ADDIS ABABA UNIVERSITY

THE EFFECT OF BANK EFFICIENCY ON BANK PROFITABILITY: THE CASE OF ETHIOPIAN BANKS

A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT FOR THE REQUIREMENT FOR MASTERS OF SCIENCE DEGREE IN ACCOUNTING AND FINANCE

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ADDIS ABABA, ETHIOPIA

JUNE 30, 2025

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Declaration

I, hereby,declare that the thesis entitled "***The effect of Bank Efficiency on Bank Profitability: The Case of Ethiopian Banks***" is my original work, and submitted in partial fulfillment of the requirements for masters of Science Degree in Accounting and Finance under the supervision of Dr,Abebe Yitayew Ambaye and all sources used have been properly cited and acknowledged.

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Date……. Date……

CERTIFICATION

This is to certify that the work contained in the thesis entitled "***The effect of Bank Efficiency on Bank Profitability: The Case of Ethiopian Banks***", submitted by Milen G/mariam for partial fulfillment of the requirements for masters of Science Degree in Accounting and Finance complies with the regulations of the university and fulfills the accepted standards with respect to originality and quality.

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External Examiner…… Signiture ……. Date ……

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Advisor Dr, Abebe Yitayew Signiture ……. Date ……

ABSTRACT

The objective of this study is to examine the effect of bank efficiency on the profitability of commercial banks in Ethiopia, utilizing panel data collected from selected private commercial banks over the period 2014 to 2024. The study adopts a quantitative research approach, employing secondary financial data and analyzing it through multiple linear regression models applied to three key profitability indicators: Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM). The study uses a fixed effects panel regression model to investigate the influence of various efficiency and performance-related factors—namely capital adequacy, asset quality, managerial efficiency, liquidity, bank size, and real GDP growth rate—on bank profitability. The findings reveal that bank-specific efficiency measures—particularly the efficiency ratio and cost-to-income ratio—have a statistically significant negative relationship with all three profitability measures, indicating that higher efficiency (lower costs) is associated with better financial performance. Bank size was positively associated with profitability, suggesting the presence of economies of scale. The ownership structure showed a limited but observable influence, with privately owned banks generally performing better than state-owned counterparts. In addition, the study confirms that internal factors play a more substantial role in influencing profitability than external variables in Ethiopia's semi-regulated financial environment. The study concludes that enhancing internal efficiency, particularly in cost management and operational practices, is critical for sustaining profitability in the Ethiopian banking sector. It also suggests that regulatory reforms and macroeconomic stability are essential to support bank performance. Policymakers are advised to consider the broader implications of monetary policy and liquidity regulations, while bank managers should prioritize strategies that improve efficiency, innovation, and sustainable growth.

Keywords: Bank Efficiency, Profitability, Commercial Banks, Panel Data, Managerial Efficiency, ROA, ROE, NIM

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LIST OF ACRONYMS

ASQ	Asset Quality
BJ	Bera-Jarque
CAMEL	Capital adequacy, Asset quality, Management quality, earning quality, Liquidity
CAP	Capital Adequacy
CLRM	Classical Linear Regression Model
DW	Durbin-Watson
GDP	Gross Domestic Product
LAS	Natural logarithm of total asset
LIQ	Liquidity
MGE	Managerial Efficiency
NBE	National Bank of Ethiopia
NIM	Net Interest Margin
NPL	Non Performing Loans
RGD	Real GDP growth rate
ROA	Return on Asset
ROE	Return on Equity

CHAPTER ONE

1. Introduction

1.1.Background of the Study

The banking sector serves as a cornerstone for economic development by channelling funds from savers to borrowers, thereby facilitating investment and consumption. Banks provide critical financial services, including deposit acceptance, credit provision, and payment services, which are essential for economic stability and growth. In developing economies like Ethiopia, the role of banks is even more pronounced due to limited access to alternative financial services (Demirgüç-Kunt, Klapper, Singer, & Van Oudheusden, 2015). Over the past few decades, the Ethiopian banking sector has experienced significant changes, driven by economic reforms, regulatory changes, and increasing competition.

In the banking industry, bank efficiency is a key factor in determining profitability and long-term viability. It shows how well a bank can maximize outputs, such loans and financial services, while minimizing input costs. Three main components make up the concept of efficiency in banking: operational efficiency, which is concerned with simplifying daily tasks; cost efficiency, which is concerned with lowering the cost of providing banking services; and allocative efficiency, which is concerned with the best possible distribution of human and financial resources (Berger & Humphrey, 1997; Djalilov & Piesse, 2016). Because they can better control overhead expenses, maximize productivity, and improve customer satisfaction, efficient banks are more resilient and flexible. According to recent research, efficiency gains are closely linked to higher profitability, especially in cutthroat and developing markets like Ethiopia (Barros, Ferreira, & Williams, 2021; Andries & Capraru, 2021). Thus, increasing return on assets, maintaining competitiveness, and attaining strong financial performance all depend on concentrating on bank efficiency.

The relationship between bank efficiency and profitability has been extensively researched in several circumstances. International studies constantly show that efficient banks are more profitable. For example, studies on European banks revealed a link between cost efficiency and profitability (Fiordelisi, Marques-Ibanez, and Molyneux, 2011). Similarly, Sufian and Habibullah (2009) found that efficiency improvements considerably increase profitability in

Malaysia's banking sector. These findings highlight the significance of efficiency as a predictor of bank performance across a variety of banking situations.

Because of its particular challenges and opportunities, the Ethiopian banking system provides an ideal framework for examining the efficiency-profitability nexus. Despite significant economic expansion, the sector has a high percentage of non-performing loans, low technological uptake, and regulatory restraints. These factors can have a substantial impact on banks' efficiency and profitability. For example, large non-performing loans might raise the cost of credit risk management, but low technological adoption can impede operational efficiency (National Bank of Ethiopia, 2022).

Ethiopia's banking system is distinguished by a high degree of state ownership and a relatively underdeveloped financial market, which bring significant difficulties and potential for efficiency and profitability. Studies on Ethiopian banks have found that regulatory frameworks and market conditions have a significant impact on their success. According to Abate and Mesfin (2019), Ethiopian banks operate at less than optimal efficiency levels, owing mostly to managerial inefficiencies and inadequate resource allocation. These inefficiencies have a substantial impact on profitability, demanding focused interventions to improve operational procedures and regulatory rules.

Technological improvements play an important role in increasing banking efficiency. The use of digital banking solutions, such as online and mobile banking, has altered the banking scene by streamlining processes, lowering costs, and enhancing customer service (Mansor, Rahman, and Zainal, 2015). In Ethiopia, the spread of mobile banking services provides a potential to increase efficiency and reach underserved populations. However, a lack of suitable infrastructure and experienced personnel continues to be a key impediment to widespread technological adoption in the banking sector (World Bank, 2019). Addressing these issues is critical for using technology to increase efficiency and profitability.

Internationally, the relationship between bank efficiency and profitability has been thoroughly researched, with results indicating a favorable association. Research in established countries, such as Europe and North America, shows that banks with higher efficiency levels are more profitable due to superior cost management and resource allocation (Fiordelisi, Marques-Ibanez, & Molyneux, 2011). Similarly, research in emerging markets, such as

Malaysia and Nigeria, corroborate the idea that improving efficiency can lead to increased profitability (Sufian & Habibullah, 2009; Kamarudin, Sufian & Anwar, 2015).

In Ethiopia, empirical research on bank efficiency and profitability is scarce. Existing research, on the other hand, offers useful insights. Tesfaye (2014) and Mekasha (2011) have emphasized the importance of operational efficiency in increasing the profitability of Ethiopian banks. Their findings indicate that banks with stronger management techniques and resource allocation strategies do better financially. These studies highlight the necessity for Ethiopian banks to focus on improving operational efficiency in order to increase profitability.

Furthermore, the regulatory climate in Ethiopia has a substantial impact on bank efficiency and profitability. The National Bank of Ethiopia has adopted a number of changes to improve the banking sector's stability and efficiency. However, regulatory limits can provide obstacles, such as limiting competition and innovation, both of which are critical for increasing efficiency (National Bank of Ethiopia, 2022). Understanding the influence of these regulatory rules on bank performance is critical for developing strategies that strike a balance between regulatory compliance and operational efficiency.

To summarize, the Ethiopian banking system offers a unique and valuable environment for researching the influence of bank efficiency on profitability. This study seeks to provide thorough insights and practical recommendations for improving bank performance by investigating several efficiency factors and their impact on profitability. The findings will contribute to the academic literature and provide helpful information to Ethiopian policymakers and bank managers.

1.2. Statement of the Problem

The Ethiopian banking sector, despite its rapid growth and significant reforms, continues to grapple with various inefficiencies that hinder its overall profitability and performance. Although there has been notable progress since the liberalization of the financial sector in the early 1990s, Ethiopian banks face challenges related to operational inefficiencies, regulatory constraints, and a lack of technological advancement (National Bank of Ethiopia, 2021). These challenges have created a complex environment where the relationship between bank efficiency and profitability is not well understood, necessitating a focused examination of the factors that drive bank performance in Ethiopia.

Despite the growing importance of the banking sector in Ethiopia, there is limited research on how efficiency impacts profitability. Most existing studies have primarily focused on the determinants of bank profitability without adequately addressing the efficiency aspect (Mekasha, 2011; Tesfaye, 2014). Furthermore, the Ethiopian banking sector is characterized by a high degree of state ownership and a relatively underdeveloped financial market, which may influence the efficiency-profitability relationship in unique ways.

Operational inefficiencies in Ethiopian banks are evident through high operating costs, suboptimal resource allocation, and managerial inefficiencies. Abate and Mesfin (2019) found that most Ethiopian banks operate below optimal efficiency levels, primarily due to ineffective management practices and an inability to minimize costs. Such inefficiencies adversely impact profitability, as banks are unable to fully capitalize on their resources to generate higher income. This issue is exacerbated by a high degree of state ownership in the banking sector, which often results in less competitive practices compared to privately-owned banks (Mekasha, 2011).

Regulatory constraints also play a significant role in shaping the efficiency and profitability of Ethiopian banks. The regulatory framework, while aimed at ensuring financial stability, often imposes stringent requirements that limit the operational flexibility of banks. For instance, high reserve requirements and restrictive lending policies can stifle banks' ability to efficiently allocate resources and respond to market demands (World Bank, 2019). These regulatory barriers can lead to increased operational costs and reduced profitability, highlighting the need for a balanced regulatory approach that promotes both stability and efficiency.

Moreover, the technological adoption in the Ethiopian banking sector is still in its nascent stages, with many banks struggling to integrate modern technologies into their operations. The lack of adequate infrastructure and skilled personnel has hindered the widespread implementation of digital banking solutions that could otherwise streamline operations, reduce costs, and enhance service delivery (Mansor, Rahman, & Zainal, 2015). As global banking trends increasingly lean towards technological innovation, Ethiopian banks risk falling behind unless significant investments are made to upgrade their technological capabilities (World Bank, 2019).

Given these considerations, this study aims to investigate the impact of bank efficiency on profitability in Ethiopian banks. By examining various dimensions of efficiency, including operational efficiency, resource allocation, and management practices, this research seeks to provide comprehensive insights into the factors that influence bank performance. The findings will offer valuable recommendations for enhancing efficiency and profitability, contributing to the overall stability and growth of the Ethiopian banking sector.

1.3.Research Questions

1. What is the current level of efficiency and profitability in Ethiopian banks?
2. How does operational efficiency influence the profitability of Ethiopian banks?
3. What management practices contribute to higher efficiency in Ethiopian banks?
4. What are the challenges faced by Ethiopian banks in achieving optimal efficiency?

1.4.Objective of the Study

1.4.1. General Objectives

Provide a comprehensive review of several aspects of bank efficiency and their impact on Ethiopian banks' profitability and offer suggestions for enhancing the stability and performance of the industry.

1.4.2. The Specific Objectives

1. To evaluate the efficiency and profitability levels of selected Ethiopian banks.
2. To analyze the relationship between operational efficiency and bank profitability.
3. To identify best practices and strategies for improving bank efficiency and profitability.
4. To provide recommendations for policymakers and bank managers to enhance the performance of the banking sector in Ethiopia.

1.5.Delimitations and Scope of the Study

Delimitations

This study focuses on Ethiopia's commercial banking sector. It excludes other financial institutions such as microfinance institutions, insurance firms, and foreign banks that do not have a large presence in Ethiopia. Commercial banks were chosen deliberately since they are the largest section of Ethiopia's financial industry and play an important role in financial

intermediation. This approach enables a more precise and relevant analysis of efficiency and profitability across a homogeneous set of financial institutions.

The study period runs from 2014 to 2024. This timeline was chosen to assure the availability of recent and thorough data, which is critical for examining current trends and practices in Ethiopia's banking sector. By focusing on this time period, the study hopes to reveal lessons that are applicable to modern banking operations and regulatory contexts.

Furthermore, the study uses secondary data from selected commercial banks' annual financial reports, publications by the National Bank of Ethiopia, and pertinent macroeconomic statistics from international organizations such as the World Bank and the International Monetary Fund (IMF). This method assures the utilization of reliable and standardized data, allowing for a comprehensive quantitative analysis. The study does not collect primary data through surveys or interviews, which may result in subjective biases and discrepancies.

Scope

This study examines the relationship between bank efficiency and profitability, with a focus on various factors of efficiency such as operational, cost, and allocative efficiency. The study seeks to investigate how these efficiency initiatives affect important profitability metrics such as Return on Assets (ROA) and Return on Equity (ROE) in Ethiopian commercial banks.

The study also takes into account the impact of many control variables, such as bank size and ownership structure, which have been found to affect both efficiency and profitability in banking literature. By combining these variables, the study aims to provide a thorough knowledge of the factors that influence bank performance in Ethiopia.

Furthermore, the study examines the impact of the regulatory framework and technological adoption on bank efficiency and profitability. The impact of the National Bank of Ethiopia's regulatory policies, as well as the problems and opportunities presented by technological improvements in the banking sector, are thoroughly analyzed.

Geographically, the study focuses on Ethiopia, taking into account the country's specific economic, regulatory, and market factors that set it apart from other countries' banking sectors. This local focus ensures that the findings are extremely relevant to Ethiopian banks and stakeholders.

Finally, the restrictions and scope of this study are focused on the selected seven private commercial banks from the country's 30 banks: Abyssinia, Awash, Dashen, Nib International Bank, United, Cooperative Bank of Oromia, and Wegagen Bank. All of the tested banks had been in operation for decades, and the study relied on data from the previous ten years. The study intends to offer actionable insights that can improve the performance and stability of Ethiopia's banking system by reducing the focus to specific institutions, time periods, and variables, as well as employing reliable secondary data.

