EFECT OF LOAN PORTFOLIO ON FINANCIAL PERFORMANCE:

EVIDENCE FROM SELECTED PRIVATE COMMERCIAL BANKS IN ETHIOPIA

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JANURY, 2025

ADDIS ABABA, ETHIOPIA

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A THESIS SUBMITTED TO THE

DEPARTMENT OF ACCOUNTING AND FINANCE

COLLEGE OF BUSINESS AND ECONOMICS, SCHOOL OF GRADUATE STUDIES,

ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE

DEGREE OF MASTER OF SCIENCE IN ACCOUNTING AND FINANCE

JANURY, 2025

ADDIS ABABA, ETHIOPIA

DECLARATION

I, Yezine Yirga Ayele, so accordingly attest that this master's thesis is entirely original with thorough citations to all sources cited. It is entirely my own original work that has never before been submitted to another university for a degree or exam.

Name: Yezine Yirga

Signature: _____

Date: 03/04/2025

CERTEFICATION

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

This is to certify that the thesis prepared by **YezineYirga Ayele**, entitled "**Effect of Loan Portfolio on Financial Performance in Banks Evidence from Selected Private Commercial Banks in Ethiopia**" submitted in partial completion of the criteria for the Master of Science (MSc) in Accounting and Finance degree, conforms with university norms and satisfies recognized standards for quality and originality.

Approved by:

Advisor: Alem Hagos (PhD.)

Signature: _____Date:_____

Approval Sheet

As members of the Examining Board of the Final Open Defense, we certify that we have read and evaluated the thesis prepared by Yezine Yirga Ayele, entitled of **Effect of Loan Portfolio on Financial Performance in Banks Evidence from Selected Private Commercial Banks in Ethiopia**, and recommend that it be accepted as fulfilling the thesis requirements for the award of the degree in Master of science in Accounting and Finance.

Name of Advisor Signature Date

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Acknowledgement

Above all, my dearest gratefulness and adoration goes to the Almighty God for giving me the chance and all those exertions to complete this research work. Next, I would like to extend my deep indebtedness to my advisors Alem Hagoss (PhD) for his persistent support from title selection up to the final writing of report, precious time, positive criticism, suggestions, valuable guidance and comments, my debts are innumerable.

I would like to address my sincere gratitude to my family members for their immense moral support and prayers, encourage me throughout the course of my life. I really admire their full interest and effort towards my success. My thanks also go to employees of Ministry of Finance and Central Bank of Ethiopia for their priceless information that has enriched this study.

Finally, I would like to express my deepest gratitude and appreciation to all those who participate directly or indirectly contributed to the successful preparation of this research.

List of Acronyms

DI: Diversification Index

ECBs: Ethiopian Commercial Banks

GDP: Gross Domestic Product

HHI: Herfindahl-Hirschman Index

HP: Hypotheses

LAR: Loan to asset ratio

MoF: Ministry of Finance

NPL: Non-performing loan

ROA: Return on Asset

RAROA: Risk Adjusted Return on Asset

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ABSTRACT

Lending portfolio means allocation of credit to different sectors, rather than focus on few sectors. Should banks and Micro finance institutions engage in diversification or concentrate (focus) their credit portfolio is a basic concern in banking industry. The objective of this research was to find out how Ethiopian commercial banks' lending portfolios affected their bottom lines. From 2013 to 2023, 11 Ethiopian commercial banks were sampled for the study's balanced panel data. The Ministry of Finance, each bank's website, and the National Bank of Ethiopia provided the data. Explanatory research design and a quantitative technique were used to accomplish the study's goals. The study's independent variables were loan diversification as determined by the diversification index, bank size, equity ratio, non-performing loan, loan to asset ratio, liquidity ratio, gross domestic product, and inflation rate, while the dependent variable was the financial performance of the banks as determined by return on asset (ROA) and risk adjusted return on asset (RAROA). The study employed a random effect model for risk-adjusted return on asset and a fixed effect model for return on asset for data analysis. The empirical finding shows that bank-specific factors (ROA and RAROA) play a significant role to affect Ethiopian banks' financial performance. These factors, which have a statistically significant and favorable impact on Ethiopian commercial banks' financial performance, include the diversification index, bank size, equity ratio, and liquidity ratio. On the other hand, the loan to asset ratio and non-performing loans have a statistically significant negative impact. Macroeconomic variable such as GDP and inflation has insignificant positive effect. The study mainly recommends that, to improve credit quality it is better to diversify loan to various sectors, because, it minimized idiosyncratic risk and enhance financial performance. And, management bodies of commercial Banks try to monitor credit risk by economic sector

Key words: lending diversification, financial performance, Ethiopian commercial banks.

CHAPTER ONE

1.NTRODUCTION

1.1. Background of the Study

1.1 Background of the Study

Diversification is a key business strategy where organizations expand into new areas to reduce risk and enhance profitability. In the banking industry, diversification is commonly achieved through loan and income diversification, with loan diversification being a critical focus due to its direct impact on a bank's risk and return profile (Turkmen & Yigit, 2012). Loan diversification refers to distributing loans across different sectors to mitigate risk and increase income, while income diversification deals with the outcomes generated by loans and other services. Given that loans are the primary source of income for banks (Nwankwo, 2000), focusing on loan diversification is essential for improving financial performance.

The debate between diversification and specialization in banking has been particularly relevant following the 2008–2023 financial crisis, which highlighted the risks of concentrated exposures, such as those seen in the US housing market (Aarflot & Arnegard, 2017). This debate is also influenced by banking regulations, which can incentivize either diversification or concentration depending on the specific rules governing asset portfolios (Acharya et al., 2006). Diversification may reduce risks but could also lower profitability, as suggested by several studies (Elsas et al., 2023; Mercieca et al., 2007). However, the effects of diversification on bank stability and performance remain a topic of ongoing debate, with conflicting findings in the literature (De Young et al., 2001; Stiroh, 2004).

While much of the empirical research on loan diversification has focused on developed countries, there is limited exploration of its impact in emerging economies like Ethiopia (Otieno & Moronge, 2014). In Ethiopia, banking regulations restrict loan exposure to a single borrower, emphasizing the need for diversification to manage risks (National Bank of Ethiopia, 2002). Sector-wise loan distribution in Ethiopia's banking system shows a concentration in certain sectors like industry and trade, which could have significant implications for both risk and return (National Bank of Ethiopia, 2018/2019). However, it remains unclear whether this concentration positively or negatively affects banks' financial performance.

This study aims to address this gap by examining the impact of loan diversification on the financial performance of Ethiopian commercial banks. Unlike existing studies that focus primarily on developed economies, this research will provide insights into the unique challenges and opportunities in the Ethiopian context.

1.2 Statement of the Problem

The management of loan portfolios is critical to the financial success of banks, as interest income from lending constitutes a significant portion of their revenue (Adzobu et al., 2017). In an increasingly competitive and deregulated banking environment, portfolio diversification is viewed as a strategy to manage risk and maximize profitability (Philita, 2018). However, the choice between diversification and concentration in loan portfolios remains a contentious issue. For instance, the 2008 global financial crisis, exacerbated by excessive exposure to the real estate sector, underscored the risks of concentration, while concentration strategies can improve profitability by leveraging sector-specific knowledge (Winton, 1999).

Empirical studies on the relationship between loan diversification and bank performance yield conflicting results. Some studies suggest that diversification reduces risk and improves stability (Tabak et al., 2010; Aarflot & Arnegard, 2017), while others argue that concentration can lead to higher returns by enhancing monitoring efficiency (Chen et al., 2023; Raei et al., 2016). Despite the theoretical and empirical debate, no consensus has been reached on whether diversification or concentration better maximizes returns and minimizes risk. This ongoing debate highlights the need for further research to better understand the implications of each strategy for bank performance.

In the context of Ethiopia, this debate is particularly relevant due to the challenges faced by Ethiopian banks in managing their loan portfolios. Banks in Ethiopia have been observed to heavily concentrate loans in certain sectors, leading to high levels of non-performing loans (NPLs). For example, Zemen Bank and Global Bank have experienced significant NPLs from concentrated sectors like car assembly and coffee exports. In contrast, banks such as Dashen Bank and Awash Bank, which have diversified their loan portfolios, reported lower NPLs and higher returns. This variation suggests that the degree of loan diversification may significantly affect both the risk and return of Ethiopian banks, but the impact is not yet well understood.

While two studies in Ethiopia—by Samuel (2018) and Elefachew & Rao (2016)—examined the effect of loan diversification on bank performance, their findings were contradictory. Samuel (2018) found that loan diversification improved bank returns, while Elefachew & Rao (2016) concluded that industrial loan diversification negatively impacted returns. Both studies, however, have notable limitations. They focused solely on returns, neglecting the risk aspect of diversification, and they covered short time periods, failing to capture the long-term effects of diversification strategies. Furthermore, both studies lacked a comprehensive theoretical framework on loan portfolio management.

Given these conflicting findings and the limitations of prior research, this study seeks to fill the gaps by examining both the risk and return implications of loan diversification on Ethiopian commercial banks. By doing so, it will provide a more nuanced understanding of the impact of diversification versus concentration, particularly in the Ethiopian context where the effects of these strategies are not fully explored.

1.3. Research Questions

This study address issues relating to the following basic questions emerging within the domain of the study problem.

- What is the effect of DI Sectoral loan on the lending diversification of Ethiopia commercial banks?
- What is Examine the impact of bank-specific factors (such as bank size, equity ratio, liquidity ratio, and loan-to-asset ratio) on the lending diversification of Ethiopian commercial banks?
- How to Analyze the influence of macroeconomic factors (such as non-performing loans, inflation, and GDP) on the lending diversification of Ethiopian commercial banks.
- What is the effect of lending diversification on Ethiopian commercial banks' profitability?

1.4. Objective of the Study

1.4.1. General Objectives of the Study

The general objective of the study is to investigate the determinants of financial performance in commercial banks in Ethiopia, with a specific focus on the factors influencing lending diversification and profitability.

1.4.2. Specific Objectives of the Study

As subsidiary to the general objective, the research aims:

I. To investigate the effect of DI Sectoral loan on the lending diversification of Ethiopia commercial banks.
II. Examine the impact of bank-specific factors (such as bank size, equity ratio, liquidity ratio, and loan-to-asset ratio) on the lending diversification of Ethiopian commercial banks.
III. Analyze the influence of macroeconomic factors (such as non-performing loans, inflation, and GDP) on the lending diversification of Ethiopian commercial banks.
IV. Assess the effect of lending diversification on the profitability of Ethiopian commercial banks.

1.5. Significant of the Study

There are several reasons why the study is important. There are only two studies on the impact of loan diversity (portfolio) on the profitability of Ethiopian commercial banks, which is one of the reasons this study was conducted, as was previously noted. As a result, this study provides some motivation for the dearth of research in Ethiopia and will ultimately be important in demonstrating the risk and return created from various industries. The findings of this research will have significance to the following groups:

The study finding and recommendations believed to have importance in enabling management body of commercial banks to adjust the efficient proportion of industrial loan diversification. For the Investors, this finding will expect to guide them on the best performing institutions to invest in for higher returns.

Research novices and scholars interested in this field should use the study's findings as a guide while conducting their own research. It will provide guidelines for economic policymakers on how to assess how the performance of the banking sector affects the economy and how that affects policy issues.

1.6. Scope of the Study

1.6.1 Time Scope

The study will analyze data from 2013 to 2023, covering a period of 11 years. The long-term data enable the authors to identify trends and patterns in the relationship between loan portfolio diversification and financial performance over time.

1.6.2 Case study Scope

The study did not cover every commercial bank and every element influencing banks' financial performance in order to keep the scope of the investigation modest. Therefore, the scope of this study

will be restricted to a few key macroeconomic and bank-specific factors that influence loan portfolio diversification and how it affects Ethiopian commercial banks' financial performance.

1.6.3 Concept Scope

The study was carried out in Ethiopia, with a focus on the commercial banking sector. The Ethiopian banking sector currently consists of the central bank (National Bank of Ethiopia), two state-owned banks, and twenty-nine private banks. Loan provision to customers in Ethiopia is conducted by all thirty-one banks as well as other financial institutions, such as microfinance institutions. However, the study utilized data from eleven pioneering private commercial banks. This approach allowed the researchers to access long-term data, enabling the analysis of trends and facilitating meaningful comparisons.

1.7. Limitation of the Study

The study has some limitations that have presented below:

The researcher has had difficulties in acquiring sufficient information for literature studies due to the dearth of prior research projects conducted on developing nations such as Ethiopia. However, the researcher has tried to overcome this problem through various ways such as, using other diversification (portfolio) literatures that are highly related with this topic and by reviewing Ethiopian banks annual report.

