crisis and sovereign debt crisis, and their results were consistent with the fact that capital adequacy and asset quality played pivotal roles in maintaining their profitability through the liquidity-preference theory. In the case of Spain, García-Herrero and Martínez-Pería (2022) confirmed that, during macro-economic crises, banks which manage their credit risks effectively outperformed others, thereby supporting the risk and return relationship. Evidence from Latin America also endorses this argument, as represented by the observation that the profitability of Brazilian banks highly depended on monetary policy transmission, with inefficient credit risk management practices accentuating their losses during interest rate hikes (Leigh and Xu 2025).

Empirical studies across Africa highlight the two-way role of credit risk management in profitability and stability. Ndyagyenda (2020) examined the Bank of Africa, Uganda Limited, and reported that non-performing loans significantly detracted from profitability, while prudent credit policies enhanced financial performance. More recently, Ogundele and Nzama (2025) researched Nigerian banks and showed that both credit and liquidity risk disclosures were positively related to financial performance, thus underlining the importance of transparency and regulatory compliance. Kingu et al. (2018), in the context of Tanzania, documented that an excessively high loan-to-deposit ratio strained liquidity and lowered returns, a result which recent post-2020 studies emphasize needs to be addressed with balanced lending strategies. These African examples demonstrate that while the drivers of bank performance are similar to that elsewhere in the world, the magnitude of the credit risk effects is often magnified by weaker institutional frameworks and macroeconomic volatility.

Recently, empirical studies have shed more light on credit risk management and its implications for the performance of Ethiopian banks. In their study, Alebachew and Roba (2024) concluded that while NPLs have a significant negative effect on profitability, an adequate capital level has a significant positive effect on risk resistance, which corresponds with global findings. Kidane's contribution in 2020 argues that overall, both bank-specific variables (loan ratios, capital adequacy ratios, and liquidity ratios) and macros variables (GDP growth rate, inflation rate) have significant effects on profitability. More up-to-date research from Academia.edu (2023) has confirmed that better-performing credit risk management practices in Ethiopian banks translate to better returns on equity, primarily via credit monitoring. These studies suggest that the Ethiopian banking industry, like other emerging markets, has similar challenges, but with the significant growth of the number of banks from 2013, credit risk becomes an important issue.

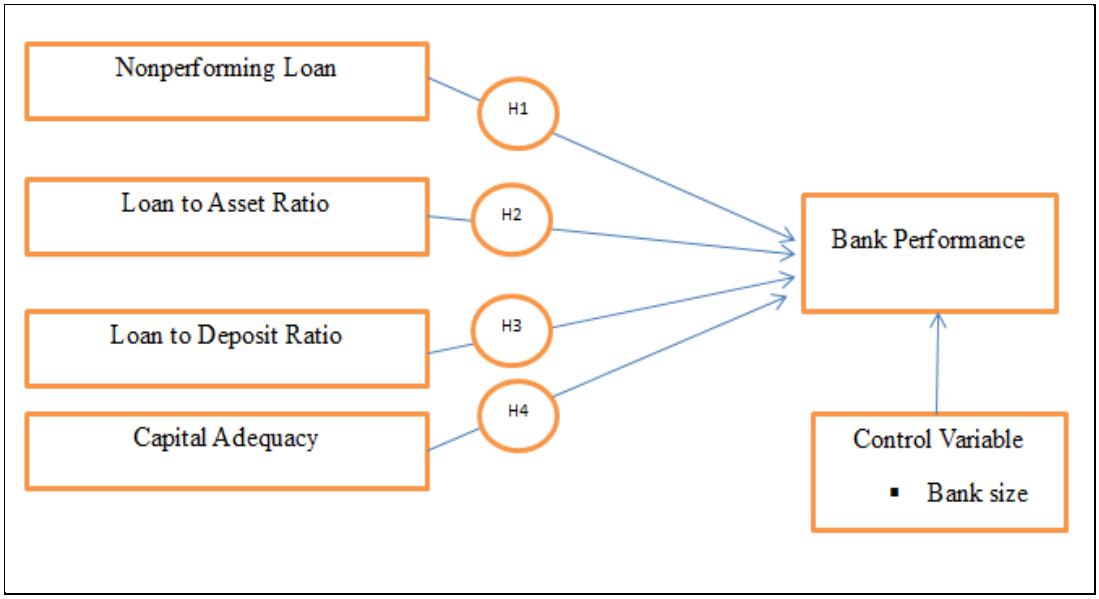
Altogether, empirical research after 2020 confirms that credit risk management is universally associated with bank performance, but it remains differed in both strength and type. Resilience in times of crisis receives prominent attention in international studies, while African research focuses on the impact of institutional flaws and transparency aspects, whereas Ethiopian

studies focus on the pressing concern for credit risk management in light of fast sectoral expansion. The proposed work shall therefore add novelty to the literature in that it focuses on Ethiopian bank performance from 2013 to 2023, spanning regulatory changes and macroeconomic fluctuations, and considers an array of indicators namely NPLs, TLTAR, TLTDR, CAR, and bank size.

2.3. Conceptual Framework

The conceptual framework of this particular study was developed based on the reviewed theoretical and previous empirical findings of related literatures as presented in Figure1. Effective credit risk management is vital for commercial bank performance, particularly in emerging economies like Ethiopia. Non-Performing Loans (NPLs) are widely recognized as detrimental to profitability, signaling weakened asset quality and elevated default risk (Ahmad & Ariff, 2007). Ratios such as Loan to Asset (LAR) and Loan to Deposit (LDR) reflect lending aggressiveness and liquidity exposure, where overly high levels may undermine sustainable returns (Athanasoglou, Brissimis, & Delis, 2008; Hossain & Hossain, 2020). Capital Adequacy serves as a strategic buffer against financial instability and loss absorption, with its positive influence on performance well-established during crisis periods (Berger & Bouwman, 2013). Additionally, bank size plays a moderating role by providing operational scale, although its impact on profitability can vary across contexts (Sufian & Habibullah, 2009). These variables collectively inform the study's framework and guide understanding of how Ethiopian banks navigate credit risk in volatile conditions.