1.6.Significance of the study

This study contributes meaningfully to the academic literature by offering empirical insights into the relationship between bank efficiency and profitability within the Ethiopian context—a developing financial system with unique structural and regulatory characteristics. While much of the global literature has explored efficiency in the context of developed economies, emerging markets like Ethiopia remain underrepresented in scholarly discourse (Djalilov & Piesse, 2016; Andries & Capraru, 2021). By addressing this research gap, the study adds localized understanding to the broader body of knowledge on how efficiency metrics—such as cost-to-income ratio and operational efficiency—affect profitability indicators like Return on Assets (ROA) and Return on Equity (ROE).

Moreover, the findings have practical implications for both policymakers and bank executives. For policymakers, the study underscores the importance of regulatory environments that incentivize efficiency, innovation, and competition. The National Bank of Ethiopia and related financial regulatory bodies can utilize the evidence to refine policies aimed at enhancing operational efficiency without compromising financial stability (IMF, 2022). For bank management, the research offers valuable benchmarks and operational strategies to improve cost structures, adopt digital banking technologies, and allocate resources effectively, thereby boosting profitability and shareholder value (Barros, Ferreira, & Williams, 2021).

Ultimately, by identifying key efficiency drivers and their implications for financial performance, the study supports the formulation of evidence-based strategies that can enhance the resilience, competitiveness, and long-term sustainability of Ethiopia’s banking sector. These enhancements are not only critical for institutional profitability but also for fostering macroeconomic growth and financial inclusion in the country (World Bank, 2023).

1.7. Operational definitions

- Profitability measures a company's strategies and activities in monetary terms. These findings are represented in the firm's return on assets, return on equity, and net interest margin.
- Bank profitability was measured using the return on average assets (ROA) ratio, which is computed as net profit after tax divided by average total assets.
- Return on equity (ROA) measures the bank's net income per birr invested in equity capital.
- Net interest margin refers to the relationship between a bank's assets and liabilities, specifically the difference between interest received on assets and interest costs on liabilities.

1.8.Organization of the paper

This study is organized into five chapters. The first chapter comprises introduction which includes background of the study, statement of the problem, Research questions, objectives of the study, and the scope of the study. Review of related literatures that includes theoretical review and empirical reviews were discussed in the second chapter. The third chapter is about the research methodologies that were applied in the study. The data analysis, interpretation and discussion of results were presented under chapter four. The fifth chapter is the major findings, conclusion, recommendation, research limitation and areas of future research.

CHAPTER TWO

2. Literature Review

2.1.Earlier Empirical Studies on the Ethiopian Banking Industry

A substantial body of empirical research has examined the determinants of commercial bank profitability in Ethiopia, typically emphasizing three broad categories of influencing factors: bank-specific, industry-related, and macroeconomic variables. These studies aim to unravel how operational decisions within banks, structural features of the financial sector, and overarching economic conditions interact to affect financial performance. Among the most frequently cited and influential works in this area are those conducted by Belayneh (2011), Habtamu (2004), and Abebaw and Depaack (2011). Their contributions have laid a strong empirical foundation for further exploration of profitability dynamics in the Ethiopian banking context.

Multifactor Framework in Profitability Determination

In one of the most comprehensive studies to date, Belayneh (2011) conducted an empirical assessment of the profitability drivers for Ethiopian commercial banks by classifying influencing variables into three core dimensions: internal (bank-specific), industry-specific, and macroeconomic determinants. His research provides robust evidence that internally driven factors, such as equity capital, play a central role in shaping profitability. Banks with stronger capital bases were found to enjoy lower costs of capital and enhanced return profiles, indicating that well-capitalized institutions are better positioned to manage risks and generate sustainable profits.

Additionally, Belayneh identified bank size, loan portfolio volume, and non-interest income streams as statistically significant and positively associated with profitability measures. These findings align with the broader literature, suggesting that scale advantages, asset diversification, and revenue diversification contribute to more resilient and profitable banking operations in Ethiopia.

However, the study also flagged critical risk factors. Notably, credit risk, measured through the ratio of non-performing loans (NPLs) to total loans, emerged as the most potent negative determinant of profitability. An increased NPL ratio implies deteriorating asset quality, which in turn erodes earnings through heightened provisioning and reduced interest income. Other

constraining factors identified include a high share of fixed deposits and non-interest operating expenses, both of which contribute to operational rigidity and elevated cost burdens, thereby negatively affecting profit margins.

Belayneh's findings underscore the importance of not only expanding bank operations but also ensuring effective risk management, efficient cost structures, and capital adequacy to sustain profitability in Ethiopia's evolving financial landscape.

Industry-Specific Factors: Market Concentration

Within the industry-specific dimension, Belayneh (2011) investigated the role of market concentration, utilizing the Herfindahl-Hirschman Index (HHI) as a proxy for competition in the Ethiopian banking sector. The findings indicate a negative relationship between market concentration and profitability, implying that greater dominance by a few large banks—particularly the Commercial Bank of Ethiopia—has historically undermined competitive dynamics. This market dominance limits price competition and reduces the incentive for innovation and operational efficiency.

As competition has gradually increased, largely due to the emergence of private commercial banks post-liberalization, the market share and pricing power of dominant banks have eroded, leading to more equitable service offerings. However, Belayneh notes that increased competition, while beneficial for market development and customer choice, may also compress profit margins in the short run, particularly for banks unable to efficiently manage costs or diversify revenue streams (Belayneh, 2011).

This observation aligns with earlier international findings by Molyneux and Thornton (1992), who argued that excessive market concentration may create complacency and inefficiency in banking systems, especially in developing economies with limited market openness.

Macroeconomic Environment

In assessing the broader macroeconomic environment, Belayneh's (2011) study identified real GDP growth as the only macroeconomic variable with a statistically significant and positive impact on bank profitability. This suggests that periods of strong economic growth provide favorable conditions for banking operations, including increased credit demand, improved loan performance, and greater transaction volumes, all of which contribute

positively to bank earnings. This finding is consistent with international studies such as those by Flamini, McDonald, and Schumacher (2009), who reported similar trends in Sub-Saharan Africa.

By contrast, variables such as inflation rate and lending interest rate were found to be statistically insignificant in explaining profitability outcomes in the Ethiopian context. This could be attributed to Ethiopia's highly regulated interest rate environment, where key financial variables are often subject to administrative controls imposed by the National Bank of Ethiopia (NBE), thus reducing their variability and predictive power. Furthermore, moderate inflation may not significantly disrupt banking operations, especially if it is offset by inflation-linked instruments or is absorbed through higher nominal returns on loan portfolios.

Such findings also align with research by Athanasoglou, Brissimis, and Delis (2008), who noted that in emerging markets, the impact of macroeconomic variables on bank performance is often moderated by regulatory interventions and market structure rigidities.

Beyond Belayneh's multifactorial study, additional contributions have enriched the understanding of profitability determinants in Ethiopia's banking sector. Notably, Habtamu (2004) and Abebaw and Depaack (2011) provide critical perspectives on the roles of operational efficiency, ownership structures, and regulatory institutions in shaping bank performance.

In his early study, Habtamu (2004) examined the financial performance of Ethiopian commercial banks by employing profitability ratios such as Return on Assets (ROA) and Return on Equity (ROE). The analysis revealed that most commercial banks were operating profitably during the period under review. However, a key distinction emerged between state-owned and privately owned banks. Specifically, private commercial banks consistently demonstrated higher efficiency levels and profitability margins than the state-owned Commercial Bank of Ethiopia (CBE). This performance gap was attributed to managerial autonomy, leaner operational structures, and a stronger focus on customer service within private banks.

Habtamu's findings underscore the importance of ownership structure in influencing profitability. While public banks may benefit from government backing and extensive

networks, their bureaucratic constraints and limited performance incentives often lead to inefficiencies. In contrast, private banks, driven by market competition and profit motives, were shown to be more agile and service-oriented.

The study also highlighted the growing competitive pressure in the Ethiopian banking industry, particularly following the re-entry of private banks in the 1990s. With liberalization, private banks began to gain market share, especially in deposit mobilization, gradually weakening the market dominance of the CBE. This evolution reflected a shift in customer preferences, with depositors increasingly prioritizing efficiency, accessibility, and service quality—areas in which private banks held a comparative advantage. The findings align with the broader view that liberalization promotes efficiency by introducing competition and customer-centric innovation (World Bank, 2001; Molyneux & Thornton, 1992).

Complementing this perspective, Abebaw and Depaack (2011) investigated the broader question of what drives commercial bank performance in Ethiopia. Their study employed a balanced panel dataset covering the period 2001 to 2008, and included both bank-specific and macroeconomic variables. They concluded that institutional quality, regulatory frameworks, and ownership structures are among the most influential factors affecting profitability. Specifically, their results confirmed that capital strength, bank size, and loan-to-asset ratios had a significant positive impact on bank performance, while inefficient cost structures and non-performing loans posed critical challenges.

Competitive Dynamics

A particularly insightful aspect of Habtamu's (2004) work lies in his analysis of competitive behavior among Ethiopian commercial banks following financial liberalization. Initially, competition was non-price in nature, focusing on elements such as service quality, customer relationship management, and branch accessibility. This trend emerged largely due to interest rate controls imposed by the National Bank of Ethiopia (NBE), which maintained a corridor system with regulated floors and ceilings. As a result, banks had limited latitude to compete through pricing strategies.

Over time, as liberalization efforts deepened, modest price competition began to emerge; however, non-price competition remained the dominant mode of market differentiation. In his policy recommendations, Habtamu advocated for an enabling environment that fosters both

price and non-price competition, suggesting that such a dual approach could enhance market efficiency, spur innovation, and improve consumer welfare in Ethiopia's banking system. These conclusions align with broader regulatory perspectives that support liberalized yet prudently supervised financial systems (World Bank, 2001).

Expanding on these insights, Abebaw and Depaack (2011) carried out an econometric investigation to pinpoint the key drivers of bank profitability, using Return on Average Assets (ROA) as the primary dependent variable. Their analysis, based on a balanced panel dataset of 62 observations covering the period from 2001 to 2008, applied panel regression techniques to evaluate both internal and external determinants of profitability in Ethiopian commercial banks.

Their results reaffirmed the primacy of bank-specific variables in shaping profitability outcomes. In particular:

- Capital strength, measured by the equity-to-assets ratio, exhibited a positive and statistically significant impact on profitability. This finding indicates that well-capitalized banks are better able to withstand shocks and finance growth, consistent with the conclusions of Berger (1995) and Indranarain (2009).

- The intermediation ratio, or the share of loans in total assets, also showed a strong positive relationship with profitability, underscoring the importance of active lending operations in driving earnings.

- Bank size, proxied by total assets, supported the economies of scale hypothesis, suggesting that larger banks benefit from greater cost efficiency and operational leverage.

Conversely, variables such as overhead costs—measured through the ratio of overhead to net interest income—and non-performing loans (NPLs) were negatively and significantly associated with profitability. This highlights the adverse effects of cost inefficiency and credit risk exposure, reinforcing the importance of internal controls and prudent risk management frameworks.

Interestingly, and consistent with other findings in the Ethiopian context, Abebaw and Depaack (2011) observed that macroeconomic indicators—including GDP growth, inflation,

and interest rates—exhibited no statistically significant impact on profitability. This implies that in semi-regulated financial systems like Ethiopia's, the internal governance structures, managerial practices, and strategic decisions of banks tend to play a more decisive role than broader economic conditions.

In summary, their study emphasizes that capital adequacy, efficient cost management, and robust intermediation practices form the cornerstone of profitability in Ethiopia's banking sector. The findings lend support to the view that in emerging markets with regulatory constraints; bank-specific characteristics consistently outweigh external macroeconomic or industry-wide variables in determining financial performance (Flamini et al., 2009; Athanasoglou et al., 2008).

2.2.International Empirical Studies on Bank Profitability

Globally, the determinants of bank profitability have been widely studied, yielding both common patterns and context-specific findings. A substantial body of literature classifies profitability drivers into three major categories: bank-specific (internal) factors, industry-specific variables, and macroeconomic conditions. These studies offer valuable comparative insights, especially for understanding how the Ethiopian banking sector aligns or diverges from international experiences.

2.2.1. Bank-Specific Determinants

Several international studies emphasize the importance of internal efficiency and asset management in determining bank profitability. For instance, Berger (1995) found that cost efficiency, particularly in operational management, significantly boosts U.S. commercial bank performance. Similarly, Pasiouras and Kosmidou (2007), in their analysis of European commercial banks, observed that equity strength, capital adequacy, and loan quality are positively correlated with profitability.

Molyneux and Thornton (1992) conducted a cross-country analysis of European banks and identified bank size, capital ratios, and non-interest income as key profitability drivers. Their findings supported the economies of scale hypothesis, where larger banks benefit from reduced per-unit costs. Likewise, Yuqi Li (2006) found that in the UK, internal factors such

as loan-to-asset ratios, cost efficiency, and risk management practices were the strongest predictors of profitability.

2.2.2. Industry-Specific and Structural Factors

Industry structure also plays a critical role. Bourke (1989) studied banks across 12 countries and found that market concentration tends to enhance profitability, a finding that contrasts with more recent literature emphasizing the positive role of competition. Demirgüç-Kunt and Huizinga (1999) added that foreign bank participation and financial liberalization contribute to improved efficiency and profitability, especially in emerging markets.

In contrast, Athanasoglou, Brissimis, and Delis (2008) found in their study of South Eastern European banks that greater competition, reflected by lower market concentration, led to reduced pricing power and lower profitability margins. This implies a trade-off between competition and profitability that varies by region and regulatory environment.

2.2.3. Macroeconomic and External Variables

Several studies also stress the role of macroeconomic conditions. For example, Sufian and Habibullah (2009), in their work on Chinese banks, found that GDP growth and inflation were important determinants of profitability. In particular, high GDP growth typically signals increased economic activity, credit demand, and payment flows, all of which are beneficial for bank income generation.

Similarly, Flamini, McDonald, and Schumacher (2009) investigated bank profitability in Sub-Saharan Africa and concluded that macroeconomic stability, effective inflation control, and sound interest rate policy are essential in fostering bank profitability. However, they also noted that bank-specific factors remain the dominant influencers in most African countries due to the limited depth of capital markets and regulatory constraints.

2.2.4. Mixed Evidence and Regional Variation

It is important to note that international findings on bank profitability are often mixed, particularly with respect to macroeconomic factors. While some studies (e.g., Guru et al., 1999) support the positive influence of inflation and interest margins, others show these

variables to be insignificant or even detrimental, depending on the country's financial structure and level of development.

The variation in findings across regions underscores the importance of institutional context, regulatory environment, and market maturity. Developed economies often benefit from stable regulatory regimes, deep financial markets, and diversified banking portfolios, while developing economies, including Ethiopia, operate under stricter monetary controls and shallower capital markets.

The international empirical literature shows that profitability in banking is largely driven by internal efficiency, supported by appropriate market structures and macroeconomic stability. While external factors such as economic growth and inflation play a role, it is the soundness of a bank's management, capital base, and operational strategy that consistently determine performance. These findings provide a benchmark for evaluating the performance of Ethiopian banks and inform strategies for improving profitability through both regulatory reforms and internal institutional improvements.