The secondary data that has been collected from annual banks report may have some limitations due to the change of reporting standard from GAAP to IFRS, it may distort the data.

1.8. Organization of the Study

There are five chapters in the study. An introduction is given in Chapter One, which covers the study's background, problem description, aims, scope, significance, and limits. The literature is reviewed in Chapter Two, together with the conceptual framework, empirical data, and theoretical underpinnings. The study design, approach, population, sampling strategies, sample size, data sources, tools, data analysis techniques, model specification, variable definitions, and hypothesis creation are all covered in Chapter Three's overview of the research methodology. Data analysis and discussion are the main topics of Chapter 4. The investigation is finally brought to a close in Chapter Five, which offers a review of the results and possible suggestions.

2.CHAPTER TWO

2.1. REVIEW OF RELEVENT LITERATURE

The theoretical and empirical research on the impact of loan diversity on banks' financial performance is the main topic of this chapter. The literature review aims to establish the foundation for the current study and address gaps identified in previous research, which will help in clearly defining the research gap and formulating the study's hypotheses.

There are four sections in the review. A theoretical review of loan portfolio strategy is given in Section One. Relevant empirical research on the effects of lending diversity is examined in Section Two. The findings and knowledge gaps are presented in Section Three. Lastly, the study's conceptual framework is described in Section Four.

2.2. The concept of lending diversification

Lending diversification means allocation of credit to different economic sectors rather than focus on few sectors. The composition of loan portfolios reflects to what extent banks apply focus or diversification strategies (Atahau & Cronje, 2017). According to Tuzcu et al. (2018) lending diversification can be defined as the expansion of credit lines to new sectors, or borrowers or geographical region.

Loan diversification is a strategy in which banks diversify their loan portfolios across different industries or even broader economic sectors and geographical regions to increase return and to minimize risks (Hayden, 2007). According to Turkmen and Yigit (2012) diversification is one of the important areas of the finance literature. This strategy is also crucial for a bank as a major player in the financial institution. Banks can intend to diversify its credit portfolio to increase the performance and to reduce the credit portfolio risk.

Financial performance of banks refers to the financial soundness of the banking sector (Rao & Desta, 2016). In light of this, commercial banks have several goals which include making profits, social goals and economical goals. However, maximizing profits is the primary goal and there for most of the plans and activities of an organization aim at realizing this key objective. Financial performance is one of the measures of banks' performance, which in effect is the measurement of the outcomes of banks' policies and operations.

2.3. Lending diversification and financial performance

In current highly competitive environment, banks may choose to diversify loan-making activities across different sectors to reduce their riskiness (Shim, 2018). Sinkey and Nash (1993) found that commercial banks specializing in credit-card loans have greater chance of insolvency than commercial banks with the mixture of traditional products. According to David and Dionne (2005) the banking sectors' poor and incompetent credit-testing and lending explain their large losses. A large part of these losses are obviously the result of a few lenders having large loans. It has significant adverse effect on banks financial performance. Norwegian banks that provide higher amount of loans to oil-related enterprise has experienced higher losses and write-downs on loans in 2016 due to decreasing oil prices, thereby their financial performances had adversely affected. On the other extreme, Hayden et al. (2007) found that lending diversification tends to be associated with reductions in a bank returns because of high monitoring cost in this strategy. The above empirical evidence shows that banks financial performance has highly affected by banks loan portfolio strategy.

2.4. Theories of loan portfolio strategy

A fundamental concern in the banking sector is whether banks and other financial intermediaries should concentrate (specialize) or diversify their loan portfolio. Scholars and professionals continue to disagree despite the development of theoretical frameworks and models that support both approaches. Regarding loan (credit) portfolio techniques, there are two primary theories. The first hypothesis, known as classical banking theory, suggests that in order to lower the likelihood of financial crisis and generate steady returns, banks should invest across a variety of industries and adopt a diversification approach. Corporate finance theory is the second theory. According to corporate finance theory, businesses should take a more focused approach and concentrate on areas in which they are experts. (Aarflot & Arnegard, 2017).

2.4.1. Traditional Banking Theory

Diamond (1984) creates a theory of financial intermediation that emphasizes the generation of information at the lowest possible cost in order to overcome incentive issues and make investments across a range of sectors and geographical areas with varying risk profiles. This idea states that because banks have varied portfolios, they are less vulnerable to shocks in certain industries. According to conventional banking theory, a bank's credit portfolio diversification has a positive correlation with risk and profitability. The quality of banks' credit portfolios increases when they extend their lending

operations to new industries, which lowers the likelihood of default. Furthermore, banks with greater diversification are less susceptible to downturns in certain industries.

By distributing assets across multiple industries, diversification lowers risk, according to classical finance theory, especially in markets with asymmetric information. It emphasizes how diversification lowers financial intermediation costs and increases incentives to keep an eye on borrowers (Diamond, 1984). This theory argues that diversification within intermediaries is crucial for achieving the potential net advantage of intermediation. The incentive problem between an individual borrower and creditor is similar to that between an intermediary and its depositors. By diversifying, an intermediary can resolve these incentive issues and make it feasible to hire an agent to monitor borrowers. Diversification remains important even if all parties in the economy are risk-neutral.

Diversifying loan portfolios can lower monitoring expenses, as Diamond's model illustrates. Banks are responsible for keeping an eye on loans in their capacity as depositors' agents. As the number of depositors and independent loan projects increases, the cost of contracting approaches zero.
Consequently, Banks are motivated to lend to as many different types of businesses and projects as they can. In line with portfolio theory, traditional banking theory also contends that diversifying a bank's loan portfolio lowers credit risk. Banks lower their risk of financial crisis by extending credit lines to new industries (Diamond, 1984).

The classical diversification hypothesis states that a bank's credit portfolio should be more diversified in order to lower realized risk, as indicated by loan loss provisions for bad loans. Diversification by itself, however, does not ensure lower risk or improved performance. The crucial function of loan monitoring is one explanation for this (Belguith and Bellouma, 2017).

Marinč (2023) builds on Diamond’s (1984) perspective by highlighting banks' function as lenders' watchdogs. He creates a model that illustrates how diversification might improve incentives for monitoring. Bank revenues are lowered in the case of a non-diversifiable systemic shock, but monitoring expenses stay the same, making monitoring more costly during difficult economic times. As a result, banks may have an incentive to stop monitoring and shift risk to depositors. However, a diversified bank is less likely to incur large losses and more likely to experience smaller losses, which stabilizes capital instead of deposits, making monitoring more valuable for shareholders.

2.4.2. Theory of Corporate Finance

Contrary to conventional banking theory, corporate finance theory contends that a bank's profitability is inversely correlated with the diversification of its credit portfolio. Scholars like Jensen (1986), Denis et al. (1997), and Meyer and Yeager (2010) contend that in order to capitalize on their knowledge, businesses, especially financial institutions like banks, should focus their operations on a single economic sector or a limited number of sectors. According to corporate finance theory, a company should concentrate its activities to maximize its knowledge and proficiency.

Denis et al. (1997) contend that businesses should focus on their core competencies in order to prevent the value-destroying consequences of diversification tactics, which might result from agency issues. A bank needs to be able to efficiently screen out bad credit risks in order to handle these agency difficulties. According to Mishkin et al. (2023), a specialized bank might obtain a competitive edge in information collecting by developing a thorough understanding of particular clients and sectors. This greatly lowers credit risk by allowing the bank to perform more effective screening and monitoring.

The literature on corporate finance also emphasizes how various stakeholders may hold divergent opinions about whether a company should diversify. According to Martin and Sayrak (2003), risk-averse managers are encouraged to diversify business operations in order to lower firm-specific risks that can affect their performance in the future because their pay is based on the success of the organization. Since they are not eligible to benefit from the possible profits of riskier economic endeavors, lenders may also be motivated to diversify. On the other hand, excessive risk-taking by businesses may reduce the possibility of payback from the lender's point of view. In contrast, shareholders have the ability to diversify their own portfolios and might favor companies that use a targeted approach to increase the returns on their own investments.

The notion of a "diversification discount" is another tactic employed by people opposed to company diversification. Servaes (1996) showed that a conglomerate's worth was lower than the sum of the values of its separate companies throughout the 1960s and 1970s merger and acquisition boom. This conclusion has been corroborated by a number of researches, such as Lang & Stulz (1994) and Berger & Ofek (1995). It is crucial to remember that the majority of the research comparing corporate finance specialization and diversification focuses on non-financial companies rather than banks or other financial organizations.

2.5. Effect of lending diversification on bank performance

Diversification Index

Lending diversification is measured by diversification index as applied by (Turkmen & Yigit, 2012; Elefachew & Rao, 2016). Diversification index shows the amount of loan diversification disbursed to various sectors.

There are two steps to get the value of lending diversification. First, the study finds the value of Herfinhal Hirschman Index. This value gives the concentration level of loan that is given by the bank to sectors. Thus, to get the value of diversification index, the researcher deducts the value of HHI from one.

The degree of industrial diversification (concentration) is measured by constructing the Herfindhal Hirschman index. It is given by:

$HHI=\Sigma si^2$

$HHI = (\%S1)^2 + (\%S2)^2 + \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots + (\%Sn)^2$

Thus, $DI =1- \Sigma si^2$ or DI= 1-HHI

Where Si is the proportion of the market that commercial banks lend to the various industries. A specialized bank with an HHI of 1 would, for example, only lend to one industry; as a result, the DI value would be zero.

For each bank, the researcher created a loan-based measure of diversity using the Herfindahl-Hirschman index (HHI). After constructing HHI to get the diversification value the researcher deduct HHI from one to acquire the level of diversification. In most studies, researchers' arbitrarily classified borrowing sectors to construct HHI. However, in this study the researcher classifies loan scope of the commercial banks into ten major sectors based on classification of NBE general borrowing sector to generate the value of HHI. These sectors are Agriculture (AGR), Industry (IND), Domestic Trade (DMT), International Trade (INT), Hotels and Tourism (HTM), Transport & Communication (TCM), Housing & Construction (HCN), Mines, Power & Water Res. (MPW), Others (OTH) and Personal (PRS).

HHI is calculated by the sum of the squared loan portfolio shares across ten types of loans:

$HHI= ((AGR/TOL)^2 + (IND/TOL)^{2+} (DMT/TOL)^2 + (INT/TOL)^2 + (HTM/TOL)^2 + (TCM/TOL)^2 + (HCN/TOL)^2 + (MPW/TOL)^2 + (OTH/TOL)^2 + (PRS/TOL)^2)$

After calculating HHI, to get the value of diversification index the study deduct HHI from one.

Diversification index (DI) = 1- HHI, the computation of loan HHI helps to acquire the value of diversification index. Thus, the level of lending diversification is measured by diversification index.

One less than HHI is the diversification index (DI). When this diversification index has a smaller value, it means that the bank makes specialized loans; when it has a greater value, it means that it makes loans in a variety of ways. If all loans are given to the same sector, the diversification index (DI) has a value of zero, while the HHI has a value of one.

2.6. Determinants of Lending Diversification

There are both bank specific and macroeconomic variables that affect lending diversification.

Bank Specific Factors

Bank Size

De-Haas et al. (2010) claimed that bank attributes including size and capital affect the loan portfolio compositions of banks acting as financial intermediaries. Because they may take advantage of scale economies when assessing the hard data that is typically available on larger customers, larger banks may have a competitive advantage when lending to these clients. However, due to size restrictions, smaller banks might not be able to lend to larger businesses. Banks have valid grounds for thinking that size and financial performance are linked.

According to Musah (2017) and Athanasoglou et al. (2005), profitability tends to increase with company size, as larger firms benefit from better risk diversification, economies of scale, and overall improved cost efficiency. Larger firms are typically able to secure larger loans and have easier access to markets, advantages that may not be available to smaller banks. In much of the literature, the effect of size on bank profitability is often measured by total assets (Muriithi, 2017). A bank's average costs can be decreased as it grows in size by spreading fixed costs among a wider range of assets. Additionally, spreading activities across several product lines, industries, and regions can reduce risk by increasing a bank's asset base (Mester, 2010).To assess whether a bank's size plays a role in the relationship between diversification and risk or return, many studies use the natural logarithm of total assets in their analysis.

Thus, the bank size is computed as follows:

SIZE= natural logarithm (total assets)

Equity Ratio

According to Rossi et al. (2023) banks with higher equity ratio have much available fund to diversify loan to various sectors. Equity ratio shows the capital structure of the bank. The ratio is measured by total equity divided by total assets. According to Ally and Zhang (2016) this ratio shows the extent to which a bank uses internal source to fund its assets. The higher the capital ratio, the safer the bank is. There is an inverse relationship between leverage, which is given by total liability over total equity, and capital ratio. It is widely known that higher leverage makes a bank financially riskier, which means in exact reverse order lower the capital ratio the riskier a bank financially. When banks are highly used this ratio, it enables to lend more asset to different sectors.

