Addis Ababa University

College of Business and Economics

Department of Economics

MSc in Financial Economics

Factors Affecting the Profitability of Private Commercial Banks in Ethiopia: A Panel Data Analysis (2012-2023)

By: Wuletaw Adamu

June, 2024

Addis Ababa, Ethiopia

Factors Affecting the Profitability of Private Commercial Banks in Ethiopia: A Panel Data Analysis (2012-2023)

By: WULETAW ADAMU

ADVISOR: - ATNAFU GEBREMESKEL (PhD)

A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY COLLEGE OF BUSINESS AND ECONOMICS IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE MASTER OF SCIENCE DEGREE (MSc) IN FINANCIAL ECONMICS

June, 2024

Addis Ababa, Ethiopia

Statement of Declaration

I, Wuletaw Adamu Workye, hereby declare that this thesis entitled "Factors Affecting the Profitability of Private Commercial Banks in Ethiopia: A Panel Data Analysis (2012-2023)" is my original work and it has never been presented for the award of other degree, diploma or other similar titles of any institution or university. All sources and materials used for this thesis have been duly acknowledged.

Name: Wuletaw Adamu Workye

Signature: _____.

Date: June/16/2024

Addis Ababa University

College of Business and Economics

School of Graduate Studies

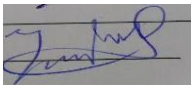
Approval Sheet

This is to certify that the thesis prepared by Wuletaw Adamu, entitled: Factors Affecting the Profitability of Private Commercial Banks in Ethiopia: A Panel Data Analysis (2012-2023) and submitted in partial fulfillment of the requirements for the Master of degree Financial Economics with the regulations of the University and meets the accepted standards with respect to originality and quality.

Approved by:

Advisor: Atnafu Gebremeskel(PhD) Signature: _____ Date: June/ 16 /2024

Internal Examiner: _____ Signature:_____ Date: June/ /2024

External Examiner: Etsubdink Sileshi Signature:  Date: June/28 /2024

Abstract

The primary aim of this study is to examine the factors that affect private commercial banks profitability in Ethiopia between 2012 and 2023. The National Bank of Ethiopia and the yearly audited financial reports of 13 particular private commercial banks were consulted by the researcher in order to accomplish this goal. We examined the factors affecting private commercial banks profitability using descriptive analysis, correlation analysis and Random effect panel data regression analysis. Return on assets (ROA) was used as the proxy for profitability and the dependent variable. The findings of this study conclude that bank size, non-interest income, market share, and GDP growth rate had a positive and significant effect on the profitability of private banks in Ethiopia. In contrast, credit risk and operational cost efficiency ratio negatively and significantly impacted profitability. The study also found that loan deposit ratio, capital adequacy, and inflation had an insignificant effect on the profitability of private banks. The major findings of the study show that bank size, credit risk, operational cost efficiency, non-interest income, and market share are very important in explaining profitability with a highly significant value. Therefore, due attention should be given to ensuring factors specific to banks and the industry for the better performance and profitability of private commercial banks in Ethiopia.

Key Words: private commercial banks of Ethiopia, profitability, Random Effect panel model

Acknowledgement

First and foremost, I would like to thank the Almighty God for granting me the strength, wisdom, and perseverance to complete this research. Without His guidance and blessings, this achievement would not have been possible. Next, I am deeply grateful to my advisor, Dr. Atnafu Gebremeskel for his unwavering support, insightful guidance, and constructive feedback throughout the research design and preparation process.

My sincere gratitude also goes to my entire family and my best friends for their moral support and valuable contribution towards the successful completion of this thesis.

Table of Contents Pages

List of Figures

List of Tables

List of Acronyms

Acronym	Full Name
AB	Awash Bank
DB	Dashen Bank
BOA	Bank of Abyssinia
WB	Wogagen Bank
UB	United (Hibret) Bank
NIB	Nib International Bank
ZM	Zemen Bank
COOP	Cooperative Bank of Oromia
LIB	Lion (Anbesa) International Bank
BB	Bunna Bank
BIB	Berhan Bank
ABB	Abay Bank
ORB	Oromia Bank
DBE	Development Bank of Ethiopia
NBE	National Bank of Ethiopia
ROA	Return on Asset
ROE	Return on Equity
NIM	Net Interest Margin
GDP	Gross Domestic Product
NPL	Non Performing Loan
OLS	Ordinary Least Square

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The banking industry plays an essential role in the economic growth of a country (Iskandar et al., 2019). Among the various financial sectors, the main mission of the banking industry has been to improve people's living standards by converting their savings into productive investments (Rahaman et al., 2020). Banks contribute to economic growth by efficiently allocating capital, streamlining commerce, and promoting investment. Thus, the expansion of the economy depends critically on the stability of the financial sector. According to Ali and Puah (2018), countries with a healthy and profitable banking sector are better able to overcome financial crises, recover quickly, and mitigate the damage to their economies. Conversely, as pointed out by Sun and Heng (2013), poor performance of financial institutions can lead to financial collapse, as observed during the global financial crises of 1997 and 2008.

African banks face challenges such as political instability, infrastructure deficits, and foreign exchange risks that can impact profitability (Asongu & Nwachukwu, 2020). Despite these challenges, initiatives to enhance financial inclusion and regulatory reforms aimed at strengthening the banking sector have supported profitability in some African countries.

The Bank of Abyssinia was founded in 1905 and was jointly held by the National Bank of Egypt and the Ethiopian government, which was then ruled by the British. This marked the beginning of banking in Ethiopia. However, after the Italians left in the 1940s, a more organized banking system started operation. Prior to being nationalized and combined into a single state-owned bank in 1976, a number of private banks and foreign bank branches coexisted alongside the state-owned commercial bank. The competitive banking environment that emerged in the 1960s and 1970s was limited by the command economy that prevailed between 1974 and 1991.

Currently, Ethiopia's banking sector includes the central bank, the National Bank of Ethiopia (NBE), two public banks (Development Bank of Ethiopia and Commercial Bank of Ethiopia), and twenty nine private banks. According to the Financial Stability Report of National Bank of

Ethiopia (NBE, 2023), the financial sector's total asset reached 3.1205 trillion Birr as of the end of June 2023, and the total capital of banks increased to 199.1 billion Birr in 2022. The total number of bank branches across the country increased to 11,281, with 32.6% located in Addis Ababa. In 2023, privately owned commercial banks held for 72.6% of the total capital of the entire banking sector, 51.3% of total deposits, 53.4% of the total loans, and 50.5% of the total assets. Therefore, the stability of the economy depends on the ability to understand what factors determine the bank's profit.

The stability of the Ethiopian financial system is affected by different factors. This includes factors related to the structure and functioning of the financial sector (NBE, 2023). These factors are generally categorized into two main groups: The first category represents the internal factors, which are specific to banks and under the control of management. Meanwhile, the second category includes external or macroeconomic factors that are beyond management's control (Ermais, 2016). Internal determinants cover various financial ratios such as bank size, loan deposit ratio, capital adequacy, operational cost efficiency, non-interest income, and credit risk.

Therefore, academic researchers have shown considerable interest in assessing the profitability of private banks. The aim of this study is to identify the factors affecting private banks profitability and provide recommendations on areas requiring managerial focus.

1.2 Statement of the problem

Managing the financial sectors and reaping the benefits they bring to the economy is a difficult task that requires a profound comprehension of the factors that influencing financial performance. Ethiopia is still considered an under banked nation in the world, with a low degree of economic development contributions from the financial sector. There are 11,281 branches of banks in operation across a country in 2023(NBE, 2022/2023). The ratio of population to bank branch is recorded as 11,516 in 2021–2022 (NBE, 2021/2022). This demonstrates that Ethiopia is, in fact, a poorly banked nation with little outreach compared to financial institutions in other African and global countries. In order to effectively manage banking operations and ensure growth in profits and efficiency, it is crucial to investigate the factors that influence banks' performance (Abera, 2012).

Despite a number of reforms and liberalization initiatives, high concentration (low competition) and operational inefficiencies characterize Ethiopia's banking industry today, which is a stark indication of the industry's poor performance with notable disparities in service delivery, particularly to the nation's rural and lower-income population. According to Lisa (2007), these modifications are anticipated to have an impact on the sector's ownership structure, concentration, profitability, and overall performance in comparison to the conditions that existed before the reform phase.

The factors that determine banks performance have been discussed for number of years and are remain unanswered in the finance literature, despite the fact that numerous scholars have studied this topic. The factors that determine profit are flexible and depend on specific location of the business (Flamini et al., 2009). Because different countries have different political, financial, economic, and operating conditions, it is impossible to discover a universally agreed set of determinants that determine profitability of the private banks. Even though many previous studies contributed to the idea of profitability and clarified their own policy implications, there focus was mostly on developed economy, and Ethiopia and other developing nations largely ignored in the literature on this topic. As a result, a study's findings and conclusions from one country may not apply to another nation.

In most research projects conducted in Ethiopia, including those by, Elshaday (2018), Abdissa (2016), and Tewodros and Gedion (2019), the method of sampling primarily focuses on long-stay banks such as Dashen bank, Abyssinia bank, Awash bank, Nib International bank and cooperative bank of Oromia. However, those studies ignored the 50% of privately held commercial banks that were founded earlier and that still account for a sizeable section of the population.

According to the Financial stability report conducted by National Bank (NBE, 2024), the profitability of the financial sector, especially banks, decreased. The Return from shareholders equity capital decreases from 32.6% in 2022 to 25.7% in 2023 and return on assets decreases from 2.4% in 2022 to 2% in 2023. Investigate this decline in profitability measurements is also the primary aim of this research. There is still a lack of understanding regarding the factors that influence their profitability over time despite the significant role that privately held banks play in

Ethiopia's financial sector and their crucial contribution to economic growth. Therefore, the primary purpose of this research is to investigate the factors affecting profitability of privately owned commercial banks in Ethiopia from 2012 to 2023 using panel data analysis.

1.3 Research Question

The study specifically addresses the following questions:

1. What are the key internal factors that significantly influence the private commercial bank's profitability in Ethiopia over the period of 2012-2023?
2. What are the external factors that significantly influence the private commercial bank's profitability in Ethiopia over the period of 2012-2023?

By addressing these research questions, the study aims to provide insightful information into the determinant factors which drive profitability in privately owned banks. It also aims to offer evidence-based recommendations for policymakers, regulators, and bank management, with the goal of improving financial performance and ensuring sustainable growth in the banking sector.

1.4 Objectives of the Study

1.4.1 General Objective of the Study

The primary Objective of this study is to examine the factors affecting the profitability of private commercial banks in Ethiopia for the period 2012–2023.

1.4.2 Specific Objectives of the Study

The study specifically focuses on the following objectives:

1. To investigate how internal factors affect the profitability of private banks in Ethiopia.
2. To evaluate the effect of industry specific factor on the private commercial banks profitability in Ethiopia.
3. To analyze the effect of macro-economic factors on the privately owned commercial banks in Ethiopia.

1.5 Significance of the Study

The finding of the study will provide insightful, useful perspectives into the country's banking industry by specifically focusing on the Ethiopian private commercial banking context. It will give managers and shareholders a roadmap for assessing their bank's profitability in relation to internal, external, and industry-specific factors.

Additionally, the research will have significant policy implications by providing evidence-based recommendations for regulators and policymakers. By understanding the factors affecting profitability, regulators can design policies that promote a more competitive and efficient banking sector. Moreover, the study will advance to the academic literature by addressing the gap in research focused on the private commercial banks. It will also use as a reference for future studies, encouraging more research on banking profitability in different contexts and periods.

1.6 Scope of the Study

This research is aimed to examining the factors of profitability in private commercial banks of Ethiopia. Awash Bank (AB), Bank of Abyssinia (BOA), Dashen Bank (DB), Hibret (United) Bank(UB) Wogagen Bank (WB),), Nib International Bank (NIB), Zemen Bank (ZB), Cooperative Bank of Oromia (COOP), Lion (Anbesa) International Bank (LIB), Bunna Banks (BB), Berhan Bank (BIB), Abay Bank (AB), and Oromia Bank (ORB) were among the thirteen private banks that were taken into consideration in the study. The newly emerged private commercial banks that have joined the industry and are in operating for a minimum of thirteen years (2012-2023) were included. Due to the fact that Commercial Bank of Ethiopia is favored by the government and is very old and big compared to the private commercial banks, the study will exclude it, as well as the Development Bank of Ethiopia (DBE).

1.7 Limitation of the Study

This research paper used more financial-related variables than non-financial measure variables, which could have an impact and might require more investigation. The state of the economy and several non-modeled variables may have an impact on financial reporting in a span of twelve years. The study's samples, which were chosen according to the banks' ages, also had limitations.

This may not accurately assess the true impacts of the external and internal factors that influence private banks' performance.

1.8 Organizations of the Paper

The rest of the paper is organized as follows; the following chapter, chapter two reviews the related theoretical and empirical literature on factors of profitability. The third chapter is devoted to the study's methodology. Data analysis and interpretation was covered in the fourth chapter, and the final and fifth chapter was designed to incorporate conclusion and recommendation of the study.

CHAPTER TWO

THEORETICAL AND EMPIRICAL LITERATURE REVIEW

2.1 Theoretical Literature Review

This section covers the fundamental theoretical queries about banks, bank profitability, and its determinants. In an attempt to ascertain what drives commercial bank profitability, a number of theories have been investigated. Market power theory, efficiency theory, and the inverted u-curve hypothesis are some of the major theories examined in this research study.

2.1.1 Market power Theory

The market power hypothesis, as described in Tregena (2009), posits that a bank's performance is influenced by the market structure of the business firm. The Structure-Conduct-Performance (SCP) and the Relative Market Power (RMP) theories are two different approaches fall under the umbrella of Market power theory.

The SCP model states that the level of market concentration and competitive behavior within the industry are correlated. It suggests that the presence of barriers to entry is a key factor affecting a company's profitability. With higher entry costs, incumbent firms are better positioned to retain their monopolistic profits. According to this notion, the characteristics of the market structure, including the distribution of firm sizes and numbers within an industry, as well as barriers to entry, determine how firms operate and compete in the market. Increased market dominance leads to monopolistic profits. The interrelation of markets serves as the cornerstone of the Structure Conduct Performance model (SCPM). Market structure influences decision-making processes and performance outcomes for banks (Berger et al., 2004; Bikker & Spierdijk, 2017). Entities with greater market share may exhibit greater strength and capitalize on this advantage.

The Relative Market Power theory asserts that market share affect bank performance, in contrast to the SCP theory. According to this view, larger banks with unique product offerings are the ones capable of affecting prices and increasing profits. Their ability to exert market influence and generate noncompetitive profits is high (Tregenna, 2009). A specific type of SCP known as the Relative Market Power Hypothesis (RMPH) contends that banks with sizable market shares

and unique services can use their position to set pricing in a way that is not competitive in order to boost profits, especially through service charges (Berger, 1995).