2.3.Determinants of Bank Profitability

The profitability of banking institutions is influenced by a variety of factors, broadly categorized into internal (bank-specific) and external (macroeconomic and industry-specific) variables. Numerous empirical studies support this multidimensional view. As noted by Andreas and Gabrielle (2009), bank profitability—commonly measured by indicators such as Return on Assets (ROA) and Return on Equity (ROE)—can be expressed as a function of both internal operational factors and external economic conditions.

Internal determinants refer to variables that are under the direct control of a bank's management. These include financial indicators such as capital adequacy, asset quality, liquidity, earnings quality, and loan performance, as well as organizational and human capital factors, including managerial efficiency, technology adoption, and staff competency. On the other hand, external determinants relate to macro-level economic and regulatory conditions—variables that banks cannot directly control but that influence the operating environment. These include the real GDP growth rate, inflation, effective tax rates, regulatory policies, and industry concentration levels.

Understanding the balance and interaction of these determinants is essential for bank managers, policymakers, and investors aiming to enhance institutional performance and financial system stability.

2.3.1. Internal Determinants of Bank Profitability

This subsection discusses the primary internal factors identified in theoretical and empirical literature as key drivers of bank profitability. These determinants are directly influenced by the strategic and operational decisions taken within the bank and are therefore essential levers for improving performance.

I. Capital Adequacy

Capital adequacy serves as a foundational pillar of financial stability and operational resilience in the banking sector. It reflects a bank's ability to absorb losses, support its risk-weighted assets, and comply with national and international regulatory standards. The Capital Adequacy Ratio (CAR)—which compares a bank's capital to its risk-weighted assets—is the standard measure used to evaluate whether a bank holds sufficient capital to buffer against unexpected losses and systemic shocks (Basel Committee on Banking Supervision, 2010).

A robust capital base not only ensures solvency but also enhances stakeholder confidence by reinforcing the bank's capacity to meet obligations under adverse conditions. Berger (1995) argues that banks with higher capital levels are perceived as more stable, which enables them to access funding at lower costs and strengthens their long-term profitability. This view is supported by empirical studies such as Imad, Hassan, and Bashir (2011) and Indranarain (2009), both of whom found a positive correlation between capital adequacy and financial performance, noting that well-capitalized banks generally exhibit superior returns on assets and equity.

From a strategic standpoint, strong capitalization provides banks with greater financial flexibility. It enables them to pursue growth opportunities—such as expanding credit portfolios or investing in new financial services—without overly relying on external debt or short-term funding. This self-sufficiency improves a bank's adaptability to market volatility, regulatory changes, or macroeconomic shocks, thereby contributing to sustainable profitability.

In the Ethiopian context, Abebaw and Depaack (2011) found that capital strength is a dominant determinant of bank profitability. Their panel data analysis demonstrated that commercial banks with a higher equity-to-asset ratio were more resilient and more profitable. This reflects the broader trend within emerging markets, where well-capitalized banks are better positioned to withstand liquidity shortages and credit risk fluctuations. Their findings also support the prudential capital standards articulated under the Basel Accords, which emphasize the quality and risk composition of bank assets—not merely the volume of liabilities—as the core determinant of required capital levels.

Additionally, Brickwork Ratings (2008) emphasized that the conceptual understanding of capital adequacy has evolved beyond a simple liability-based view. Modern regulatory approaches increasingly assess capital in relation to asset risk and the overall balance sheet structure. This shift is reflected in global initiatives to harmonize capital standards across jurisdictions, aiming to establish a consistent and resilient banking framework that minimizes systemic risk.

In summary, capital adequacy is not merely a regulatory requirement but a strategic lever for profitability and growth. It strengthens a bank's ability to absorb shocks, enhances market credibility, and supports the efficient deployment of resources. In highly regulated and competitive environments—such as Ethiopia's banking sector—capital adequacy emerges as a key driver of financial performance, facilitating long-term sustainability and investor confidence.

II. Asset Quality

Asset quality is a pivotal factor influencing a bank's profitability and long-term financial sustainability. It primarily reflects the institution's ability to manage credit risk and maintain the soundness of its loan and investment portfolios. A deterioration in asset quality—typically reflected by the presence of non-performing loans (NPLs)—can lead to a significant decline in earnings, necessitating increased loan-loss provisioning, and heightening a bank's exposure to financial instability.

As argued by Yuqi (2006), poor asset quality is one of the most prominent contributors to declining profitability in commercial banks. This is largely due to the impaired performance of loans, which not only reduce interest income but also compel institutions to allocate more resources toward loss provisions. Asset quality, therefore, serves as a proxy for credit risk

management efficiency and the robustness of lending practices. It is typically assessed by analyzing the composition of loan portfolios, recovery rates, the ratio of NPLs to total loans, and the bank's provisioning and write-off policies.

From a project finance and institutional governance perspective, the Financial Management and Analysis of Projects (2006) highlights the importance of loan recovery efficiency, write-off trends, and the prevalence of weak or underperforming loans as key indicators of asset quality. These metrics not only indicate the current state of a bank's credit portfolio but also reveal the effectiveness of its risk control systems and monitoring mechanisms.

Empirical evidence reinforces the critical relationship between asset quality and bank performance. In their econometric analysis of Ethiopian commercial banks, Abebaw and Depaack (2011) employed the NPL ratio as a quantitative proxy for asset quality. Their findings reveal a statistically significant negative association between NPLs and profitability, illustrating that banks with higher volumes of non-performing loans face reduced net interest margins and profitability, primarily due to the cost of provisioning and reduced cash flow from impaired assets.

Supporting this, Access Capital Research (2010) documented significant improvements in the asset quality of Ethiopian banks during the post-liberalization period, reporting a sector-wide reduction in NPL levels to an average of around 5% of total loans. This trend was largely attributed to enhanced credit screening procedures, proactive monitoring, and more aggressive loan recovery strategies adopted by both private and public financial institutions. Given that loans constitute the primary revenue-generating asset for commercial banks, a well-performing loan book is instrumental in sustaining profitability.

Furthermore, asset quality is not solely dependent on loan performance but also on the collateral backing of those loans and the market valuation of other assets. Banks that engage in risk-based lending, apply accurate asset valuations, and conduct periodic credit reviews are better positioned to manage asset quality effectively and maintain strong financial outcomes.

In conclusion, asset quality is a central parameter of a bank's credit discipline, resilience to economic shocks, and operational efficiency. High asset quality minimizes exposure to credit losses, improves earnings stability, and fosters long-term profitability. As such, banks must prioritize sound lending practices, comprehensive credit assessments, and early warning

systems to preserve asset quality and enhance stakeholder confidence in an increasingly competitive financial landscape.

III. Management Quality

Management quality is a critical internal determinant of bank profitability, as it influences nearly every aspect of an institution's operations. Within the CAMEL framework—which assesses financial institutions based on Capital adequacy, Asset quality, Management, Earnings, and Liquidity—management quality is typically given significant weight in evaluating a bank's overall soundness. According to Brickwork Ratings (2008), the performance of the other four CAMEL components is closely linked to the vision, competence, integrity, professionalism, and agility of the bank's executive and operational leadership.

Effective management is considered the cornerstone of institutional success. As highlighted by Financial Management and Analysis of Projects (2006), a bank's long-term sustainability and profitability are fundamentally shaped by the leadership's strategic foresight, risk appetite, and corporate governance practices. Strong management facilitates timely decision-making, effective resource allocation, and adaptive responses to market dynamics.

To assess managerial efficiency, researchers and analysts commonly employ financial indicators such as the ratio of operating expenses to operating income, and operating expenses to total assets. These ratios serve as proxies for how well the bank controls costs relative to the income it generates. A lower ratio implies greater efficiency, indicating that the bank can maintain operations with fewer resources, thereby improving its profitability (Tobias and Themba, 2011).

Empirical studies support the positive link between managerial efficiency and profitability. Indranarain (2009), Bourke (1989), and Molyneux and Thornton (1992) all assert that banks with more efficient management structures tend to outperform their peers in terms of profitability. This suggests that profitability is not merely a function of market conditions or capital strength, but also of the internal capacity to manage operations cost-effectively and strategically.

Moreover, the assessment of management quality goes beyond financial ratios. It includes evaluating the track record, experience, and ethical standards of senior leadership, as well as

the robustness of the bank's corporate governance systems. According to Brickwork Ratings (2008), this evaluation also considers how management handles technological innovation, adapts to competitive pressures, and aligns organizational strategy with market growth opportunities. A management team with a balanced risk appetite—avoiding both excessive risk-taking and undue conservatism—is more likely to maintain steady profitability over time.

It is important to note, however, that the relationship between expenditure and profitability is not always linear or straightforward. As Tobias and Themba (2011) observe, higher operating expenses might reflect an expansion in service delivery, investment in technology, or market development efforts, all of which can lead to higher revenue generation. Therefore, while efficiency remains a key goal, it must be interpreted in the context of the bank's broader strategic objectives and operational scope.

In conclusion, management quality is both a direct and indirect driver of bank profitability. Its influence permeates areas such as credit risk management, cost control, customer service, technological adoption, and strategic planning. As such, banks that invest in developing skilled, ethical, and forward-looking leadership are better positioned to sustain profitability and adapt to evolving market conditions.

IV. Earnings Quality

Earnings quality is a crucial indicator of a bank's financial strength and sustainability. It reflects not only the level of profit earned but also the stability, reliability, and recurring nature of that income over time. High-quality earnings enable a bank to support asset growth, accumulate reserves, meet debt obligations, and ultimately enhance shareholder value. According to the Financial Management and Analysis of Projects (2006), strong and consistent earnings performance fosters the confidence of key stakeholders—including depositors, investors, creditors, and regulators—and underpins the bank's long-term viability.

The quality of a bank's earnings is influenced significantly by the management of assets and liabilities. Effective asset-liability management (ALM) ensures a proper match between the maturities and yields of assets and liabilities, minimizing the risk of interest rate mismatches and income volatility. Poor ALM practices can lead to unstable earnings and impair the bank's ability to consistently generate returns, especially in changing macroeconomic environments (Tobias and Themba, 2011).

According to Brickwork Ratings (2008), earnings quality is also shaped by the extent of mismatches in the balance sheet, particularly in terms of interest rate sensitivity. For instance, if a bank holds long-term assets funded by short-term liabilities, any unexpected rise in interest rates could compress margins and reduce profitability. Additionally, banks that rely heavily on non-core or one-off income streams, such as asset sales or revaluation gains, may appear profitable in the short term but lack sustainability in their earnings profile.

Another dimension of earnings quality is its relationship with leverage and risk exposure. As observed by Tobias and Themba (2011), banks that rely excessively on debt to fund their operations tend to exhibit greater earnings volatility. This volatility can affect not only profitability but also the bank's capacity to expand credit and maintain adequate liquidity buffers, ultimately weakening its core financial intermediation functions.

Earnings quality, therefore, plays a dual role: it serves as both an outcome of effective financial management and a determinant of future financial resilience. It impacts the bank's ability to:

- Sustain capital adequacy through retained earnings,
- Expand operations via reinvestment,
- Absorb shocks from non-performing assets or adverse macroeconomic conditions,
- Enhance market reputation and access to funding.

In essence, banks with high-quality earnings demonstrate not only the capacity to generate profits but also the predictability and sustainability of those profits. Such institutions are more likely to attract long-term investment, maintain public trust, and fulfill regulatory expectations for prudential soundness (Tobias and Themba, 2011).

V. Liquidity

Liquidity is one of the most critical components of a bank's financial health, reflecting its ability to meet short-term obligations, particularly withdrawals and payment commitments to depositors and creditors. A well-managed bank must strike a strategic balance between maintaining adequate liquidity and ensuring profitability. This balance is primarily achieved

through sound Asset-Liability Management (ALM) practices, which align the maturities and cash flows of assets and liabilities (Abdus Samad et al. 2001).

According to Brickwork Ratings (2010), liquidity analysis evaluates not only a bank's ability to meet its financial obligations but also the proportion of liquid assets to total assets, the efficiency of deposit mobilization, and renewal rates. In the absence of adequate liquidity, even fundamentally solvent banks can face operational distress or failure. Consequently, effective liquidity management is essential for ensuring that a bank remains a going concern.

A widely accepted measure for evaluating liquidity is the loan-to-deposit ratio (LDR), which has been employed in several studies including those by Abdus Samad et al. (2001) and Pak and Huh (1995). The LDR indicates the proportion of customer deposits utilized for lending activities. While a higher ratio suggests efficient use of deposit funds, it may also imply potential liquidity risk if the bank overextends itself. In contrast, a very low LDR may reflect conservative lending and underutilized resources.

In the Ethiopian context, Habtamu (2004) noted that although the liquidity position of commercial banks was generally stable, bank-specific adjustments were often necessary to address liquidity mismatches and ensure smooth operations. Moreover, the Financial Management and Analysis of Projects (2006) emphasized that poor liquidity management can erode public confidence and destabilize financial institutions, thus highlighting the need for robust internal controls.

The relationship between liquidity and profitability remains complex. Studies by Molyneux and Thornton (1992) and Guru et al. (1999) found a negative and statistically significant relationship between liquidity levels and profitability, suggesting that higher liquidity—although reducing risk—can limit the income-generating capacity of banks. Holding excess liquid assets such as cash or low-yield securities often results in opportunity costs, as these resources are not deployed into more profitable avenues like loans or investments. However, Bourke (1989) presented a contrasting view, indicating that in some contexts, liquidity may support profitability, possibly due to reduced funding costs or enhanced customer confidence.

It is also worth noting that standard liquidity ratios like the current and quick ratios are not particularly suitable for banks due to the nature of their operations. Instead, more tailored metrics such as the loan-to-deposit ratio, core funding ratio, and liquidity coverage ratio

(LCR) are considered more appropriate indicators of a bank's liquidity position (Brickwork Ratings, 2008).

In addition to traditional liquidity challenges, portfolio quality plays a significant role in shaping a bank's liquidity. Poor loan performance or a high incidence of non-performing assets (NPAs) can reduce recoverable cash flows and increase reliance on external funding. As such, financial analysts routinely assess the collectability of loans, loan-loss provisioning, and the diversification of asset portfolios when evaluating liquidity risk (Abdus Samad et al. 2001).

Furthermore, the regulatory environment significantly influences bank liquidity. In Ethiopia, a notable policy shift occurred in 2012, when the National Bank of Ethiopia (NBE) mandated private commercial banks to allocate 27% of their gross loan disbursements toward purchasing government bonds. As reported by Addis Fortune (January 15, 2012), this directive aimed to channel resources into public investment while temporarily easing liquidity pressures within the banking sector. While the move may have increased liquid reserves and created space for additional loan disbursements, it also introduced potential trade-offs by diverting funds from more profitable lending activities.