According to Sufian (2011) when banks are well capitalized (used high equity to asset ratio), banks face lower costs to become bankrupt and then lower funding costs and dependence on external funding so as to generate higher profitability. This ratio show the magnitude of capital own which is used to finance all of the company's assets.

The higher the proportion of equity ratio it was increasingly high also attachment or motivation owner of the bank's business continuity, so the higher the role of the owner in influencing the management of performance improvement or efficiency of their bank in a more professional manner. Moreover, with the existence of high equity ratio can protecting depositors from losses and maintaining public trust due to available capital to guard their funds (Hendrayanti, 2023).

Equity Ratio= Equity/Total Asset

Non-Performing Loan

As per Hou and Dickinson (2007) Non-performing loans are ones that are not generating income, principal and interest payments are not expected to be made in full, principal and interest are 90 days or more past due, or the due date has passed and full payment has not been made. NPL issues continue to be a global nuisance and a top worry for regulators despite strict supervision and continuous efforts to oversee the banking industry generally and lending activities specifically (Boudriga et al., 2023). As per (Panta, 2018) distributing loans to various sectors are one of the mechanisms to reduce higher NPL.

Non-performing loans make financial institutions insolvent and severely harm the economy as a whole by making banks reluctant to extend credit (Hou and Dicknson, 2007). So it has a significant negative impact on banks financial performance. Non-performing loans ratio is calculated as the ratio of nonperforming loans to total loans according to (Chen et al., 2023; Raei et al., 2016; Rao, 2015; Tabak et al., 2010).

NPL ratio= Non-Performing Loan/Total loans and advance

Loan to Asset Ratio

Since loans are one of the most dangerous assets, the loan to asset ratio is regarded as one of the primary indicators of asset quality; the higher the ratio, the more exposed the bank is to risk. Thus, more loans could result in a decline in the quality of the bank's assets, which would have a negative impact on the bank's performance (Alper & Anbar 2011).

On the other hand, since loans are a bank's primary source of revenue, it is anticipated that its profitability will rise as its loan portfolio expands. Loan to asset ratio is a variable used to measure what percent of total assets is comprising by loans and it measures the percentage of total assets the bank has invested in loans (or financings) (Moin, 2008; Boyd & Champ, 2003). According to Rivai (2007) The loan to asset ratio is a metric that shows how well banks can use their whole asset base to meet demand for loans. Because there is a larger loan component in the overall asset structure, the higher this percentage, the better the credit performance level.

Loan to asset ratio= total loan/ total asset

Liquidity

Banks with sufficient liquidity have much available funds to distribute loans to various sectors and thereby it expected to increase loan disbursement to different sectors. However, at the same time banks hold higher liquidity amount indicates that banks are not used their asset to provide loan to sectors and this leads to decrease loan diversification. A bank's liquidity condition indicates its ability to fulfill its responsibilities in a timely and efficient manner. Even yet, it is regarded as one of the primary determinants of a bank's status as a financial institution (Samad, 2004).

Liquidity ratio measures banks' ability to fulfill short-term obligations using cash and other assets that are most readily converted to cash. However, there are some differences in the measurement that is employed in the empirical investigations. The cash to deposit ratio was used by some authors, such as

Ilhomovich (2023), to gauge banks' liquidity levels. Others make use of the ratios of liquid assets to total assets, loans to deposits, and current assets to current liabilities. Regulators in the majority of nations, however, establish the minimal amount of liquidity that banks must maintain. Similarly, the National Bank of Ethiopia established a liquid asset to deposit ratio that is anticipated to remain above 15% of the bank's net current liabilities, with approximately 5% of that amount being held in cash, primary reserve assets, and assets that are readily convertible to cash (see directive no SBB 55/2023). Therefore, this study used the liquid asset to deposit ratio, which is a measure used by the National Bank of Ethiopia as well as ECBs to evaluate its link with performances.

Liquidity ratio= liquid asset/deposit ratio

Macroeconomics Factors

Economic growth

The real GDP is a measure of economic growth. According to earlier research, GDP growth is anticipated to improve banks' financial performance (Musah, 2017). The effects of changes in overall economic activity are captured by real GDP. Athanasoglou (2005) asserts that increased economic growth improves the quality of banks' assets, motivates them to lend more, and allows them to charge larger margins. The increment of real GDP has a positive effect on all sectors development thus, the demand for loan by sectors are increased and it expected to have increase the loan diversification.

Inflation

Generally speaking, inflation is the steady rise in the level of prices for goods and services inside an economy over time. Each unit of currency may purchase fewer products and services when prices rise. As a result, inflation causes the economy's medium of exchange and unit of account to lose real value, as well as the purchasing power per unit of money (Boyd & Champ 2003). High inflation rate is associated with higher costs and also higher income.

2.7. Empirical review

Researches have been conducted studies to identify the effect of lending diversification on financial performance in banking industry at different countries.

Abroad Studies

Acharya et al. (2006) investigated the first work on this issue, after their study several researchers have been conducted on this issue.

Using information on banks' exposure to various industries and sectors, the primary goal of this study was to determine the impact of loan portfolio focus versus diversification on the return and risk of Italian banks during the sample period 1993–99.

They used the Hirschman-Herfindahl Index (HHI) to gauge how diversified banks' loan portfolios were. Return on assets (ROA) and stock return are used to gauge financial performance, whereas the ratio of doubtful and nonperforming assets to assets and the ratio of loan loss provisions to assets are used to gauge risk. The study's control variables include the bank's asset size, capital ratio, branch ratio, and employee ratio. The study's conclusions demonstrate that the impact of diversification on banks' earnings varies according to the banks' level of risk. Diversification lowers bank return for riskier banks while generating riskier loans.

Diversification offers low-risk banks either a minor benefit or an inefficient risk-return trade-off. It has only been demonstrated that diversification increases returns when credits are subjected to modest risk. Overall, they come to the conclusion that diversification does not always translate into improved bank performance and/or safety. Similar to Winton's (1999) conclusions, these results can be explained by less effective supervision brought on by a lack of previous lending expertise in the just joined industry.

Hayden et al. (2007) investigated the relationship between German banks' bank return (as determined by ROA) and industry and geographic diversification (as determined by HHI). They employed the Hirschman–Herfindahl Index to evaluate focus (or diversity, respectively), and they added asset size, equity ratio, and personnel cost as control variables. Financial performance was measured using return on equity (ROE) and return on assets (ROA) (dependent variable). The same risk measurement as that employed by Acharya et al. (2002) was utilized to calculate risk balance sheet ratios like "Doubtful and Non-Performing Loans/Total Loans." Diversification is often linked to poorer bank returns for most data; even when risk is taken into account, increased diversification is linked to worse returns for nearly all banks, particularly those with low and moderate risk.

There are occasionally statistically significant positive correlations between industrial diversification and bank returns and high-risk banks. Their results run counter to both the theoretical conclusions of Winton (1999) and the empirical findings of Acharya et al. (2006).

In a similar study, Tabak et al. (2010) examined the risk-return trade-off in relation to the diversification of 96 commercial banks in Brazil from 2003 to 2023. Used monthly high frequency panel data that was created for the Brazilian banking system and included bank-level loan statistics by economic sector. The study determined if it is better for banks to diversify or concentrate their lending portfolio across different economic sectors. According to their findings, a higher level of loan portfolio concentration generally results in a higher return while also lowering the risk of default. The findings thus demonstrate that Brazilian banks' overall financial performance is enhanced when they concentrate their lending efforts on a small number of sectors.

Utilizing unbalanced panel data from 1997 to 2023, Chen and Lin (2010) examine how diversification affects the risk and return of Taiwanese domestic commercial banks utilizing information gathered from 41 domestic banks. Risk was assessed using a Z-score measure of insolvency risk, the ratio of non-performing loans to total loans, and the ratio of loan loss provision. Returns were assessed using various metrics, including ROA, ROE, and Net Interest Margin (NIM). Diversification was measured by HHI and evaluated as both revenue and credit diversification. Loan diversification was found to have a considerable negative impact on all three of the study's profitability metrics. Nonetheless, credit diversification reduced a bank's risk by improving the NPL ratio.

Singh (2014) carried out a study on how loan diversification affected returns and risk at cooperative banks in Punjab, India. The study concentrated on how diversification affected the cooperative banks' risk and return. For this investigation, secondary data from ten fiscal years, from 2002–03 to 2011–12, was used.

The data was analyzed with statistical tools like Hirschman-Herfindhal Index, weighted average and simple linear regression model. The result found by the researcher shows that diversification and return are negatively related.

It means diversification didn’t help the central cooperative banks in increasing return rather it has adversely affected the return. In addition, diversification couldn’t help the banks in reducing risk. Researcher could not find significant association between diversification and risk.

Foster and Bailey (2015) investigated the relationships between loan diversification and banks financial performance and stability in Jamaican commercial bank by using panel data over the period 2005 to 2015. Return on equity, return on assets, and risk-adjusted return on equity were used to gauge financial success. Similar with traditional portfolio theory, the results show that loan portfolio diversification leads to improvements in bank stability as well as increases profitability. However, as

was shown for both big and small banks, greater loan portfolio diversification contributes to the decline in credit risk.

Simpasa and Pla (2015) conducted a study on Sectoral Credit Concentration and Bank Performance in Zambia. Using data at the bank level, this study investigated the relationship between credit concentration and risk in Zambia. They maintained that by limiting lending to a small number of industries, banks may lower monitoring expenses and, consequently, risk, increasing total profitability. This indicates that a bank's financial performance would suffer if it adopted a highly diversified lending portfolio. This result aligns with the theory of corporate finance.

Atahau and Cronje (2017) studied on whether diversification leads to better loan portfolio returns or not in Indonesia commercial banks. They gathered the information via secondary data and The impact of lending diversity on loan portfolio returns was assessed using panel data regression and non-parametric testing of means on data relating to 109 commercial banks from 2003 to 2011. The loan portfolio returns are calculated as the ratio of loan interest income to the average number of loans. The researchers discovered a strong positive correlation between loan portfolio returns and loan diversification in the industrial sector.

Aarflot and Arnegard (2017) conducted a study on the impact of industrial diversification on bank performance, using annual data from Norwegian banks over the period 2004–2023. Investigating if a bank's commercial lending diversification strategy affects its profitability was the goal. The Herfindahl-Hirschman Index (HHI) was the independent variable and return on assets (ROA) was the dependent variable. Control variables including bank size, equity ratio, and staff costs were also included. The findings revealed that increased diversification enhances financial performance for banks in Norway, aligning with Diamond’s (1984) traditional banking theory, which emphasizes improved monitoring incentives and performance through diversification. The results showed that increased portfolio concentration negatively impacted bank profitability, and this trend was consistent across different diversification measures.

Belguith and Bellouma (2017) examined the effect of loan portfolio diversification on the profitability of Tunisian banks. The 10 biggest banks in Tunisia, which collectively possessed over 85% of the industry's total assets, provided panel data for the study. The Herfindahl-Hirschman Index (HHI) was used as the independent variable, while other dependent variables, such as return on equity (ROE), return on assets (ROA), and risk-adjusted return on assets (RAROA), were used to measure

profitability. In addition to macroeconomic variables like GDP growth and inflation, control variables included bank-specific elements like size, equity, and credit risk. The study indicated that diversification has a negative impact on bank profitability since it was more profitable to focus on fewer areas than to diversify lending operations.

Adzobu et al. (2017) examined, using data from 30 Ghanaian banks from 2007 to 2014, how loan portfolio diversification affects the risks and profits of banks in emerging nations. The HHI was the independent variable, and return on equity (ROE) and return on assets (ROA) were the dependent variables. Bank size, capital adequacy, liquidity, funding costs, and GDP were all considered control factors. The results showed that bank returns were positively and significantly impacted by GDP, bank size, liquidity, and HHI. On the other hand, non-performing loans, cost effectiveness, revenue diversification, and the capital adequacy ratio all had a detrimental and substantial impact. The results suggested that increasing loan portfolio concentration was associated with higher profitability, and sectoral loan diversification negatively impacted profitability. This finding was consistent with research by Tabak et al. (2011) and Acharya et al. (2006), which also suggested that diversification does not necessarily reduce credit risks for banks.