2.1.2 The Efficiency Structure (ES) Theory

According to this theory of banks performance higher managerial efficiency leads to increased concentration and profits within commercial banks, providing crucial indicators of financial health. It suggests that banks with greater efficiency are likely to expand in size and market share because they can charge lower prices than their competitors while still remaining profitable. Furthermore, the theory indicates a positive correlation between concentration and profitability.

Moreover, banks that outperform their competitors in terms of efficiency are able to achieve higher profits. This theory suggests that larger banks possess superior production and management capabilities compared to smaller banks, enabling them to reduce operating expenses and thereby generate larger profits (Soana, 2011).

2.1.3 Inverted U-Curve Hypothesis

According to this bank performance hypothesis, profitability should rise initially when a bank grows larger, level off over time, and eventually begin to drop (Paula Kibathi, 2014). Because a large financial institutions have the ability to work with a wide variety of borrowers, which further lowers the projected cost of resolving information asymmetries. Profits are increased as a result of cost reductions. Or, to put it another way, economies of scale will be available to big banks. The opposing view is that a nonlinear link will be evident as bank profits begin to decline due to bureaucratic factors as the bank grows too big.

2.1.4 Measurements of Profitability

Return on Asset (ROA)

The return on assets is the most comprehensive and widely used measure of a bank's overall performance. ROA is a ratio of bank's after-tax profit and total assets. In simpler terms, ROA indicates how effectively a bank's management can extract value and make profit from its assets. It shows the profit per unit of assets and demonstrates how well the management has used the

bank financial asset and investment to turn a profit (Goyal et al., 2016). It takes into account both tangible and intangible assets listed on the balance sheet. However, as noted by Flamini et al. (2015), Nicolae et al. (2009), and Elsiefy (2013), ROA has a major drawback in that it ignores a bank's exposure to off-balance sheet items and the risks that come with them. This research chooses to utilize the return on asset as a proxy measure of bank profitability because it is an easy-to-use and widely-accepted metric, which is consistent with previous studies that looked at the factors influencing banks' profitability.

Return on Equity (ROE)

Return on Equity used as a measure of profitability and it illustrating the profit a company generates from shareholders' equity. According to Ommeren (2011), ROE reflects the efficiency with which bank management utilizes shareholders' funds. ROE measures the return to shareholders on their equity and is a ratio of income after tax and total equity capital of a bank. However, Flamini et al. (2009) observed that analyzing ROE overlooks financial leverage and its associated risks.

The net interest margin (NIM) is also used by many empirical researchers as a measure of bank performance (Kosmidoul, 2003). The net interest margin can be computed as the percentage of revenue assets (i.e., all bank assets that collect interest, including from loans and investments) less expense of banks from interest paid (i.e., the interest the bank owes to its depositors and creditors from borrowers). Income from loans and securities is referred to as interest income.

2.1.5 Determinants of Bank Profitability

There are two categories of determinants that affect commercial banks profitability: internal or bank specific and external factors. Internal determinants of bank performance are variables that are affected by management decisions and the bank's policy objectives (Wood and Staikouras, 2002). The factors that are not impacted by particular bank choices and policies but rather by uncontrollable external events beyond managements control are external determinants of commercial bank profitability.

2.1.5.1 Internal (Bank Specific) Factors of Bank Profitability

The most widely used metrics for determining bank profitability that are derived from financial statements include:

Bank Size

The majority of research uses total asset to illustrate how bank size affects profitability. Many banking industry researchers anticipate that bank size and profitability will positively correlate. According to Elshaday et al. (2018) and Moges (2017), larger banks have greater economies of scale and claim that there is a positive relationship between bank size and banks profitability. However, size may have a detrimental impact on banks that grow to be very big for bureaucratic and other reasons (Athanasoglou et al., 2005). Doa, Ngoa, and Phung's (2020) analysis concluded that the bank's size is not statistically significant and does not appear to have an impact on bank's performance. This could be because the amount of assets necessary for the banking procedure obscures the bank's profitability.

Loan Deposit Ratio

The possibility that a bank won't be able to finance growth in assets or lower liabilities on the asset creates liquidity. It is a situation when banks have fewer liquid assets and they are more vulnerable to massive deposit withdrawals. Liquidity risk, according to Saunders and Cornett (2008), is the situation that an asset cannot be converted into cash easily and with fewer costs. Bank advances are divided by total deposits to determine liquidity. The degree of profitability and liquidity were found to be negatively correlated by Al-Qudah et al. (2013). However, Samad (2015) discovered a significant positive relationship between bank liquidity and profitability. As a result, the link between liquidity and profitability is ambiguous.

Capital Adequacy

The quantity of bank equity needed to protect the bank from potential shocks is known as capital adequacy. A popular indicator of capital sufficiency is the equity to asset ratio, which reflects both financial risk and the bank's capacity to withstand losses. Because it shows the bank's financial health, capital is frequently considered as one of the factors determining bank

profitability (Athanasoglou, Brissimis and Delis, 2005). The bank level of safety, according to Aburime (2008), was attained by the greater capital requirements, which produced positive net earnings. Valentina, Flamini, McDonald, and Schumache (2009) used 389 sample banks to investigate the factors influencing the profitability of commercial banks in forty one Sub-Saharan African nations. They used indicators related to return on asset to calculate profitability. They found that it has a positive and significant effect on profitability. According to Tan (2015), the positive relationship between capital adequacy and bank profitability is expected to have a positive relationship due to having higher capital lower the cost of fund, increase the risk absorbing capacity and minimize bank's reliance on liability.

Credit Risk

Loans and advances whose credit quality has deteriorated so that full collection of principal and/or interest in compliance with the repayment period is in question and that are past due by more than 90 days considered as Non-Performing Loan according to NBE directive, SBB/43/2008. Several reasons contribute to loans becoming problem credits. NPLs simply represent the default risk inherent in a borrower's willingness and ability to repay all commitments. The National Bank of Ethiopia advises commercial banks to keep their non-performing assets (NPL) percentage below 5%.

According to some earlier research, non-performing loans may have a negative impact on profitability, or contribute to banks' inefficiency. Loans and advances constitute the primary operational domain of commercial banks, carrying a significant risk to the banks' ability to continue operating as a result of failing to take the necessary corrective action (Boru, 2014). According to Dang (2011), the bank's greatest risk is loan losses resulting from late loans.

Operational Cost Efficiency

Profitability can increase significantly and steadily when costs are reduced. Numerous evaluations have concurred that cost effectiveness is the main component influencing bank profitability. Prior research has demonstrated that profitability is significantly impacted by cost effectiveness (Garcia-Herrero, Gavilá, & Santabárbara, 2007). The ratio of operating expense to operating income is used as a measurement of operational cost efficiency management. According of the studies of Akbas, (2012), Artor (2017), Tewodros and Gedion (2019), and

Elshadey (2017), the higher the ratio of operating expense and operating income is an indicator of poor management ability in controlling operational expenses and which results lower profitability.

Non-Interest Income

Noninterest revenues include fees and commissions from non-cash loans and services provided by the bank. According to Flamini et al. (2009), the ratio of net interest revenues to other operational income is a negative and extremely significant predictor of diversification and profitability. Petria et al. (2015) used the ratio of noninterest income to total assets to test the impact of noninterest revenues and found a positive and significant relationship.

2.1.5.2 External Determinants of Bank Profitability

External determinants of profitability include macroeconomic and industry-specific data that management cannot control.

2.1.5.2.1 Industry Specific Factors

The banking industry's organizational structure has a significant impact on a bank's potential earnings.

Market Share

The market share variable is the ratio of the assets of a specific individual bank to the total assets of the entire bank in the industry (Dietrich & Wannenried, 2009). Ordinarily, a stronger competitive environment in the banking sector could lead to a negative correlation between market share and profitability, and this could result in a larger bank concentration. The SCP hypotheses have been applied in many studies by various researchers, and the results show that a positive relationship between market share and performance (measured by profits) exists.

Additionally, SCP acknowledged that there is a favorable correlation between market concentration and the performance (profitability) of banks with a high market share, despite the fact that small market share banks are less competitive than large market share banks (Berger and Hannan, 1989 and Goddard et al., 2004).

In highly concentrated markets, banks may apply levies and pricing that are less advantageous to customers due to reduced competition, as per the first perspective, often known as the SCP hypothesis. In light of this, the SCP hypothesis predicts that banks that operate in highly concentrated markets should profit more than those that do not. In a research on Ethiopia's banking industry, Belayneh (2011) found a strong negative correlation between Ethiopia's commercial banks' profitability and the country's diminishing market share.

2.1.5.2.2 Macro-Economic Factors

Macroeconomic factors that impact the operation and performance of banks are beyond management's control.

GDP growth rate

A bank's profitability is impacted by the GDP growth rate in a number of important ways. First off, during periods of faster GDP development, banks notice an increase in demand for loans as businesses prosper and consumers spend more money. Consequently, banks' profitability rises as a result of an increase in interest income from lending activities. Furthermore, a growing economy typically results in better loan quality since individuals and businesses have more income and are in better financial health, which lowers the number of loan defaults and lowers bank provisioning costs (Demirgüç-Kunt & Huizinga, 2010; Berger, Hasan, & Zhou, 2009).

The net interest margin (NIM) and interest rate spreads of banks are also impacted by GDP growth. When there is more competition for deposits during economic booms, deposit costs may raise if loan rates do not change proportionately. Nonetheless, during economic expansion, a stable deposit base brought about by heightened consumer and corporate confidence aids banks in maintaining a consistent source of funding, so bolstering their profitability (Debelle, 2004).

Increased profit through returns will subsequently boost bank profitability. Since GDP growth is a proxy for economic expansion, more bank profitability is expected as a result of it. Most past studies bolster the positive correlation between economic expansion and bank performance. Delis (2005) assert that the demand for bank assets is influenced by the trend of the GDP. In contrast to a recession, a boom period is anticipated to have a higher demand for loans.

Consequently, during economic downturns, the opposite may be true, with sales growing faster than costs and resulting in higher profits. However According to Staikouras and Wood (2004), bank profitability was negatively impacted by GDP growth.

Inflation

Private commercial banks' responses to inflation differ substantially depending on several criteria, such as their size, clientele, business model, geographical location, and risk control protocols. Larger banks benefit from diversified portfolios and economies of scale, which reduce inflation risk and enable them to more easily, absorb increased operating costs (Demirgüç-Kunt & Huizinga, 2010). Businesses can also better control financing expenses during inflationary periods since businesses have better access to capital markets. Conversely, smaller banks, which often serve specialized markets, are more vulnerable to inflation because of their limited access to capital markets and higher-than-average rise in operational expenses (Berger, Hasan, & Zhou, 2009).

Furthermore, banks' responses to inflation are greatly influenced by their risk management procedures, asset and liability structures, and other factors. While banks with fixed-rate loan portfolios may see a decline in margins when funding costs rise, those with well-diversified asset and liability management strategies can better withstand inflationary pressures (Stiroh, 2004).

Regarding the relationship between profitability and inflation, the findings are not entirely consistent. Numerous researchers have found that inflation negatively affects bank performance (Boyd & Champ, 2006; Cetin, 2019; Mbabazize et al., 2020). The exact opposite conclusion was put forth by Guru et al. (2002), Fadzlan (2009), Miguel et al. (2018), Gilbert and Jaya (2019), and Almansour et al. (2021). The inverse relationship between inflation and bank profitability showed how unexpectedly high rates of inflation deter saving and investment, which can be bad for bank earnings.

2.2 Empirical Literature Review

Many studies have been conducted on the profitability of the banking sector; the empirical studies on bank profitability will be analyzed in this subsection by being divided into two categories with a focus on developing nations outside of Ethiopia and empirical research carried out in Ethiopia specifically.

2.2.1 Review of Empirical Studies in Developing countries

Olweny and Shipho (2011) conducted a study using panel data to analyze the factors affecting the profitability of 38 commercial banks in Kenya between 2002 and 2008. Their research concluded that the profitability of these banks is predominantly driven by internal characteristics unique to each bank, rather than by external market forces. Their findings indicate that commercial banks that accomplish these objectives have a higher chance of being profitable: they seek to keep the proper level of liquid assets on hand, reduce operating expenses, improve asset quality by minimizing the proportion of loss loans and advances, and using revenue diversification strategies. According to their findings, a significant amount of Kenya's banking sector's profitability can be attributed to managerial decisions rather than outside market forces.

Pastory and Marobhe (2015) conducted a study using panel secondary data from 18 commercial Tanzanian banks as a sample, covering the years 2000-2011.The financial performance of Tanzanian banks is examined using the CAMEL model, which stands for capital adequacy, asset quality, management capability, earnings, liquidity, and sensitivity. The study's findings, which focused on both internal and external factors, demonstrated that macroeconomic variables (interest rate and inflation) as well as capital adequacy, liquidity, and asset quality are important elements that have been shown to have a statistically significant impact on return on asset (ROA) results.

Sufian et al. (2009) investigate the factors that affect bank profitability applying unbalanced panel of SSA commercial banks, a sample of 389 banks from 41 SSA nations, and data from 1998 in 2006. Based on this analysis, bank profitability was determined using return on assets (ROA). As opposed to this, independent variables included GDP growth, bank size, market power, capital, credit risk, and mixed activity. The study's findings indicated that

macroeconomic factors also have an impact on bank returns, with larger banks and more diversified operations being linked to higher returns on assets. The study also implies that credit expansion might be enhanced by macroeconomic policies that support steady production growth and low inflation. The idea of implementing higher capital requirements in the region to create better financial stability is also supported by the report.

Using data from 2000 to 2007, Kiyota (2009) examined the profitability and efficiency of commercial banks in 29 Sub-Saharan African nations. During the pre-crisis period (2004–2007), the analysis discovered a statistically significant negative association between the profit efficiency of Non-SSA international banks and three variables: the return on average equity, equity to net loans, and net loans to total assets.

Bennaceur and Goaied (2008) analyze how bank specific variables, macroeconomic variables, and financial structure affected Tunisian banks' net-interest margin and profitability from 1980 to 2000. They applied econometric techniques of the fixed effect and random effect models. Banks with more capital and higher overhead expenses tend to have better net interest margins and profitability. However, Bank size has a negative effect on Tunisian banks' profitability. The analysis indicates a positive relationship between stock market trends and bank profitability during the studied period. The research indicates that there is no major impact of macroeconomic conditions on the profitability of banks in Tunisia.