Figure 1 - Conceptual framework



Source: Ahmad and Ariff (2007); Athanasoglou et al. (2008); Berger and Bouwman (2013); Hossain and Hossain (2020); Sufian and Habibullah (2009).

2.4. Research Hypotheses

Non-Performing Loans (NPLs) are the biggest threat to bank profitability and performance. They are loans whose scheduled payments are not received from the borrower, which reduces the bank's interest income directly. NPLs also demand provisions for possible losses, which lower reported profits directly and consume capital that could have been used for productive lending. As contended by Udari & Weligamage (2020), high NPL ratios have a significant impact of augmenting the credit risk exposure of a bank and lowering its income-generating capacity, and thus affecting its financial performance negatively. This adverse effect is well established in the banking literature. Deteriorated asset quality, often symbolized by high rates of non-performing loans

(NPLs), is consistently linked to weakened profitability. High NPLs also increase financial instability, making banks more vulnerable to shocks. For instance, Hiwot (2018) specifically found a negative and significant effect of credit risk, measured in terms of the NPL to total loan ratio, on bank performance. Hence, there is a need for robust asset quality management to maintain healthy finances and sustainable performance.

H1: Non-Performing Loans (NPL) have a negative and significant effect on bank performance.

The Loan to Total Assets Ratio (TLTAR) is a prime indicator of the ability of a bank to put its assets to work in income-earning loans. The higher the TLTAR, the larger percentage of a bank's total assets is being deployed in lending, which directly adds to increased interest income and, hence, profitability. Empirical evidence by Febriani & Sari (2019) and Nurani (2020) supports this point, that effective deployment of assets in lending is critical in driving bank performance through increased interest income. To be specific, it was shown by Engidawork (2014) that the loan to total asset ratio significantly and positively contributes to the performance of Ethiopian commercial banks. However, worth mentioning here is that some studies, like Tesfaye (2014), while reporting a positive association established an effect that was not statistically significant, which suggests the potential for variation in the strength of this association. Notwithstanding such reservations, the universal theoretical expectation and most of the evidence all point towards a positive effect.

H2: Loan to Total Asset Ratio positively and significantly influences bank performance.

The TLTDR measures how well a bank uses its deposits to generate loans, which produce interest income. A higher TLTDR generally correlates with higher profitability, as more deposits are converted into income-generating loans. Studies by Raharjo & Haryanto (2015) and Siregar & Dewi (2019) showed that TLTDR positively and significantly affects ROA, which is a proxy for bank performance (Muhammad et al., 2016).

If banks raise their loan-to-deposit ratio (TLTDR) prudently, their performance is likely to improve as a result of securing more interest-bearing assets from relatively cheap deposits, as supported by the risk–return tradeoff theory (Navas et al., 2020; Handorf, 2025) and financial intermediation theory (Kithandi, 2025; Panov & Larionova, 2021). Nevertheless, in the framework of liquidity preference and prudential requirement perspectives, if their TLTDR is raised imprudently, banks' performance is likely to worsen due to an increase in loan defaults and provisions, offsetting their profit efficiency (Navas et al., 2020; Handorf, 2025). Empirical estimations show that if their TLTDR is raised prudently, Indonesian commercial banks (Raharjo & Haryanto, 2015; Siregar & Dewi, 2019; Muhammad Amir et al., 2016), European banks following the new EU liquidity regulation framework (Kosmidou, 2008), and Spanish banks with optimal loan funding (García-Herrero & Martínez-Pería, 2022) would perform better, thus validating the third assumption that improving and enhancing their deposit base leads to higher net-interest income and earnings due to higher efficiency in securing higher net-interest margins (Raharjo & Haryanto, 2015; Siregar & Dewi, 2019; Kosmidou, 2008).

Furthermore, evidence indicates that there is a point beyond which additional, negative returns occur, particularly when TLTDR is very high, thereby enhancing liquidity risk. Findings from Tanzania and Uganda indicate that when TLTDR is high, there is a press upon liquid assets, fragility, and profitability, particularly when there is a macroeconomic shock that increases interest rates (Kingu et al., 2018; Ndyagyenda, 2020). Additionally, panel results from Ethiopian studies indicate that when a bank is too aggressive about lending, loan costs increase, while performance declines, particularly when there is a joint negative effect from TLTDR and non-performing loans (Alebachew & Roba, 2024). Thus, based both on theory and evidence, there is a concavity relationship, indicating that while TLTDR improves performance, it can decrease it beyond a certain optimal point, particularly in emerging economies, where there is relative uncertainty about

funds providers as well as their screening criteria (Kingu et al., 2018; Ndyagyenda, 2020; Alebachew & Roba, 2024). Thus, H3 – Loan to Deposit Ratio is positively related to performance, though with diminishing returns when liquidity risk increases (Raharjo & Haryanto, 2015; Siregar & Dewi, 2019; Kingu et al., 2018; Ndyagyenda, 2020; Alebachew & Roba, 2024).

H3: Loan to Deposit Ratio (TLTDR) has a positive and significant effect on bank performance.

Capital adequacy ensures that banks have sufficient capital to absorb losses and maintain stability, which enhances confidence and supports sustainable profitability. Empirical evidence shows that higher capital adequacy ratios positively influence bank performance by reducing risk and supporting lending activities (Alebachew & Roba, 2024). But Biruk, (2018) state CAR has negative and significance effect on ROA.