A study was conducted in order to ascertain the impact of sectoral credit diversification on the financial performance of the banking sectors in East Africa as well as the consequences of this diversification on the efficacy of bank monitoring (Mulwa, 2018). For eight solid years, from 2008 to 2015, secondary data was gathered from the Bank Supervision reports of the central banks in Kenya, Uganda, Rwanda, and Tanzania, who are members of the East African Community (EAC).

Sectoral loan diversification was regressed against asset quality, a stand-in for the efficacy of bank supervision, and financial performance indicators in order to accomplish these goals. According to the study, sectoral credit diversification enhanced the financial performance of banks throughout all of East Africa. These results were consistent with Diamond's (1984) theoretical recommendations that diversity lowers the intermediary's assigned monitoring costs, allowing the intermediary to generate a return over what is due to the fund suppliers.

Empirical Studies in Ethiopia

Elefachew & Rao (2016) conducted a study on the impact of industrial diversification on Ethiopian banks' profitability in 12 selected commercial banks. The data covers a period of 2008/09 to 2023/14 and secondary data was used. The dependent variables are return on equity and return on asset. The degree of diversification on bank loans given to a specific industry was measured using the

Diversification Index (DHI), which also served as a control variable. Included were GDP, bank size, capital ratio, liquidity, credit risk, and inflation. The outcome demonstrates that the banks in Ethiopia may be considered to have diversified their lending portfolios across several industries. The regression result was estimated using a fixed effects model, and it was discovered that industry diversification significantly and negatively impacted return on equity and return on assets. This study support focus strategy for better profitability.

In Ethiopia more recent study conducted by Samuel (2018) examines how lending diversity affects Ethiopian commercial banks' financial performance using data from 15 chosen banks between 2012 and 2016. The study employed a quantitative research methodology, and linear regression models were used to analyze secondary financial data for the dependent variables of bank performance measures, including return on equity (ROE), return on asset (ROA), risk-adjusted return on equity (RAROE), and risk-adjusted return on asset (RAROA).

Bank size, equity ratio, non-performing loans, inflation rate, and GDP were used as control factors, while the HHI sectoral index (diversification index) was utilized as an independent variable. All of the bank performance metrics employed in this study showed a favorable correlation with the HHI sectoral index, according to the researcher. All metrics of a bank's financial performance are positively and significantly impacted by GDP, equity ratio, and bank size. However, the financial performance of Ethiopian commercial banks is significantly impacted negatively by inflation and non-performing loans.

Table 2.1: Summary of important empirical findings

Authors and Date	Title and Case area	Variables considered	Empirical findings
Belguith& Bellouma (2017)	The Effect of Diversifying Loan Portfolios on the Profitability of Tunisian Banks	HHI, Bank size, equity ratio, non-performing loan, GDP and inflation	HHI and non-performing loan have significant positive effect on banks return. Bank size, equity ratio and GDP have positive effect. Inflation has insignificant positive effect on return. The study concludes loan diversification has a negative impact on profitability.
Elefachew & Rao (2016)	The effect of industrial diversification on the profitability of Ethiopian banks	GDP, inflation, credit risk, bank size, capital and liquidity ratios, and HHI	DI has a statistically significant negative effect on profitability. Bank size has a positive and statistically significant impact on banks profit. GDP growth and inflation are negatively related to bank profitability but the coefficients are not statistically significant. Capital ratio has no effect on performances. The study concludes loan diversification has a negative impact on profitability.
Samuel (2018)	The effect of lending diversification on the financial performance of commercial banks in Ethiopia	HHI, bank size , equity ratio, non-performing loan, inflation and GDP	HHI sectoral loan index, bank size, equity ratio and GDP have positive and significant relationship with financial performance. But Inflation rate and non-performing loan have significant and negative

			relationship. The study concludes lending diversification has positively affect banks profitability.
Adzobu et al. (2017)	Evidence from an emerging market regarding the impact of loan portfolio diversification on banks' risks and returns (Ghana)	HHI, bank size, liquidity, GDP, Capital adequacy ratio, cost efficiency, income diversification and non-performing loan	HHI, bank size, liquidity and GDP have positive and significant effect on banks return. Capital adequacy ratio, cost efficiency, income diversification and non-performing loan were negative and significant effect. Diversification has negative effect on bank performance.

Source: authors developed from the literature, 2024

2.7. Conclusion and knowledge gap

Although the aforementioned empirical review attempted to present its findings in the context of their country and study area, this does not imply that it would be replicated in other contexts. Evidence from prior studies shows some researchers' support lending concentration and some researchers support lending diversification based on their finding. These contradictory results revealed that there is inconsistency among research findings on bank strategy. For instance, Elefachew & Rao (2016) concludes that loan industrial diversification has a negative and significant effect on bank return. However, Samuel (2018) found loan diversification increased Ethiopian banks' return.

Up to the best knowledge of the researcher, only two studies are investigated on this topic in Ethiopia by Samuel (2018) and Elefachew and Rao (2016). This shows there is a problem of literature shortage on this topic. Thus, the researcher motivated to contribute updated empirical evidence on the issue to reduce literature limitation regarding the topic. And, the researcher has identified research gaps from the above two studies that were carried out in Ethiopia. First, both researchers have arbitrarily classified borrowing sectors to construct HHI. Since the value of HHI has a key to determine the effect of lending diversification on performance of banks. Thereby, the researcher classified loan scope of the commercial bank into ten major sectors based on classification of NBE general borrowing sector.

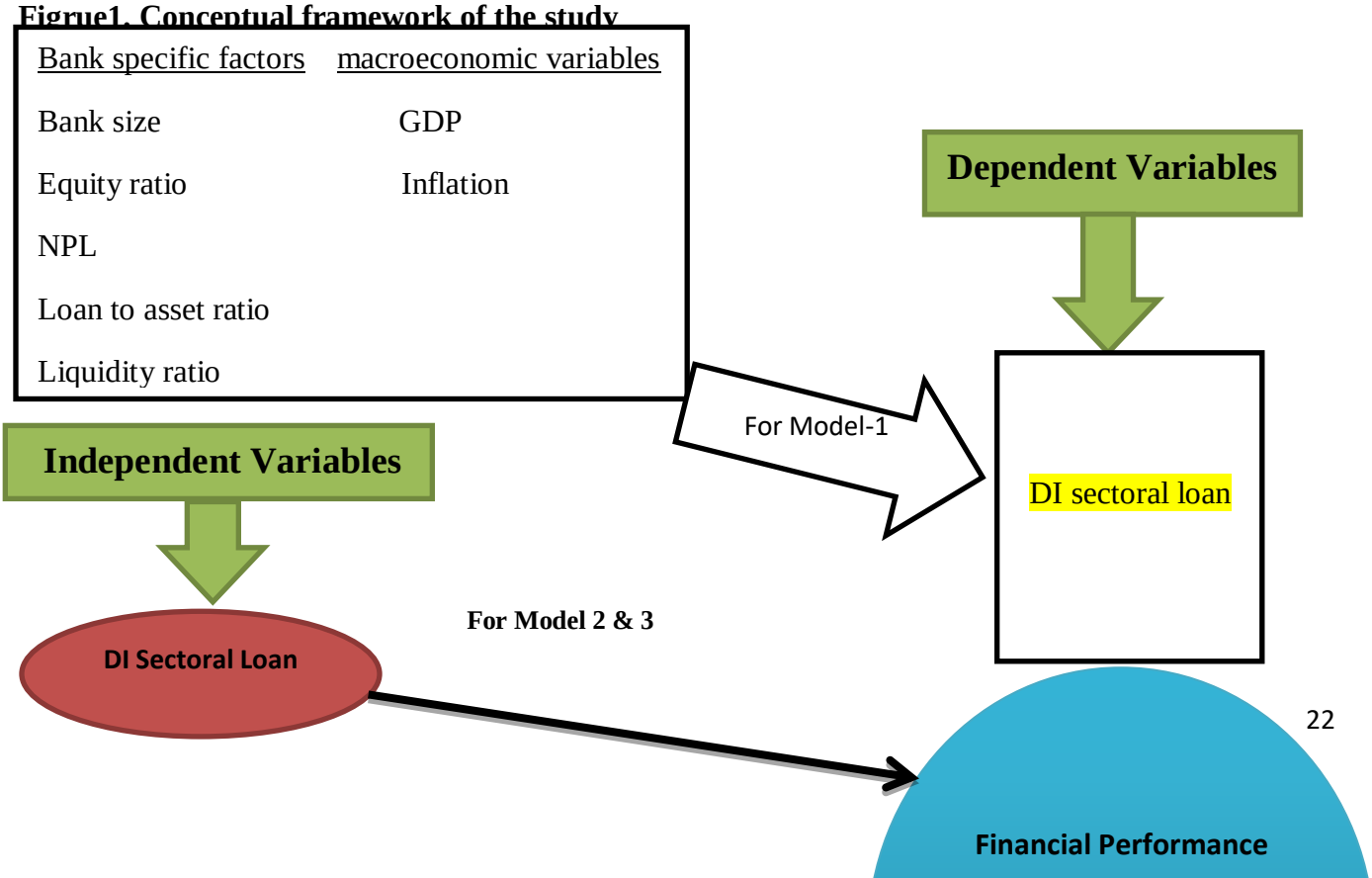
Second, both studies used five years financial data to conduct the study but, in this study the researcher used eleven (11) years audited financial data to find out a robust result.

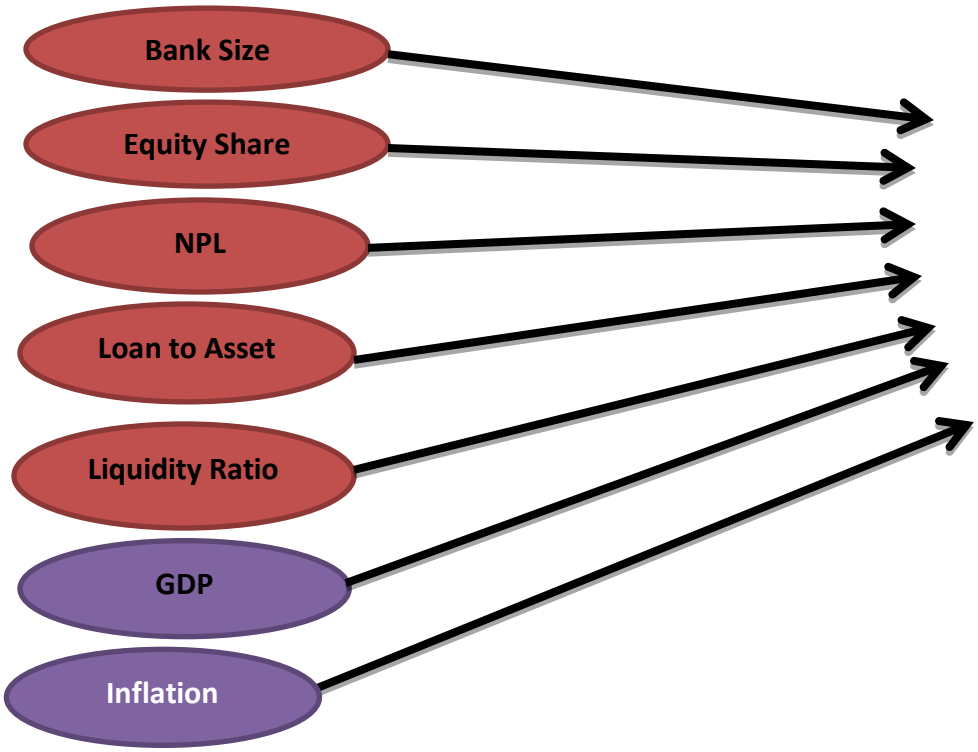
Third, the profit component of loan portfolio diversification is the main emphasis of the two aforementioned research. However, by placing a strong focus on non-performing loans and risk-adjusted return on assets, the researchers in this study addressed both the return and the risk component of the loan diversification benefit. Lastly, to determine the impact of lending diversity on banks' financial performance, both researchers employed bank size, equity ratio, credit risk, liquidity ratio, GDP, and inflation as control variables. However, because they influence the degree of lending diversification, those factors are employed as predictors of lending diversification in this study. The impact of lending diversification on financial performance is then examined using regression analysis. The impact of loan diversity on banks' financial performance can be determined using either approach. However, this study adds value by identifying factors that affect lending diversification instead of only used as control variables. Thus, it makes this study unique not only from the above two studies rather from other similar studies.

2.7. Conceptual frameworks

The researcher created the following conceptual framework, which highlights the dependent and independent variables and summarizes the study's emphasis and scope, based on the literature review previously discussed:

Figrue1. Conceptual framework of the study





Source: authors designed based on literature (2024)

3.CHAPTER THREE

3.1 RESEARCH METHODOLOGY

The research approach used in the study is described in this chapter. It goes into detail about the data type used for the study and discusses the research design and methodology. Additionally, it describes the methods used to identify key factors influencing the research, the target population, the sampling techniques employed, and the sources and types of data gathered. The chapter also defines and measures the variables used in the study, as well as the model specification for the thesis.