Abel and Le Roux (2016) investigated the variables influencing the profitability of Zimbabwe's banking industry between 2009 and 2014. Overall, the study's findings revealed that banking sector profitability in Zimbabwe is mostly determined by bank-specific characteristics. This study's findings indicate that bank-level management characteristics influence banking sector profitability. This discovery is crucial for suggesting suitable measures to bank executives for enhancing the financial industry's profitability. In addition to having effective cost control, the authors contended that banks with higher levels of capital, comparatively more liquid assets, and a lower percentage of non-performing loans are more profitable. According to the authors' findings, raising asset quality, enhancing cost control, and boosting liquidity can all boost the banking industry's profitability in Zimbabwe.

Ali et al. (2011) examined the variables influencing public and private commercial banks in Pakistan's profitability between 2006 and 2009. They used return on equity and return on assets to gauge profitability. The analysis took into account macroeconomic factors like GDP growth rate and consumer price inflation in addition to bank-specific factors including size, operating efficiency, capital adequacy, credit risk, asset management, and portfolio management. The findings, ascertained using the least square estimator, demonstrated that asset management and economic expansion have a substantial impact on Pakistani banks' profitability.

2.2.2 Review of Empirical Researches Conducted in Ethiopia

In this section, relevant empirical research carried out in Ethiopia throughout various time periods are reviewed in detail.

According to Boru's (2014) study, which used both descriptive and econometric methodologies to investigate the factors that influenced Ethiopian banks' performance between 1990 and 2012, bank-specific variables accounted for a significant variation in profitability. However, macroeconomic factors like real GDP growth rate have little effect on the profitability of banks. The performance of the bank has been proven to be significantly impacted by inflation, one of the external determining factors. In order to explain profitability, the capital adequacy ratio and the total loan and advance to deposit ratio were not very important. The ratio of non-interest income to gross income, which is used to compute income from service charges and commissions, has positive effects on profitability. On the other hand, there was a significant negative effect observed between profitability and the non-interest expense ratio.

Alemu (2015) examined the variables that predicted the profitability of eight Ethiopian banks between 2002 and 2013. The study used multiple linear regressions and fixed-effect regressions to analyze the data. The study found a statistically significant negative correlation between profitability and funding costs, liquidity risk, operational efficiency, and banking sector development. The final finding is that there is a significant and statistically significant relationship between bank profitability and bank size, capital adequacy, and GDP growth rate of the country.

Birhanu (2012) examined the effect of macroeconomic and bank specific factors on Ethiopian financial banks' profitability between 2000 and 2011 using OLS estimation method. The study utilized net interest margin profitability proxy. The result shows that every factor specific to a bank has a significant positive effect on profitability, except bank's size, control over expenses, and credit risk. However, of the macroeconomic variables, GDP increased the bank's interest margin and asset return the most, while interest rate policy only had a positive effect on interest margin.

Samuel (2015) investigated the variables affecting Ethiopian commercial banks' profitability using panel data from eight commercial banks covering the years 2002 to 2013. The study employed a mixed research strategy, and several linear regression models were utilized to examine secondary financial data in order to calculate Return on Asset (ROA), a measure of bank profitability. The study's conclusions showed a statistically significant negative relationship between bank profitability and operational cost efficiency, liquidity risk, and banking sector development. Additionally, there was no statistically significant correlation between employee, management, inflation, and foreign exchange rate efficiency.

Melaku (2016) investigated the variables impacting bank profitability in private banks of Ethiopia using audited financial statements of six sampled private commercial banks for the years 2004 to 2011 and the National Bank of Ethiopia. The investigation of variables including labor productivity, overhead, liquidity, and market share that other researchers had overlooked was one of the study's novel characteristics. Return on assets (ROA) was the proxy profitability variable employed in the study. An econometrics model, more especially fixed effects estimates, and descriptive statistics were both employed to investigate the connections between the dependent and independent variables. The main findings of the study show that characteristics specific to individual banks affected profitability more than variables derived from other sources. On the other hand, bank-specific drivers of profitability are negatively connected with credit risk and cost efficiency. The size of a bank's assets, capitalization, worker productivity, liquidity, and non-interest revenue are all favorably and significantly connected with the bank's profitability.

The factors influencing Ethiopia's commercial banks' profitability were examined in a study done by Amdemikael (2012). A balanced panel of data covering the years 2001–2011 was provided by eight commercial banks in Ethiopia for the study. In order to investigate the influence of various internal and external factors on key profitability indicators, the study uses documentary analysis with comprehensive interviews. The study found that a statistically significant and positive relationship between bank profitability and capital strength, non-interest income, the size of bank, and GDP growth rate. However, determinant factors like asset quality and operational cost efficiency have a statistically significant negative correlation with profitability of banks. On the other hand, inflation, concentration, and liquidity risk have insignificant effect on profitability of Ethiopian commercial banks.

Tesfaye (2014)'s study looks at the variables that affect profitability of banks by considering both external and bank-specific factors between 1990 and 2012. The empirical study uses Return on Assets (ROA), an accounting statistic, to assess the institutions' performance. He comes to the conclusion that factors unique to particular banks account for the majority of the difference among banks profitability. High performance in banks requires the ability to limit overhead expenses, diversify revenue streams by introducing non-traditional banking services, and manage credit risk. The study also showed that a bank's capital and liquidity situation had no appreciable impact on its overall performance. However, he discovered that there is no substantial correlation between the size of a bank and macroeconomic factors like real GDP growth rates and bank profitability except inflation rate, which a researcher found to be a significant driver of Ethiopian banks' profitability.

Dawit (2017) claims that the factors influencing bank profitability in Ethiopian private banks were determined using the 2005–2015 audited financial statements of six selected private commercial banks. The profitability of Ethiopia's private commercial banks is influenced by both internal and external factors. The study used Return on Asset as the measurement of profitability and GDP, inflation, money supply, income diversification, concentration, capital sufficiency, and operational efficiency as the independent variables. The empirical findings demonstrate a strong relationship between Ethiopian private commercial banks' capital, money supply, income diversity, operational efficiency, concentration, and profitability. The findings, however, indicate

a very poor correlation between GDP, inflation, and liquidity and commercial banks' profitability in Ethiopia.

2.3 Summary and Gap in Literature

Profitability is essential for all businesses, but it is particularly important for the banking industry because banks' stability depends on it. The profitability of commercial banks is directly linked to the health of the national economy as a whole. This is supported by the aforementioned empirical review. However, the majority of previous researches investigating the factors affecting profitability of bank have predominantly focused on countries with developed economies (Kosmidou and Zopounidis, 2008; Athanasoglou et al., 2007; Albertazzi and Gambacorta, 2008). Because of the stark differences in the financial, political, regulatory, and economic environments between emerging and developed nations, their conclusions might not be easily applied there. Therefore, studies that are specific to Ethiopian banks' particular setting and explain how they affect profitability are required.

Studies by Belayneh (2011), Abebaw and Kapuer (2011), and Tesahle (2011) analyzed bank profitability determinants in Ethiopia, encompassing both government-owned and privately held banks. According to financial stability report (NBE, 2024), Commercial Bank of Ethiopia(CBE) constituted 49.5% and 48.7% percent of the whole banking sector total assets and deposits respectively at end of June 2023. Its total capital also accounted for over a quarter (27.5 percent) of the total. Failure to differentiate between these entities could introduce biases in conclusions and policy recommendations, given potential differences in financial performance metrics. Therefore, this study exclusively focuses on privately owned commercial banks to address this gap.

Much of the existing literature focuses on analyzing the determinants of bank profitability using short-term data panels. However, this approach often leads to inconsistent findings among different studies (Kanella et al., 2021, De Haan and Poghosyan, 2012). Numerous of the evaluated researches are short-term or based on data from a few years only. This means that a lot of observations gathered over a long period of time may be included in these researches. In addition, a significant number of private banks will be involved, deviating from earlier study

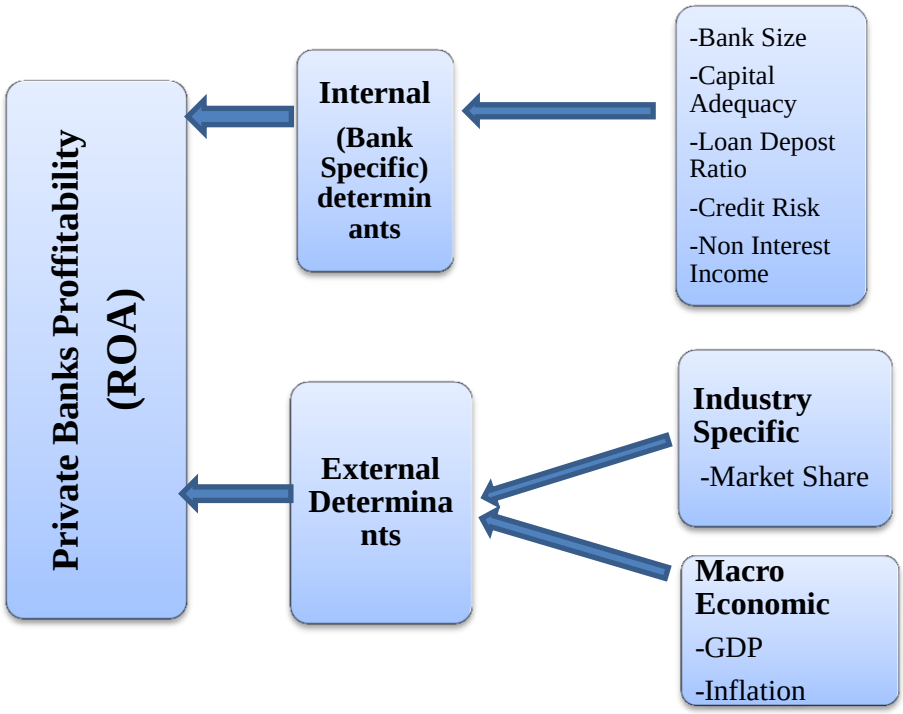
approaches that depended on quantitative methods and few observations to guarantee the robustness of findings considering the time-varying volatility of our variables.

Addressing these gaps would contribute to a more robust understanding of the factors of bank profitability in Ethiopia and other developing economies, thereby informing policymakers, regulators and industry stakeholders about strategies to enhance the resilience and sustainability of the banking sector in Ethiopia.

2.5 Conceptual Framework

Various empirical findings indicated that internal and external factors influence the profitability of financial institutions, particularly banks. The size of the bank, loan deposit ratio, capital adequacy, operational cost efficiency, and Credit risk are among the internal determinants. The Market share is an industry-specific factor that influence bank profitability. GDP growth rate and inflation level are macro economic factors. The return on assets (ROA) is used as a measure of banks profitability. The researcher created the conceptual framework below to condense the primary objective and scope of this study into terms of dependent and independent variables, drawing from the previously indicated literature evaluation.

Figure 1**: Relation Between private banks profitability and its detrminants**



Source: *Adapted from the reviewed literatures.*

CHAPTER THREE

RESEARCH METHODOLOGY

The research methods employed for this study are covered in this chapter. The subjects that will be covered are research design, data collection and sources and methods, target population, data analysis techniques, definition of variables, and model specification.

3.1 Research Design

The researcher intends to employ an explanatory research design in accordance with the study's objectives. The rationale behind this decision is that explanatory research method is useful especially when a study needs to measure the cause and effect relationships between dependent and independent variables. This study also adopted quantitative research approach to see the relationship between the profitability of private commercial banks and the factors affecting profitability in Ethiopia.

3.2 Sources and Methods of Data Collection

In order to conduct the investigation, the researcher gathered secondary data from the audited annual financial reports of sampled banks and the National Bank of Ethiopia annual report. Consequently, the major secondary data for the research was collected from the financial statements of the participating banks, while we used the National Bank of Ethiopia (NBE) for macroeconomic data. The STATA software was used to examine the data that had been gathered.

3.3 Study Population and Sampling Design

The research population included all of Ethiopia's active private commercial banks. This study used a non-probabilistic sample strategy, using one of the non-probability sampling methods, which is purposive sampling. According to Brynjolfsson (2009), purposeful sampling is frequently utilized in circumstances involving limited samples with the goal of choosing examples that provide the most pertinent information. To implement purposive sampling, the researcher assessed the availability of complete data for the selected time period. Additionally, factors such as the size of the banks and their years of operational experience were taken into

consideration by the study. These banks are assumed to represent other private banks operating in Ethiopia. Among all the privately owned banks, thirteen of them aged more than Twelve years. These banks are: Awash Bank (AB), Hibret (United) Bank (UB), Dashen Bank (DB), Wegagen Bank (WB), Bank of Abyssinia (BOA), Nib International Bank (NIB), Zemen Bank (ZB), Lion (Anbesa) International Bank (LIB), and Cooperative Bank of Oromia (COOP), Bunna Bank (BB), Abay Bank (AB), Berhan International Bank (BIB), and Oromia (OB) Bank. This study excludes private commercial banks that have not been in operation for twelve years in order to maintain balanced panel data for twelve years.

3.4 Method of Data Analysis

To investigate the presented hypotheses, this study was employed data analysis methods such as econometrics, correlation, and descriptive analysis. According to Kothari (2004), descriptive statistical techniques aid researchers in formulating specific hypotheses based on raw data and to investigate the mean, median, standard deviation, minimum, and maximum values. STATA software was utilized for secondary data analysis. Additionally, variables for the econometric model were chosen and multicollinearity was examined using correlation analysis. For every bank in the sample, correlation matrices and descriptive statistics were calculated prior to any data alterations.

The researcher used panel data and a number of econometric tools to examine the variables influencing the profitability of private commercial banks in Ethiopia. A panel regression analysis offers the benefit of providing more meaningful data since it includes time series information that records dynamic adjustment, as well as cross-sectional information that shows individual variability (Brooks, 2008). In order to account for random fluctuations and control for specific bank features, respectively, the Fixed Effects Model (FEM) and Random Effects Model (REM) will be the primary econometric models utilized.

3.5 Variables Definition and Measurements

3.5.1 Dependent Variable

Return on Asset (ROA) is a ratio of net income generated and the total assets of each bank. The ROA illustrates the bank's profitability and how management effectively uses the resources of the bank to produce profitability. In several research, including Ben and Hamza (2015), Alshatti (2015), Elgadi (2016), Al-Rdaydeh et al. (2017), Amaliah and Hassan (2019), Menacer et al. (2019), Abbas et al. (2019), this ratio is often utilized as an indicator of banks' financial performance. For this study, ROA is used above other alternative metrics of bank profitability because of its wide range of applications in evaluating profitability and financial performance.