Capital adequacy continues to be a cornerstone of bank performance, with recent studies reaffirming its role in absorbing losses, reducing distress costs, and stabilizing funding access through risk absorption and signaling channels. Well-capitalized banks are better positioned to sustain lending cycles without breaching regulatory thresholds, thereby maintaining depositor and investor confidence. For instance, Ozili (2024) emphasized that strong capital buffers enhance resilience against credit shocks and improve profitability, while Berger, Bouwman, and Kim (2017) demonstrated that capital strength supports liquidity creation and market trust. Similarly, Abubakar and Bala (2023) found that capital adequacy directly influences risk-taking behavior and financial stability in emerging markets, underscoring its continued relevance in modern banking systems. The empirical literature often finds a marked CAR-performance correlation; European data indicate capital buffers have a role to play in improving profitability under more stringent regulation and macroeconomic stressors (Kosmidou, 2008), while Portuguese lenders were able to sustain profitability during times of crises by virtue of better capital and their generally high quality assets (Almeida & Sousa, 2025), as well as adequate risk disclosures to benefit Nigerian lenders to deliver sound performance due to high capitalization levels as well as effective risk disclosures (Ogundele & Nzama, 2025). The Ethiopian data lends similarity to this finding as CAR is found to positively influence ROA as lenders remain effective in managing their credit risks (Alebachew & Roba, 2024).

However, the capital itself does not come for free, as it could increase the overall cost of capital if there is more equity than needed, as well as limit benefits through leverage, with a possible negative relationship between CAR and ROA if coupled with a cautious risk approach (Biruk, 2018). In a similar manner, a very high buffer could mitigate loan expansion benefits in Europe as well as in Spain, showing there could be efficiency trade-offs in such a high buffer situation (Kosmidou, 2008; García-Herrero & Martínez-Pería, 2022). All these theoretical as well as empirical considerations underscore the inverted-U form, where capital will increase bank performance within its economically desirable levels, but beyond which efficiency costs might become more dominant in a macro-conducive environment with low risk-premium adjustments (Kosmidou, 2008; García-Herrero & Martínez-Pería, 2022; Biruk, 2018). Thus, H4: The effect of capital adequacy on bank performance is positive and significant under conditions of high risk, stringent regulation, with a possible efficiency cost in a high capital position above the desired levels (Almeida & Sousa, 2025; Ogundele & Nzama, 2025; Alebachew & Roba, 2024; Biruk, 2018).

H4: Capital Adequacy has a positive and significant effect on the performance of banks.

3. Methodology

3.1. Research Design and Approach

This study adopts an explanatory research design using panel data analysis to investigate the effect of credit risk management on the performance of Ethiopian commercial banks. Panel data is particularly suitable because it combines both cross-sectional and time-series dimensions, allowing for richer insights into dynamic relationships across banks and over time (Baltagi, 2021). By controlling for unobserved heterogeneity, panel models reduce omitted variable bias and provide more efficient estimates compared to purely cross-sectional or time-series approaches. The design is quantitative, aiming to establish causal relationships between credit risk indicators (NPLs, LTAR, LDR, CAR), bank size, and performance measures (ROA). The inclusion of macroeconomic controls enhances explanatory power and situates bank performance within broader economic conditions, as recommended in recent empirical studies (Almeida & Sousa, 2025; Ogundele & Nzama, 2025). However, the study focuses on internal bank specific factors because consistent macroeconomic data for all banks and years was not available or reliable.

3.2. Population of the Study

The population comprises all 31 registered commercial banks in Ethiopia as of 2023. From this, a purposive sample of 10 banks was selected based on size, age, and data availability, ensuring representativeness of the industry in terms of financial performance and operational characteristics. The sample includes: Commercial Bank of Ethiopia, Bank of Abyssinia, United Bank, Dashen Bank, Wegagen Bank, Awash Bank, Oromia International Bank, Cooperative Bank of Oromia, Nib International Bank, and Bunna Bank. This purposive sampling is justified because larger and older banks provide consistent longitudinal data and reflect systemic trends, while smaller banks often lack complete records. The study uses secondary data from annual reports, audited financial statements, and publications of the National Bank of Ethiopia, covering the period 2013–2023. Data for 2024 was excluded due to unavailability at the time of collection. This 11-year span captures regulatory reforms and macroeconomic shocks, providing a robust basis for analysis.

3.3. Data Types

This study relied exclusively on secondary data, collected from audited annual reports of Ethiopian commercial banks, publications of the National Bank of Ethiopia (NBE), and recognized financial databases. Secondary data were chosen because they provide reliable, standardized, and publicly available information on bank performance and risk indicators over time. Using secondary data ensures consistency across institutions and years, reduces collection bias, and allows for robust panel analysis of credit risk management variables (NPLR, TLTAR, TLTDR, CAR, and bank size) against profitability measures such as ROA.

3.4. Data Analysis Technique

The study used panel data analysis in the examination of credit risk management, macroeconomic factors, bank size, and bank performance for Ethiopian commercial banks. Panel data analysis was used because it allows one to examine both the cross-sectional and the time-series dimensions of the data and have an insight on how these dynamics change over time. Panel data analysis is particularly relevant for this study since it is able to control for individual-specific effects, which are needed when estimating bank performance measures over institutions in a longitudinal manner. Panel data analysis controls issues related to omitted variable bias and provides more efficient estimates than cross-section or time-series analyses alone.

For validity, data went through the validation process. Missing data was validated by multiple sources (bank annual reports, publications by NBE, and financial data bases). Outliers

were detected through standardized residuals and winsorization. There was also a validity check to ensure data was consistent with its reporting over time and consistent with NBE regulatory statements. Such measures promote validity through increased transparency to resolve potential inconsistencies among reporting data from different banks (Baltagi, 2021; Alebachew & Roba, 2024).