3.2. Research Design

As Kothari (2004) states, the selection of research design depends on the study's objectives. As was previously said, the primary aim of this study was to investigate the connection between bank financial performance and loan diversification. Explanatory study design was recommended by Saunders (2023) as a means of evaluating the causal linkages between independent and dependent variables. As a result, this study used an explanatory research approach.

3.3. Research Approach

The goal of quantitative research is to measure and analyze statistical data in order to draw conclusions that can be measured. According to Creswell (2023), when the objective is to identify factors influencing an outcome, assess the effectiveness of an intervention, or understand the key predictors of outcomes, a quantitative approach is the most suitable. This method is ideal for addressing problems by examining the impact of variables on an outcome, using scientific methods. These include model generation, theory and hypothesis development, the creation of measurement instruments, variable manipulation, empirical data collection, and data analysis. Therefore, the study used a quantitative research method to better understand how lending diversification affects commercial banks' performance.

3.4. Target population, Sampling Technique and sample Size

The target population for this study consists of all commercial banks currently operating in Ethiopia that have registered with the National Bank of Ethiopia (NBE). As of April 2024, the NBE annual report indicates that there are 31 banks in Ethiopia, consisting of 2 public and 29 private banks. The list of these banks includes: The following: Lion International Bank, Oromia International Bank, Zemen Bank, Buna International Bank, Berhan International Bank, Abay Bank, Addis International Bank,

Debub Global Bank and Enat Bank, Hijra Bank, Zemzem Bank, Sinqee Bank, Ramis Bank, Shebelle Bank, Tsehay Bank, Tsedey Bank, Omo Bank, Amhara Bank, Development Bank of Ethiopia, Awash International Bank, Dashen Bank, Abyssinia International Bank, Wegagen Bank, Nib International Bank, United Bank, Nib International Bank, Cooperative Bank of Oromiya, Lion International Bank, Awash International Bank, Dashen Bank, Dashen Bank, Dashen Bank, Oromiya International Bank, and Lion International Bank. Development Bank of Ethiopia, one of the banks mentioned above, is not a commercial bank and is therefore excluded from the study. Therefore, all private commercial banks that are currently involved in the industry make up the study's target group.

The Development Bank of Ethiopia is excluded from the study, as it does not fall under the category of a commercial bank. The study focuses exclusively on the 29 private commercial banks that meet the inclusion criteria, as these are the most relevant to the research questions.

Given the nature of the study and the data availability from 2013–2023, the purposeful sampling technique was applied. This technique allows for the selection of a sample that is most relevant to the research objectives. The researcher specifically chose 11 commercial banks that have been operational since before 2023, as newly established banks (those founded after 2023) were excluded due to their non-relevance to the study period and objectives.

The starting period of 2013 was selected due to the country's significant macroeconomic challenges, notably high inflation and low international reserves, which have affected commercial banks' operations since 2007/2008. In 2023, regulatory changes implemented by the National Bank of Ethiopia (such as increased statutory reserves, liquidity requirements, and credit ceilings) had a profound impact on the banking sector. This provides a unique context for analyzing the evolution of lending diversification and profitability in the Ethiopian commercial banking sector.

The 11 banks selected for the sample represent 85.5% of the market share by number of branches and 90% of the market share by capital (as reported by NBE in 2023/24). This makes the sample highly representative of the Ethiopian commercial banking sector, ensuring that the findings from this study are generalizable to the entire population of commercial banks in Ethiopia.

Purposeful sampling is particularly well-suited for this study because it allows for the deliberate selection of banks that are most pertinent to the research question. By selecting banks that have been in operation since before 2023, the study focuses on institutions that have experienced the significant macroeconomic challenges and regulatory changes in recent years, making them particularly relevant for the analysis of lending diversification and profitability.

However, it is important to acknowledge the limitations of purposeful sampling:Potential selection bias: Since purposeful sampling involves selecting a sample based on specific criteria (i.e., banks operating before 2023), there is a risk that the sample may not fully represent the broader population of commercial banks, especially newer institutions or those with smaller market shares.

Overemphasis on vocal perspectives: Purposeful sampling may also risk overemphasizing the experiences of larger or more prominent banks while underrepresenting smaller or less vocal institutions, potentially skewing the findings.

To mitigate these limitations, several strategies were implemented: Inclusion of diverse banks: The 11 banks selected for the sample vary in size, capital, and geographical distribution, ensuring a broad representation of the commercial banking sector ,Exclusion of new banks: By excluding banks established after 2023, the study maintains a focus on those institutions that have experienced the macroeconomic and regulatory changes under investigation And Secondary data validation: The sample's representativeness was cross-checked with the most recent data from the NBE, confirming that the selected banks collectively account for a significant portion of the market share. To analyze the data, this study employs fixed/random effects models rather than alternatives like pooled OLS. The rationale for choosing these models is based on the following considerations:

Fixed/Random Effects Models: Accounting for unobserved heterogeneity: These models allow for the control of unobserved, time-invariant factors that might affect each bank (e.g., management practices, regional economic factors). This helps to avoid bias in estimating the effects of lending diversification and profitability.

Panel data structure: Given the study's use of panel data (data that spans multiple years for the same banks), fixed/random effects models are more appropriate than pooled OLS. Pooled OLS assumes that all units (banks) are homogeneous, which is unlikely in the case of banks with different sizes, market segments, and geographical coverage.

Pooled OLS Limitations: Ignoring unobserved heterogeneity: Pooled OLS fails to account for individual differences across banks and the temporal dynamics that may affect lending diversification and profitability. Potential bias: Without controlling for the bank-specific and time-specific factors, pooled OLS may produce biased estimates, leading to misleading conclusions.

Model Specification: The Hausman test will be used to determine whether the fixed or random effects model is more appropriate for the data. If the test suggests significant differences, a fixed effects model will be preferred, as it accounts for the possibility that individual banks may have unique, time-invariant characteristics that influence lending diversification and profitability.

The purposeful sampling technique was chosen for its ability to select banks that are most relevant to the research questions, specifically focusing on those that have been operational since before 2023. While the technique has limitations, such as potential selection bias, steps were taken to ensure the sample is representative of the broader Ethiopian commercial banking sector. The use of fixed/random effects models, as opposed to pooled OLS, is justified by the need to account for unobserved heterogeneity and the dynamic nature of panel data. These methodological choices will ensure robust, reliable findings in analyzing the factors affecting lending diversification and profitability in Ethiopian commercial banks.

Table 3.1: sample banks

	Banks	Year of establishment	Ownership	Current capital(in millions of birr)	No. of branches
1	Global Bank	2012	Private	2,400	220
2	Awash International Bank	1994	Private	6,024.1	423
3	Dashen Bank	1995	Private	5,210.2	421
4	Bank of Abyssinia	1996	Private	3,647.4	353
5	Wegagen Bank	1997	Private	3,605.4	355

6	United Bank	1998	Private	3,241.0	294
7	Nib International Bank	1999	Private	3,782.9	280
8	Cooperative Bank of Oromia	2005	Private	2,509.3	405
9	Lion International Bank	2006	Private	1,958.5	235
10	Oromia International Bank	2008	Private	2,851	277
11	Zemen Bank	2008	Private	1,793.1	44

Source: National Bank of Ethiopia, annual report of 2023/2024

3.5. Data Type, Source and Collection Instrument

This study employed panel data, which was chosen due to its suitability for financial modeling involving both time series and cross-sectional elements, as noted by Brooks (2014). Compared to using only cross-sectional or pure time-series data, panel data enables researchers to address a greater range of concerns and more complex challenges. Additionally, it lessens the impact of bias caused by omitted variables in regression findings. The main benefit of panel data, according to Saona (2011), is its capacity to take into consideration the unobservable, consistent, and varied features of every bank that participated in the research. Similarly, Baltagi (2005) highlighted that panel data effectively controls for individual heterogeneity and reduces collinearity among variables. This research was used secondary data for analysis and in the estimation of the empirical model. The collected data covers time period of 2023 up to 2023. The data was gathered from each bank's website, National Bank of Ethiopia and Ministry of Finance.

3.6. Variables description, Research Hypothesis and Measurements

3.6.1. Dependent variables

Banks performance indicators are dependent variables. Profit is the bank's ultimate goal, and as such, all of its strategies and operations are intended to achieve this lofty goal. Thus, the dependent variables Return on Asset (ROA) and Risk Adjusted Return on Asset were used to gauge banks' performance.

3.6.1.1. Return on asset (ROA)

Return on assets was used in the study to gauge banks' financial performance. The ratio of net income to total assets is known as return on assets, or ROA. Return on asset provides a measure for assessing the overall efficiency with which the assets are used to produce net income from operations. It is also indicative of banks management effectiveness and efficiency in deploying capital, because it is certainly possible to be efficient and yet poorly positioned in terms of how capital is utilized. It displays the earnings for each birr of assets.

It is a frequently used performance metric that shows how well management of a company uses its resources to generate profits. In the same study, the following writers also employed ROA as a gauge of bank financial performance Raei et al.(2016), Chen et al, (2023); and Tabak et al, (2011) and Acharya et al, (2006).

Return on Asset (ROA) = profit after tax/ Total asset

3.6.1.2. Risk adjusted return on asset (RAROA)

In addition to return on asset (ROA) the researcher was used risk adjusted return on assets. The rationale to use this variable as a dependent variable is that, this variable fills the gap of return on asset. Return on asset does not account for the risk that is taken to earn the profit on assets. A bank could earn a high profit level by taking higher level of risk (Anarfo & Appiahene, 2017). Hence, this variable shows the volatility of return by considering standard deviation.

If there is high volatility of return the standard deviation of return is high thus, risk adjusted return is low. If a firm able to sustain its return the standard deviation is low, it lowers risk as well and raises risk-adjusted return on assets. Thus, the study is possible to demonstrate the amount of return in relation to the risk by incorporating RAROA as a dependent variable.

In most diversification study many authors used this variable as a dependent variable such as Belguith and Bellouma (2017) because, diversification has highly correlated with risk-adjusted returns. For example, according to traditional theory, a well-diversified loan portfolio will yield higher risk-adjusted returns. This performance metric indicates the degree of risk attached to net operating income. The risk-

adjusted return improves with decreasing risk. According to Perz (2010), to assess the degree of risk associated with achieving a given level of profitability, the risk adjusted return is a good indicator.

RAROA= ROA/**σ**ROA, (Belguith & Bellouma, 2017; Chen and Lin, 2010; Foster & Bailey, 2015).

3.6.2. Independent variables and respective hypothesis

The DI Sectorial Loan Index

Empirically, different researchers arrived at different findings such as (Aarflot & Arnegard, 2017; Atahau and Cronje, 2017; Mulwa, 2018; Samuel, 2018) found significant and positive relationship between HHI sectoral loan (DI) and bank performance. Researchers like (Belguith and Bellouma, 2017; Elefachew & Rao, 2016; Singh, 2014) found significant and negative relationship between diversification HHI and bank performance. Majority of researchers found positive relationship between HHI and profitability especially studies conducted in Africa. Therefore, positive relationship is expected.

HP1: There is significant and positive relationship between DI Sectoral index and financial performance of commercial banks.

Bank size

According to Samuel (2015), Bank size is commonly used to assess potential economies or diseconomies of scale within the banking sector, and in most studies on the determinants of bank profitability, total assets are used as a measure of bank size. Additionally, bank size is linked to diversification, which can have a positive effect on risk and product portfolio. Existing literature suggests a positive relationship between bank size and financial performance (Acharya et al., 2002; Belguith & Bellouma, 2017; Elefachew & Rao, 2016; Samuel, 2018). This empirical result shows that big banks are more profitable and have better capital adequacy than small banks. Hence, a positive relationship between bank size and financial performance is expected.

HP2: There is significant and positive relationship between bank size and financial performance of commercial banks.

Equity ratio

Several studies see whether equity ratio affects bank financial performance, Samuel (2018) and Liu & Wilson (2010) found that equity ratio has a positive and significant relationship with profitability for banks in Japan. Moreover, Brighi & Ventrally (2014) found capital ratio positively correlated to

profitability and diversity. However, Elefachew and Rao (2016) and Dietrich and Wanzenried (2014), capital ratio does not have a significant impact on bank profitability. Therefore, positive relationship is expected.

HP3: There is significant and positive relationship between equity ratio and financial performance of commercial Banks in Ethiopia.