3.5.2 Independent Variables

Internal Factors (Bank Specific Variables)

- **Capital Adequacy Ratio**: It represents the proportion of capital that a bank must retain to absorb losses stemming from statutory capital mandates. It acts as a safeguard against business losses (Munteanu, 2012). The association between CAR and banks is noteworthy, as banks with lower liquidity requirements typically exhibit higher CAR. This enables banks to stabilize and rebound from unforeseen disruptions. The overall safety and soundness of the financial institution is indicated by the ratio of total equity to total asset. A significant correlation between capital and bank profitability has been found in previous study (Anwar et al., 2011; Berger, 1995; Bashir, 2003).
- **Bank Size (BS):** Bank size has been quantified by computing the natural logarithm of total assets. The study incorporated the natural logarithm of total assets of banks to account for this potential non-linear relationship and to mitigate the influence of scale effects. Elsahday et al. (2018), Menicucci & Paolucci (2016), and Moges (2017) assert that economies of scale, increased production, and the possibility of loan diversification are advantageous for larger banks. Large scale banks will therefore probably have lower unit expenses than smaller banks and a better profitability ratio.
- **Loan Deposit Ratio (LDR):** This indicator shows what proportions of a bank’s loans are funded by deposits. Liquidity is measured by a bank's advances to deposits ratio.

Profitability and liquidity levels were found to be negatively correlated by Al-Qudah et al. (2013). Nonetheless, Samad (2015) discovered a strong correlation between bank profitability and liquidity. As a result, the relationship between liquidity and profitability remains unclear. Liquidity is also adversely impacted by an increase in the loan-to-deposit ratio (total outstanding loan plus bonds and securities / total deposit). A loan to deposit ratio of less than 90% is required by the NBE.

- **Credit Risk (CR):** The ratio of all non-performing loans to total assets is used to calculate the credit risk ratio. Rahman (2015) states that the credit risk ratio significantly and favorably affects bank profitability. Boru (2014) looked into the possible risk that and loans and advances could represent to the viability of the banks because of insufficient use and supervision.
- **Operational Cost Efficiency (OCE):** The operational expense to operating income is frequently used to gauge the managerial effectiveness of banks. To enhance profitability in banking, it is recommended to minimize the cost-efficiency ratio. This is because there is an expected negative correlation between operating costs and profitability. Elevated operating costs result in reduced profits, whereas lower operating costs tend to lead to higher profits. According to Molyneux and Thornton (1992) and Indranarain (2009), a bank's profitability increases with its level of efficiency. Thus, a favorable correlation between bank profitability and efficiency is anticipated.
- **Non- Interest Income (NII)**: The noninterest income to total assets of each bank (NII) ratio was another internal bank specific factor that affects bank profitability. This ratio showed the percentage of total income that a bank makes from fee-based sources other than interest. The primary source of non-interest income for banks is fees, which include transaction and deposit costs, insufficient funds, penalties, annual fees, monthly account service fees, inactivity fees; check and deposit slip fees, and so on.

External Factors

Industry-Specific Factor

- **Market Share (MRS):** The size and distribution of banks within a particular market or nation are assessed by this metric. The ratio of each bank's total assets to the total assets of all banks determines its market share. Studies of (Berger, 1995; Eichengreen &

Gibson, 2001 as referenced in Francis, 2006) show a direct correlation between market share and bank profitability.

Macro-Economic Factors

- **GDP growth rate:** This is determined by the actual yearly GDP growth rate of a countries economy and is anticipated to have a favorable effect on banking profitability. In times of economic boom, there is typically high demand for credit compared to periods of recession (Athanasoglou et al., 2005; Belayneh, 2011; Andreas and Gabrielle, 2009; and Athanasoglou et al., 2008). Therefore, it is expected that bank profitability and GDP will positively correlate.
- **Inflation**: Inflation is a decrease in the purchasing power of currency results from an increase in the general level of prices for goods and services, which is known as inflation (INF). Belayneh (2011) asserts that a high rate of inflation is linked to both higher income and higher costs. Profitability is predicted to benefit from inflation if a bank's revenue increases faster than its expenses. Conversely, when expenses outpace revenue, a negative coefficient is anticipated.

Table 3.1: Description of Dependent and Independent Variables

	Variables	**Measurement**	**Notation**	**Expected relation**
Dependent Variable	Return On Asset	Profit after tax/Total Asset	ROA	-
	Capital Adequacy Ratio	Total equity/Total asset	CA	Positive
	Bank Size	Natural Logarithm of total asset	BS	Positive
	Loan Deposit Ratio	Total loan and Advance/Total deposit	LDR	Negative
	Credit Risk	Non-performing loan/Total Asset	CR	Negative
	Operational Cost Efficiency Ratio	Total operating expense/Total operating income	OCE	Negative
	Non-Interest Income	The ratio of non-interest revenue and Total Asset	NII	Positive

External Variables	Industry specific variable	Market Share	A ratio of total assets of a bank and total industry assets	MRS	Positive
	Macro-economic variable	GDP growth rate	The Annual GDP growth rate	GDP	Positive
		Inflation	Annual Inflation Rate (%)	INF	Negative

3.6. Model Specification

Forecasting and establishing causal connections between variables are achieved through regression analysis, as outlined by Gujarati (2004). Brooks (2008) explains regression as a method to elucidate alterations in one variable by juxtaposing it with changes in another variable. In order to achieve the goals of the study, the researcher employed a panel regression method of the random effect model. Additionally, the balanced panel approach is adopted, guaranteeing that every cross-sectional unit receives equal time for in-depth observation.

The model utilized in this analysis was taken from the study of Artor (2017), Moges (2017), Abebaw (2021) and Elshaday et al. (2018), which looked at factors influencing commercial banks' profitability.

$$\Pi_{it} = \alpha + \beta X_{it} + \varepsilon_{it} = \sum \beta_k X_{it}^{n} + \varepsilon_{it} \qquad \text{(I)}$$

$$\Pi_{it} = \sum_{b=1}^{b} \beta_b X_{it}^{b} + \sum_{d=1}^{d} \beta_d X_{it}^{d} + \sum_{m=1}^{m} \beta_m X_{it}^{m} + \varepsilon_{it}$$

Where Πit is the proxy for measuring profitability, α is the intercept term, β is parameters analyzed on the explanatory variables, and X_{it} is a vector of observations on the independent variables. The cross-section is indicated by the subscript i=1...13, while the time series dimension is indicated by t=1…12. X_{it}^{b} , X_{it}^{d} and X_{it}^{m} is bank related factors, industry specific factors, and macroeconomic factors that determines the dependent variable.

Extending the above equation will provide our regression model as follows:

$$\prod_{it} = \beta_1(CA)_{it}+\beta_2(LNBS)_{it}+\beta_3(LDR)_{it}+\beta_4(CR)_{it}+\beta_5(OCR)_{it}+\beta_6(NII)_{it}\ \beta_7(MRS)_{it}+\beta_8(GDP)_{it}$$

$$+\beta_9(INF)_{it}+\varepsilon_{it} \quad \text{(II)}$$

$$ROA_{it} = \beta_1(CA)_{it}+\beta_2(LNBS)_{it}+\beta_3(LDR)_{it}+\beta_4(CR)_{it}+\beta_5(OCR)_{it}\beta_6(NII)_{it}+\beta_7(MRS)_{it}+\beta_8(GDP)_{it}$$

$$+\beta_9(INF)_{it}+\varepsilon_{it} \quad \text{(III)}$$

Where:

ROA_{it} = Profitability of a bank at year t.

CA_{it} = Capital Adequacy ratio of a bank at year t.

$LNBS_{it}$ = Natural logarithm of Total Asset of bank a bank at year t

LDR_{it} = Loan Deposit Ratio of a bank at year t.

CR_{it}= Credit Risk ratio of a bank at year t.

OCR_{it} = Operating Cost to Operating Income ratio of a bank at year t.

MRS_{it}=Market Share of i_{th} bank at year t

GDP_{it}= Gross Domestic Product of country at year t.

INF_{it}= Inflation Rate of a country at year t.

ε_{it} = disturbance or error term

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

This chapter covers the research findings, including the descriptive statistics of the variables, the correlation results between the independent and dependent variables, the diagnosis test of the models, and the regression analysis of the models.

4.1 Descriptive statistics of variables

This section displays the findings from the descriptive statistics for nine independent variables and one dependent variable. Researchers can gain a better knowledge of the major elements influencing the financial performance of the sample banks by examining these statistics to find patterns and trends that affect profitability. The table (4.1) displays the mean, median, standard deviation, minimum and maximum values for every variable. Thirteen private commercial banks had a total of 156 observations given for the years 2012–2023.

Table 4.1 Summary of Descriptive Statistics for dependent and Independent Variables

Variable	Observations	Mean	Median	Std.Dev.	Minimum	Maximum
ROA	156	0.025	0.0245	0.008	0.027	0.049
BS*	156	23.645	23.717	1.111	20.936	26.135
CA	156	0.141	0.131	0.095	0.013	1.264
LDR	156	0.690	0.674	0.128	0.430	1.044
CR	156	0.031	0.150	0.067	0.000	0.745
OCE	156	0.546	0.555	0.130	0.208	0.982
NII	156	0.022	0.019	0.022	0.002	0.265
MRS	156	0.135	0.132	0.028	0.062	0.213
GDP	156	0.081	0.085	0.019	0.053	0.106
INF	156	0.171	0.148	0.091	0.066	0.339

Source: Own computation from Stata 14 software

The average return on assets (ROA) of the sampled private commercial banks was 2.5%, with a maximum of 4.9% and a minimum of 2.7%, as seen in table 4.1 above. This suggests that, over the years 2012–2023, an investment of one birr in the entire assets of private banks will yield an

average return after taxes of birr 2.5. Additionally, this shows that during the past ten years, Ethiopian private commercial banks have averaged positive profits. During the study period, there was a moderate dispersion in how private commercial banks used their real and financial assets to produce profits, as seen by the 0.08% standard deviation of ROA. The outcome thus indicates that in order to maximize the return on their assets, these institutions must maximize how they use them.

The mean value of the capital adequacy ratio, which is determined by dividing equity capital by total assets, is 14.1%. In this study, the sampled private commercial banks used equity capital to fund 14.1% of their total fund needs. The ratio also has a minimum and maximum value of 0.013 and 1.264 respectively with the 9.5% standard deviation. Because a bank with a higher capital adequacy ratio has more equity capital than assets, it can withstand possible losses and is therefore in a stronger financial position. A lower ratio, on the other hand, might indicate a greater chance of insolvency.

Bank size which is defined by logarithm of total asset has a maximum and the minimum value of 20.936 billion and 26.135 billion respectively. The mean value was 23.64 billion. The typical division shown in with a value of birr 1.11 billion implies that there is a considerable disparity between the biggest bank and the little bank's total asset. The profitability of a bank rises with its size; larger banks enjoy advantages such as greater market share, stronger competitiveness, and superior financial scope.

The Loan deposit ratio (LDR), a measures banks' capacity to withstand strain by expanding lending, has a mean value of 6.9%. This indicates that there were more volatile deposits associated with illiquid loans in private commercial banks. The standard deviation of 12.8 percent indicates a little dispersion of loan to deposit (LTD) values among banks with respect to their mean value. The loan to deposit ratio had a minimum and maximum value of 43% and 104.4% respectively. A loan to deposit ratio of less than 90% is required by the NBE. An extremely high loan-to-deposit ratio indicates that almost all depositor funds are held by borrowers rather than being liquid assets, which in the event of adverse events could result in a liquidity issue.

Credit risk (CR), a measure of the bank's asset quality, is calculated by dividing the total assets by non-performing loan and advances. A higher ratio denotes a higher credit risk, which is detrimental to the operations and well-being of the bank. The mean credit risk ratio for private commercial banks, as shown in the table above, was 0.031, with maximum and minimum values of 0 and 0.74, respectively. Some banks saw this high percentage throughout the last five years of political instability and civil war in the country's northern regions. The minimal value of credit risk was zero, indicating that the asset quality for these banks is strong; with a 6.7 percent difference between high and low quality assets. The mean value indicates that an average of 3.1% of the total loan and advance given by private commercial banks were bad loans that defaulted or went uncollected throughout the sample period.

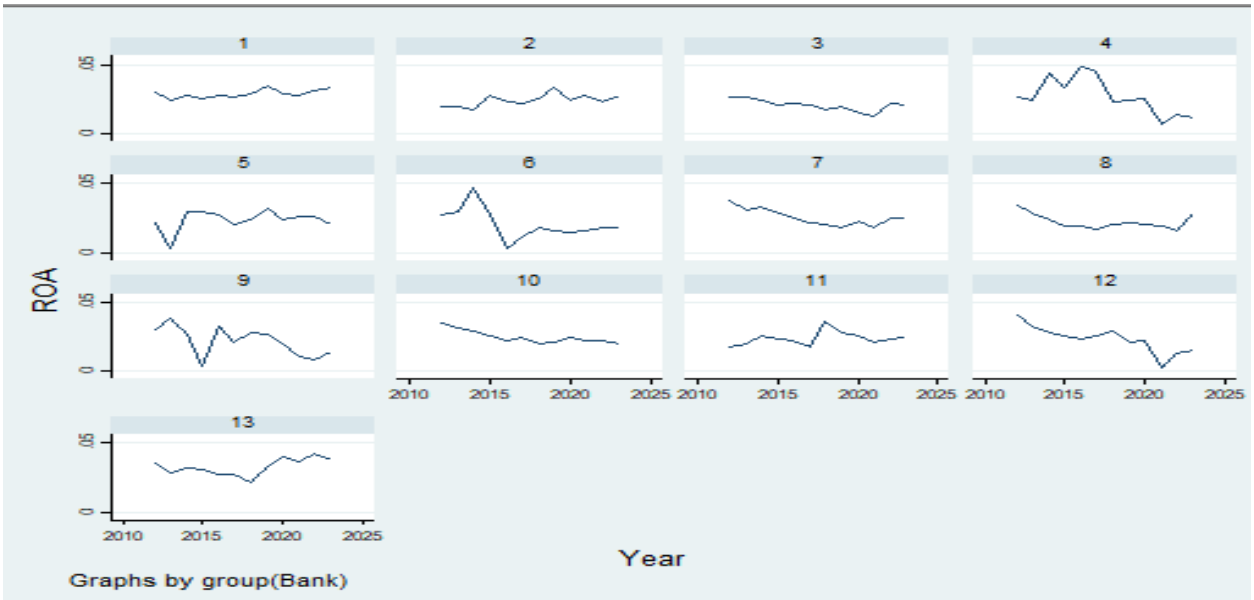
The operational cost efficiency ratio (OCE) is a measure of how efficiently a business is using its operating resources to generate income. It is computed as the operational income to operating expense ratio. As shown in the above table, the ability of management to control costs ranges from a minimum of 20.8% to a maximum of 98.2%. The mean value of 0.545 indicates that most sampled private commercial banks incurred 54.5% operating expense out of the gross operating income generated per a specific period. A low operating efficiency ratio indicates that the management's contribution to cost control is a high level of efficiency and raises profitability. The maximum ratio of 98.2% indicates that with a specified year of operation a private commercial bank have incurred the highest operating expense and that bank is the most inefficient. The operating cost efficiency ratio's standard deviation, which was 13.08%, demonstrates the variance in how different banks used their resources and used management's capacity for cost control throughout the research period.