3.5. Robustness Checks

To enhance methodological rigor, the study incorporated robustness checks to ensure that the results are not model-dependent. In addition to the Random Effects GLS model, a Fixed Effects specification was estimated, with the Hausman test guiding model selection. The results remained stable under this alternative specification, thereby strengthening confidence in the validity of the conclusions.

3.6. Hypothesis Testing Procedure

The hypotheses developed in this study were tested using panel data regression techniques. Data were collected from secondary sources, including audited annual reports of commercial banks, publications of the National Bank of Ethiopia (NBE), and recognized financial databases. The explanatory variables included Non-Performing Loan Ratio (NPLR), Loan to Total Asset Ratio (TLTAR), Loan to Deposit Ratio (TLTDR), Capital Adequacy Ratio (CAR), and Bank Size, while Return on Assets (ROA) was used as the primary measure of performance.

To test the hypotheses, the study employed Generalized Least Squares (GLS) estimation under a Random Effects specification, with the Hausman test guiding model choice between Random and Fixed Effects. Each hypothesis was evaluated by examining the sign, magnitude, and statistical significance of the estimated coefficients. This procedure ensured that the results were grounded in a transparent analytical framework and that the conclusions drawn were based on established econometric techniques.

4. Result and Discussions

4.1. Descriptive Statistics Analysis

This section presents descriptive findings of the variables. Descriptive statistics utilized were mean, median, minimum, maximum and standard deviation. Results are shown in Table 1.

Table 1 - Descriptive Statistics Analysis Result

	ROA	NPLR	TLTAR	TLTDR	CAR	TA
Mean	2.8041	0.0141	0.5101	0.6548	0.1342	17.6354
Median	2.7907	0.0080	0.5226	0.6765	0.1264	17.1858
Maximum	5.1269	0.0910	0.8847	1.720	0.2595	27.8979
Minimum	1.0087	0.000	0.0140	0.050	0.0372	14.0488
Std. Dev.	0.7326	0.0181	0.1582	0.1901	0.0461	2.3873
Observations	110	110	110	110	110	110

Source: This research (2025).

In the Table 1 the Mean value of ROA is 2.80% which indicates that on average, these Ethiopian commercial banks returned 2.80% on their overall assets during the years 2013-2023. This indicates a generally profitable banking sector. The natural log transformed average total asset worth for the sampled Ethiopia commercial banks between the periods of 2013-2023 has been 17.64 million Ethiopian Birr. This log transformed mean, thus, is the point of middle, or more

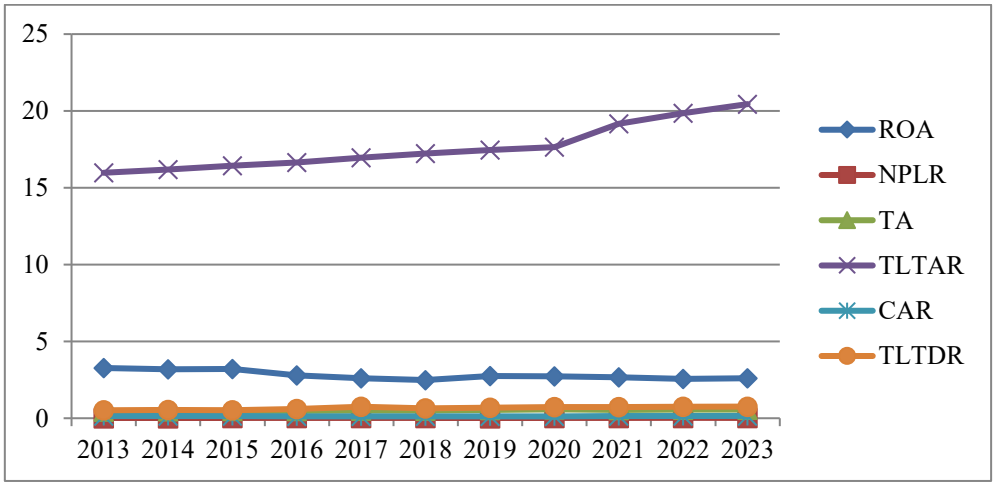
specifically, the central point of the bank sizes on the logarithmic scale. The average total loan to total deposit ratio (TLTDR) of the sampled Ethiopian commercial banks during 2013-2023 was 0.65 (or 65.48%), suggesting that, on average, about 65.48% of the total deposits were used for lending, reflecting a very high mobilization of the deposited funds into loans. Average total loan to total asset ratio (TLTAR) for the sampled Ethiopian commercial banks over the 2013-2023 period stood at 0.51 (or 51.01%), indicating that loans constituted a significant percentage of the banks' total assets and highlighting lending as an integral business function. The banks under research had an average CAR of 13.43%, which shows a healthy capital position above regulatory levels in the majority of jurisdictions, suggesting sufficient ability to absorb potential losses. The average NPLR of the Ethiopian commercial banks surveyed over the 2013-2023 period was 0.014, or 1.41%, which is significantly low and indicative of the fact that, on average, nonperforming loans form a relatively minor proportion of the loan book, meaning that there exists good overall quality of assets as well as good credit risk management in the industry. The overall descriptive statistics give a useful picture of the financial well-being and risk characteristics of the 10 banks in question between 2013 and 2023.

4.1.1. Trend Analysis of Key Indicators

To enhance the readability of the results, charts and trend lines were incorporated to illustrate the movement of Return on Assets (ROA), Non-Performing Loans (NPLs), and Capital Adequacy Ratio (CAR) over the study period. These visualizations highlight the dynamic changes in profitability, asset quality, and capitalization across Ethiopian commercial banks. The trend lines make it evident that periods of rising NPLs coincide with declines in ROA, while improvements in CAR are associated with greater resilience and stability.