Non-performing loans ratio

Karim et al. (2010) found that a higher percentage of non-performing loans reduces banks' cost efficiency, which has a negative effect on profitability. This study examined the relationship between non-performing loans and bank efficiency in Malaysia and Singapore. Hu et al. (2004) suggested that profitable banks are less likely to engage in risky activities, as they face less pressure to generate revenues. In contrast, inefficient banks, particularly those with short-term managerial incentives, may take on riskier loans. Many scholars have observed a negative relationship between non-performing loans and bank financial performance (Jiminez & Saurina, 2006; Jellouli et al., 2023; Vogiazas & Nikolaidou, 2011; Samuel, 2018). Therefore, this study anticipates a negative correlation as well.

HP4: There is significant and negative relationship between non-performing loan and financial performance of commercial Banks.

Loan to asset ratio

Liu and Wilson (2010) found that relationship between total loan to total assets ratio and profitability is insignificant. On the contrary, Trujillo-Ponce (2023) and Çınar et al. (2018) found a positive and highly significant coefficient of loans to total assets with pfinancial performance, in terms of both ROA. A study by Rumler and Waschiczek (2016) presents significantly negative relationship with both. This means that as the period of research and geographic location of the banks change, they show a very diverse kind of result as far as relationship between total loan to total assets ratio and ROA is concerned. Since greater loans would result in interest income for the bank, the researcher anticipates a favorable relationship between the loan to asset ratio and financial performance.

HP5: There is significant and positive relationship between loan to asset ratio and financial performance of commercial Banks.

Liquidity ratio

Research on the relationship between bank liquidity situation and financial performance shows conflicting results. According to studies showing a negative correlation between performance and liquidity, banks continue to bear the cost of having liquidity reserves, primarily those that are required (Berger and Bouwman, 2023). According to other research, a stable liquidity position enhances performance (Dang, 2011; Bourke, 1989). Other research conducted in China and Malaysia has similarly examined the lack of a meaningful correlation between bank performance and liquidity (Said and Tumin, 2011). The liquidity ratio and bank profit have a positive and significant link in Ethiopia (Elefachew & Rao, 2016). Positive relationships are therefore anticipated.

HP6: There is significant and positive relationship between loan to asset ratio and financial performance of commercial Banks.

Economic growth

Ahmad et al. (2012), Ahmad & Kabir (2023), Nachane and Ghosh (2007), and Athanasoglou et al. (2005) investigated how economic growth (GDP) affected bank profitability and came to the conclusion that there was a strong and positive relationship between the two. Specifically, for Ethiopian commercial banks, this variable has a significant positive effect on profitability, as noted by Samuel (2018) and Belayneh (2011). The rationale behind this relationship is that robust GDP growth typically leads to higher economic activity, It enhances the quality of banks' assets, permits them to charge larger interest margins, and motivates them to lend more. Elefachew & Rao (2016), however, discovered a weak and negative correlation between GDP and bank performance. This study, which is based on earlier research, uses the real GDP.

HP7: There is significant and positive relationship between GDP and financial performance of commercial Banks.

Inflation

One important macroeconomic factor that may influence both the costs and revenues of banks is the inflation rate. Numerous writers have studied the connection between inflation and bank financial performance, arguing that how inflation impacts wages and other operating costs determines how it affects bank profitability. Staikouras & Wood (2003) point out that inflation can impact bank profitability through both direct effects, like higher labor expenses, and indirect effects, such changes in interest rates and asset values. Empirical studies by Samuel (2018), Elefachew and Rao (2016), and Kohler (2014) have found a negative relationship between inflation rates and profitability. Conversely,

Tan (2016) observed a positive relationship. Based on these findings, a negative relationship is expected in this study.

HP8: There is significant and negative relationship between inflation rate and financial performance of commercial Banks.

Table 3.2 Description of the variables and their expected relationship

Variables	Measure	Notation	Expected sign
Return on asset	Profit after tax/ total asset	ROA	
Risk adjusted return on asset	Return on asset/standard deviation of return on asset	RAROA	
Diversification index or DI sectoral index	1- HHI	DI	(+)
Bank size	Natural logarithm of total asset	BSZ	(+)
Equity ratio	Total equity/total asset	EQR	(+)
Non-performing loan	Non-performing loan/Total loan and advance	NPL	(-)
loan to asset ratio	Total loan/total asset	TLTA	(+)
Liquidity ratio	Liquid asset/total deposit	LIQ	(+)
Inflation	Annual Inflation Rate	INFN	(-)
GDP	Real Gross Domestic Product growth rate	GDP	(+)

Source: author's compiled (2024)

3.7. Model Specification

The data used in this study allows for the application of a panel data model, which offers advantages over both time series and cross-sectional data. The model specification is built upon the relevant information available for the study, meaning that the formulation of the economic model is shaped by the available data, grounded in standard theories and key empirical works. To identify the factors influencing loan diversification and examine its impact on the financial performance of private commercial banks, the

Model 1: Return on Asset (ROA) = α+β1DIit+β2B$SZit$+ β3EQRit+ β4NPLRit+ β5LARit+ β6LIQit+ $\beta 7GDP$it +$\beta 8INF$it + εi

Model 2: 1 Risk Adjusted ROA (RAROA) = α+β1DIit+β2B$SZit$+ β3EQRit+ β4NPLRit+ β5LARit+ β6LIQit+ $\beta 7GDP$it++$\beta 8INF$it εi

i= commercial banks =1….11, t= the time period covered, α= constant term, β= coefficient of independent variable, DI= Diversification Sectorial Loan Index, BSZ= Bank size, EQR= Equity ratio, NPLR= Non-performing loan ratio, LTA= Loan to total asset, LIQ= Liquidity ratio, GDP= Real GDP Growth, INF= Inflation Rate, ε= error term.

3.8. Methods of data analysis

During the acquisition of the necessary data, multiple linear regression analysis, correlations, and descriptive statistics were used for analysis. A correlation matrix was utilized to investigate the link between the dependent variable and the variables that provide explanations, and mean values and standard deviations were utilized to study the overall trends of the data from 2023–2019 based on the sector sample of eleven (11) banks. The relative significance of each independent variable in affecting financial performance was ascertained using a multiple linear regression model and t-statistic.

4.CHAPTER FOUR

4.1. DATA ANALAYSISS, PRESENTATION, RESULT AND DISCUSSION

4.2. INTRODUCTION

Presenting the results and data analysis, as well as a discussion of the findings, is the aim of this chapter. The STATA 14 software program was used to process and analyze the gathered data. A

descriptive analysis of the study variables is presented in the first section, followed by a discussion of correlation analysis in the second section, the fulfillment of the assumptions of the classical linear regression model (CLRM), including diagnostic tests, in the third section, and the presentation of the regression analysis results in the fourth section, which represent the main findings of the study.

The researcher used descriptive statistics to analyze the data first, then correlation analysis to look at the relationships between the independent variables (diversification index (DI), bank size, equity ratio, non-performing loans, loan-to-asset ratio, liquidity, inflation rate, and GDP) and dependent variables (ROA and RAROA). Multiple regression analysis was performed to evaluate the predictor factors' role in explaining the dependent variables (ROA & RAROA) following the application of several tests to the data.

4.3. Descriptive Statistics

Based on the sample banks, this part presents the descriptive statistics for the independent and dependent variables employed in the research. Table 4.1 displays the summary of these descriptive statistics, which are intended to give a general picture of the data (for both dependent and independent variables). Each variable has 121 observations in total, which included information from 11 banks between 2013 and 2023. Each variable's mean, standard deviation, minimum, and maximum values are displayed to show the general patterns in the data over the course of the study. The measurement of the data's central placement and variability is the main goal of this study's descriptive statistics. The standard deviation captures the variability or spread of the data around the mean, whereas the mean measures the central tendency, which is represented by location.

Table 4.1: Summary of descriptive statistics for dependent and independent variables

Variable	Observation	Mean	Std. Dev.	Minimum	Maximum
ROA	121	0.0259016	0.0065862	0.00366	0.04249
RAROA	121	3.946232	1.422767	0.29374	6.522152

DI	121	0.7405094	0.0543759	0.579452	0.859201
BSZ	121	23.27118	1.376507	19.60351	27.29134
EQR	121	0.1251451	0.0307272	0.041865	0.1959032
NPL	121	0.0363165	0.0091346	0.013	0.08
LAR	121	0.452787	0.0586555	0.318796	0.587881
LIQ	121	0.2142614	0.0813214	0.1163386	0.4991226
GDP	121	0.0964727	0.0109995	0.077	0.114
INF	121	0.15	0.103833	0.103833	0.364

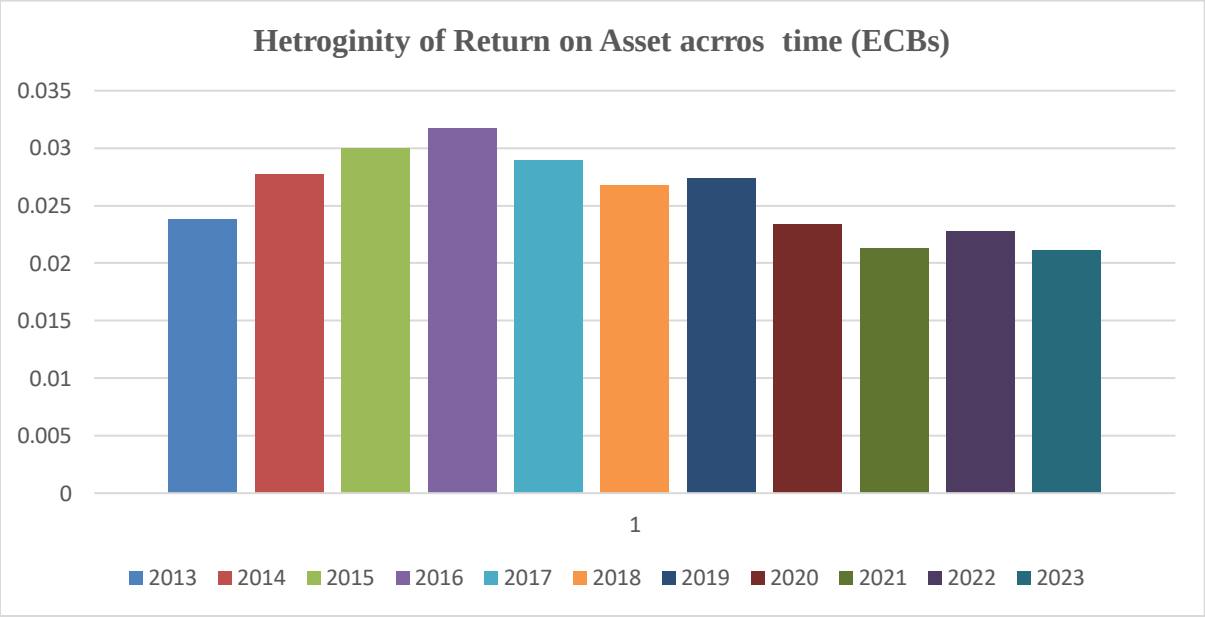
Source: STATA 14 output results for sampled commercial banks from 2013-2023.

Note: Return on asset (ROA), Risk adjusted return on asset (RAROA), Diversification index (DI), Bank size (BSZ), Equity ratio (EQR), Non-performing loan (NPL), Loan to asset ratio (LAR), Liquidity ratio (LIQ), Inflation (INF) and Gross domestic product (GDP).

The banks' financial performance was evaluated using return on asset and risk-adjusted return on asset, as shown in table 4.1. ROA is the primary metric used to assess a bank's financial performance. It shows how profitable the Ethiopian commercial banks that were sampled were. It is calculated by dividing net income after taxes by total assets, and during the 2013–2023 sample period, its mean value was 0.0259016. According to this finding, the average profit after taxes for the Ethiopian commercial banks in the sample was 2.6% of total assets. According to the Basel Committee on Banking Supervision, this mean value exceeds the global ROA guideline of 1%. The result implies that Ethiopian commercial banks are profitable and effective in their operations. On the other hand, even though they are profitable, they are not efficient in using their asset. It suggests that in order to boost asset returns, Ethiopian commercial banks must make the best use of their resources. ROA had a minimum value of 0.00366 and a maximum value of 0.04249. This indicates that for every Birr invested in the banks' assets, the most profitable commercial bank in the sample made almost 4.03 cents in profit after taxes. However, for every Birr invested in the bank's assets, the least profitable commercial bank in the sample generated 0.366 cents of net income. The standard deviation is 0.66 percent, indicating that there are moderate differences in the profitability figures for each bank.