In conclusion, liquidity is not only a safeguard against short-term financial shocks but also a determinant of long-term profitability. Banks must navigate the trade-off between maintaining sufficient liquidity and optimizing returns, requiring dynamic strategies that respond to internal operations, market developments, and regulatory mandates. Sound liquidity management thus remains a cornerstone of sustainable banking operations.

VI. Bank Size

Bank size, commonly measured by the total value of assets, is a significant internal determinant of bank profitability. It is often used as a proxy for evaluating the economies or diseconomies of scale within financial institutions. In empirical research, including the current study, bank size is considered as an independent variable, and it is typically included in econometric models by taking the natural logarithm of total assets to ensure consistency with other ratio-based variables—especially when Return on Assets (ROA) is used as a dependent variable (Indranarain, 2009).

To mitigate skewed effects from disproportionately large institutions, some studies, including this one, exclude dominant players such as the Commercial Bank of Ethiopia, whose size and market dominance may introduce bias or distort aggregate results. The rationale for including size in the analysis lies in the expectation that larger banks are better positioned to leverage operational efficiencies and enjoy cost advantages, which should translate into improved profitability. According to Indranarain (2009), a positive relationship is generally anticipated between bank size and profitability, particularly where scale economies allow for more efficient transaction processing, technology utilization, and resource allocation.

From a theoretical standpoint, the question of an optimal bank size has garnered considerable attention in financial literature. Researchers such as Andreas and Gabrielle (2009) argue that larger banks often benefit from greater product and loan diversification, which helps to reduce risk exposure and stabilize income streams. Additionally, size allows for economies of scale, where the average cost of operations decreases as output increases. This cost efficiency can enhance a bank's competitiveness and allow it to offer more competitive pricing, further reinforcing profitability.

However, the relationship between size and profitability is not unilaterally positive. Beyond a certain threshold, diseconomies of scale may emerge. Excessive size can lead to increased bureaucratic layers, slower decision-making, and higher agency costs, all of which can dilute operational efficiency and erode profits. These risks are particularly pronounced in over-centralized or poorly managed institutions, where the benefits of scale are offset by coordination failures or resource misallocation (Indranarain, 2009).

Moreover, larger banks may face heightened regulatory scrutiny, systemic risk concerns, and more complex risk management requirements, which can impact profitability either directly through higher compliance costs or indirectly by constraining strategic flexibility. As such, Andreas and Gabrielle (2009) caution that while growth in size may enhance profitability up to a point, beyond this point, the marginal benefits decline, and may even become negative.

In conclusion, bank size plays a dual role—it can both enhance and hinder profitability depending on the institution's ability to manage growth effectively. Optimal sizing, therefore, requires a balance: banks must be large enough to benefit from economies of scale and diversification, but not so large that complexity and inefficiency diminish their profitability potential.

VII. Technology

Technological advancement has become an indispensable driver of transformation within the banking industry, influencing both operational practices and strategic positioning. The European Central Bank (1999) notes that developments in information and communication technology (ICT) have significantly altered the structure, delivery mechanisms, and efficiency of banking services. Technology has not only facilitated more efficient transactions but has also enabled banks to broaden their market reach, customize products, and improve customer engagement, thereby enhancing their overall competitive advantage (Thomas Ogoro et al. 2010).

According to Brickwork Ratings (2008), the deployment of modern technology within a bank directly influences its operational efficiency. The extent and sophistication of technological infrastructure determine how well a bank can automate processes, reduce turnaround times, and minimize operational errors—factors that collectively enhance profitability. In an increasingly digitized financial environment, technology is also a key determinant of service quality, customer satisfaction, and institutional agility (Thomas Ogoro et al. 2010).

Thomas Ogoro et al. (2010) emphasize that technological innovations in banking have replaced repetitive and time-consuming manual tasks with automated solutions, thus significantly reducing the potential for human error and enabling greater operational precision. Furthermore, ICT allows banks to gather, store, and analyze customer data at scale, offering insights that would be prohibitively costly to obtain through traditional, person-to-person interaction. This contributes to better decision-making, targeted marketing, and personalized financial services.

Despite these benefits, banks face a strategic dilemma in maintaining a balance between automation and human interaction. While digital channels such as online banking, mobile apps, and ATMs offer convenience and lower costs, customers may still value the personal touch offered by in-branch services. This tension is especially relevant in emerging markets, where digital literacy and access to digital infrastructure may vary widely (Thomas Ogoro et al. 2010).

Technological change in banking primarily impacts two critical areas. First, it reduces the cost of information management—including the collection, processing, storage, and transmission of data—by substituting paper-based systems and manual workflows with

digital alternatives. This shift enhances operational efficiency and supports scalability. Second, technology redefines customer access to banking services, largely through automated delivery channels such as internet banking, mobile banking, and interactive voice response systems. These advancements, collectively referred to as remote banking, have become especially prominent in retail banking, where customer convenience and real-time service delivery are vital (Thomas Ogoro et al. 2010).

The European Central Bank (1999) further notes that while improvements in information management have been ongoing for several decades, the rise of remote banking is a more recent development, evolving progressively in response to consumer demand and competitive pressures. This shift has profound implications for profitability, as it reduces overhead costs, expands service coverage, and enables 24/7 banking without proportional increases in staffing or physical infrastructure.

In conclusion, technology serves as a strategic enabler of profitability in the modern banking sector. By enhancing efficiency, lowering operational costs, and improving service delivery, technological innovation strengthens banks' ability to compete in an increasingly digital economy. However, success depends on thoughtful integration that also addresses customer expectations, cybersecurity risks, and regulatory compliance.

VIII. Human capital

The people in a bank are the most valuable resources and the major driving force for successes and failures. The quality of human resources employed by a bank greatly affects its profitability. The recruitment process and training standard of the financial institution, which reflects the quality of the people in the organization, their ability to guidance and support to operations staff, compensation package as per the industry norms and attrition rate in the financial institution, which reflect the satisfaction among the employees and staff towards their work and organization (Brickwork ratings 2008).

The human capital in organizations is valuable because of the capabilities that the people have. As part of the strategic role, Human Resource managers are often seen as responsible for expanding the capabilities of the human resources in an organization. Currently, considerable emphasis is being focused on the competencies that the employees in the organization have and will need the organization to grow in the future. Yet the mobility of human capital is less a threat to competitive advantage than it would first seem to be because

once an organization integrates human capital with other complementary resources and uses this integration to create organizational capabilities, losing one or a few individuals may not lead to a loss of competitive advantage (John I Njugun 2009).

IX. Loan performance

Loan is a type of debt. Like all debt instruments, a loan entails the redistribution of financial assets over time between lender and the borrower. According to access capital research (2011) lending by Ethiopia‟s private banks is coming to a virtual standstill. They found that the average private bank has recently been giving out just 30 million birr in loans per month, or almost half the peak lending volume seen in recent years. Lending patterns continue to vary widely among banks reflecting their strategic preferences as well as varying degrees of success in entering particular business segments. One of the major functions of any commercial bank is providing loan to the business society. Lending is the provision of resources (granting loan) by one party to another. The second party doesn‟t reimburse the first party immediately there by generating a debt, and instead arranges either to repay or return those resources at a later date. Banks function as financial intermediaries, collecting funds from savers in the form of deposit and then supplying to borrowers as loans. Those functions benefit both the banks and the borrowers (Zewdu 2010).

As quoted from Zewdu (2010) the principal profit- making activity of commercial banks is making loans to its customers. Lending represents the heart of the industry. Loan is a major asset, income source for banks, and risky area of the industry. Moreover, its contribution to the growth of any country is very clear. Therefore, managing loan in a proper way not only has positive effect on the bank's profitability but also on the borrower firms and a country as a whole. The heart of any successful commercial lending function is credit discipline written in loan policy, structured loan approval process and strong loan administration function (Barrickman 1990).

2.3.2. External Determinants of Bank Profitability

External determinants of bank profitability encompass factors beyond managerial control, reflecting broader economic, regulatory, and market conditions that influence financial institutions' performance. While internal factors are shaped by bank-specific decisions, external variables operate at the macroeconomic or systemic level, creating an operational environment that either constrains or amplifies profitability. Empirical studies, including

those focused on Ethiopia, suggest that external factors exert a comparatively modest influence on bank profitability relative to internal drivers (Abebaw & Depaack, 2011). However, their interplay with institutional and market dynamics remains critical to understanding profitability trends. Key external determinants include macroeconomic indicators such as GDP growth, inflation, and regulatory frameworks, as well as structural features like market concentration.

Gross Domestic Product (GDP) Growth

Macroeconomic conditions, particularly GDP growth, significantly shape banking sector performance. During economic expansions, heightened business activity and consumer confidence typically increase demand for loans and financial services, boosting bank revenues (Athanasoglou et al., 2008). Conversely, economic contractions elevate credit risk due to rising defaults, thereby compressing profitability. In the Ethiopian context, Belayneh (2011) identifies real GDP growth as the only macroeconomic variable with a statistically significant positive relationship with bank profitability. This aligns with global findings where economic booms enhance borrowers' repayment capacity, reducing non-performing loans (NPLs) and strengthening banks' interest income (Andreas & Gabrielle, 2009). For instance, Ethiopia's sustained GDP growth of approximately 9% annually between 2005 and 2015 correlated with robust profit margins for commercial banks, as credit demand surged alongside infrastructural and private sector development (Access Capital, 2010). Nevertheless, the transmission mechanism may vary in developing economies, where informal sectors dominate and financial inclusion remains limited, potentially diluting GDP's direct impact on banking performance.

Market Concentration and Competitive Dynamics

Market concentration, measured as the share of assets held by the largest banks, reflects the degree of competition within the banking sector. The *structure-conduct-performance (SCP)* hypothesis posits that concentrated markets enable collusive behavior, allowing dominant banks to charge higher loan rates and offer lower deposit rates, thereby extracting monopoly rents (Gilbert, 1984). Conversely, the *efficient-structure hypothesis* argues that market concentration arises from superior efficiency, where larger institutions leverage economies of scale to outperform competitors (Boone & Weigand, 2000). In Ethiopia, the banking sector is highly concentrated, with the state-owned Commercial Bank of Ethiopia (CBE) controlling

over 40% of total assets as of 2020 (NBE, 2021). Despite this, Belayneh (2011) observes a negative relationship between concentration and profitability, attributing it to CBE's inefficiencies and the emergence of competitive pressures from private banks. This contrasts with global trends, where studies in the EU and U.S. often report positive concentration-profitability linkages (Jeon & Miller, 2005). Such divergence underscores the unique dynamics of Ethiopia's bank-led economy, where regulatory constraints on foreign competition and product diversification limit the SCP paradigm's applicability.

Inflation and Monetary Policy Transmission

Inflation influences bank profitability through dual channels: direct effects on operational costs and indirect effects via central bank policy responses. High inflation typically escalates nominal interest rates, expanding net interest margins (NIMs) if banks adjust lending rates faster than deposit rates (John & Bruce, 2006). However, inflationary pressures also elevate wages, technology costs, and loan loss provisions, eroding profitability. In Ethiopia, where inflation averaged 19% between 2005 and 2015, nominal bank returns of 25–30% translated to modest real returns of 5–10% (Access Capital, 2010). This aligns with cross-country evidence showing that inflation's net impact on profitability depends on banks' ability to pass costs to customers (Athanasoglou et al., 2008). Notably, Ethiopian banks exhibit limited sensitivity to inflation due to interest rate caps imposed by the National Bank of Ethiopia (NBE), which constrain repricing flexibility. This regulatory intervention mitigates the volatility of NIMs but also stifles competitive pricing strategies, illustrating the complex interplay between inflation and policy frameworks.

Regulatory and Institutional Frameworks

Banking regulations, designed to ensure stability and consumer protection, invariably shape profitability by influencing operational flexibility and risk-taking. Peltzman (1968) pioneered empirical analysis of regulation's impact, demonstrating that entry restrictions and branching laws affect market structure and capital adequacy. In Ethiopia, stringent regulations-including high liquidity ratios (25%), capital adequacy requirements (8%), and limits on foreign bank entry-create a conservative operational environment (NBE, 2021). While these measures enhance systemic stability, they also compress profitability by restricting product innovation and geographic expansion. Fraser and Rose (1972) observed that new market entrants seldom erode incumbent profitability, a finding resonant in Ethiopia, where private banks like

Dashen and Awash have thrived despite CBE's dominance. However, post-2008 global regulatory reforms, such as Basel III's liquidity coverage ratios, have heightened compliance costs, disproportionately affecting smaller banks with limited capital buffers (Sum, 2015). In Ethiopia, the absence of differentiated regulations for small and large banks exacerbates these challenges, stifling scalability for newer entrants.

While external determinants collectively shape bank profitability, their influence is often mediated by institutional and regional specificities. In Ethiopia, macroeconomic growth and regulatory stringency emerge as pivotal drivers, whereas inflation and market concentration exhibit muted effects due to unique policy interventions. This contrasts with advanced economies, where monetary policy transparency and competitive markets amplify external factor impacts (Demirgüç-Kunt & Detragiache, 2011). Future research should explore nonlinear relationships, such as threshold effects of inflation or regulatory overhauls, to better capture the dynamic interplay between external conditions and bank performance in emerging markets.