The non-interest income (NII), which is calculated as the ratio of non-interest revenue to total asset, has a mean value of 0.022. This means that, for the private banks in the sample, 2.2 percent of their total asset value comes from non-interest sources on average. The standard deviation value of 2.2 percent suggests that non-interest income ratio varies significantly across different private banks. The minimum and maximum value of non-interest income was 0.2% and 25.6% respectively. This implies that there were private banks for which non-interest income makes up 0.2 percent of their total asset and also some banks have a 25.6% of total asset generating income from non-interest income

Market share (MRS) is the percentage of a bank's total assets to the industry's total assets over a specific time period. Industry structural variable is the name given to this variable. 13.5% was the average figure, with 2.8% standard deviations. The result ranges in minimum and highest values from 6.2% to 21.3. The findings indicated that there were significant differences between banks in terms of their ability to control market share over the course of the research. From the sampled private banks in the study period, the smallest bank has a minimum value of 6.2 % market share, while the most concentrated bank has a maximum value of 21.3 % market share. This demonstrates the variation in market share amongst banks with respect to their ability to control market share during the past twelve years in Ethiopia's private commercial banks.

Ethiopia's GDP has increased by 8.09% on average during the last thirteen years, with a peak growth rate of 10.5% and a lowest growth rate of 5.31%. In addition, the Standard deviation of 1.92 indicates a somewhat erratic economic growth rate. The chance of positive turnover in the activities of private commercial banks is high when the macroeconomic climate is favorable, and vice versa. Inflation, which has a mean value of 17.06% and a standard deviation of 91.13, is the other macroeconomic indicator that affects how profitable private banks are. The lowest and largest percentages, recorded in the years 2022 and 2016, were 6.62% and 33.88%, respectively. Due to a lack of foreign currency reserves, the country's current inflation rate increase is correlated with currency devaluation. The presence of political instability and civil war for the last three years also negatively affect the countries growth rate; limit the productivity and tradability of agricultural consumed products which in turn aggravated the inflation.

Figure 2: Trend of Return on Asset



The graph illustrates the Return on Assets (ROA) for thirteen private banks over twelve years. Most banks show fluctuations in their ROA, with several experiencing notable trends. Banks 1, 2, and 13 exhibits relatively stable ROA with minor fluctuations. Banks 3, 7, 8, 10, and 12 display a general declining trend, with Bank 8 and 12 having more pronounced drops, especially around 2020. Banks 4, 5, 6, 9, and 11 show peaks and subsequent declines, particularly around mid-2010s, with Bank 9 and 12 having sharp declines in specific years. Overall, the data indicates varied profitability trends, with many banks facing challenges in maintaining consistent ROA over the period.

4.2 Correlation Analysis

Correlation analysis entails analyzing correlations between variables throughout time across various entities (Wooldridge, 2010). It shows the linear relationship between variables. The Pearson correlation coefficient is the most frequently used method of correlation analysis. In order to investigate the correlation between variables used in this study, correlation coefficients were calculated and displayed using a correlation matrix in Tab. 4.3 below.

Table 4-1 Pairwise correlations between the variables

Variables	ROA	BS	CA	LDR	CR	OCE	MOB	INF	GDP	NII
ROA	1.000									
BS	-0.179*	1.000								
CA	-0.073	-0.227*	1.000							
LDR	-0.246*	0.693*	0.060	1.000						
CR	-0.317*	-0.172*	0.826*	0.156	1.000					
OCE	-0.290*	-0.032	0.068	0.128	0.150	1.000				
MRS	0.366*	-0.577*	0.223*	-0.240*	0.038	0.044	1.000			
INF	-0.179*	0.558*	0.046	0.708*	0.123	0.003	-0.181*	1.000		
GDP	0.239*	-0.692*	-0.043	-0.722*	-0.111	0.022	0.283*	-0.864*	1.000	
NII	0.003	-0.324*	0.908*	-0.010	0.780*	0.105	0.180*	0.002	0.022	1.000

p<0.05 *Source: Author's calculation from STATA (14)*

The dependent variable, ROA, has a positive association with GDP, non-interest income (NII), and market share (MRS), as can be seen in the correlation matrix analysis table above. ROA had a positive significant correlation with GDP and market share (MRS). Non-interest income had a positive but insignificant correlation with Return on Asset.

The result also portrays that there was a significant negative linear relationship between rerun on Asset (ROA) and liquidity ratio (LDR), operational cost efficiency (OCE), capital adequacy (CA), credit risk (CR) and inflation (INF). This means that as the value of OCE, LDR, CA, CR and INF increases, bank profitability decreases. The correlation between ROA and capital adequacy (CA) is negatively insignificant at 0.05 implies that the relationship is not strong enough to detect with the given sample size.

4.3 Diagnostic tests

The diagnostic tests listed below were performed to check that the study's goal was met and that the method used met the classical linear regression model (CLRM) assumptions. As stated by Gujarati (2004) and Studenmund (2014), when the Ordinary Least Squares approach satisfies the CLRM assumptions, it becomes the Best Linear Unbiased Estimators (BLUE). The classical

assumptions underlying the OLS model are tested to ensure that the model's properties and the proposed variables in equation of this study do not violate any of them. Furthermore; model specification tests were performed to determine the best fit for the data among random and fixed effects models.

4.3.1 Heteroscedastic Test

The heteroscedasticity of the efficiency model has been assessed in order to verify the accuracy of the standard errors and the reliability of the conclusions. It is assumed that the error terms display homoscedasticity, or constant variance. The null hypothesis is that the errors are homoscedastic. This was tested using the Breusch-Pagan-Godfrey test, which was performed to ensure that the assumption is true and that the p-value is greater than 0.05 in order for the null hypothesis to be accepted.

Table 4-2 Breusch-Pagan / Cook-Weisberg test for heteroscedasticity

$Chi^2(1)$	Prob > chi2	Decision
1.11	**0.2910**	**Do not reject H0**

Source: *researchers' computation of stata (14)*

4.3.2 Autocorrelation Test

The autocorrelation diagnostic test is run under the presumption that there is no correlation between the error terms. The errors would be described as "auto correlated" or "serially correlated" if they are not uncorrelated with one another. According to Boorks (2008), the most popular methods for testing this assumption are the Woodridge autocorrelation test, the Breusch-Godfrey test, and the Durbin-Watson test.

In this study the researcher applied the Woodridge test to detect the problem of autocorrelation. We can determine that we cannot reject the null hypothesis because the p-value is bigger than the 5% significant level (see table 4.4 below) and the residuals show no evidence of autocorrelation.

Table 4-3 Wooldridge test for autocorrelation in panel data

Hypothesis	Description
H0:	There is no first order autocorrelation
H1:	There is first order autocorrelation

Test Statistics	Value	Decision
F(1, 12)	1.348	Do not reject H0
prob >F	0.2682	

Source: Researchers computation from Stata (14)

4.3.3 Multicollinearity Test

Correlation matrix and the variance inflation factor (VIF) (O'Brien, 2017) are commonly used metrics to assess how much an independent variable in a regression model is multicollinear with the other independent variables. According to Brooks (2008), multicollinearity is the result of a high degree of correlation between some or all of the independent variables. It illustrates how the regression model finds it challenging to identify the independent factors influencing the dependent variable. In case the multicollinearity issue in a model is too severe, it is recommended to either include more significant variables or eliminate less significant independent variables. VIF equal to or greater than 10 indicates severe multicollinearity; VIF less than 10 indicates no significant multicollinearity (Kwak, 2015).

A variance inflation factor (VIF) test has been performed to evaluate multicollinearity amongst the independent variables under investigation. If a variable's variance index (VIF) is greater than 10, the model is multicollinear. Since each independent variable's VIF is less than 10 and the mean VIF is likewise less than 5, as shown in Table 4.5 below, multicollinearity is not an issue for these data.

Table 4-4 Variance Inflation Factor

	VIF	1/VIF
CA	9.134	0.109
NII	7.038	0.142
GDP	5.568	0.18
BS	5.175	0.193
INFR	4.485	0.223
CR	4.078	0.245
LDR	3.342	0.299
MRS	2.123	0.471
OCE	1.094	0.914
Mean VIF	4.671	.

Source: researcher's computation using stata (14) results

4.3.4 Model specification test- Ramsey-RESET Test

The Ramsey-RESET model specification error might arise from selecting the incorrect functional form, adding extraneous variables, or deleting a pertinent independent variable. Model specification error is likely to arise when there is a correlation between the variable that was omitted and the one that was included. This leads to biased and inconsistent estimators. Errors in model definition won't arise if the missing variable has no correlation with the one that is included, and the estimators are fair and consistent. Therefore, the researcher has to validate the model specification using the Ramsey RESET Test in order to choose an appropriate estimated model.

The hypothesis for the model specification test was formulated as follow;

H0: The model specification is correct

H1: The model specification is incorrect.

Decision Rule: Reject H0, if P value is less than 0.05. Otherwise, do not reject H0.

Table 4.5 Model specification test: Ramsey RESET test

Test	Probability F-statistics	Decision rule
Ramsey RESET test	0.7529	Do not reject HO

Source: Researcher computation from stata (14)

Choosing Random effect (RE) versus fixed effect (FE) models

Fixed effects models and random effects models are the two main categories of panel data estimator approaches that can be used in empirical research. When the researcher used panel data approaches, this also called for great concern. Consequently, the first decision is whether to use a random effects (RE) model or a fixed effects (FE) model based on the Hausman test. The null hypothesis for this test states that the random effects model is preferred and appropriate than the fixed effects model (Brooks, 2008).

Table 4-5 Summary of FE and RE models

Variables		***Fixed Effect***		***Random Effect***	
Dependent ROA		**Coeff.**	**Prob.**	**Coeff.**	**Prob.**
	BS	0.003	0.067	0.003	0.007
	CR	-0.068	0.000	-0.064	0.000
	LDR	-0.006	0.499	-0.008	0.274
	OCE	-0.017	0.001	-0.017	0.000
	CA	-0.026	0.171	-0.026	0.113
	NII	0.292	0.001	0.282	0.000
	MRS	0.134	0.000	0.133	0.000
	INF	0.009	0.447	0.011	0.342
	GDP	0.120	0.093	0.132	0.032
	Constant	-0.054	0.140	-0.061	0.032
Number of Obs.		156		156	
R-squared between		0.784		0.796	
R-squared within		0.380		0.380	
Overall r-squared		0.450		0.452	
F-test		9.141	Chi square	109.54	
Prob. > F		0.000	Prob. > chi2	0.000	

Source: own computation of stata version 14 results

The Hausman test, as presented in Table 4.9 below, supports the RE model by showing that the difference in coefficients between FE and RE is not systematic. The null hypothesis is not rejected at the 5% significant level, meaning that the random effects model is appropriate and the fixed effects specification is not preferred. This is indicated by the test's p-value of greater than 0.05. Therefore, this study is best suited for the cross-section random effects model.

Table 4-6 Hausman specification test –choosing for FE and RE

Test summary	Chi-square	P-value
Cross section Random	**1.014**	**0.999**

Source: own computation from Stata (14) results

4.3.5 Cross sectional Dependency Test

Cross-sectional dependence can lead to bias in tests results (also called contemporaneous correlation). The cross-sectional dependence test, or Pasaran CD test, is employed to ascertain whether the residuals are associated among entities. When cross-sectional units (banks, countries, etc.) are not independent of one another, this is known as cross-sectional dependence. The null hypothesis for this test is that there is no cross-sectional dependence (residuals are not correlated across cross-sectional units (P> 0.05)).

Table 4 -7 Pasaran Cross sectional Dependency Test

Pesaran's Test Statistic	0.068
P-value(Pr.)	0.9455
Average absolute value	0.282

Source: Own computation from Stata (14) output

Since the p-value is above the significant level (p = 0.9455), the null hypothesis, which states that there is no significant cross-sectional dependency in the data, cannot be rejected.

4.4 Regression Result and Discussion

The Random Effect Regression Analysis between variables is covered in this section along with remarks. The aim of this study was to investigate whether factors unique to individual banks affect the profitability of private commercial banks operating in Ethiopia. The impact of

determinant factors on the Return on Asset (ROA) of private commercial banks in Ethiopia is presented in the following fixed effects model (FE) and random effects model (RE) findings. The discussion is based on the random effect model of regression results, since we prefer it after the hausman specification test.

Table 4-8 Regression results of Random Effect panel regression model

ROA(Dependent Variable	Coeff.	St.Err.	t-value	p-value	[95% Conf.	Interval]	Sig
BS	0.003	0.001	2.70	0.007	0.001	0.005	***
CR	-0.064	0.015	-4.20	0.000	-0.093	-0.034	***
LDR	-0.008	0.007	-1.09	0.274	-0.022	0.006	
OCE	-0.017	0.004	-3.93	0.000	-0.025	-0.008	***
CA	-0.026	0.016	-1.59	0.113	-0.057	0.006	
NII	0.282	0.065	4.37	0.000	0.156	0.409	***
MRS	0.133	0.027	4.92	0.000	0.080	0.186	***
INF	0.011	0.011	0.95	0.342	-0.011	0.033	
GDP	0.132	0.061	2.15	0.032	0.011	0.252	**
Constant	-0.061	0.028	-2.15	0.032	-0.117	-0.005	**
Mean dependent var.		0.025	SD dependent var.			0.008	
R-squared between		0.796	Number of obs.			156	
Chi-square		109.541	Prob. > chi2			0.000	
R-squared within		0.380	Overall R-square			0.452	
Wald chi2(9)		109.54					

****** p<0.01, ** p<0.05, * p<0.1*** *source: Stata(14) output*

The above table 4.10 presents the panel data analysis of the factors affecting the profitability of privately owned commercial banks in Ethiopia measured by the Return on Asset. A positive sign of the coefficient indicates positive impact on profitability and negative coefficient means that the variable had adverse effect on profitability. A Wald chi-squared test with probability of 0.000 indicates that the explanatory variables are all statistically significant in explaining the dependent variable. This shows that the overall model is statistically significant. The value of R-square between different banks and the overall R-square was 79.6 and 45.2 percent respectively. This result implies that, 80% of the variation in the dependent variable between different banks is explained by the independent variable and 45 % of the total variation in the dependent variable is explained by the explanatory variables.

Bank Size and Return on Asset

According to the above random effect regression analysis (Table 4.10), bank size (proxy to natural logarithm of total assets) has a positive and highly significant effect on profitability at 1% significant level. Larger banks typically generate higher profits due to this obvious positive correlation. Larger banks are thought to be more profitable due to their ability to seize possibilities for loan diversification opportunities, engage in riskier but highly profitable project financing, have a higher capacity for providing operational services, be able to use better technology, and have better opportunities to retain experienced management personnel. All of these factors are consistent with prior empirical evidence.