In order to describe dependent variables more broadly and the sake of giving adequate information, the researcher used graphic description in addition to tabular description. In figure 4.1 and figure 4.2, below; the researcher tried to indicate the heterogeneity of ROA using across time and across banks, since the type of data was panel data. Specifically, figure 4.1; indicate the heterogeneity of return on asset (ROA) for sampled Ethiopian commercial banks across a period covering from 2013-2023, while figure 4.2; indicated that the heterogeneity of return on asset across sampled commercial banks in Ethiopia.

Figure 4.1: yearly changes in average return on asset (ROA) for sampled Ethiopian commercial banks.

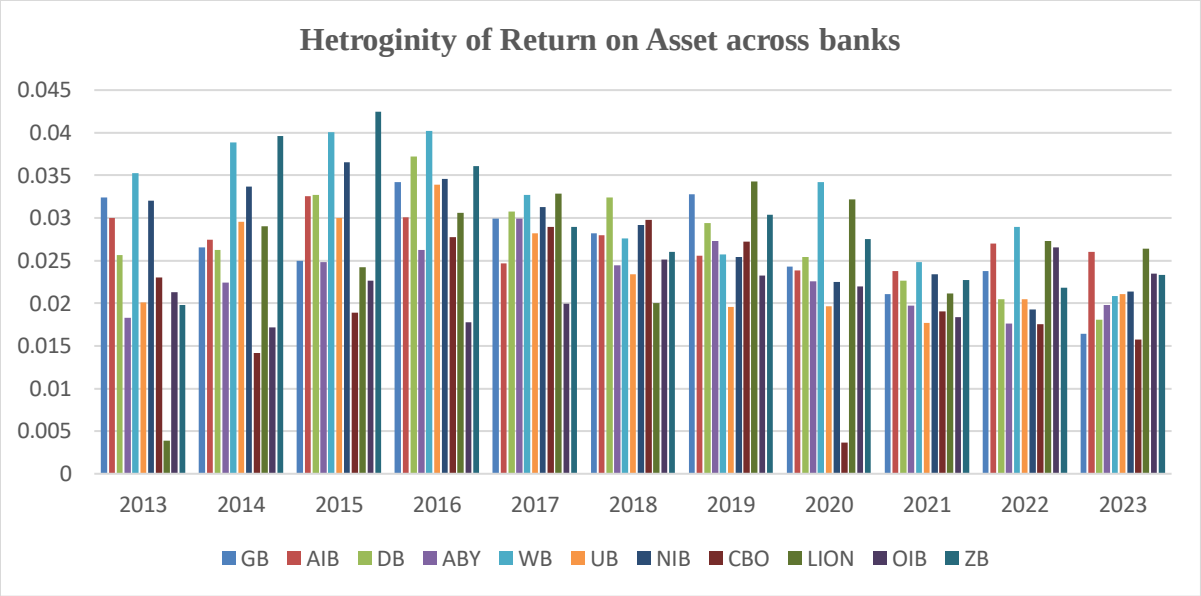


Source: Microsoft Excel output results for sampled commercial banks from 2013-2023.

As the above figure 4.1 shown that, the average value of return on asset for sampled commercial banks in Ethiopia as measured by the proportion of Net income and total asset was ranges from the minimum value of 0.021138 in 2019 up to the maximum value of 0.031697 in 2012 for last eleven years. This result indicates that, from the sample period Ethiopian commercial banks performed higher return on asset in 2016. However, the lower return on asset was registered during the year 2019. The reason for performing lower return on asset on the year 2019 was that, as per NBE report, 2021/22 has been a challenging year for the Ethiopian external sector particularly exports. In the same way, total merchandize import slowed down by 0.9 percent due to lower imports of industrial and consumer

goods. In the year 2019 from the total loan that was Ethiopian Commercial banks disbursed to different sectors and international trade took the lion share, which is more than 30% of total loan was distributed to this sector. Because of Ethiopian banks highly concentrated their loan to this sector and in the same year this sector had highly damaged, banks had unable to fully collect their loan from this sector and this leads to higher NPL. Thereby Ethiopian banks return on asset has decreased.

Figure 4.2.Trend Return on Asset (ROA) for each sampled Ethiopian commercial banks



Source: Microsoft Excel output results for sampled commercial banks from 2013-2023.

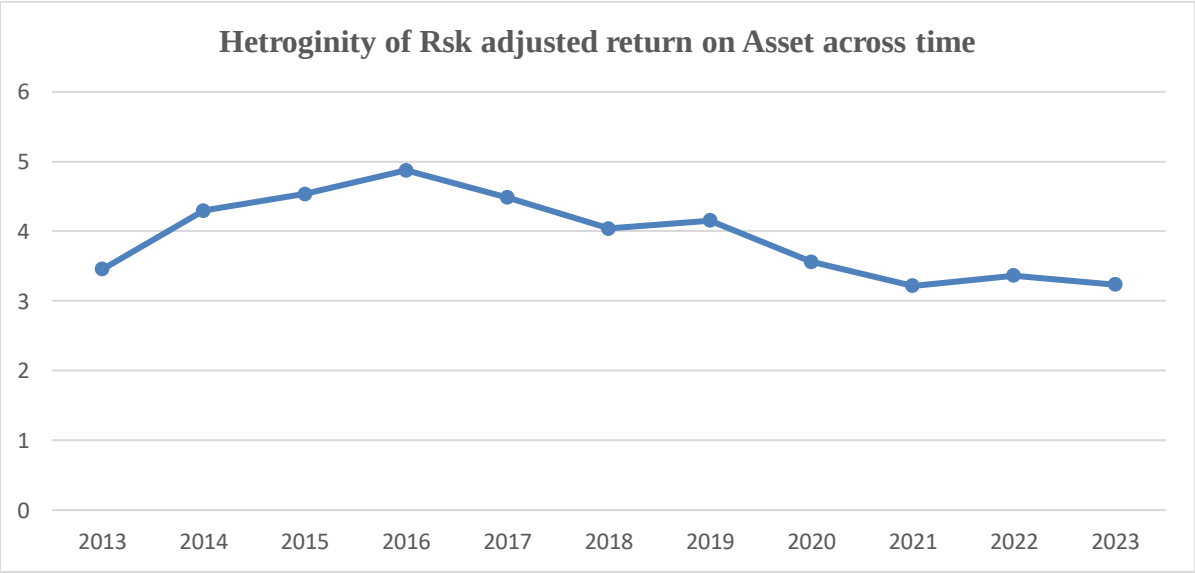
As shown in figure 4.2 above, the trend of return on asset for each bank for the last eleven years covering from 2013-2023 did not consistent in the study period, which means the value of return on asset was increase in one period and decrease in another period. Likewise, the value of return on asset that reaches at minimum point among ECBs was Cooperative Bank of Oromia with the value of 0.00366 in 2020. Since the year 2020 was the year of great challenges to this bank reflected in resource scarcity, particularly foreign currency generation and weak liquidity position of the bank. While the value of return on asset that reach at maximum point among commercial banks in Ethiopia was Zemen Bank with the value of 0.04249 in the year 2015 followed by Wegagen Bank with the value of return on asset 0.04021 in the year 2016. The reason for the higher return on asset by those banks was contrary to the common misconception that Ethiopian private banks focus their lending almost exclusively on sectors such as importers and domestic traders; Zemen Bank and Wegagen Bank devotes their loan to different key sectors that is widely recognized as national priorities and this leads to higher return on asset. In general, the above figures reflect that, there is no greater heterogeneity of return on asset

(ROA) across a time for Ethiopian commercial banks rather there is high heterogeneity of return on asset (ROA) across sampled commercial banks in Ethiopia.

Risk-adjusted return on assets (RAROA) is the second metric used to assess a bank's financial performance. The profitability of the bank after adjusting for risk is known as the risk-adjusted return. Thus, the result is based on the standard deviation of return on asset of each banks mainly and the return on asset itself. If there is high variation of return, there is higher standard deviation and it reduced banks risk adjusted return, because the risk is higher. However, a bank with stable return has higher risk adjusted returns because it has low standard deviation. As indicated in table 4.1 the mean value of 3.946232 risk adjusted return on asset indicates that Ethiopian commercial banks relatively earned stable return as compared to some other African country banks like Tunisia. The research done by Belguith and Bellouma (2017) indicated Tunisia has 2.64283 risk adjusted return on asset. In other word, the risk towards Ethiopian commercial banks operation is relatively low.

The maximum and minimum value of risk adjusted ROA is 6.522152 and 0.29374 respectively. This result indicates banks stability of return has different among each other. Although ECBs have relatively better RAROA, there is a problem to sustain their profit. The higher risk adjusted return is preferable because it indicates there is higher profitability of return and in the same way variation of return also low. The standard deviation was 1.422767 it implies there is a high variation of return on asset from one period to another for each bank.

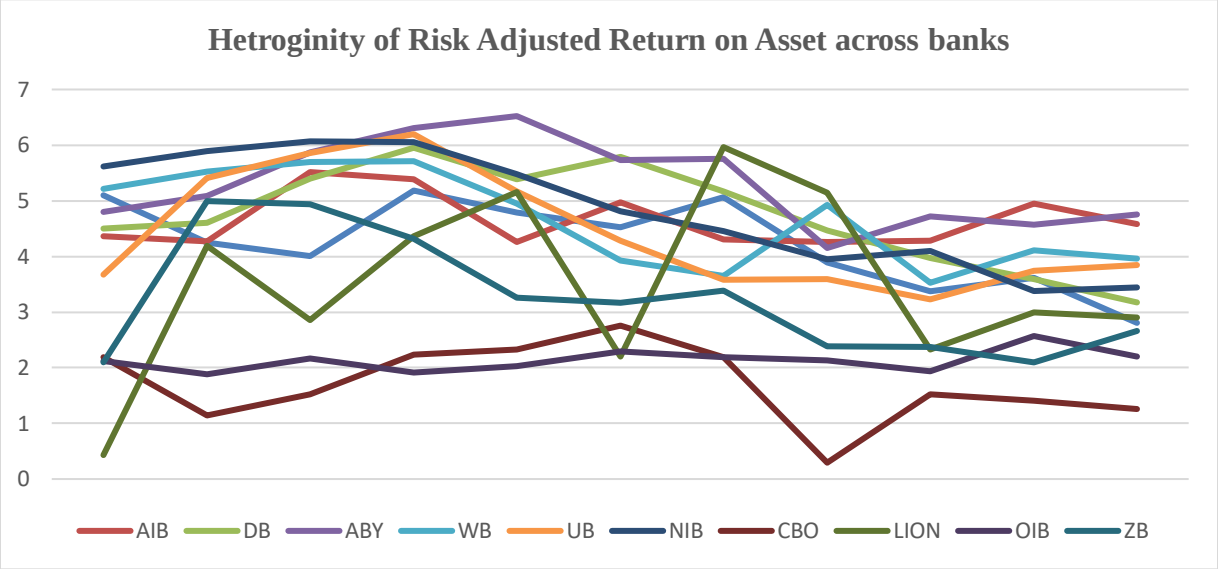
Figure 4.3: yearly changes in risk adjusted average return on asset (RAROA) for sampled Ethiopian commercial banks.



Source: Microsoft Excel output results for sampled commercial banks from 2013-2023.

Figure 4.3 shows that the highest RAROA was registered in the year 2016 with the value of 4.87469. This maximum result indicates that, from the study period ECBs performed stable and higher return on asset in the year 2016. However, the minimum RAROA was generated in the year 2021 with the value of 3.215227. This minimum result implies that from the sample period ECBs earned the most unstable return on asset and also the return on asset was very low.

Figure 4.4: Trend of risk adjusted Return on Asset (ROA) for each sampled Ethiopian commercial bank



Source: Microsoft Excel output results for sampled commercial banks from 2013-2023.

Figure 4.4 shows there is high variation of RAROA during the study period. The value of risk adjusted return on asset reached at maximum point among commercial banks in Ethiopia was Abyssinia Bank with the value of 6.522152 in the year 2023. The result indicates that among Ethiopian commercial banks, Bank of Abyssinia earned highly stable return. In other word, yearly variation of return on asset for Bank of Abyssinia was very low and in the year 2023 its ROA was reached climax in the sample period. Thus, this bank achieved higher risk adjusted return on asset. On the other hand, among commercial banks in Ethiopia Cooperative Bank of Oromia reached at minimum point with the risk adjusted return on asset of 0.29374 in the year 2020. Form the sampled banks, CBO, OIB, ZB and LIB mean value of Risk adjusted return on asset was lower than the average value of risk adjusted return on asset of sampled banks with the value of 1.711734, 2.13011, 3.242061 and 3.502797, respectively. The result implies that among Ethiopian commercial banks Cooperative Bank of Oromia registered highly

unstable return than other ECBs. From ECBs, this bank return show high variation and at the same time its return was low.