This line graphs in Figure 2 illustrates the evolution of key financial indicators across Ethiopian commercial banks over an eleven-year period. ROA remained relatively stable, reflecting consistent profitability levels despite fluctuations in asset quality. NPLR showed notable peaks in 2016, 2018, and 2022, indicating periods of increased credit risk. TA followed a steady upward trajectory, suggesting sectorial growth and asset expansion. TLTAR rose sharply after 2020, signaling intensified loan exposure relative to total assets. CAR maintained a modest upward trend, reflecting gradual improvements in bank capitalization. TLTDR also increased steadily, pointing to growing reliance on liabilities to support lending activities.

Figure 2 - Trends of ROA, NPLR, TA, TLTAR, CAR, and TLTDR (2013–2023)



Source: This research (2025).

4.2. Correlation Analysis Result

The correlation analysis the Table 2 reveals that the Non-Performing Loans Ratio (NPLR) has a strong, statistically significant negative relationship with Return on Assets (ROA), indicating that higher NPLR substantially reduces bank profitability in Ethiopia. Similarly, the Total Loans to Total Assets Ratio shows a moderate negative and significant impact on ROA, suggesting that excessive loan concentration exposes banks to elevated risk and diminished returns.

Table 2 - correlation analysis result

	ROA	NPLR	TLTAR	TLTDR	CAR	TA
ROA	1.0000					
NPLR	-0.4597***	1.0000				
TLTAR	-0.3999***	0.2674	1.0000			
TLTDR	-0.1077	-0.0058	-0.0207	1.0000		
CAR	0.3241***	-0.2164	-0.3797	0.1741	1.0000	
TA	-0.0238	0.0681	0.0879	0.1884	-0.1550	1.0000

Source: This research (2025).

In contrast, the Total Loans to Total Deposits Ratio exhibits a very weak and statistically insignificant correlation, implying limited influence on profitability. The Capital Adequacy Ratio (CAR) presents a moderate positive and statistically significant correlation with ROA, demonstrating that well-capitalized banks tend to perform better. Finally, bank size (Total Assets) shows a negligible and non-significant correlation with ROA, suggesting that scale alone does not determine profitability within the Ethiopian banking sector.

4.3. Mode Selection Criteria

4.3.1. Fixed Effect Verses Random Effect

Panel data is a combination of time series and cross-sectional data. Three main models are typically used to analyze panel data, namely the common effects model, the fixed-effects model, and the random-effects model. The choice between the Fixed Effects and Random Effects models will be determined by the Hausman test. If the test indicates that the individual-specific effects are correlated with the independent variables, the Fixed Effects model will be preferred. Otherwise, the Random Effects model will be used. As we saw in the Table 3 Hausman specification test, the P-values of the model is 0.6140, which is higher than a 5% level of significance.

Table 3 - Hausman Specification Test Result

Test Summary		**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
		3.562140	5	0.6140
Variable	**Fixed**	**Random**	**Var (Diff.)**	**Prob.**
NPLR	-14.180035	-14.527951	1.333838	0.7632
TLTAR	0.465103	0.385491	0.012757	0.4809
TLTDR	-0.356408	-0.634374	0.041241	0.1711
CAR	2.830205	3.126053	0.558309	0.6921
TA	-0.062425	-0.073593	0.000868	0.7046
*** WARNING:** estimated cross-section random effects variance is zero.				

Source: This research (2025).

The Hausman test output includes a software-generated warning indicating that the estimated cross-section random effects variance is zero. This simply means that the random effects

estimator converges very closely to the fixed effects estimator, reducing the variance of their difference. As per Hausman specification test, null hypothesis (H0) is stated as the random effect model is suitable, and alternative hypothesis is stated as the fixed effect model is suitable. Therefore, since the P-value of Hausman specification test 0.6140 > 5%, we fail to reject the null hypothesis, i.e., the random effect model is suitable for this study.

4.3.2. Random effect vs Ordinary least square

Ordinary least square (OLS) is linear regression with no fixed and random effects. OLS model constant intercept and slopes regardless of the group or time. OLS regression model yields unbiased and efficient parameter estimates if there is no individual effect Ui (cross-section or time specific) (Ui=0). Table 4 presents Breusch and pagan Lagrangian multiplier test used to choose a random effect over ordinary least square (OLS).

Table 4 - Breusch and pagan Lagrangian multiplier test for random effect model

Null (no rand. effect)	**Cross-section**	**Period**	**Both**
Alternative	One-sided	One-sided	
Breusch-Pagan	1.800776 (0.1796)	37.30547 (0.0000)	39.10625 (0.0000)
Honda	-1.341930 (0.9102)	6.107821 (0.0000)	3.369994 (0.0004)

Source: This research (2025).

Both cross-section and period alternatives are reported as one-sided tests in the software output. Therefore, the Breusch and pagan Lagrangian multiplier test result reveals no significance of differences between banks in our model since the probability (Prob of (Chi2)) is less than the decision criteria 0.05, hence the Random effect regression model is appropriate to the model.

4.4. Regression Analysis Result

Based on the Hausman Specification Test Result and Breusch and pagan Lagrangian multiplier test it confirmed that Random Effects model is appropriate for this specific study. Therefore, this section of the study presents the findings and discussions of the Random Effects model output.

Table 5 presents the Random Effects model output, here's an interpretation and discussion of the findings regarding the determinants of Return on Assets (ROA).

Table 5-Regression Analysis Result Random-effects GLS Regression

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	4.106436	0.623996	6.580870	0.0000
NPLR	-14.52795	3.448359	-4.213004	0.0001
TA	0.385491	0.391978	0.983450	0.3277
TLTDR	-0.634374	0.327427	-1.937451	0.0554
CAR	3.126053	1.456487	2.146296	0.0342
TLTAR	-0.073593	0.027661	-2.660556	0.0090
R-squared	0.340699	Mean dependent var		2.804106
Adjusted R-squared	0.309002	S.D. dependent var		0.732689
S.E. of regression	0.609057	Sum squared resid		38.57883
F-statistic	10.74856	Durbin-Watson stat		2.231248

Prob(F-statistic)	0.000000

Source: This research (2025).