Conceptual Frameworks

Below is a conceptual model illustrating how these variables interact to influence bank profitability:

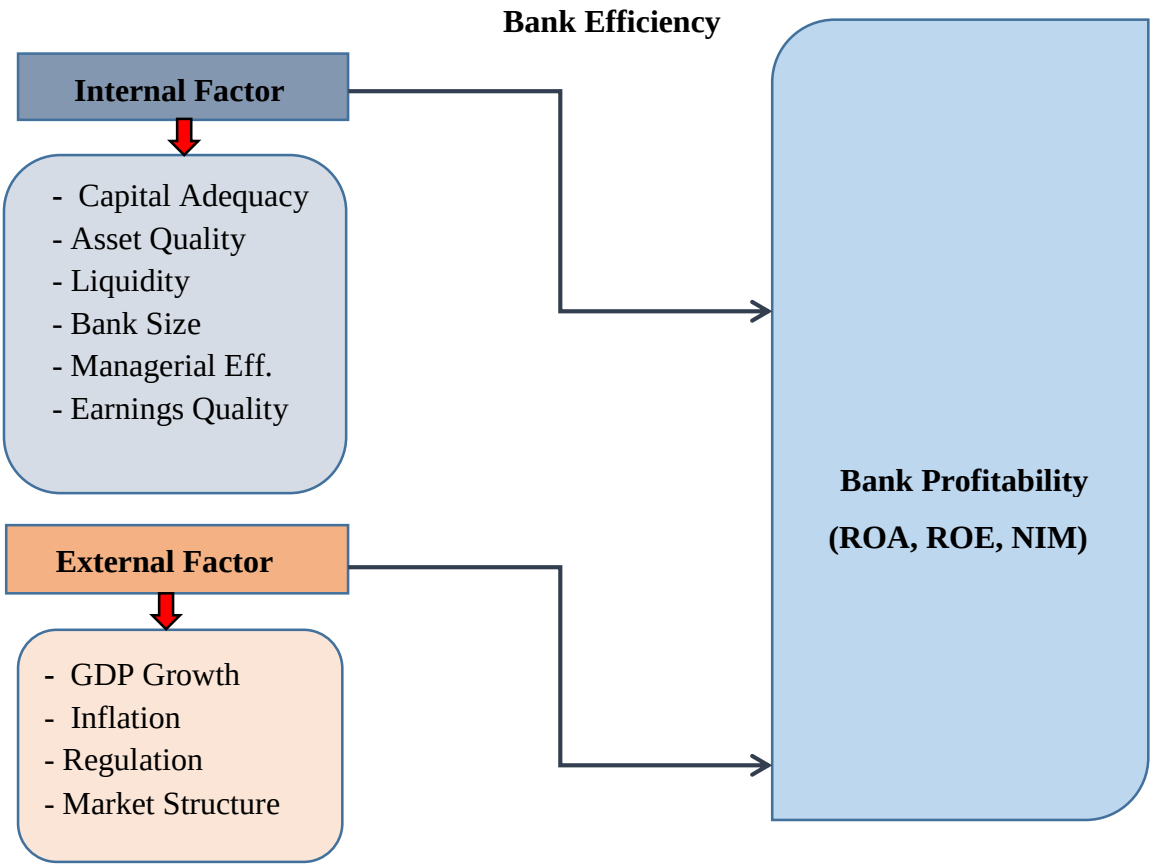


Figure 1 Conceptual model illustrating internal and external factors on the profitability of Banks

2.4. Introduction to Bank Efficiency

Bank efficiency is broadly defined as a financial institution's ability to generate the maximum possible output—such as loans, deposits, or other financial services—using the least possible amount of input, including labor, capital, and operational costs. It is a multidimensional concept encompassing technical efficiency, allocative efficiency, and cost efficiency, each capturing different aspects of performance optimization (Berger, Hasan, & Zhou, 2009; Andries & Capraru, 2021).

Technical efficiency refers to the bank's capability to produce the highest output level with a given amount of inputs, often assessed through frontier efficiency models like Data Envelopment Analysis (DEA) or Stochastic Frontier Analysis (SFA) (Barros, Ferreira, & Williams, 2021). Allocative efficiency focuses on how well the bank allocates resources to optimize profits, emphasizing the appropriate mix of input prices and usage in line with output prices. Cost efficiency, meanwhile, combines both technical and allocative dimensions, evaluating the bank’s ability to minimize costs while maintaining its service output and operational scale (Kasman & Carvallo, 2020).

An efficient bank typically enjoys higher profitability, competitive advantage, and financial sustainability, as it can serve more customers at a lower cost, adapt better to economic shocks, and utilize digital infrastructure effectively (Sufian & Kamarudin, 2016). Furthermore, increased efficiency enhances customer satisfaction and shareholder value by allowing the institution to reinvest savings into innovation and growth initiatives.

Theoretical Framework

The relationship between bank efficiency and profitability can be explained through several theoretical frameworks, including the production approach and the intermediation approach. The production approach views banks as producers of financial services, where efficiency is measured by the ratio of outputs to inputs (Berger & Mester, 1997). The intermediation approach, however, considers banks as intermediaries that transform deposits into loans, focusing on the efficiency of this transformation process (Sealey & Lindley, 1977).

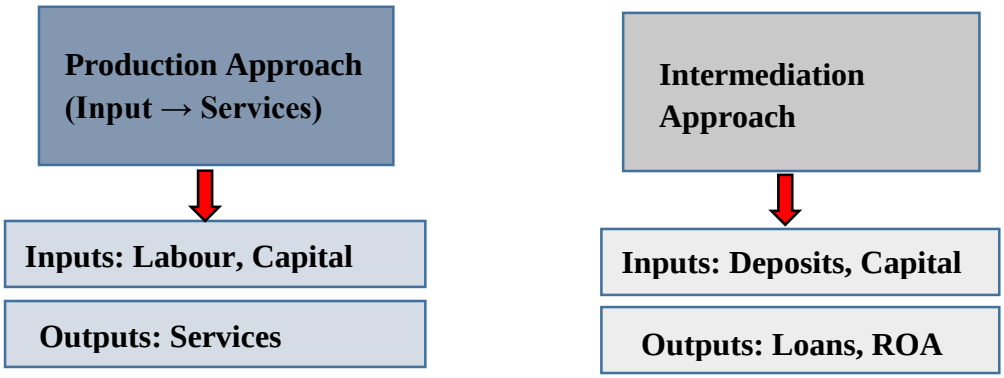


Figure 2 Theoretical Models of Bank Efficiency

2.5. Empirical Evidence on Bank Efficiency and Profitability

Numerous studies have explored the relationship between bank efficiency and profitability across different contexts. For instance, Sufian and Habibullah (2009) found a positive relationship between efficiency and profitability in the Malaysian banking sector, suggesting that more efficient banks tend to achieve higher returns on assets (ROA) and return on equity (ROE). Similarly, a study by Pasiouras and Kosmidou (2007) in the European banking sector revealed that cost efficiency significantly influences bank profitability.

In the Ethiopian context, research on bank efficiency and profitability is limited. However, studies such as those by Tesfaye (2014) and Mekasha (2011) have indicated that operational efficiency is a significant determinant of bank profitability. These studies highlight the importance of improving efficiency to enhance the financial performance of Ethiopian banks.

2.6.The Role of Technology in Enhancing Bank Efficiency

The adoption of technology in banking operations has been shown to improve efficiency and profitability. Technological advancements, such as online banking and mobile banking, enable banks to streamline their operations, reduce costs, and enhance customer service (Mansor et al., 2015). In Ethiopia, the increasing penetration of mobile banking services presents an opportunity for banks to improve their efficiency and reach underserved populations.

The literature on bank efficiency and profitability underscores the importance of understanding the factors that influence these relationships. While there is a growing body of research on the topic, the specific context of Ethiopian banks remains underexplored. This study aims to fill this gap by examining the impact of bank efficiency on profitability in Ethiopian banks, providing valuable insights for policymakers and bank managers.

CHAPTER THREE

3. Research Methodology

3.1.Research Design

This study employed a quantitative research design, utilizing secondary data collected from the annual financial reports of Ethiopian banks. The research focus was on a sample of commercial banks operating in Ethiopia over a specified period.

3.2.Data Collection

Data for this study was gathered from various sources:

Sources of Data:

- **Annual Financial Reports**: Financial statements, including balance sheets and income statements for the selected banks, were collected.
- **National Bank of Ethiopia Publications**: Reports and statistical information published by the National Bank of Ethiopia were used to obtain additional relevant data.
- **World Bank and International Monetary Fund (IMF) Reports**: Macroeconomic data relevant to the banking sector in Ethiopia provided context for the analysis.

Data Period: The study analyzed data of seven banks from a Ten-year period from 2014 to 2024. This period was chosen to reflect recent trends and practices within the Ethiopian banking sector, allowing for a more relevant and timely analysis.

3.3.Operationalization of Variables

The variables in this study were operationalized as follows:

- **Bank Efficiency**: Measured using the efficiency ratio (expenses/ revenues) and the cost-to-income ratio. Lower ratios indicate higher efficiency.
- **Profitability**: Measured using two key metrics:
- **Return on Assets (ROA)**: Calculated as Net Income divided by Total Assets.
- **Return on Equity (ROE)**: Calculated as Net Income divided by Shareholder Equity.
- **Control Variables**: Other factors influencing profitability were also measured, including:
- **Bank Size**: Using the natural logarithm of total assets.

- **Ownership Structure**: A binary variable indicating whether the bank is state-owned (1) or privately owned (0).

3.4.Data Analysis

The data were analyzed using multiple regression analysis to determine the relationship between bank efficiency and profitability while controlling for other factors. The analysis process involved the following steps:

1. **Descriptive Statistics**: Initial descriptive statistics provided an overview of the data, presenting means, medians, and standard deviations for each variable.
2. **Correlation Analysis**: Pearson correlation coefficients were calculated to assess the degree of association between the independent and dependent variables.
3. **Regression Analysis**: Multiple regression models was developed to examine the impact of bank efficiency on profitability.

Regression analysis makes it possible to evaluate how much bank efficiency measures affect profitability while adjusting for other variables like ownership structure and bank size. The hypothetical regression model that was applied is shown below:

Dependent Variable:
- Profitability (ROA, ROE, NIM)
Main Independent Variable:
- Efficiency (captured by managerial efficiency ratio, cost-to-income ratio, etc.)
Control Variables:
- Bank size (log of total assets)
- Ownership structure (dummy variable: 1 = private, 0 = public)
- Capital adequacy, asset quality.

$$\textbf{Profitability}_{it} = \beta 0 + \beta 1 \textbf{Efficiency Ratio}_{it} + \beta 2 \textbf{Cost-to-Income Ratio}_{it} + \beta 3\ \textbf{Bank Size}_{it} + \beta 4\ \textbf{Ownership Structure}_{it} + \epsilon_{it}$$

Where:

- **Profitability $_{it:}$** Measured using two key metrics—Return on Assets (ROA) and Return on Equity (ROE) for bank ***i*** at time ***t***.
- **Efficiency Ratio $_{it}$:** Operating expenses as a percentage of total operating income, representing operational efficiency.
- **Cost-to-Income Ratio $_{it}$:** Measures cost efficiency, calculated as total costs divided by total income.
- **Bank Size $_{it}$:** Represented by the natural logarithm of total assets, to account for economies of scale.
- **Ownership Structure $_{it}$:** A dummy variable where 1 represents state-owned banks and 0 represents privately owned banks.
- **β_0:** Intercept term.
- **β_1, β_2, β_3, β_4:** Regression coefficients representing the effect of each independent variable on profitability.
- **ϵ_{it}:** Error term capturing unobserved factors.

Bank size and ownership structure are acknowledged as contextual/control variables that might affect a bank's operating environment and strategic behaviour. However, they do not provide direct metrics of efficiency. As a result, their inclusion in the model serves merely to account for bank heterogeneity. This method assures that the influence of efficiency on profitability is correctly calculated without confusing the model. For example, larger banks may benefit from economies of scale, but privately owned banks may have more adaptable and performance-oriented management structures.

In addition to the basic measurements employed in this study—the Efficiency Ratio and the Cost-to-Income Ratio—bank efficiency can be measured using a variety of quantitative indicators. These measures offer a broader perspective on how successfully banks use their resources, control operating costs, and maximize profits through intermediation functions. Though they were not included in the final regression models in Chapter Four due to parsimony issues, they are acknowledged as potential robustness tests and are suggested for future empirical extension.

Incorporating several efficiency proxies helps to triangulate operational efficiency from many functional perspectives, such as asset usage, income production, and cost control. In the

literature on banking performance, the following metrics are discussed as supplementary efficiency indicators:

1. Total Asset Turnover Ratio: This metric assesses how well a bank utilizes its assets to create total revenue. A higher ratio shows greater efficiency in leveraging asset bases to support revenue-generating activities.
2. Loan-to-Asset Ratio: This metric indicates how much of a bank's total assets are dedicated to lending. A greater ratio shows aggressive credit intermediation, which is a basic function of banks, and may indicate superior profitability performance when managed efficiently.
3. Non-Interest Expense to Gross Income Ratio: This metric measures how efficiently banks manage their administrative and overhead expenses. A lower ratio shows that non-interest expenses are being managed more tightly in relation to earnings.

Hypotheses

Based on the regression model, the following hypotheses were tested:

4. $H_0: \beta_1 = 0$: Operational efficiency (measured by the efficiency ratio) has no significant impact on profitability.
5. $H_A: \beta_1 \neq 0$: Operational efficiency significantly impacts profitability.
6. $H_0: \beta_2 = 0$: Cost efficiency (measured by the cost-to-income ratio) has no significant impact on profitability.
7. $H_A: \beta_2 \neq 0$: Cost efficiency significantly impacts profitability.
8. $H_0: \beta_3 = 0$: Bank size has no significant impact on profitability.
9. $H_A: \beta_3 \neq 0$: Bank size significantly impacts profitability.
10. $H_0: \beta_4 = 0$: Ownership structure has no significant impact on profitability.
11. $H_A: \beta_4 \neq 0$: Ownership structure significantly impacts profitability.

Expected Findings from Regression Coefficients

The regression coefficients ($\beta_1, \beta_2, \beta_3, \beta_4$) will provide insights into the magnitude and direction of the relationship between each independent variable and profitability. A positive coefficient indicates a direct relationship, while a negative coefficient indicates an inverse relationship. For example:

- A positive β_1 suggests that improved operational efficiency leads to higher profitability.
- A negative β_2 would imply that higher cost-to-income ratios reduce profitability.
- Larger banks (positive β_3) are expected to benefit from economies of scale, contributing to higher profitability.
- The coefficient β_4 will reveal whether state-owned or private ownership is more conducive to profitability in Ethiopia's banking context.

4. **Statistical Software**: Statistical analysis was conducted using software such as SPSS or STATA for efficient data handling and analysis.

3.5. Validity and Reliability

To ensure the validity and reliability of the research findings:

Validity: The study employed both content validity and construct validity. Content validity was ensured through careful selection of indicators that accurately represent bank efficiency and profitability. Construct validity was established by employing well-defined operational definitions and utilizing established metrics from existing literature (Hair et al., 2010).

Reliability: The reliability of the data was tested using Cronbach's alpha coefficient, ensuring that the measures used in the study are consistent over time and across different banks.

Table 3.1: Reliability Test Using Cronbach's Alpha

Variable Group	Number of Items	Cronbach's Alpha	Interpretation
Efficiency Ratios	2	0.751	Acceptable Reliability
Profitability Measures	2	0.735	Acceptable Reliability
Capital & Asset Quality	3	0.780	Good Reliability
Macroeconomic Indicators	2	0.701	Acceptable Reliability
Overall	**9**	**0.745**	**Acceptable Reliability**

3.6.Ethical Considerations

The study adhered to ethical research guidelines, including:

Confidentiality: All data collected will be kept confidential and used solely for research purposes. Personal identifiers were removed or kept anonymous where necessary.

Informed Consent: While secondary data were utilized, any interactions with management or stakeholders from the banks were conducted with informed consent, ensuring transparency about the research purpose.

Integrity: The research was conducted with integrity, ensuring that findings are reported honestly without manipulation or falsification of data.

3.7.Conclusion

This methodology chapter outlines the systematic approach taken to examine the relationship between bank efficiency and profitability in Ethiopian banks. By employing a quantitative research design, the study aims to provide valuable insights into how bank efficiency impacts profitability, thereby contributing to the literature on banking in emerging economies.

CHAPTER FOUR

4. Results and Discussion

The data analysis results are presented in this chapter along with a discussion of the findings in light of the study's goals. Regression analysis is used in this study to examine how bank efficiency affects bank profitability in Ethiopian banks. The findings are evaluated and compared to earlier research to provide a complete picture of how various efficiency measures affect profitability.