The variable has a significant impact on banks' profitability, and the results are consistent with the study's hypothesis. Bigger banks have a higher probability of becoming profitable due to factors including improved management, scale, and ability to develop new products, market, and commercialize them. They also have a wider financial reach, specialty, and bargaining value.

The Efficient Structure hypothesis and the economies of scale (big banks have a scale advantage and benefit from cost reduction) are supported by the size variable's positive and significant coefficient. The prior researches by Elshadey (2017), Brahmana et al. (2018), Ahmad (2016), Moges (2017), Beakal and Abel (2017), Muhammad Sajid Saeed (2014), and Samuel (2015) is in line with this favorable association with profitability.

Credit Risk and Return on Asset

Non-performing loan Ratio shows the level of banks' exposure to credit risk. The effect of Credit Risk (CR) is negative and highly significant at 1% significant level. The coefficient of -0.064 indicates that a one unit increase in the credit risk ratio corresponds to a 0.064 unit change in profitability in the opposite direction. This result is consistent with the research conducted by Tefera (2011) and Mekasha (2011), who both found a negative correlation between credit risk and commercial banks' profitability. This result also aligns with what the researcher had anticipated.

Loan deposit ration and return on Asset

The loan to deposit ratio (LTDR) evaluates a bank's liquidity by comparing the total number of loans given to the total amount of deposits. A bank's ability to cover loan losses and consumer withdrawals is also evaluated. A higher ratio suggests that the bank has lent out a substantial amount relative to its deposits. This suggests increased risk and decreased liquidity. This research demonstrates that, for each private commercial bank in the sample, the predicted coefficient for the loan to deposit ratio is negative and not statistically significant. With a p-value of 0.274 and a coefficient of -0.008 in the regression analysis, the loan deposit ratio does not seem to have a meaningful effect. This result is consistent, according to Sufian (2009), Mamo (2017), Fisseha (2017), Ismael and Davidson (2015).

Operational Cost Efficiency and Return on Asset

The ratio of operating cost to operating income is used for measuring managerial efficiency. It was inversely correlated with the profitability of private commercial banks, as the regression table illustrates. A lower ratio indicates greater cost control, so banks with superior cost management would see larger returns. The inverse link between operational cost efficiency and return on asset is indicated by the negative sign. Bank profitability drops by 0.017 units when OCE changes by one unit. At the 1% significant level, the negative relationships were statistically significant. The p-value 0.0000, demonstrates OCE is one of the banks particular (Internal) independent variable that highly determines the bank's profitability. The prior research by Tewodros and Gedion (2019), Artor (2017), Elshadey (2017), Delis (2005), Ahmad (2016), and Brahmana et al. (2018) is in line with this negative association with profitability. Increased OCE ratios are interpreted as an indication of poor management, which lowers bank profitability by failing to keep operational costs under control. The investigation found that insufficient expense control is one of the main reasons Ethiopian private commercial banks perform below expectations in terms of profitability.

Capital Adequacy and Return on Asset

Regression analysis indicates that capital adequacy has a negative, statistically insignificant effect on ROA, which in turn influences banks' risk-taking behavior. The outcome, therefore,

deviates from the theory formulated in this investigation. The study's hypothesis was that bank ROA and CA will significantly positively correlate negative sign. It suggests that a one unit change in the capital adequacy ratio of the banks has resulted in 0.26 units of opposing changes in the return on equity levels. Banks will therefore lose 0.26 Birr on profit when they retain Birr 1 as a CAR. This finding is consistent with the research of Gull et al. (2011), which demonstrates that there is no significant correlation, particularly for international banks, between capital sufficiency and bank profitability.

Non -interest income and Return on Asset

The non-interest income ratio plays a vital role in the performance of private Commercial banks of Ethiopia during the study. The ratio measures of how much percent of a bank's asset generated from fee based income other than interest income. In this study the variable has a positive and highly significant (at 1% significant level) effect on profitability, which was as it was expected in the hypothesis. Through the generation of income from non-interest activities including trading income, commissions, and fees, banks can reduce their dependence on traditional interest income. Income from non interest sources aids in stabilizing earnings during interest rate volatility, reduce the risk of loan defaults and Expanding your service offerings helps to keep customers, which boosts overall profitability and transaction volumes. This finding is consists with Sufian (2011), (Belayneh, 2011) and Gemechu A. (2016).

Market share and Return on Asset

In order to determine whether or not having a large market share corresponds with high profitability, market share (MRS) was estimated for this study. The ratio, which establishes the industry structural components, is measured by comparing the total assets of a bank to the total assets of the industry at a specific time. The RMP hypothesis was supported by the market share outcome, which showed a very significant and beneficial influence on bank profitability at the 1% significant level. This finding is well-supported by theoretical and empirical findings. This study finds that firms with higher market share can better capitalize on customer satisfaction heterogeneity, leading to improved financial outcomes including ROA.(Grewal, R., Chandrashekaran, M., & Citrin, A. V. (2010). The significant positive impact of market share

was also demonstrated by the Ethiopian research' findings of Benti, T. (2014), and Woldeyohannes, A. (2014).

GDP growth rate and Return on Asset

The study discovered that, GDP growth rate significantly and positively affects ROA. The findings of numerous studies (e.g., Demirguc-Kunt and Huizinga, 2000; Athanasoglou et al., 2005 and Bikker and Hu, 2002) support the notion that there is a positive effect of economic growth on profitability of banks. This is because in a healthy economy as opposed to a declining economy, the default risk is smaller. Apart from its significance impact, the outcome is consistent with the hypothesis that this study expected. The positive association suggests that when the macroeconomic climate is favorable, bank operations particularly resource mobilization and asset quality show improvement, which raises profitability and vice versa.

Inflation and Return on Asset

This study's regression result found a positive statistically significant value with a probability value of 0.342 and a coefficient of 0.011. This indicates that ROA increased by 1.1% for every 1% increase in inflation. This suggests that the private commercial banks anticipated the levels of inflation during the research period. This provided them with the chance to suitably modify the interest rates, which led to their excellent performance. This is due to the fact that private banks are able to freely select the interest rate at which they extend credit, allowing them to readily adjust this rate in order to counteract expectedly high inflation and preserve profitability. This research supports the conclusions of Athanasoglou (2008), Dawit (2017), Samuel (2015), and Eden (2014). Commercial banks must raise their base lending rates to counteract earnings imbalances and achieve profitability because inflation pushes lending rates upward.

CHAPTER FIVE

Conclusion and Policy Recommendation

5.1 conclusion

The main objective of this study was to investigate the factors that affect the profitability of Ethiopia's private commercial banks. Secondary data were gathered from the annual reports of each sampled private banks between 2012 and 2023. Descriptive statistics, correlation analysis, and Random Effect regression analysis were used to present and evaluate the data in order to determine the factors that influence profitability of private banks in Ethiopia. The independent variables considered are return on assets ratio (ROA), Loan Deposit ratio (LDR), bank size (BS), operating cost efficiency ratio (OCE), capital adequacy ratio (CA), Market Share (MRS), Inflation (INF) and growth rate (GDP). Return on asset is a dependent variable used to measure profitability.

The results of the random effect panel regression showed that bank size, which enables institutions to achieve economic scale by lowering costs, is a statistically significant determining factor that favorably enhances the profitability of the sampled private commercial banks in Ethiopia. Additionally, it was found that GDP and market share had a statistically significant positive effect on profitability.

The study found that the profitability of Ethiopian private commercial banks was significantly impacted by several bank-specific characteristics, including bank size, credit risk, operational cost efficiency, and non-interest income. However, capital adequacy and the loan-to-deposit ratio did not have a significant impact. The industry-specific variable, market share, demonstrated a highly significant positive value (at the 1% significance level). Both GDP and inflation, among the macroeconomic variables taken into account in this study, exhibited a positive association with return on assets; however, only GDP significantly impacted the profitability of Ethiopia's private commercial banks. The "too big to fail" theory ran counter to the favorable correlation we found between bank size and profitability.

5.2 Policy Recommendations

Based on the findings of the study the researcher forwards the following possible recommendations.

- Banks should aim to increase their size through mergers or organic growth to leverage economies of scale. Additionally, Strengthen Credit Risk Management through Implementing robust credit risk assessment and management frameworks to minimize the impact of credit risk on profitability.
- Non-interest income is a key determinant of profitability for Ethiopian private commercial banks. Therefore, Banks ought to prioritize preserving balanced mix of non-interest-bearing assets that generate service charge earnings. By moving away from traditional intermediary business operations, Ethiopian banks should engage in fee-based activities with lower credit risk to sustain and expand their profitability.
- Macroeconomic factors have little effect on the profitability of commercial banks because bank management actions do not directly influence them. Thus, when it comes to upholding and overseeing bank-specific policies that have a big influence on the bank's profitability, policy makers, managers, shareholders, and directors should proceed with the utmost prudence.
- Operational Cost expense management needs to be prioritized. Private commercial banks' profitability is heavily impacted by operational costs, which are determined by dividing operating costs by operating income. Lower profitability is the result of ineffective management controlling expenses, as indicated by a greater ratio. According to the this study, the average ratio for private commercial banks is 54.6%, which indicates that they spend 56 cents for every 1 birr of revenue. In comparison, this ratio is high. This means that banks need to implement effective controls over operating expenses to ensure their long-term viability. Organize and train staff, reengineer services or use better technology, and remove needless bureaucracy to save operational costs are just a few of the tasks you should take to improve managerial efficiency.
- Analyzing factors that specifically affect private banks' profitability in Ethiopia was the main objective of this study. It is possible that certain significant variables were omitted of this analysis. Future researchers are therefore advised to conduct similar studies on these banks with other characteristics in order to better validate the findings of this study.

Future research on recently established banks is also suggested in order to have a deeper comprehension of the factors affecting profitability in the Ethiopian banking sector.

Reference

Abel, S., & Le Roux, P. (2016). Determinants of banking sector profitability in Zimbabwe. *International Journal of Economics and Financial Issues, 6*(3), 845-854.

Abera, T. (2012). The influence of financial factors on the performance of private commercial banks in Ethiopia. (Master's thesis). Addis Ababa University.

Ahmad, R., Goyal, A., & Bhatia, V. (2016). Assessing profitability of public and private sector banks: A study in Indian context. *Asian Journal of Research in Business Economics and Management, 6*(8), 1-12.

Alemu, A. (2015). Factors determining the profitability of commercial banks in Ethiopia. *European Journal of Business and Management, 7*(27), 60-67.

Ali, K., Akhtar, M. F., & Ahmed, Z. (2011). Bank-specific and macroeconomic indicators of profitability - Empirical evidence from the commercial banks of Pakistan. *International Journal of Business and Social Science, 2*(6), 235-242.

Ali, R., & Puah, C. H. (2018). The impact of macroeconomic and bank-specific factors on profitability of banks: Evidence from Pakistan. *Journal of Accounting and Finance, 18*(3), 110-130.

Al-Qudah, A. M., & Jaradat, M. S. (2013). The impact of macroeconomic variables and bank characteristics on Jordanian Islamic banks profitability: Empirical evidence. *International Business Research, 6*(10), 153-162.

Amdemikael, (2012), Factors affecting profitability: an empirical study on Ethiopian banking commercial banks, Unpublished Master's thesis, Addis Ababa University.

Asongu, S. A., & Nwachukwu, J. C. (2020). *Political instability, infrastructure deficits, and foreign exchange risks impact profitability of African banks*.

Athanasoglou, P. P., Brissimis, S. N., & Delis, M. D. (2008). Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions and Money, 18*(2), 121-136.

Athanasoglou, P. P., Delis, M. D., & Staikouras, C. K. (2005). Determinants of bank profitability in the South Eastern European region. *Bank of Greece Working Paper.*

Babu, M. S. (2018). The role of banking sector in economic development of India. *International Journal of Applied Research, 4*(12), 76-78.

Bennaceur, S., & Goaied, M. (2008). The determinants of commercial bank interest margin and profitability: Evidence from Tunisia. *Frontiers in Finance and Economics, 5*(1), 106-130.

Berger, A. N. (1995). The profit-structure relationship in banking—Tests of market-power and efficient-structure hypotheses. *Journal of Money, Credit and Banking, 27*(2), 404-431.

Berger, A. N., Demsetz, R. S., & Strahan, P. E. (2004). The consolidation of the financial services industry: Causes, consequences, and implications for the future. *Journal of Banking & Finance, 23*(2-4), 135-194.

Berger, A. N., & Hannan, T. H. (1989). The price-concentration relationship in banking. *The Review of Economics and Statistics, 71*(2), 291-299.

Bikker, J. A., & Spierdijk, L. (2017). *Measuring and explaining competition in the financial sector.* Cambridge University Press.

Birhanu, T. (2012). Determinants of commercial banks profitability in Ethiopia. (Master's thesis). Addis Ababa University.

Boru, W. (2014). Determinants of profitability in Ethiopian commercial banks. (Master's thesis). Addis Ababa University.

Dawit, G. (2017). Determinants of private commercial banks profitability in Ethiopia. *Journal of Poverty, Investment and Development, 37*, 27-36.

Demirguc-Kunt, A., & Huizinga, H. (1999). Determinants of commercial bank interest margins and profitability: Some international evidence. *The World Bank Economic Review, 13*(2), 379-408.

Dietrich, A., & Wanzenried, G. (2009). What determines the profitability of commercial banks? New evidence from Switzerland. *Swiss Journal of Economics and Statistics, 145*(4), 515-538.

Elshaday, A. (2018). The impact of bank specific factors on the performance of commercial banks in Ethiopia. (Master's thesis). Addis Ababa University.

Elsiefy, E. (2013). Determinants of profitability of commercial banks in Qatar. *International Journal of Economics and Management Sciences, 2*(11), 108-142.

Ermais, A. (2016). Determinants of Ethiopian commercial banks profitability. (Master's thesis). Addis Ababa University.

Flamini, V., McDonald, C., & Schumacher, L. (2009). The determinants of commercial bank profitability in Sub-Saharan Africa. *IMF Working Papers, 2009*(15).

Goddard, J., Molyneux, P., & Wilson, J. O. S. (2004). Dynamics of growth and profitability in banking. *Journal of Money, Credit and Banking, 36*(6), 1069-1090.

Goyal, A., Khandelwal, R., & Khandelwal, U. (2016). Profitability determinants of public and private sector banks in India. *Research Journal of Finance and Accounting, 7*(15), 23-32.

Iskandar, T. M., Yatim, P., & Sanusi, Z. M. (2019). Determinants of bank profitability: Empirical evidence from Bangladesh. *International Journal of Business and Economics Research, 8*(3), 68-72.