Adjusted R-squared (0.3090): These statistics show that the independent variables in the model account for about 30.9 % of the variation of ROA. With an adjusted value of 30.90%, after controlling for the number of predictors in the model, which is a good fit but with extremely high levels of ROA variability still unaccounted for by this model.1

F-statistic (10.74856) and Prob(F-statistic) (0.000): The very significant F-statistic ($p < 0.001$) shows that the model as a whole is statistically significant. This means that the independent variables as a group significantly contribute to ROA.

Non-Performing Loans Ratio NPLR=-14.52 (Prob. = 0.0001). The coefficient is significant at $p < 0.001$. It indicates that an increase in the non-performing loans ratio is associated with a highly significant decrease in ROA. That is, an increase by one unit in NPLR results in an estimated decrease of 14.53 units in ROA, ceteris paribus. The result is such that intuitively it goes without saying since high levels of nonperforming loan ratios are likely to be associated with reduced bank profit.

Total Loans to Total Assets Ratio (TLTAR) = -0.07 (Prob. = 0.009): The coefficient of Total Loans to Total Assets Ratio is negative and statistically significant at $p < 0.01$. The implication is that the higher the ratio of loans to total assets, the lower is the ROA. For every increase of one unit in the Total Loans to Total Assets Ratio, there is a fall of 0.07 units of ROA, ceteris paribus.

Total Loan to Total Deposits Ratio (TLTDR) = -0.63 Prob. = 0.05; The coefficient is negative, i.e., the higher the ratio of total liability to total deposit, the lower is ROA. The p-value 0.0554 has just crossed the traditional level of significance level of 0.05. Though showing a negative relationship, this has to be interpreted carefully as to whether it is really significant at the 5% level of significance.

Capital Adequacy Ratio (CAR) = 3.13 (Prob. = 0.03): The CAR coefficient is significant at $p < 0.05$ and positive. This implies that ROA increases with a rise in the capital adequacy ratio. With one unit of rise in CAR, there is a rise in ROA by 3.13 units, ceteris paribus. It could be suggestive of well-capitalized institutions' ability to generate higher returns.

Total Assets (TA) = 0.39 (Prob. = 0.33): The TA coefficient is negative, which means that the bigger institutions in terms of total assets have lower ROA. This coefficient is not statistically significant, though ($p > 0.05$), and we cannot say that TA has any actual effect on ROA here. The hypothesis testing results in the Table 6 reveal mixed outcomes regarding the relationship between credit risk management indicators and bank performance.

Table 6 - Hypothesis test result summary

No	Hypothesis	Coefficients	Result
H1	Non-Performing Loans (NPL) have a negative and significant effect on bank performance.	B=-14.52795, Prob.=0.0001	Accepted
H2	Loan to Total Asset Ratio positively and significantly influences bank performance	B=-0.073593, Prob.=0.0090	Not Accepted
H3	Loan to Deposit Ratio (LDR) has a positive and significant effect on bank performance	B=-0.634374, Prob.=0.0554	Not Accepted
H4	Capital Adequacy has a positive and significant effect on the performance of banks	B=3.126053, Prob.=0.0342	Accepted

Source: This research (2025).

Non-Performing Loans were found to have a negative and significant effect, confirming that deteriorated asset quality undermines profitability. In contrast, the Loan to Total Asset Ratio and the Loan to Deposit Ratio did not show the expected positive influence, suggesting that aggressive lending strategies may not always translate into improved performance, particularly under conditions of heightened risk. Capital Adequacy, however, demonstrated a positive and significant effect, indicating that well-capitalized banks are better positioned to absorb shocks and sustain profitability. Overall, the findings highlight that while asset quality and capitalization are critical drivers of performance, lending ratios require careful balancing to avoid adverse effects on stability and returns.

4.5. Discussion of the Study

H1: Non-Performing Loans (NPL) have a negative and significant effect on bank performance: Accepted

The empirical findings lend strong support to Hypothesis H1, revealing a statistically significant negative effect of Non-Performing Loans Ratio (NPLR) on bank performance, with an estimated coefficient of -14.53 and p-value < 0.001. This indicates that a one-unit rise in NPLR corresponds to a substantial decline in Return on Assets (ROA), affirming that high levels of non-performing loans critically undermine profitability by diminishing interest income, increasing provisioning requirements, and constraining capital use. Consistent with existing literature, including studies by Udari & Weligamage (2020) and Hiwot (2018), the results underscore that elevated NPLs intensify credit risk exposure and impair revenue generation. These insights reinforce the necessity for sound credit risk management strategies that aim to minimize NPLs as a means of safeguarding the financial health and long-term sustainability of commercial banks.

The negative impact of NPLs on profitability represents the risk-return tradeoff theorem (Navas et al., 2020; Handorf, 2025) and financial intermediation theory (Soatov, 2025; Natufe & Evbayiro-Osagie, 2023; Adenuga et al., 2019), whereby the degradation of asset quality leads to risk with no returns. High NPLs are associated with reduced net interest income, provision charges, and unrealized capital usage, which also appear in the literature (Udari & Weligamage, 2020; Hiwot, 2018; García-Herrero & Martínez-Pería, 2022). In terms of policy formulation, its implication for the Ethiopian government's monetary authority emphasizes the importance of improving credit evaluation practices, as well as increasing the dissemination of credit information, thereby complementing similar recommendations for African countries (Ndyagyenda, 2020; Ogundele & Nzama, 2025). Thus, the reduction of NPLs offers the major advantage of securing liquidity reserves and promoting sustainability of banking profitability, complementing the literature worldwide that effective credit risk management guarantees banking resilience (Almeida & Sousa, 2025; Alebachew & Roba, 2024).