4.1.Descriptive statistics of variables

The descriptive statistics provide an overview of the key variables used in the study, including return on assets (ROA), return on equity (ROE), efficiency ratio, cost-to-income ratio, and bank size. The table below includes the mean, maximum, minimum, and standard deviation values. The general description of the data utilized in the regression models is provided by these figures.

Table 4.1-1 Descriptive statistics of variables

Variable	Mean	Max	Min	Std. Dev	Interpretation
ROA	2.39%	4.68%	-2.37%	1.42	Profitability varies widely, with some banks incurring losses.
ROE	21.31%	42.29%	-3.58%	11.31	High ROE indicates strong equity returns but with volatility.
NIM	4.85%	8.33%	2.63%	1.43	Narrow spread suggests competitive lending markets.
Capital Adequacy	0.60	10.15	0.06	1.77	Wide dispersion reflects varying risk management practices.
Asset Quality (NPL)	5.89%	14.75%	0.00%	2.74	Some banks exhibit pristine loan books; others face high defaults.
Managerial Efficiency	0.48	1.93	-0.01	0.35	Negative scores indicate inefficiencies in cost control.
Liquidity	47.43%	128.57%	20.34%	18.98	Extreme liquidity levels signal divergent risk appetites.
Bank Size (ln Assets)	9.15	10.17	4.86	1.06	Larger banks dominate the sector (e.g., CBE).
GDP Growth	9.26%	12.70%	-2.10%	4.70	Reflects Ethiopia’s volatile macroeconomic environment.

Source: E-views output from private banks financial statements

The table shows that Return on Asset has the lowest mean value (2.39), compared to other dependent variables. The profitability measurements had the lowest variability in data, with a standard deviation of 1.42 and a range of 7.15. The average value of return on equity is 21.31, which is the highest among all dependent variables. The standard deviation of 11.31 and the range of 45.87 indicate substantial variability. Finally, the Net Interest Margin averaged 4.85, indicating a moderate number. The standard deviation of 1.43 is close to the mean and shows moderate variability when compared to other dependent variables. It indicates that practically all private commercial banks charge generally consistent interest rates on all types of finances, with minor changes in net interest margin. The National Bank of Ethiopia sets interest rates for banks, resulting in similar net interest income.

Table 4.1-1 displays six variables that are projected to impact the profitability of private commercial banks, including capital adequacy, asset quality, management efficiency, liquidity, bank size, and GDP, each with unique features.

Capital adequacy has the second lowest mean value of 0.60, with a range of 10.21 and a moderate standard deviation of 1.17 when compared to other independent variables. The data was consistent, as the standard deviation was close to the mean. The capital adequacy mean value results indicate that private commercial banks financed 60% of their assets with shareholder funds and 40% with deposit liabilities.

Asset quality has an average of 5.89 and a standard deviation of 2.74. The minimum and maximum values are 14.75 and 0.00 respectively. Non-performing loans account for approximately 5.89% of all loans and advances in private commercial banks, according to the average asset quality score. According to Access Capital Research (2010), private commercial banks have an excellent asset quality, with a loan and advance NPL rate close to the average of 5%.

Managerial efficiency has a moderate mean of 0.48, a range of 1.94, and a standard deviation of 0.35, indicating the lowest variability among explanatory factors. Private commercial banks are efficient due to low operating expenses per unit of return, resulting in one birr of operational income for every 0.48 birr of operating expenses.

Private banks had the biggest variability across variables, with an average liquidity value of 47.43 and a range of 148.91. The variable has the largest standard deviation value (18.98) among the explanatory variables. Ethiopian private commercial banks had a significantly

higher liquidity ratio above the minimum statutory ratio of 20% set by the National Bank of Ethiopia (NBE) in January 2012.

The bank's size is vital in maintaining its market position. The survey found that private commercial banks have an average size of 9.15, with maximum and minimum values of 10.17 and 4.86, respectively. The standard deviation value is 1.06, the third highest among independent variables. Private commercial banks in Ethiopia have minimal diversity in total assets, according to these findings.

The final independent variable, the level real GDP growth rate, has the maximum standard deviation of 4.07 and a mean of 9.26. The greatest and minimum values are 12.07 and -2.10, respectively. The table shows that liquidity and GDP growth rate have significantly higher standard deviations (18.98 and 4.70, respectively) than other variables. The study found that bank liquidity and GDP growth rate have higher variation than other explanatory variables.

4.2.Correlation analysis between study variables

In this section, the relationship between the profitability measures—Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM)—and the explanatory variables—capital adequacy, asset quality, managerial efficiency, earning ability, liquidity, bank size, and GDP growth rate—is examined through correlation analysis. A correlation matrix is utilized to assess the degree of association between the explanatory variables and to detect potential multicollinearity issues within the model.

According to Cooper and Schindler (2009), a correlation coefficient exceeding 0.8 between independent variables signals the presence of multicollinearity, which can distort the reliability of regression estimates. In support, Malhotra (2007) emphasizes that correlation coefficients approaching 0.75 warrant careful scrutiny, while Hair et al. (2006) suggest that coefficients below 0.9 generally do not indicate a severe multicollinearity problem.

Following these guidelines, the correlation analysis revealed that the variable earning ability demonstrated a correlation coefficient exceeding 0.8 with bank size, indicating a potential multicollinearity concern. To mitigate this issue and enhance the robustness of the regression results, earning ability was excluded from the final regression model. This adjustment ensures that the explanatory variables included in the model maintain an acceptable level of

independence, thereby improving the interpretability and reliability of the estimated coefficients.

Furthermore, it is critical to manage multicollinearity in order to minimize exaggerated standard errors as well as to appropriately analyze each variable's unique contribution to explaining profitability.

4.2.1. Correlation analysis between return on asset and explanatory variables

Return on Assets (ROA) is a widely recognized indicator of a bank's profitability, representing the efficiency with which a bank utilizes its assets to generate net income. This section examines the correlation between ROA and a set of explanatory variables—namely capital adequacy (CAP), asset quality (ASQ), managerial efficiency (MGE), liquidity (LIQ), bank size (LAS), and real GDP growth (RGD)—to evaluate their relationships with bank profitability.

The Pearson correlation matrix presented in Table 4.2-1 shows the direction and strength of linear relationships between ROA and the selected variables. As indicated in the matrix, ROA demonstrates positive correlations with capital adequacy, asset quality, managerial efficiency, bank size, and GDP growth rate, suggesting that improvements in these variables are generally associated with higher profitability. On the other hand, liquidity exhibits a negative correlation with ROA, implying that greater liquidity levels—often held as idle or low-yielding assets—may suppress earnings potential.

Table 4.2-1 Pearson Correlation Matrix between ROA and Explanatory Variables

	ROA	CAP	ASQ	MGE	LIQ	LAS	RGD
ROA	1						
CAP	0.284	1					
ASQ	0.109	-0.196	1				
MGE	0.739	-0.362	0.181	1			
LIQ	-0.074	0.301	-0.280	-0.019	1		
LAS	0.690	0.582	0.165	0.687	-0.188	1	
RGD	0.468	0.111	-0.051	0.118	0.288	0.035	1

Source: E-views output from private banks financial statements

From the table above, the correlation between ROA and managerial efficiency (r = 0.739) is the strongest among all relationships. This high positive coefficient implies that more efficient management—reflected by a lower ratio of operating expenses to operating income—has a substantial influence on enhancing profitability. This finding underscores the importance of cost control and operational efficiency in Ethiopian private commercial banks, consistent with the conclusions of Pasiouras & Kosmidou (2007) and Fiordelisi et al. (2011), who emphasized the role of internal efficiency in boosting bank performance.

In contrast, the correlation between ROA and asset quality (r = 0.109) is the weakest positive relationship. This modest correlation suggests that asset quality, although positively related, exerts a relatively minimal influence on profitability. This result could imply a weak credit evaluation and loan portfolio management process among Ethiopian private commercial banks, where non-performing loans or suboptimal asset structures may be diluting profitability, even if marginally.

Interestingly, liquidity is negatively correlated with ROA (r = -0.074). While the magnitude is small, the direction of the relationship is consistent with the argument made by Hempel et al. (1994), who suggest that highly liquid banks tend to be more risk-averse, resulting in lower returns. In the Ethiopian context, this may reflect excessive holdings of low-yielding liquid assets due to conservative regulatory requirements or risk management practices, which may hinder income generation.

Positive relationships are also observed between ROA and capital adequacy (r = 0.284) and bank size (r = 0.690). The latter result supports the theory of economies of scale, where larger banks can leverage their asset base more efficiently to enhance profitability. Similarly, the positive correlation between ROA and GDP growth (r = 0.468) indicates that banks perform better in favourable macroeconomic environments, where increased economic activity may translate into better loan performance and higher financial returns.

Overall, the correlation analysis highlights that managerial efficiency and bank size are the most influential variables positively associated with ROA in Ethiopian private commercial banks. These findings imply that internal management quality and institutional scale play critical roles in enhancing profitability, while liquidity and weak asset quality may serve as potential drags on performance. These insights inform the subsequent regression analysis, which seeks to quantify the exact impact of each factor on profitability outcomes.

4.2.2. Correlation Analysis between Return on Equity and Explanatory Variables

Return on Equity (ROE) measures how effectively a bank generates net income from shareholders' equity and serves as an essential profitability indicator for investors and internal stakeholders. It reflects the return per unit of equity capital, offering insight into the efficiency with which the bank converts shareholder investments into profits.

This section presents a correlation analysis between ROE and selected explanatory variables, including capital adequacy (CAP), asset quality (ASQ), managerial efficiency (MGE), liquidity (LIQ), bank size (LAS), and real GDP growth (RGD). These variables are believed to influence profitability directly or indirectly by affecting the operational, financial, and risk structure of banks.

Table 4.2-2 Pearson Correlation Matrix between ROE and Explanatory Variables

	ROE	CAP	ASQ	MGE	LIQ	LAS	RGD
ROE	1						
CAP	0.268	1					
ASQ	0.111	-0.196	1				
MGE	0.504	-0.362	0.181	1			
LIQ	-0.069	0.301	-0.280	-0.019	1		
LAS	0.669	0.583	0.165	0.687	-0.188	1	
RGD	0.481	0.111	-0.051	0.118	0.288	0.035	1

Source: E-views output from private banks financial statements

The correlation matrix shows that ROE is positively associated with most explanatory variables, including capital adequacy (r = 0.268), asset quality (r = 0.111), managerial efficiency (r = 0.504), bank size (r = 0.669), and real GDP growth (r = 0.481). These results suggest that improvements in these factors may contribute to increased shareholder returns in Ethiopian private commercial banks.

Among all explanatory variables, bank size (LAS) exhibits a strong positive correlation (r = 0.669) with ROE, implying that larger banks tend to deliver higher returns to shareholders. This can be attributed to economies of scale, where larger banks are able to reduce per-unit

costs, diversify their portfolios more effectively, and access capital markets more efficiently. Furthermore, size is often related to a bank's capital adequacy position, where larger banks can maintain sufficient equity buffers with relatively lower capital costs, enhancing their profitability.

Managerial efficiency (MGE) also shows a moderately strong positive correlation (r = 0.504) with ROE. This suggests that banks that efficiently manage their operating expenses relative to income are more likely to generate higher returns on equity. Efficient cost control enhances bottom-line profits, which directly boosts the return on shareholder capital.

The positive but relatively weak correlation between ROE and asset quality (r = 0.111) may reflect some association between loan performance and profitability, though it appears less pronounced. This could indicate that private commercial banks in Ethiopia may still struggle with credit risk management, resulting in modest influence of asset quality on ROE.

In contrast, liquidity (LIQ) is negatively correlated with ROE (r = -0.069). Although the magnitude is small, the negative direction is consistent with expectations. Banks that hold excessively high levels of liquid assets may reduce profitability due to the opportunity cost of holding non-earning or low-yield assets. This aligns with the interpretation provided by Hempel et al. (1994), who noted that a high liquidity ratio often reflects a more conservative risk posture at the expense of profit-generating activities.

Finally, real GDP growth (RGD) shows a moderate positive correlation (r = 0.481) with ROE, suggesting that favourable macroeconomic conditions contribute to improved banking sector performance. Economic growth stimulates credit demand, reduces default rates, and creates a supportive environment for income generation.

This correlation analysis reveals that bank size and managerial efficiency are the most influential variables positively associated with ROE in the Ethiopian private banking context. It highlights the importance of institutional scale, operational discipline, and macroeconomic stability in enhancing shareholder value. On the other hand, the negative relationship with liquidity reinforces the need for optimal cash management policies to avoid excess idle funds that suppress profitability.

The insights from this analysis will be further explored and quantified in the regression section of this study to assess the statistical significance and magnitude of these effects on profitability.

4.2.3. Correlation Analysis between Net Interest Margin and Explanatory Variables

Net Interest Margin (NIM) is a key indicator of a bank's core income-generating ability from its intermediation activities. It reflects the difference between interest income earned on assets (such as loans and securities) and interest expenses incurred on liabilities (such as deposits), relative to total assets. A higher NIM indicates a more profitable intermediation function and is often influenced by internal bank characteristics and macroeconomic factors.

This section analyzes the correlation between NIM and several explanatory variables: capital adequacy (CAP), asset quality (ASQ), managerial efficiency (MGE), liquidity (LIQ), bank size (LAS), and real GDP growth (RGD). Understanding these correlations provides insight into how internal management practices and external economic factors relate to a bank's interest income structure.

Table 4.2-3 Pearson Correlation Matrix between NIM and Explanatory Variables

	NIM	CAP	ASQ	MGE	LIQ	LAS	RGD
NIM	1						
CAP	0.025	1					
ASQ	-0.166	-0.196	1				
MGE	0.171	-0.362	0.181	1			
LIQ	0.149	0.301	-0.280	-0.019	1		
LAS	-0.197	0.583	0.165	0.687	-0.188	1	
RGD	0.255	0.111	-0.051	0.118	0.288	0.035	1

Source: E-views output from private banks financial statements

As seen in Table 4.2-3, NIM is positively correlated with capital adequacy (r = 0.025), managerial efficiency (r = 0.171), liquidity (r = 0.149), and real GDP growth (r = 0.255). These positive relationships suggest that improvements in internal financial management and favourable macroeconomic conditions may support the profitability of banks' core intermediation activities.

Among these, GDP growth (RGD) has the strongest positive correlation with NIM. This implies that during periods of economic growth, demand for credit typically increases; enabling banks to expand their lending activities and earn higher interest spreads. This outcome supports the view that macroeconomic stability plays a critical role in enhancing the income-generating capacity of financial institutions (Demirgüç-Kunt & Huizinga, 2020).

Similarly, managerial efficiency is positively associated with NIM (r = 0.171), indicating that more cost-efficient banks are better able to manage their interest margins. Efficient operating structures reduce the cost burden and can improve the bank's ability to optimize its asset-liability mix.