Izhar, H., & Asutay, M. (2007). Estimating the profitability of Islamic banking: Evidence from Bank Muamalat Indonesia. *Review of Islamic Economics, 11*(2), 17-29.

Kiyota, K. (2009). Efficiency and profitability of commercial banks in Sub-Saharan Africa. *Journal of Banking & Finance, 33*(3), 395-406.

Lelissa, T. B. (2007). The impact of financial reform on the performance of Ethiopian private commercial banks. (Master's thesis). Addis Ababa University.

Melaku, D. (2016). Determinants of bank profitability in Ethiopian private commercial banks. *Global Journal of Management and Business Research, 16*(7), 1-12.

Moges, H. (2017). Determinants of profitability of commercial banks in Ethiopia. (Master's thesis). Addis Ababa University.

National Bank of Ethiopia (NBE). (2023). *Financial Stability Report.* Addis Ababa: NBE.

Nicolae, I., Marcu, N., & Manole, A. (2015). Determinants of bank performance in CEE countries. *Romanian Journal of Economic Forecasting, 18*(4), 165-183.

Ommeren, S. V. (2011). An examination of the determinants of banks' profitability in the European banking sector. (Master's thesis). Erasmus University.

Olweny, T., & Shipho, T. (2011). Effects of banking sectoral factors on the profitability of commercial banks in Kenya. *Economics and Finance Review, 1*(5), 1-30.

Pastory, D., & Marobhe, M. (2015). The determinants of bank financial performance in Tanzania. *European Journal of Business and Management, 7*(13), 142-155.

Rahaman, M. M., Hamid, K. T., & Islam, M. R. (2020). The role of banks in economic development: A study in Bangladesh context. *European Journal of Business and Management, 12*(18), 25-34.

Samad, A. (2015). Determinants of bank profitability: Empirical evidence from Bangladesh. *International Journal of Financial Services Management, 8*(4), 374-388.

Samuel, T. (2015). Determinants of commercial banks profitability in Ethiopia. *Journal of Research in Business and Management, 3*(11), 36-52.

San, O. T., & Heng, T. B. (2013). Factors affecting the profitability of Malaysian commercial banks. *African Journal of Business Management, 7*(8), 649-660.

Saunders, A., & Cornett, M. M. (2008). *Financial Markets and Institutions: An Introduction to the Risk Management Approach.* McGraw-Hill.

Soana, M. G. (2011). The relationship between corporate social performance and corporate financial performance in the banking sector. *Journal of Business Ethics, 104*(1), 133-148.

Staikouras, C. K., & Wood, G. E. (2004). The determinants of European bank profitability. *International Business & Economics Research Journal, 3*(6), 57-68.

Sufian, F., & Chong, R. R. (2008). Determinants of bank profitability in a developing economy: Empirical evidence from the Philippines. *Asian Academy of Management Journal of Accounting and Finance, 4*(2), 91-112.

Tamiru, S. (2013). Determinants of profitability of private commercial banks in Ethiopia. (Master's thesis). Addis Ababa University.

Tan, Y. (2015). The impacts of risk and competition on bank profitability in China. *Journal of International Financial Markets, Institutions and Money, 35*, 1-15.

Tewodros, B., & Gedion, A. (2019). Bank-specific determinants of profitability of Ethiopian commercial banks. (Master's thesis). Addis Ababa University.

Tregena, F. (2009). The market power theory and profitability in banking. *International Journal of Economics and Business Research, 2*(2), 112-124.

APPENDICES

Appendices –I Descriptive statistics

Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
ROA	156	0.025	0.008	0.003	0.049
BS	156	23.645	1.111	20.936	26.135
CR	156	0.031	0.067	0.000	0.745
LDR	156	0.690	0.128	0.430	1.044
OCE	156	0.546	0.130	0.208	0.982
CA	156	0.141	0.095	0.013	1.264
NII	156	0.022	0.022	0.002	0.265
MRS	156	0.135	0.028	0.062	0.213
INF	156	0.171	0.091	0.066	0.339
GDP	156	0.081	0.019	0.053	0.106

Appendices –II correlation Analysis

Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) ROA	1.000									
(2) BS	-0.179*	1.000								
	(0.025)									
(3) CR	-0.317*	-0.172*	1.000							
	(0.000)	(0.032)								
(4) LDR	-0.246*	0.693*	0.156	1.000						
	(0.002)	(0.000)	(0.052)							
(5) OCE	-0.290*	-0.032	0.150	0.128	1.000					
	(0.000)	(0.693)	(0.062)	(0.111)						
(6) CA	-0.073	-0.227*	0.826*	0.060	0.068	1.000				
	(0.368)	(0.004)	(0.000)	(0.459)	(0.402)					
(7) NII	0.003	-0.324*	0.780*	-0.010	0.105	0.908*	1.000			
	(0.966)	(0.000)	(0.000)	(0.904)	(0.191)	(0.000)				
(8) MRS	0.366*	-0.578*	0.038	-0.241*	0.046	0.223*	0.180*	1.000		
	(0.000)	(0.000)	(0.636)	(0.002)	(0.572)	(0.005)	(0.025)			
(9) INF	-0.179*	0.558*	0.123	0.708*	0.003	0.046	0.002	-0.182*	1.000	
	(0.025)	(0.000)	(0.127)	(0.000)	(0.968)	(0.565)	(0.983)	(0.023)		
(10) GDP	0.239*	-0.692*	-0.111	-0.722*	0.022	-0.043	0.022	0.285*	-0.864*	1.000
	(0.003)	(0.000)	(0.166)	(0.000)	(0.782)	(0.594)	(0.784)	(0.000)	(0.000)	

**** p<0.01, ** p<0.05, * p<0.1*

Appendices –III Test for classical regression model assumption

1. Test for Multicollinearity

Variance inflation factor

	VIF	1/VIF
CA	9.134	.109
NII	7.038	.142
GDP	5.568	.18
BS	5.175	.193
INF	4.485	.223
CR	4.078	.245
LDR	3.342	.299
MRS	2.123	.471
OCE	1.094	.914
Mean VIF	4.671	.

2. Test for Autocorrelation (Serial correlation)

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
F (1, 12) = 1.348
Prob. > F = 0.2682

3. Test for Heteroscedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of ROA
chi2 (1) = 1.11
Prob > chi2 = 0.2910

4. Test for Model specification-Ramsey RESET test

Ramsey RESET test using powers of the fitted values of ROA
Ho: model has no omitted variables
F (3, 143) = 0.40
Prob > F = 0.7529

5. Hausman Test for choosing RE and FE m

	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
BS	.0025901	.0029244	-.0003344	.0008895
CR	-.0684109	-.0636193	-.0047915	.0080895
LDR	-.0058432	-.0079745	.0021313	.0045792
OCE	-.016655	-.0165469	-.000108	.0029424
CA	-.0257954	-.0256633	-.0001321	.0094923
NII	.292477	.2824336	.0100434	.0515895
MRS	.1341185	.1328214	.0012971	.0208562
INF	.0092294	.0107789	-.0015496	.004229
GDP	.1196767	.1318379	-.0121611	.0351033

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

Test: Ho: difference in coefficients not systematic

chi2(9) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 1.01
Prob>chi2 = 0.9994

6: Pasaran Cross sectional Dependency Test

Pesaran's test of cross sectional independence = 0.068, Pr = 0.9455

Average absolute value of the off-diagonal elements = 0.282

.

Appendices IV: Fixed and Random Effect Regression analysis between ROA and Explanatory Variables

Regression, FE

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
BS	.003	.001	1.85	.067	0	.005	*
CR	-.068	.017	-3.98	0	-.102	-.034	***
LDR	-.006	.009	-0.68	.499	-.023	.011	
OCE	-.017	.005	-3.24	.001	-.027	-.006	***
CA	-.026	.019	-1.38	.171	-.063	.011	
NII	.292	.083	3.54	.001	.129	.456	***
MRS	.134	.034	3.93	0	.067	.202	***
INF	.009	.012	0.76	.447	-.015	.033	
GDP	.12	.071	1.69	.093	-.02	.26	*
Constant	-.054	.036	-1.49	.14	-.125	.018	

Mean dependent var	0.025	SD dependent var	0.008
R-squared	0.380	Number of obs	156
F-test	9.141	Prob > F	0.000
Akaike crit. (AIC)	-1149.294	Bayesian crit. (BIC)	-1118.795

*** p<.01, ** p<.05, * p<.1

Regression results, RE

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf.	Interval]	Sig
BS	.003	.001	2.70	.007	.001	.005	***
CR	-.064	.015	-4.20	0	-.093	-.034	***
LDR	-.008	.007	-1.09	.274	-.022	.006	
OCE	-.017	.004	-3.93	0	-.025	-.008	***
CA	-.026	.016	-1.59	.113	-.057	.006	
NII	.282	.065	4.37	0	.156	.409	***
MRS	.133	.027	4.92	0	.08	.186	***
INF	.011	.011	0.95	.342	-.011	.033	
GDP	.132	.061	2.15	.032	.011	.252	**
Constant	-.061	.028	-2.15	.032	-.117	-.005	**

Mean dependent var.	0.025	SD dependent var.	0.008
Overall r-squared	0.452	Number of obs.	156
Chi-square	109.541	Prob > chi2	0.000
R-squared within	0.380	R-squared between	0.796

*** p<.01, ** p<.05, * p<.1

Bank	Year	ROA	BS	CR	LDR	OCE	CA	NII	MRS	INF	GDP
AWASH	2012	0.030051	23.297	0.00746	0.598044	0.296	0.125	0.019	0.125	0.236	0.0864
AWASH	2013	0.024663	23.601	0.00065	0.614577	0.208	0.116	0.018	0.116	0.0746	0.1058
AWASH	2014	0.027968	23.819	0.01176	0.596261	0.426	0.117	0.02	0.117	0.0689	0.1025
AWASH	2015	0.025598	23.95	0.00732	0.662241	0.481	0.126	0.017	0.126	0.0956	0.1039
AWASH	2016	0.027331	24.162	0.00788	0.627787	0.517	0.126	0.014	0.144	0.0662	0.0943
AWASH	2017	0.026986	24.46	0.00844	0.678562	0.526	0.114	0.015	0.129	0.1068	0.0956
AWASH	2018	0.028998	24.735	0.01054	0.720443	0.497	0.117	0.015	0.089	0.1383	0.0681
AWASH	2019	0.034514	25.035	0.00841	0.792774	0.422	0.129	0.018	0.094	0.158	0.0836
AWASH	2020	0.02902	25.215	0.01152	0.797422	0.445	0.134	0.017	0.097	0.2035	0.0605
AWASH	2021	0.027603	25.58	0.01274	0.851644	0.488	0.123	0.02	0.146	0.2683	0.0564
AWASH	2022	0.030625	25.934	0.00167	0.872919	0.488	0.114	0.027	0.088	0.3388	0.0531
AWASH	2023	0.033253	26.135	0.00128	0.873404	0.56	0.124	0.025	0.102	0.293	0.061
Dashen	2012	0.037215	23.586	0.00437	0.565164	0.486	0.104	0.02	0.104	0.236	0.0864
Dashen	2013	0.030726	23.706	0.00322	0.546534	0.623	0.103	0.014	0.103	0.0746	0.1058
Dashen	2014	0.033199	23.812	0.00292	0.533309	0.611	0.118	0.015	0.118	0.0689	0.1025
Dashen	2015	0.028771	23.932	0.00355	0.571971	0.79	0.118	0.016	0.118	0.0956	0.1039
Dashen	2016	0.025442	24.075	0.00441	0.548307	0.517	0.117	0.015	0.117	0.0662	0.0943
Dashen	2017	0.021003	24.267	0.01142	0.642428	0.616	0.115	0.018	0.145	0.1068	0.0956
Dashen	2018	0.02045	24.539	0.01751	0.640722	0.673	0.129	0.014	0.129	0.1383	0.0681
Dashen	2019	0.018086	24.752	0.01735	0.723727	0.669	0.121	0.016	0.121	0.158	0.0836
Dashen	2020	0.022516	24.946	0.0104	0.786399	0.647	0.121	0.02	0.121	0.2035	0.0605
Dashen	2021	0.018229	25.273	0.01726	0.826925	0.58	0.106	0.02	0.106	0.2683	0.0564
Dashen	2022	0.025031	25.486	0.03273	0.820598	0.547	0.122	0.021	0.123	0.3388	0.0531
Dashen	2023	0.02462	25.697	0.03367	0.827578	0.593	0.133	0.025	0.133	0.293	0.061
Abyssinia	2012	0.026187	22.832	0.00814	0.560799	0.439	0.11	0.013	0.11	0.236	0.0864
Abyssinia	2013	0.026059	23.041	0.01503	0.542426	0.42	0.109	0.014	0.109	0.0746	0.1058
Abyssinia	2014	0.024007	23.145	0.01764	0.55637	0.495	0.135	0.015	0.135	0.0689	0.1025
Abyssinia	2015	0.021058	23.338	0.01463	0.531133	0.552	0.132	0.015	0.132	0.0956	0.1039
Abyssinia	2016	0.022596	23.546	0.01011	0.587578	0.829	0.126	0.02	0.126	0.0662	0.0943
Abyssinia	2017	0.021332	23.955	0.0077	0.672787	0.587	0.131	0.021	0.114	0.1068	0.0956
Abyssinia	2018	0.017597	24.188	0.00733	0.689331	0.305	0.132	0.015	0.132	0.1383	0.0681
Abyssinia	2019	0.019774	24.394	0.02102	0.72858	0.275	0.125	0.004	0.125	0.158	0.0836
Abyssinia	2020	0.015005	24.764	0.02949	0.772619	0.416	0.099	0.005	0.099	0.2035	0.0605
Abyssinia	2021	0.012897	25.366	0.02439	0.84888	0.35	0.083	0.008	0.083	0.2683	0.0564
Abyssinia	2022	0.021651	25.73	0.0283	0.914246	0.384	0.095	0.006	0.095	0.3388	0.0531
Abyssinia	2023	0.020436	25.967	0.02817	0.90702	0.433	0.102	0.007	0.102	0.293	0.061
Hibret	2012	0.033898	22.896	0.00589	0.623305	0.357	0.125	0.023	0.125	0.236	0.0864
Hibret	2013	0.028235	23.024	0.01193	0.600504	0.432	0.12	0.019	0.12	0.0746	0.1058
Hibret	2014	0.023422	23.197	0.0074	0.560841	0.525	0.132	0.019	0.132	0.0689	0.1025
Hibret	2015	0.019589	23.387	0.00809	0.606943	0.61	0.117	0.018	0.117	0.0956	0.1039
Hibret	2016	0.01963	23.572	0.00828	0.646081	0.603	0.12	0.017	0.12	0.0662	0.0943
Hibret	2017	0.017345	23.814	0.00416	0.723525	0.627	0.112	0.015	0.112	0.1068	0.0956
Hibret	2018	0.020464	24.056	0.011	0.752474	0.56	0.105	0.017	0.105	0.1383	0.0681
Hibret	2019	0.021052	24.299	0.01368	0.860513	0.595	0.108	0.006	0.108	0.158	0.0836
Hibret	2020	0.020781	24.484	0.01323	0.888105	0.605	0.124	0.01	0.124	0.2035	0.0605
Hibret	2021	0.01915	24.713	0.08713	0.888611	0.594	0.119	0.018	0.119	0.2683	0.0564
Hibret	2022	0.016187	24.934	0.01915	0.904128	0.559	0.107	0.019	0.107	0.3388	0.0531
Hibret	2023	0.027829	25.137	0.02155	1.006101	0.561	0.113	0.018	0.113	0.293	0.061
NIB	2012	0.034587	22.836	0.00163	0.618063	0.669	0.184	0.026	0.184	0.236	0.0864
NIB	2013	0.031305	22.936	0.00147	0.665541	0.555	0.182	0.021	0.182	0.0746	0.1058
NIB	2014	0.029195	23.097	0.00104	0.682512	0.612	0.182	0.023	0.182	0.0689	0.1025
NIB	2015	0.025428	23.307	0.02424	0.705337	0.63	0.164	0.016	0.164	0.0956	0.1039
NIB	2016	0.022531	23.485	0.02249	0.604682	0.681	0.159	0.011	0.159	0.0662	0.0943
NIB	2017	0.024569	23.768	0.02149	0.652474	0.607	0.14	0.015	0.14	0.1068	0.0956
NIB	2018	0.019291	24.007	0.02247	0.624382	0.561	0.126	0.012	0.126	0.1383	0.0681