H2: Loan to Total Asset Ratio positively and significantly influences bank performance: Not Accepted

The study's findings contradict Hypothesis H2 and prevailing theory by revealing a negative and statistically significant relationship between the Total Loans to Total Assets Ratio (TLTAR) and Return on Assets (ROA), with a coefficient of -0.07 ($p < 0.01$). Despite traditional views that higher loan ratios enhance profitability through increased interest income, this outcome suggests that, in the observed Ethiopian banks, a greater loan concentration actually reduced performance likely due to poor asset quality, elevated non-performing loan risks, and weak credit assessment practices. The result emphasizes the importance of prudent risk management and indicates that beyond an optimal point, aggressive lending may erode bank profitability, especially in volatile or under regulated environments.

The treatment of H2 is consistent with liquidity preference theory, as it argues that when a certain level of lending is exceeded, it leads to a lack of liquidity that affects banking stability. Based on this theoretical relationship, a reasonable interpretation is that Ethiopian banks' sensitivity to higher TLTDR undermined their profitability, contrary to what was expected (Kingu et al., 2018; Ndyagyenda, 2020) for Tanzanian and Ugandan banks. Global research emphasizes that exponential lending growth without suitable risk measures can have adverse effects on a bank's profitability (Kosmidou, 2008; García-Herrero & Martínez-Pería, 2022). Recommendations from these research studies cover a need for a diverse portfolio of assets, along with a dynamic approach for their liability management, as proposed for Africa (Ogundele & Nzama, 2025) and for Europe (Almeida & Sousa, 2025). Careful observation by supervisors over loan concentration ratios is a policy prescription for avoiding risks, while requiring growth in lending without undermining liquidity (Biruk, 2018; Alebachew & Roba, 2024).

H3: Loan to Deposit Ratio (TLTDR) has a positive and significant effect on bank performance: Not Accepted

The conventional perspective, most common in financial texts, is that the Loan to Deposit Ratio (LDR) is extremely crucial for bank profitability. The greater the TLTDR, the healthier typically the bank tends to be since it implies a bank's comparatively lower-cost deposit base is being utilized to generate greater interest income from loans. This is evidenced by various studies such as those of Raharjo & Haryanto (2015) and Siregar & Dewi (2019), which found that LDR has positive and significant effects on Return on Assets (ROA), which is one main proxy for bank performance (Muhammad Amir et al., 2016). Similarly, for Ethiopian commercial banks, Dereje & Dviyang (2022) documented a positive and statistically significant influence of the loan to deposit ratio on profitability. The general agreement stresses the expected positive relationship between the intensity of lending by a bank and its performance.

However, such standard expectation notwithstanding, this research finding concerning the Total Loan to Total Deposits Ratio (TLTDR), whose coefficient is -0.63 and p-value 0.06, contradicts such expectation to result in the rejection of H3. Though marginally significant at the 5% level, the negative coefficient suggests that an increase in the total loans over total deposits ratio would be accompanied by a decrease in ROA. This surprising result can be reconcilable with the idea that a very high TLTDR may pose considerable dangers that offset the advantage of higher lending. As per researches and other finance literature, a bank whose loan book is over-aggressive relative to deposits can risk higher liquidity risk, which may necessitate borrowing funds at higher interbank rates or even at central banks in order to meet withdrawal demands, thereby sacrificing profit margins. Besides, a high incentive to convert deposits into loans can be a cause for credit quality compromise, compelling banks to lend to riskier borrowers. This can lead to more non-performing loans (NPLs) and provisioning expenses, which are easily higher than the incremental interest income obtained through an increased loan book, ultimately causing overall profitability to decline. This result therefore highlights the existence of an ideal TLTDR, beyond which the pursuit of higher volumes of loans can attract excessive credit and liquidity risk, leading to profitability actually being reduced rather than increased.

The negative unanticipated consequence of TLTDR can be reconciled with risk return tradeoff and liquidity preference theories, predicting diminishing returns when the intensity of lending surpasses optimal thresholds. While Indonesian and Ethiopian studies have documented positive effects, Raharjo & Haryanto (2015); Siregar & Dewi (2019); Muhammad Amir et al. (2016); Dereje & Dviyang (2022), Tanzanian and Ugandan evidence attest that excessive LDRs strain liquidity and reduce profitability, Kingu et al. (2018); Ndyagyenda (2020). Ethiopian panel results have also given credence to the effect of aggressive lending on the amplification of credit costs and performance compression upon the deterioration of loan quality, Alebachew & Roba

(2024). The policy implications suggest the setting of prudential limits on LDR and concomitant strengthening of liquidity coverage ratios in conformity with international best practice recommendations, García-Herrero & Martínez-Pería (2022); Almeida & Sousa (2025). Thus, the findings are an emphasis of the threshold beyond which profitability declines with the increase in TLTDR level as a result of growing liquidity and credit risk.

H4: Capital Adequacy has a positive and significant effect on the performance of banks: Accepted

The research result for Hypothesis 4, indicating the Capital Adequacy Ratio (CAR) to have a positive and significant effect on Return on Assets (ROA) with a coefficient of 3.13 and p-value of 0.03, is as expected in that highly capitalized institutions are likely to generate more returns. This is a positive relationship in which an increase in CAR by one unit is related to an increase in ROA by 3.13 units, capturing the importance of a healthy capital base. According to Research Publish (2024), capital adequacy serves as a surety that banks possess sufficient cushions to take losses, withstand shocks, and enhance the confidence of stakeholders, thereby recording sustainable profitability and enabling healthy lending operations. This perspective presumes that higher capital ratios reduce aggregate risk exposure, allowing banks to work in a more effective and attractive way. Nevertheless, the significance should be mentioned that empirical realities are not always symmetrical; e.g., Biruk (2018) had a contrary negative and significant effect of CAR on ROA, which means that in some cases, excessive capital may lead to leverage being lower and, perhaps, to lower return on equity. Despite such diverging outcomes, the outcome of this present research supports the widely accepted view that a robust base of capital adequacy is a key determiner of enhanced financial performance among Ethiopian commercial banks, supporting resiliency and enabling successful operations.