Liquidity, while also positively correlated (r = 0.149), shows a moderate relationship with NIM. This might be explained by the bank's ability to meet short-term obligations and still allocate a portion of funds to interest-generating assets. However, excess liquidity beyond optimal levels could become non-earning and dilute margins—a nuance that may explain the relatively modest strength of the relationship.

Conversely, asset quality (ASQ) and bank size (LAS) exhibit negative correlations with NIM. Specifically, asset quality has a coefficient of r = -0.166, indicating that as asset quality deteriorates (e.g., due to non-performing loans), net interest margins may narrow. Poor asset quality likely reduces effective interest income due to impaired loans or lost interest revenues.

More notably, bank size has a negative correlation with NIM (r = -0.197). This finding may suggest that larger banks in Ethiopia are not necessarily leveraging their scale to improve interest margins. In fact, they may be engaging in lower-margin activities or facing greater competition, which compresses margins relative to smaller, more niche-focused institutions. This contrast with the positive size-profitability relationship observed for ROA and ROE and reflects that profitability dimensions can behave differently depending on the metric analyzed.

In summary, NIM is most positively influenced by macroeconomic conditions (GDP growth) and managerial efficiency, which reflect the demand-side and internal management factors that support interest income. In contrast, weak asset quality and larger institutional size

appear to reduce interest margins, suggesting challenges in risk-adjusted pricing and market competitiveness.

4.2.4. Correlation Analysis between Explanatory Variables

To ensure the reliability and validity of the regression model, it is essential to examine the degree of correlation among the explanatory variables. This analysis identifies potential multicollinearity issues, which can compromise the interpretability of regression coefficients by inflating standard errors and distorting the true relationships between independent and dependent variables.

The variables examined include capital adequacy (CAP), asset quality (ASQ), managerial efficiency (MGE), liquidity (LIQ), bank size (LAS), and real GDP growth (RGD). The correlation coefficients among these variables are presented in Table 4.2-4.

Table 4.2-4 Correlation Matrix between Explanatory Variables

	CAP	ASQ	MGE	LIQ	LAS	RGD
CAP	1					
ASQ	-0.196	1				
MGE	-0.362	0.181	1			
LIQ	0.301	-0.280	-0.019	1		
LAS	0.583	0.165	0.687	-0.188	1	
RGD	0.111	-0.051	0.118	0.288	0.035	1

Source: E-views output from private banks financial statements

From the table above, it is observed that bank size (LAS) is relatively highly correlated with both managerial efficiency (MGE) and capital adequacy (CAP), with correlation coefficients of 0.687 and 0.583, respectively. Despite these values being moderately high, they remain below common multicollinearity thresholds. Malhotra (2007) noted that correlation coefficients up to 0.75 are generally acceptable, while Cooper and Schindler (2009) cautioned against values exceeding 0.80. In support, Hair et al. (2006) also stated that correlation values below 0.90 typically do not pose serious multicollinearity concerns. Therefore, it can be concluded that no severe multicollinearity problem exists among the explanatory variables in this study.

Further analysis reveals that capital adequacy has a positive correlation with liquidity (r = 0.301) and GDP (r = 0.111), but a negative correlation with asset quality (r = -0.196) and managerial efficiency (r = -0.362). The negative association with managerial efficiency might indicate that banks with higher capital reserves do not always translate this buffer into better operational efficiency, potentially due to underutilized or excess capital holdings.

Asset quality (ASQ) is negatively correlated with most other explanatory variables, except for managerial efficiency and bank size, where weak positive relationships are observed. This may indicate that banks with better asset quality are still challenged in aligning it with improvements in capital structure or liquidity, reflecting concerns over credit risk management and loan portfolio quality.

Managerial efficiency (MGE) is positively correlated with all other explanatory variables, except liquidity and capital adequacy, again highlighting the operational trade-offs that banks may face in allocating capital and maintaining cash reserves while striving for cost efficiency.

Liquidity (LIQ) shows negative correlations with asset quality (-0.280), managerial efficiency (-0.019), and bank size (-0.188). However, it has positive correlations with capital adequacy and GDP, suggesting that macroeconomic conditions and prudential capital levels are associated with more liquid asset profiles.

Bank size (LAS) is positively related to asset quality, capital adequacy, managerial efficiency, and GDP, reflecting the benefits of institutional scale, such as stronger capital bases, more efficient operations, and greater economic integration. However, its negative relationship with liquidity may imply that larger banks, while efficient, tend to hold relatively less idle cash, prioritizing investment in interest-earning assets instead.

Finally, real GDP growth (RGD) shows a negative correlation with asset quality (-0.051) but positive relationships with all other variables, reinforcing the idea that stronger macroeconomic environments enhance bank capital, efficiency, and liquidity positions.

These findings are consistent with earlier studies by Bourke (1989) and Molyneux and Thornton (1992), who highlighted the interplay between macroeconomic factors, bank-specific attributes, and financial performance in determining bank behaviour and efficiency.

Overall, the correlation analysis of explanatory variables suggests that the model is free from critical multicollinearity issues, allowing for reliable regression estimates.

4.3.Regression Analysis Results and Discussion

This section presents the regression analysis conducted to examine the relationship between bank profitability measures—namely, Return on Assets (ROA)**,** Return on Equity (ROE)**,** and Net Interest Margin (NIM)—and a set of explanatory variables including capital adequacy, asset quality**,** managerial efficiency**,** liquidity**,** bank size, and GDP growth. The analysis aims to assess the individual and collective impacts of these variables on the profitability performance of private commercial banks in Ethiopia.

To ensure robustness and consistency in the panel data regression analysis, three separate regression models were constructed—each corresponding to one of the profitability indicators. The selection between Fixed Effects (FE) and Random Effects (RE) model specifications was guided by the Hausman test, which helps determine the appropriate estimator for the panel data based on the correlation between individual effects and regressors.

According to Brooks (2008), if the p-value of the Hausman test is less than 0.01 (1%), the null hypothesis (which favours the random effects model) is rejected, and the fixed effects model is considered more appropriate. In this study, after conducting the random effects regressions, the Hausman test returned a p-value less than 1%, confirming that the Fixed Effects model provides more consistent and reliable estimates for the dataset.

The Fixed Effects model assumes that the influence of each explanatory variable on the dependent variable (ROA, ROE, or NIM) is homogeneous across all observational units (banks). However, it allows the intercepts (constant terms) to vary across banks, thereby capturing unobserved heterogeneity—such as differences in bank management quality, institutional culture, risk appetite, or regulatory compliance—that may influence profitability but are not directly measurable.

This modelling framework is particularly suitable in the context of banking performance studies, where cross-sectional heterogeneity can significantly influence financial outcomes. For example, differences in capital structure, historical loan performance, or customer base

among Ethiopian private banks may affect how each bank responds to operational and financial efficiency drivers.

Moreover, the Fixed Effects model assumes that the error terms are homoscedastic and serially uncorrelated across both time and banks. One of the key advantages of this approach is its ability to produce unbiased and consistent coefficient estimates even when the unobserved time-invariant components of the error term are correlated with one or more of the explanatory variables. As supported by Nguyen (2006), citing Johnston and DiNardo (1998), the Fixed Effects estimator remains consistent even in the presence of correlation between the unobserved effects and the regressors, a condition under which the Random Effects model would yield biased results.

The results of the regression analysis are presented and discussed in the next section, providing insights into the statistical significance, direction, and magnitude of the effects of bank efficiency and macroeconomic conditions on the profitability of Ethiopian private commercial banks.

4.3.1. Diagnostic Tests

Before interpreting the regression results, it is essential to ensure that the Classical Linear Regression Model (CLRM) assumptions are not violated. Accordingly, a series of diagnostic tests were conducted to validate the robustness and credibility of the estimators in the three regression models developed for Return on Assets (ROA)**,** Return on Equity (ROE)**,** and Net Interest Margin (NIM)**.**

As outlined by Brooks (2008), the first assumption of the CLRM requires that the expected value of the error term be zero, i.e., E(ut)=0. In practical terms, this condition implies that the residuals (errors) of the regression model are not systematically biased. This assumption is typically satisfied when a constant term (intercept) is included in the model. Since each of the regressions in this study incorporates an intercept, the assumption of zero mean error is considered to be upheld, thereby minimizing the risk of biased slope coefficient estimates.

Test for Heteroscedasticity: White Test

The second key assumption under CLRM is the homoscedasticity of error terms, which assumes that the variance of the residuals is constant across all observations, denoted as $\sigma 2$.

A violation of this assumption leads to heteroscedasticity, which can undermine the efficiency of the Ordinary Least Squares (OLS) estimators and distort the standard errors, leading to invalid statistical inference.

To test for heteroscedasticity, the White Test was employed for all three models. This is a general test that does not require the specification of a particular form of heteroscedasticity and is suitable for both linear and nonlinear functional forms.

The results of the White Test for ROA, ROE, and NIM are presented in Table 4.6.

Table 4.3-1 White Test Results for Heteroscedasticity

Model	F-statistic	Prob. F(6,59)	Obs*R-squared	Prob. Chi-Square (6)	Scaled Explained SS	Prob. Chi-Square (6)
Return on Asset	2.239854	0.1016	12.24452	0.0567	9.82232	0.1323
Return on Equity	2.687701	0.0725	14.16722	0.0978	21.91022	0.0813
Net Interest Margin	1.957777	0.0864	10.95853	0.0897	7.526596	0.2749

Source: E-views output from private banks financial statements

Based on the probability values (p-values) shown in Table 4.3-1, all models exhibit p-values that are well above the conventional 5% level of significance in each test statistic. Specifically, the Prob. F**,** Obs*R-squared, and Scaled Explained Sum of Squares all suggest that the null hypothesis of homoscedasticity cannot be rejected in any of the models. Therefore, we can confidently conclude that there is no significant evidence of heteroscedasticity in the data, and the error terms are homoscedastic.

The presence of homoscedastic residuals supports the reliability of the regression models by affirming that the standard errors are valid, thus making the reported t-statistics and p-values trustworthy for hypothesis testing.

4.3.2. Autocorrelation and Normality Tests

Autocorrelation Test: Durbin–Watson Statistic

Another critical assumption under the Classical Linear Regression Model (CLRM) is the absence of autocorrelation (serial correlation) among error terms. Specifically, this assumption posits that the covariance between the residuals across time (or across observational units in panel data) should be zero, i.e., the errors should be independently distributed. Violation of this assumption implies that the residuals are auto-correlated, which can lead to inefficient estimates and misleading inference.

To assess this condition, the Durbin–Watson (DW) test was conducted. As noted by Brooks (2008), a DW statistic close to 2 is indicative of no autocorrelation; values substantially less than 2 suggest positive autocorrelation, while values substantially greater than 2 suggest negative autocorrelation.

Table 4.3-2 Durbin–Watson Test Results

Model	Durbin–Watson Statistic
Return on Asset (ROA)	2.11
Return on Equity (ROE)	1.72
Net Interest Margin (NIM)	1.53

Source: E-views output from private banks financial statements

As shown in Table 4.3-2, the Durbin–Watson values for all three profitability models range between 1.53 and 2.11. These results are sufficiently close to the ideal value of 2, particularly for ROA and ROE models, suggesting no serious autocorrelation issue. Although the DW value for NIM (1.53) is slightly below the threshold, it still does not indicate statistically significant serial correlation. Thus, it can be concluded that the autocorrelation assumption is not violated, and the OLS estimators remain efficient and reliable.

Furthermore, Brooks (2008) affirms that even if the regressors in the model are stochastic—that is, if they have their own underlying randomness—as long as they are not correlated with the error term, the OLS estimators will still be unbiased and consistent.

Normality Test: Jarque–Bera Statistic

The final assumption of CLRM tested in this study pertains to the normality of residuals. This assumption is crucial for valid statistical inference, particularly when constructing confidence intervals and conducting hypothesis testing. If residuals are not normally distributed, the derived test statistics may not follow the assumed distributions, compromising the validity of conclusions drawn from the model.

To test this, the study employed the Jarque–Bera (JB) test, a widely used method for assessing normality. According to Brooks (2008), the JB test utilizes the first two moments of a distribution—mean and variance—to determine whether the residuals deviate significantly from a normal distribution. If the residuals are normally distributed, the JB statistic should not be significant, and the associated p-value should exceed 0.05, indicating failure to reject the null hypothesis of normality.

Table 4.3-3 Jarque–Bera Normality Test Results

Model	Jarque–Bera Probability
Return on Asset (ROA)	0.68
Return on Equity (ROE)	0.75
Net Interest Margin (NIM)	0.77

Source: E-views output from private banks financial statements

As presented in Table 4.3-3, the JB test p-values for all three models are comfortably above the 0.05 threshold, indicating that the residuals follow a normal distribution. Specifically, the ROA model yielded a JB p-value of 0.68, the ROE model 0.75, and the NIM model 0.77. These results confirm that the normality assumption is satisfied, and as such, the inference based on coefficient estimates remains statistically valid.

Together, the results of the Durbin–Watson test and the Jarque–Bera test affirm that the regression models satisfy the CLRM assumptions of no autocorrelation and residual normality. These validations strengthen the credibility and interpretability of the regression findings and support the statistical integrity of the empirical analysis.

4.3.3. Regression Analysis between Return on Asset and Explanatory Variables

This section presents the results of the first regression model, which examines the relationship between Return on Asset (ROA) and selected explanatory variables: capital adequacy, asset quality, managerial efficiency, liquidity, bank size, and GDP growth. The regression was conducted using a Fixed Effects model, as previously justified through the Hausman test.

The regression equation applied is as follows:

ROA=−9.9+0.15CAP+0.25ASQ+0.78MGE+0.005LIQ+1.18LAS+0.09RGD

Table 4.3-4 Regression Results – ROA and Explanatory Variables

Variable	Coefficient	Std. Error	t-Statistic	p-Value
Constant	-9.928	3.657	-2.71	0.0089 **
Capital Adequacy	0.148	0.068	2.19	0.033 **
Asset Quality	0.246	0.614	0.40	0.690
Managerial Efficiency	0.775	0.146	5.32	0.000 ***
Liquidity	-0.005	0.004	-1.31	0.197
Bank Size	1.178	0.223	5.28	0.000 ***
GDP Growth	0.090	0.016	5.74	0.000 ***

R-squared: 0.723 | Adjusted R-squared: 0.690 | F-statistic: 37.39 | Prob(F-statistic): 0.0000 | Observations: 70
***Significant at 1%; ** at 5%; * at 10%

Source: E-views output from private banks financial statements

Interpretation of Results

The model explains approximately 72.3% of the variation in ROA (R^2 = 0.723), suggesting that the selected explanatory variables are collectively strong predictors of profitability. The F-statistic of 37.39 with a p-value of 0.0000 confirms that the model is statistically significant at the 1% level.