NIB	2019	0.021376	24.241	0.01379	0.695875	0.531	0.13	0.012	0.13	0.158	0.0836
NIB	2020	0.024577	24.471	0.01101	0.759899	0.527	0.136	0.011	0.136	0.2035	0.0605
NIB	2021	0.022447	24.715	0.01687	0.785943	0.555	0.129	0.009	0.129	0.2683	0.0564
NIB	2022	0.02177	24.842	0.01838	0.782504	0.57	0.131	0.011	0.131	0.3388	0.0531
NIB	2023	0.019564	25.067	0.00766	0.89741	0.634	0.129	0.008	0.129	0.293	0.061
CBO	2012	0.027516	22.023	0.01455	0.487408	0.527	0.113	0.023	0.113	0.236	0.0864
CBO	2013	0.02895	22.6	0.00828	0.465778	0.793	0.106	0.036	0.106	0.0746	0.1058
CBO	2014	0.046807	22.718	0.0561	0.668633	0.528	0.148	0.053	0.148	0.0689	0.1025
CBO	2015	0.027258	23.162	0.03936	0.891156	0.982	0.123	0.033	0.123	0.0956	0.1039
CBO	2016	0.00366	23.092	0.04679	0.689377	0.753	0.114	0.017	0.114	0.0662	0.0943
CBO	2017	0.011725	23.598	0.02997	0.677995	0.695	0.085	0.017	0.085	0.1068	0.0956
CBO	2018	0.017513	24.12	0.01787	0.579373	0.264	0.079	0.011	0.079	0.1383	0.0681
CBO	2019	0.015739	24.455	0.01799	0.597135	0.314	0.078	0.013	0.078	0.158	0.0836
CBO	2020	0.014543	24.683	0.02064	0.740574	0.34	0.097	0.014	0.062	0.2035	0.0605
CBO	2021	0.01632	25.121	0.01489	0.761469	0.679	0.087	0.014	0.087	0.2683	0.0564
CBO	2022	0.017847	25.464	0.01486	0.870697	0.628	0.098	0.014	0.098	0.3388	0.0531
CBO	2023	0.018558	25.667	0.02427	0.881881	0.681	0.105	0.013	0.105	0.293	0.061
Abay	2012	0.019514	20.936	0.0042	0.580491	0.586	0.213	0.032	0.213	0.236	0.0864
Abay	2013	0.019494	21.391	0.00526	0.57122	0.626	0.014	0.025	0.173	0.0746	0.1058
Abay	2014	0.018017	21.885	0.01132	0.585663	0.66	0.013	0.026	0.141	0.0689	0.1025
Abay	2015	0.027378	22.245	0.01081	0.63782	0.557	0.156	0.026	0.156	0.0956	0.1039
Abay	2016	0.02368	22.545	0.01227	0.636035	0.589	0.155	0.019	0.155	0.0662	0.0943
Abay	2017	0.022007	22.877	0.02289	0.629288	0.364	0.153	0.039	0.154	0.1068	0.0956
Abay	2018	0.025719	23.234	0.01607	0.623114	0.439	0.146	0.03	0.146	0.1383	0.0681
Abay	2019	0.033204	23.438	0.01526	0.655021	0.504	0.162	0.035	0.162	0.158	0.0836
Abay	2020	0.024807	23.729	0.01118	0.72138	0.542	0.152	0.021	0.152	0.2035	0.0605
Abay	2021	0.028239	24.124	0.01337	0.831037	0.483	0.14	0.021	0.14	0.2683	0.0564
Abay	2022	0.022933	24.429	0.00953	0.820887	0.56	0.143	0.015	0.143	0.3388	0.0531
Abay	2023	0.028179	24.731	0.01048	0.873229	0.564	0.139	0.022	0.139	0.293	0.061
Wegagen	2012	0.040209	22.845	0.01038	0.640896	0.379	0.192	0.014	0.192	0.236	0.0864
Wegagen	2013	0.032717	23.064	0.0101	0.641439	0.408	0.176	0.011	0.176	0.0746	0.1058
Wegagen	2014	0.027621	23.168	0.01078	0.564089	0.514	0.185	0.01	0.185	0.0689	0.1025
Wegagen	2015	0.025705	23.341	0.01214	0.61513	0.536	0.176	0.011	0.176	0.0956	0.1039
Wegagen	2016	0.023201	23.507	0.01272	0.677545	0.582	0.173	0.011	0.173	0.0662	0.0943
Wegagen	2017	0.025403	23.765	0.06512	0.730021	0.554	0.16	0.012	0.16	0.1068	0.0956
Wegagen	2018	0.028971	24.033	0.07134	0.7369	0.646	0.139	0.031	0.139	0.1383	0.0681
Wegagen	2019	0.020859	24.116	0.03262	0.699458	0.649	0.144	0.021	0.144	0.158	0.0836
Wegagen	2020	0.021801	24.365	0.03338	0.794569	0.63	0.133	0.029	0.133	0.2035	0.0605
Wegagen	2021	0.003196	22.1	0.74501	0.880196	0.696	1.264	0.265	0.126	0.2683	0.0564
Wegagen	2022	0.012787	24.487	0.07536	0.909395	0.822	0.103	0.02	0.13	0.3388	0.0531
Wegagen	2023	0.015403	24.702	0.05547	0.959879	0.642	0.094	0.025	0.129	0.293	0.061
Zemen	2012	0.036075	21.596	0.00989	0.554726	0.363	0.117	0.042	0.117	0.236	0.0864
Zemen	2013	0.028982	21.901	0.03545	0.500184	0.269	0.151	0.046	0.151	0.0746	0.1058
Zemen	2014	0.032602	22.09	0.02916	0.430135	0.353	0.167	0.04	0.167	0.0689	0.1025
Zemen	2015	0.031445	22.307	0.02123	0.564659	0.449	0.156	0.031	0.156	0.0956	0.1039
Zemen	2016	0.027497	22.721	0.02134	0.593036	0.408	0.135	0.028	0.135	0.0662	0.0943
Zemen	2017	0.027512	23.001	0.06245	0.54219	0.369	0.138	0.034	0.135	0.1068	0.0956
Zemen	2018	0.021788	23.244	0.0192	0.488867	0.466	0.136	0.025	0.136	0.1383	0.0681
Zemen	2019	0.032934	23.41	0.01469	0.654574	0.395	0.158	0.03	0.158	0.158	0.0836
Zemen	2020	0.039962	23.64	0.01064	0.676089	0.353	0.168	0.029	0.168	0.2035	0.0605
Zemen	2021	0.037077	23.948	0.01276	0.738515	0.362	0.178	0.031	0.178	0.2683	0.0564
Zemen	2022	0.042035	24.282	0.00848	0.785999	0.343	0.178	0.032	0.178	0.3388	0.0531
Zemen	2023	0.037944	24.589	0.00722	0.851382	0.393	0.177	0.027	0.177	0.293	0.061
Lion	2012	0.030614	21.624	0.18256	0.550264	0.386	0.179	0.018	0.179	0.236	0.0864
Lion	2013	0.037824	21.802	0.03022	0.617779	0.367	0.184	0.02	0.184	0.0746	0.1058
Lion	2014	0.026729	22.007	0.03291	0.573568	0.511	0.173	0.015	0.173	0.0689	0.1025
Lion	2015	0.003543	22.491	0.03441	0.635027	0.425	0.14	0.02	0.14	0.0956	0.1039
Lion	2016	0.032213	22.817	0.01063	0.679457	0.464	0.131	0.014	0.131	0.0662	0.0943

Lion	2017	0.021103	23.118	0.01025	0.625158	0.529	0.132	0.012	0.132	0.1068	0.0956
Lion	2018	0.02729	23.384	0.01843	0.633531	0.401	0.126	0.011	0.126	0.1383	0.0681
Lion	2019	0.026434	23.738	0.02077	0.708826	0.343	0.125	0.01	0.125	0.158	0.0836
Lion	2020	0.020235	24.182	0.02834	0.730213	0.515	0.109	0.006	0.109	0.2035	0.0605
Lion	2021	0.010387	24.195	0.11433	0.839832	0.473	0.113	0.004	0.113	0.2683	0.0564
Lion	2022	0.008152	24.218	0.13674	0.917302	0.567	0.116	0.002	0.116	0.3388	0.0531
Lion	2023	0.013757	24.295	0.10174	0.977303	0.607	0.122	0.005	0.122	0.293	0.061
Berhan	2012	0.026547	20.974	0.01127	0.529873	0.671	0.183	0.04	0.183	0.236	0.0864
Berhan	2013	0.023797	21.51	0.01074	0.605099	0.486	0.173	0.04	0.173	0.0746	0.1058
Berhan	2014	0.043229	21.757	0.01518	0.579253	0.857	0.197	0.046	0.197	0.0689	0.1025
Berhan	2015	0.033213	22.151	0.01976	0.611326	0.554	0.174	0.038	0.174	0.0956	0.1039
Berhan	2016	0.048606	22.696	0.01536	0.698883	0.463	0.147	0.045	0.147	0.0662	0.0943
Berhan	2017	0.044944	23.073	0.01064	0.69204	0.502	0.175	0.034	0.179	0.1068	0.0956
Berhan	2018	0.023304	23.367	0.01421	0.65064	0.612	0.156	0.024	0.156	0.1383	0.0681
Berhan	2019	0.023884	23.676	0.02172	0.670487	0.594	0.145	0.028	0.145	0.158	0.0836
Berhan	2020	0.025904	23.784	0.01651	0.753536	0.634	0.16	0.028	0.16	0.2035	0.0605
Berhan	2021	0.007241	24.016	0.06461	0.785962	0.621	0.139	0.023	0.139	0.2683	0.0564
Berhan	2022	0.014472	24.221	0.05675	0.804712	0.687	0.135	0.016	0.135	0.3388	0.0531
Berhan	2023	0.011291	24.53	0.04795	0.809479	0.734	0.111	0.011	0.111	0.293	0.061
Oromia	2012	0.017705	21.748	0.00507	0.475334	0.715	0.157	0.025	0.157	0.236	0.0864
Oromia	2013	0.01996	22.087	0.01393	0.523707	0.693	0.14	0.024	0.14	0.0746	0.1058
Oromia	2014	0.02509	22.539	0.01258	0.505918	0.624	0.121	0.025	0.121	0.0689	0.1025
Oromia	2015	0.023262	22.978	0	0.587881	0.653	0.104	0.017	0.104	0.0956	0.1039
Oromia	2016	0.022011	23.146	0	0.55262	0.72	0.116	0.015	0.116	0.0662	0.0943
Oromia	2017	0.017812	23.513	0.0234	0.524953	0.746	0.102	0.011	0.102	0.1068	0.0956
Oromia	2018	0.035477	23.892	0.01636	0.589377	0.497	0.108	0.017	0.108	0.1383	0.0681
Oromia	2019	0.028358	24.182	0.01747	0.683057	0.516	0.116	0.018	0.116	0.158	0.0836
Oromia	2020	0.025446	24.244	0.02055	0.72163	0.586	0.135	0.015	0.135	0.2035	0.0605
Oromia	2021	0.020915	24.453	0.01355	0.745195	0.623	0.131	0.014	0.131	0.2683	0.0564
Oromia	2022	0.023078	24.675	0.01057	0.734586	0.613	0.131	0.019	0.131	0.3388	0.0531
Oromia	2023	0.024148	24.903	0.00945	0.798554	0.649	0.132	0.023	0.132	0.293	0.061
Buna	2012	0.022	21.259	0.12819	0.721728	0.774	0.159	0.038	0.21	0.236	0.0864
Buna	2013	0.00278	21.478	0.14116	0.606368	0.651	0.175	0.037	0.175	0.0746	0.1058
Buna	2014	0.029845	21.825	0.11785	0.62433	0.542	0.171	0.028	0.171	0.0689	0.1025
Buna	2015	0.029892	22.227	0.08892	0.690635	0.522	0.15	0.027	0.15	0.0956	0.1039
Buna	2016	0.027422	22.643	0.03386	0.532454	0.659	0.14	0.026	0.14	0.0662	0.0943
Buna	2017	0.020497	23.007	0.27033	0.538721	0.713	0.137	0.022	0.137	0.1068	0.0956
Buna	2018	0.024246	23.289	0.02055	0.533157	0.531	0.152	0.02	0.152	0.1383	0.0681
Buna	2019	0.03183	23.397	0.02388	0.574076	0.514	0.177	0.028	0.177	0.158	0.0836
Buna	2020	0.023337	23.66	0.03099	0.735411	0.598	0.162	0.02	0.162	0.2035	0.0605
Buna	2021	0.025834	23.979	0.01678	0.691683	0.54	0.146	0.022	0.157	0.2683	0.0564
Buna	2022	0.026106	24.252	0.03384	1.026248	0.594	0.147	0.025	0.147	0.3388	0.0531
Buna	2023	0.020459	24.56	0.02604	1.044132	0.68	0.14	0.022	0.14	0.293	0.061