The finding that a Random Effects model substantially explains bank profitability, represented by Return on Assets (ROA), with a general statistically significant impact from the variables incorporated, is strongly aligned with other studies on Ethiopian commercial banks. Studies such as Engidawork (2014), Million et al. (2015), Biruk (2018), Hiwot (2019), Zelalem (2020), Muhidin (2016), Kassahun (2023), Asmare (2019), and Dereje & Dviyang (2022) often employ the same econometric methods and often employ the ROA or the ROE as primary performance indicators to assess the impacts of credit risk management determinants like Non-Performing Loans (NPLs), loan-to-asset ratios, capital adequacy, and bank size. While the model accounts for 34.07% variation in ROA with moderate explanatory strength and partial hypothesis confirmation, this is a common outcome in empirical financial modeling. Bank profitability is the result of a complex interplay of internal and external influences affecting macroeconomic conditions, regulatory climates, and competitive forces many of which are not observed or difficult to completely capture in a single model. Correspondingly, a modest R-squared is typical and is acceptable because the joint statistical significance of the variables still strongly confirms their influence on bank performance, alongside the significant relationships discovered in the broader literature on Ethiopian banking.

The positive and significant impact of CAR supports by Ozili, (2024), which focus on the fact that soundly capitalized banks are more robust and evoke trust among stakeholders. Empirical research confirms this in Europe (Kosmidou, 2008; García-Herrero & Martínez-Péria, 2022), in Portugal (Almeida & Sousa, 2025), in Nigeria (Ogundele & Nzama, 2025), and in Ethiopia (Alebachew & Roba, 2024). Conversely, some empirical results indicate that overly high levels of CAR can result in decreased efficiency in some countries, such as in Ethiopia (Biruk, 2018) and Spain (García-Herrero & Martínez-Péria, 2022). Therefore, implications for policies include advising Ethiopian banks to build adequate capital buffers beyond minimum requirements but avoid over-capitalization that hampers lending in Ethiopian banks, in line with global best practices proposed in other studies (Leigh & Xu, 2025; Kidane, 2020).

5. Conclusion and Recommendations

The research concludes with a sequence of noteworthy conclusions that emphasize the determinants of Ethiopian commercial bank performance. A general overriding conclusion is the overall significance of credit risk management. The strong and statistically significant negative relationship between ROA and the non-performing loan ratio strongly supports the argument that banks with a greater percentage of non-performing loans are less profitable. This is a pointer to the fact that efficient credit appraisal, monitoring, and recovery processes are not only working realities but also vital drivers of a bank's bottom line. Second, the research highlights the positive role of capital adequacy. Those banks with greater capital adequacy ratios have better profitability. It indicates that a sound base of capital serves as a shock absorber and helps banks weather unexpected losses, remain stable, and instill confidence among stakeholders, ultimately leading to better financial performance. Third, it refers to the subtle influence of asset allocation. Precisely, the negative sign of the total loans to total assets ratio with ROA reveals that an increase in the percentage of the asset to be used for lending is linked with lower profitability. This implies that lending is a core business, but too much asset growth in loan books may subject banks to more risk, and hence reduce profitability. Lastly, the research records that bank size measured by total assets does not register a statistically significant impact on profitability in the case under investigation. In other words, economies and/or diseconomies of scale have no significant impact on a bank's ROA in the Ethiopian banking industry during the sample period.

The study, utilizing a Random Effects model, robustly identified key determinants of bank profitability (ROA). Consistent with theoretical expectations, Non-Performing Loans were found to have a significant negative impact on bank performance, emphasizing the importance of effective credit risk management. Conversely, and contrary to conventional assumptions, both a higher Loan to Total Asset Ratio and Loan to Deposit Ratio were unexpectedly associated with decreased profitability, suggesting an optimal threshold for lending activity exists beyond which excessive loan expansion introduces detrimental liquidity and credit risks. In alignment with established financial principles, Capital Adequacy significantly enhanced bank performance, underscoring its crucial role in providing essential buffers against losses, maintaining stability, and fostering stakeholder confidence for sustainable returns.

5.1. Pragmatic and Policy Implications

The findings of this study have direct relevance for regulators, managers, and policymakers in Ethiopia’s banking sector. For regulators such as the National Bank of Ethiopia, the evidence that non-performing loans significantly reduce profitability underscores the need for stricter asset quality supervision and enhanced early-warning systems. The positive role of capital adequacy suggests that regulatory capital requirements should be maintained and stress-tested to ensure resilience during macroeconomic shocks. For bank managers, the results highlight the importance of balancing loan-to-asset and loan-to-deposit ratios to avoid liquidity pressures, while using capital buffers strategically to sustain profitability. Policymakers can also draw on these findings to align monetary and fiscal measures with banking sector stability, particularly by promoting transparency in risk disclosures and encouraging prudent lending practices. Altogether, the study provides actionable insights that can inform lending rate decisions, risk policy design, and effective supervisory structures in Ethiopia’s rapidly expanding banking industry.

5.2. Limitations

Although macroeconomic indicators such as GDP growth, inflation, and interest rates may influence bank performance, this study was constrained by data availability and therefore focused on internal bank factors. Future research should incorporate these external variables to enhance explanatory power.

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