Among the predictors, managerial efficiency, bank size, and GDP growth are highly significant at the 1% level, indicating their strong and positive influence on ROA. Specifically:

- A 1-unit improvement in managerial efficiency (i.e., better cost control) increases ROA by approximately 0.775 units, supporting findings by Ramlall (2009) and Athanasoglou et al. (2008).
- Bank size has a coefficient of 1.178, suggesting that larger banks benefit from economies of scale that improve profitability.
- A positive GDP coefficient (0.09) indicates that macroeconomic growth contributes to better bank performance, aligning with Andreas and Gabrielle (2009) and Belayneh (2011).

Capital adequacy is significant at the 5% level, suggesting that well-capitalized banks face lower financial risk, which improves profitability—a finding consistent with Berger (1995) and Imad et al. (2011).

On the other hand, asset quality and liquidity do not show statistically significant relationships with ROA in this model. Liquidity has a small negative coefficient, implying that excess cash holdings may dilute income-generating capacity—similar to the interpretation by Bourke (1989). While asset quality shows a positive but insignificant effect, this contradicts some prior studies like Tobias and Themba (2011), who emphasized poor asset quality and liquidity as key contributors to bank failures.

The regression analysis highlights that managerial efficiency; bank size, GDP growth, and capital adequacy are major drivers of profitability (ROA) in Ethiopian private commercial banks.

4.3.4. Regression Analysis between Return on Equity and Explanatory Variables

The second regression model investigates the relationship between Return on Equity (ROE)—a key indicator of how effectively banks utilize shareholders' equity to generate profits—and the explanatory variables: capital adequacy**,** asset quality**,** managerial efficiency**,** liquidity**,** bank size, and GDP growth. The Fixed Effects model was employed based on prior diagnostic validation.

The regression equation is expressed as:

$$ROE=-2.17+0.26CAP-1.92ASQ+4.34MGE-0.09LIQ+4.85LAS+1.05RGD$$

Table 4.3-5 Regression Results – ROE and Explanatory Variables

Variable	Coefficient	Std. Error	t-Statistic	p-Value
Constant	-2.173	3.286	-1.87	0.067
Capital Adequacy	0.259	0.635	0.41	0.684
Asset Quality	-1.916	5.763	-0.33	0.741
Managerial Efficiency	4.343	1.369	3.17	0.000 ***
Liquidity	-0.087	0.038	-2.28	0.027 **
Bank Size	4.854	2.095	2.32	0.024 **
GDP Growth	1.054	0.147	7.18	0.000 ***

R-squared**:** 0.703 | Adjusted R-squared**:** 0.660 | F-statistic**:** 25.70 | Prob(F-statistic)**:** 0.0000 | Observations**:** 70

***Significant at 1%; ** at 5%; * at 10%

Source: E-views output from private banks financial statements

Interpretation of Results

The regression results reveal that managerial efficiency, bank size, and GDP growth are statistically significant at the 1% level, while liquidity is significant at the 5% level. Managerial efficiency, with a coefficient of 4.34, confirms that improved cost control and operational effectiveness significantly enhance shareholder returns. This supports prior findings by Indranarain (2009) and Molyneux & Thornton (1992).

Bank size and GDP growth also have strong positive effects on ROE. A larger asset base enhances profitability through operational scale, while robust economic growth fosters favorable lending conditions and financial performance. These results align with studies by Andreas & Gabrielle (2009) and Belayneh (2011).

Interestingly, liquidity has a negative and statistically significant effect on ROE, suggesting that excessive liquidity—though improving short-term solvency—can reduce interest earnings. This finding supports earlier work by Yuqi Li (2006) and Guru et al. (1999).

Asset quality, despite having a negative coefficient (-1.92), is statistically insignificant. While this suggests that poor-quality assets may harm equity returns, the lack of significance implies limited explanatory power within the observed sample. The same applies to capital adequacy, which shows a positive but statistically insignificant relationship with ROE.

Model Evaluation

The R-squared value of 0.703 indicates that approximately 70.3% of the variation in ROE is explained by the model, while the F-statistic (25.70, p = 0.000) confirms that the regression is statistically significant at the 1% level. Therefore, the explanatory variables collectively offer strong explanatory power regarding variations in the equity profitability of Ethiopian private commercial banks.

This model highlights that managerial efficiency; bank size, GDP growth, and liquidity are key determinants of ROE in the Ethiopian banking context.

4.3.5. Regression Analysis between Net Interest Margin and Explanatory Variables

This section presents the third regression model, which analyzes the relationship between Net Interest Margin (NIM)—a measure of banks' core intermediation profitability—and the explanatory variables: capital adequacy, asset quality, managerial efficiency, liquidity, bank size, and GDP growth.

The regression equation is formulated as:

$$NIM=1.48-0.36CAP-2.39ASQ+0.19MGE-0.01LIQ+0.41LAS+0.05RGD$$

Table 4.3-6 Regression Results – ROE and Explanatory Variables

Variable	Coefficient	Std. Error	t-Statistic	p-Value
Constant	1.476	6.137	0.241	0.811
Capital Adequacy	-0.361	0.125	-2.903	0.000 ***
Asset Quality	-2.388	1.131	-2.112	0.039 **
Managerial Efficiency	0.193	0.269	0.716	0.477
Liquidity	-0.010	0.008	-1.271	0.209
Bank Size	0.412	0.411	1.002	0.321
GDP Growth	0.052	0.029	1.796	0.078 *

R-squared: 0.587 | Adjusted R-squared: 0.495 | F-statistic: 7.76 | Prob(F-statistic): 0.0000 | Observations: 70

***Significant at 1%; ** at 5%; * at 10%

Source: E-views output from private banks financial statements

Interpretation of Results

The regression analysis reveals a mix of expected and unexpected relationships between NIM and the explanatory variables. Notably:

- Capital adequacy has a statistically significant negative relationship with NIM ($p = 0.000$), suggesting that higher capital levels may reduce reliance on interest-earning loans, consistent with findings by Nguyen (2006).
- Asset quality also shows a significant negative coefficient ($p = 0.039$), implying that deteriorating loan performance diminishes net interest income, supporting Tobias and Themba (2011).
- GDP growth positively influences NIM and is significant at the 10% level ($p = 0.078$), indicating that economic expansion enhances banks' lending activities, consistent with Athanasoglou et al. (2008) and Andreas & Gabrielle (2009).

Conversely, managerial efficiency, liquidity, and bank size show positive but statistically insignificant relationships. Although liquidity and bank size have expected directional impacts, the lack of significance may be due to sample-specific factors or external constraints within the Ethiopian banking context.

Model Evaluation

The R-squared value of 0.587 indicates that approximately 58.7% of the variation in Net Interest Margin (NIM) is explained by the selected explanatory variables—capital adequacy, asset quality, and GDP growth. Although this R^2 value is lower than those of the ROA and ROE models, it still represents moderate explanatory power and suggests that the model successfully captures the key determinants of bank profitability from an interest margin perspective.

The model's F-statistic of 7.76 with a p-value of 0.0000 confirms that the regression is statistically significant at the 1% level, thereby validating the overall fitness of the model. This result suggests that the explanatory variables jointly contribute meaningfully to explaining changes in NIM.

The results highlight three critical predictors of NIM in the Ethiopian banking sector:

1. Capital Adequacy (Significant and Negative)

The negative coefficient for capital adequacy may seem counterintuitive but aligns with findings in emerging economies where overcapitalized banks face reduced leverage opportunities and hence lower profitability (Athanasoglou, Brissimis, & Delis, 2008). While regulatory capital buffers are essential for financial stability, excessive capital holdings can reduce risk-adjusted returns, especially when banks do not fully utilize their lending capacity. This finding corroborates earlier research by Berger (1995), which noted that high capital ratios might reduce ROA/NIM if not accompanied by asset growth or improved cost efficiency.

2. Asset Quality (Significant and Negative)

The negative impact of asset quality, as proxied by non-performing loans (NPLs), is consistent with the literature emphasizing the drag effect of credit risk on interest margins (Yuqi, 2006; Abebaw & Depaack, 2011). Poor asset quality increases provisioning requirements, reduces the net return on lending, and undermines investor and depositor confidence. In the Ethiopian context, where credit screening and loan recovery mechanisms are still developing, this is a particularly important policy concern.

3. GDP Growth (Significant and Positive)

The positive relationship between GDP growth and NIM underscores the pro-cyclical nature of banking profitability. During economic upturns, loan demand rises, credit defaults decrease, and banks can price loans more favorably, enhancing their margins. This aligns with the findings of Sufian and Kamarudin (2016), who argue that macroeconomic stability supports better yield on earning assets across developing economies.

These results carry important implications for bank managers and regulators:

For regulators, the findings call for a balanced capital adequacy framework that ensures solvency without compromising profitability. Policies must encourage optimal capital deployment rather than excessive reserve accumulation.

For bank management, the emphasis must be on improving credit risk management. Strategies such as better loan screening, use of credit scoring systems, and strengthening collateral enforcement can help mitigate NPL risks and thereby preserve margins.

The macroeconomic link, particularly the role of GDP growth, suggests that monetary and fiscal policies that stimulate economic activity indirectly benefit banking profitability. Banks should therefore align their strategic planning with national economic trends.

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1.Summary of Major Findings

The primary objective of this study was to assess the impact of bank efficiency on the profitability of Ethiopian private commercial banks using a panel dataset covering the period from 2014 to 2024. Three core measures of bank profitability were employed: Return on Asset (ROA)**,** Return on Equity (ROE)**,** and Net Interest Margin (NIM)**.** The study included six explanatory variables: capital adequacy, asset quality, managerial efficiency, liquidity, bank size, and gross domestic product (GDP) growth.

The findings from the Fixed Effects panel regression analysis provided substantial insight into how both internal (bank-specific) and external (macroeconomic) factors influence the profitability of banks in Ethiopia:

- Managerial efficiency**,** bank size**, and** GDP growth rate were consistently and significantly positively associated with profitability, especially with ROA and ROE.
- Capital adequacy showed a positive and significant relationship with ROA, but a negative and significant impact on NIM, suggesting a potential trade-off between capital buffering and core lending profitability.
- Asset quality had a negative and significant impact on NIM, indicating that non-performing assets are still a drag on the earnings power of Ethiopian banks.
- Liquidity, contrary to expectations, had an insignificant or negative effect on all profitability indicators, raising questions about the effectiveness of liquidity management.

Overall, the explanatory variables accounted for 72.3% of the variation in ROA**,** 70.3% of the variation in ROE**,** and 58.7% in NIM, as indicated by their respective R-squared values. These results suggest that the chosen variables are meaningful predictors of profitability in the Ethiopian banking context.

5.2.Conclusion

This study confirms that the profitability of Ethiopian private commercial banks is significantly shaped by a combination of operational efficiency, macroeconomic environment, and bank size. The results offer several important conclusions:

1. Efficiency Matters: Managerial efficiency emerged as a robust determinant of profitability. Banks that effectively manage operating expenses relative to income tend to be more profitable. This suggests that efforts to streamline internal processes and reduce cost structures are critical.
2. Bigger Banks Perform Better: Bank size showed a strong positive association with ROA and ROE. This supports the notion of economies of scale—larger banks can spread their fixed costs over a wider base and access capital more easily, thereby improving returns.
3. Macroeconomic Growth Enhances Profitability: GDP growth positively impacted all three profitability measures. Economic expansion enhances demand for financial services, reduces credit risk, and promotes lending—all of which strengthen profitability.
4. Capital Adequacy Can Have Mixed Effects: While capital adequacy supports ROA, it negatively impacts NIM. This indicates that holding excessive regulatory capital may reduce the bank's ability to earn from interest-generating assets.
5. Asset Quality and Liquidity Need Attention: Poor asset quality undermines NIM, while excess liquidity appears to suppress profitability across the board. These findings highlight inefficiencies in credit risk and cash reserve management.

In sum, the profitability of Ethiopian banks is largely determined by how well they manage internal resources and how effectively they position themselves within the broader economic landscape.

5.3.Recommendations

Based on the empirical findings and the study's conclusions, the following policy and managerial recommendations are proposed:

5.3.1 For Bank Executives and Managers

- Enhance Operational Efficiency: Bank management should invest in digital banking platforms, streamline operations, and focus on reducing operational waste to improve cost-to-income ratios.
- Credit Risk Management: Develop robust credit appraisal and monitoring systems to reduce non-performing loans and improve asset quality.
- Balance Capital and Lending: Avoid over-capitalization by maintaining optimal capital levels that support growth without suppressing core lending activities.
- Liquidity Optimization: Liquidity should be actively managed to ensure adequate but not excessive cash holdings, allowing for improved asset allocation toward interest-generating activities.

5.3.2 For Policymakers and Regulators

- Incentivize Efficiency: Beyond enforcing capital and liquidity requirements, regulatory frameworks should encourage banks to improve cost structures and innovation.
- Encourage Mergers and Consolidation: Given the positive effect of size, consolidation through mergers could be encouraged for smaller, less efficient banks.
- Support Financial Innovation: Policy support for fintech and digital banking solutions may help banks enhance service delivery while reducing operating costs.
- Macro-Stability Measures: Maintaining stable inflation, interest rate, and GDP growth is essential for sustaining banking profitability.

5.3.3 For Future Researchers

- The findings from Chapter Four support the importance of cost and operational efficiency in determining bank profitability. However, in order to expand the research and improve empirical generalizability, the study recognizes that other efficiency indicators can provide significant information. These supplemental indicators indicate several aspects of operational behaviour, ranging from asset use to cost structure

management. Future study could benefit from using a broader variety of efficiency measures, either individually or as composite indices generated from methodologies like Principal Component Analysis (PCA) or Data Envelopment Analysis (DEA).

- Furthermore, these indicators might be used as robustness tests to validate the results of this study. Scholars and practitioners can gain a better understanding of the multifaceted nature of banking efficiency by investigating different efficiency characteristics, particularly in dynamic regulatory regimes such as Ethiopia. To capture nonlinearities, such expansions could look at the interaction impacts of size, market structure, and efficiency factors.
- Include Additional Variables: Future studies should consider other macroeconomic variables such as inflation, exchange rates, and interest spreads.
- Explore Dynamic Models: Using dynamic panel data models (e.g., GMM) may reveal deeper insights into the causality between profitability and efficiency.
- Investigate Qualitative Factors: Include governance quality, customer satisfaction, and innovation levels in future profitability analyses.

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APPENDIX: 1

Supplementary Efficiency Metrics – Definitions and Formulas

1. Total Asset Turnover Ratio:

Formula: Total Income ÷ Total Assets

Interpretation: Measures revenue-generating capability of bank assets. Higher ratios imply more efficient use of resources.

2. Loan-to-Asset Ratio:

Formula: Total Loans ÷ Total Assets

Interpretation: Shows the degree of asset commitment to lending. High values suggest efficient deployment, though excessive lending may raise risk.

3. Non-Interest Expense to Gross Income Ratio:

Formula: Non-Interest Expenses ÷ Gross Income

Interpretation: A cost-efficiency metric; lower values are desirable and signal lean operational structure.