It indicates that the risk was very high to this bank relative to other ECBs during the study period followed by Oromia Intentional Bank, Zemen bank and Lion International Bank. On the other hand, Bank of Abyssinia, Dashen Bank and Awash International Bank are higher mean value of RAROA with the value of 5.296864, 4.726667 and 4.650421 respectively. The result shows that form the sampled banks, these banks performed stable return on asset. Thus, the risk of sustaining profit was lower compared to other sampled Ethiopian commercial banks.

Regarding to explanatory variables as indicated in table 4.1 the mean value of DI sectoral loan is 0.7405094 with a maximum value of 0.859201 and a minimum value of 0.5794522. The maximum value of 86 percent indicates some banks moderately diversified their loan to different sectors. However, the lowest percentage of 58% suggests that a far larger loan amount was provided for a select few industries. The 0.0543759 standard deviation suggests that banks vary somewhat in how they allocate loans to various industries.

When compared to other explanatory factors, bank size, as determined by the natural logarithm of total assets, had the highest standard deviation (1.376507), indicating that it was the variable that strayed from its mean the most. This finding suggests that there is significant diversity in the size of Ethiopian commercial banks.

Equity ratio measures how much fund is provided by shareholders and earning retained in the bank. The mean value of equity ratio was 0.1251451 or 12.5 percent, it indicates from total asset of sampled Ethiopian banks on average only 12.5 percent are the share of stockholders, the remaining 87.5 percent of their assets comes from liability. The value equity ratio ranged from a maximum of 0.1959032 to a minimum of 0.0418656. According to this outcome, the most capitalized bank retained 19.6% of its entire assets in equity, while the less capitalized bank retained 4.2%. The equity ratio's standard deviation was 0.0307272. The standard deviation result shows that the equity to asset ratio varies more throughout the chosen banks. The majority of Ethiopian commercial banks maintain greater levels of capital requirements than those declared by the National Bank of Ethiopia, as evidenced by the mean value of the capital adequacy ratio of 12.5%.

Table 4.1 shows that the average NPL value was 0.0363165, or 3.6%, with a minimum of 0.013 and a maximum of 0.08. This shows that during the study period, an average of 3.6% of all loans disbursed

by Ethiopian Commercial Banks were in default or uncollected. During the study period, the lowest NPLs ratio that banks encountered was 0.13%. The greatest NPLs ratio of ECBs, on the other hand, was 8%, above the National Bank of Ethiopia's (NBE) 5% maximum ceiling. In most case Ethiopian commercial banks higher NPL occurred due to loan concentration and it has negative impact on their performance. The range of the NPLs ratio of ECBs over the sample period is indicated by the difference between the minimum of 0.13% and the maximum of 8% of NPLs. In comparison to other variables like ROA, the standard deviation (0.0091346) of non-performing loans (NPLs) also demonstrates the existence of heterogeneity across ECBs with regard to their loan recovering capacity.
There is a very large variation in loan to asset ratio indicated by the range between 0.3187969 and 0.587881. The loan to asset ratio's typical value is 0.452787, or 45%. This showed that, on average, almost half of the bank's total assets are held in loan form. The standard deviation (0.0586555) of LAR implies that, there is high variation between ECBs in providing loan from their asset.

The ratio of liquid assets (cash and short-term securities) to total deposits is used to calculate liquidity risk, and it has an average value of 0.2142614. The average value shows that there was more than enough cash held by Ethiopian commercial banks during the study period, with 21.42 cents of liquid asset to meet obligations for every birr of total deposit. This is higher than the standard rate of the National Bank of Ethiopia (NBE) (2014), which is 15%. According to the descriptive statistics, the liquid asset to deposit ratio had a minimum of 0.1163386 (11.6%) and a maximum of 0.4991226 (49.9%).
This means that the most liquid commercial bank has 49.9 cents to meet obligation per 1-birr total deposit this exceeds the national bank's benchmark rate. According to the liquidity result, Ethiopian commercial banks typically have higher liquidity, which is marginally more than that of legal equipment.

One of the anticipated macroeconomic variables that would have an impact on the banks' financial performance was GDP growth, which over the previous eleven years averaged 0.0964727, or 9.6 percent. Throughout the sample period, the economy's growth rate peaked in 2015 at 11.4% and fell to its lowest in 2018 at 7.7%. The real GDP growth rate showed minimal variance from its mean, as indicated by the standard deviation of 0.0109995. In 2015 Ethiopian commercial banks earned higher amount of return it shows GDP has positive effect on banks performance. On the other hand, from the sample period in 2022 the amount of GDP was reached minimum point and also the return was one of the lower amounts that During the study period, Ethiopian banks made money.

The inflation rate, one of the macroeconomic variables included in this analysis, has averaged 0.15, or 15%, over the last eleven years. The highest documented rate of inflation was 36.4% in 2023, while the lowest was at 2.8% in 2014. With a standard deviation of 0.103833, or 10.38%, the inflation rate was widely distributed during the sample years. This suggests that Ethiopia's inflation rate was somewhat erratic over the study period. Therefore, it can be said that, with the exception of minor volatility in the inflation rate, the macroeconomic variables were rather constant during the sample periods when compared to bank-specific variables in a particular study.

4.4. Correlation Analysis

An indicator of the strength and direction of a relationship between two or more variables is correlation. The Pearson correlation, also known as the Pearson product-movement coefficient, is the most widely used bi-variant correlation statistic and is employed in this investigation. In this study, the correlation matrix was used to illustrate the linear relationship between the explanatory and dependent variables. Most investigations start with a correlation analysis between variables before moving on to a detailed regression analysis. The degree of association between two variables and the direction of that relationship are determined using correlation analysis. The correlation coefficient ranges from +1 to -1. Strong positive or negative relationships between variables are indicated by correlation coefficients that are near to either +1 or -1, respectively. On the other hand, uncorrelated variables are indicated by a correlation coefficient of zero. In this part, the relationship between variables is analyzed and examined through correlation analysis.

Table 4.2: Correlation matrix of dependent and independent variables

VAR	ROA	RAROA	DI	BSZ	EQR	NPL	LAR	LIQ	GDP	INF
ROA	1.0000									
RAROA	0.7139	1.0000								
DI	0.5485	0.5772	1.0000							
BSZ	-0.0673	0.1628	-0.0824	1.0000						
EQR	0.4948	0.2453	0.5146	-0.4446	1.0000					

NPL	-0.4828	-0.4411	-0.2718	-0.1101	-0.1890	1.0000			
LAR	-0.5358	-0.3205	-0.2718	-0.0294	-0.0109	0.1264	1.0000		
LIQ	0.1018	0.3209	-0.1565	-0.2074	-0.0423	-0.1780	0.0095	1.0000	
GDP	0.2046	0.1534	0.1092	-0.3164	0.0364	0.0140	-0.2491	0.0811	1.0000
INF	0.1287	0.0958	0.0667	-0.2625	0.0643	-0.0989	-0.1115	0.0305	-0.1563	1.0000

Source: STATA 14 output results for sampled commercial banks from 2013-2023.

Table 4.2's correlation analysis results demonstrate a substantial positive relationship between DI and ROA. It means +banks that has diversify loan to different sectors associated with an increase in ROA. The reason for this may be as loans disbursed to different sectors by the banks lead to decreases idiosyncratic risk and NPL. Thus, it leads an increase in profitability of banks. Likewise, DI and RAROA have a strong positive relationship. The cause of this could be, when loan diversification of the bank increases, the banks risk is reduced and also variation of returns decreased this leads to increased RAROA.

Although there is a direct (positive) association between bank size and RAROA, the size of the bank, as determined by the natural log of the bank's total assets, exhibited a weakly negative correlation with ROA.

Correlation analysis that carried out between equity ratio and ROA and RAROA shows that there is positive relation among them.

The correlation data unequivocally show that NPL and ROA and RAROA have a strong inverse linear connection. The negative relationship among NPL and both dependent variables arises because of NPL increases banks performance has decreases. Therefore, it leads to lower ROA and RAROA. As we all know the banks higher amount of income comes from loan and advance given to customer. However, the correlation analysis shows ECBs LAR and ROA and RAROA are negative relationship. This may arise as a result of loan concentration which means larger amount of loans are given to single or few sectors which leads to higher amount of losses to banks this reduces banks performance.

The correlation table 4.2 (p.52) shows, Liquidity ratio and both bank performance measurements has positive relationship. The positive association between liquidity and return on assets may come from banks that hold reasonable amount of liquid assets have an improved profitability.

Both financial performance metrics showed a positive correlation with the macroeconomic variables of inflation and real GDP growth rate. This association unequivocally demonstrates that profitability shifts in tandem with the actual GDP growth rate. Also, inflation has weak positive relationship with both dependent variable measurements.

4.5. Classical Linear Regression Model Assumption and Diagnostic Test

In order to conduct effective hypothesis testing and provide data for dependable outcomes, the regression model assumption test is necessary. The coefficient estimators of the independent variables (β) and constant term (α) that are found using ordinary least square (OLS) have several desirable assumptions and are commonly referred to as Best Linear Unbiased Estimators (BLUE). The findings of the diagnostic tests (heteroscedasticity, autocorrelation, multicollinearity, normality, and model specification test) that were performed to ascertain whether or not the data meets the fundamental presumption of the classical linear regression model are therefore covered in the section that follows. The following subsections offer the test's implications, decision rules, test results, and their discussion.

4.5.1. Test for Heteroscedasticity

Brooks (2014) states that the assumption of homoscedasticity, which holds that the variance of the errors is constant, σ2, has been used up to this point. Errors are considered heteroscedastic if their variance is not constant. Ignoring this issue could result in incorrect standard errors and erroneous conclusions. The overestimation of variance causes the t-test to be smaller and statistically insignificant, which results in an incorrect conclusion. As a result, the t-test and f-test produce incorrect results (Gujarati, 2004). A number of tests are available to identify any violations of this premise. In order to determine whether the problem of heteroscedasticity existed for both models, this study employed the most well-known and often used test, the Breusch-Pagan test.

H0: Homoscedastic error term

H1: Heteroscedasticity error term

Table 4.3: Heteroskedasticity test for return on asset (ROA)

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of roa

chi2(1)	1.20
Prob > chi2	0.2731

Source: STATA 14 output results for sampled commercial banks from 2013-2023.

Table 4.4: Heteroskedasticity test for risk adjusted return on asset (RAROA)

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of raroa	
chi2(1)	2.97
Prob > chi2	0.0847

Source: STATA 14 output results for sampled commercial banks from 2013-2023.

The decision rule for Heteroscedasticity test is that, there isn't a heteroscedastic issue if the P value is more than 0.05 ($P \geq 0.05$). The p-value of the statistic is 0.2731 for the ROA and 0.0847 for the RAROA, which is greater than 5% of the significance level, according to the results of the heteroscedasticity test, as shown in tables 4.3 and 4.4 above. As a result, the test's conclusion has demonstrated that there is no proof of heteroscedasticity, and the null hypothesis is approved for both models. Stated otherwise, the study satisfied the homoscedasticity assumption.

4.5.2. Autocorrelation Test

There isn't a heteroscedastic issue if the P value is more than 0.05 ($P \geq 0.05$). The p-value of the statistic is 0.2731 for the ROA and 0.0847 for the RAROA, which is greater than 5% of the significance level, according to the results of the heteroscedasticity test, as shown in tables 4.3 and 4.4 above. As a result, the test's conclusion has demonstrated that there is no proof of heteroscedasticity, and the null hypothesis is approved for both models. Stated otherwise, the study satisfied the homoscedasticity assumption.

Table 4.5 Autocorrelation test for ROA

Durbin-Watson d-statistic (9, 121)	1.559599

Source: STATA 14 output results for sampled commercial banks from 2013-2023.

Table 4.6 Autocorrelation test for RAROA

Durbin-Watson d-statistic (9, 121)	1.188001

Source: STATA 14 output results for sampled commercial banks from 2013-2023.

According to (Brooks.2014) Decision rule for DW is that, if DW = 2 shows there is no autocorrelation in the residuals. So roughly speaking, If DW is close to 2, the null hypothesis would not be disproved. However, the situation when the residuals have perfect positive autocorrelation is represented by DW = 0. The point at which the residuals exhibit perfect negative autocorrelation is represented by DW = 4.

Therefore, the estimated DW(durbin-watson) in this study on model two (ROA) was 1.559599, which is closest to 2, suggesting that there is no autocorrelation issue, as seen in table 4.5. This suggests that there is no correlation between the error terms for the various observations in this investigation. The DW for RAROA as indicated in table 4.6 was 1.188001. This value shows that even though it is near to 2 than 0 and 4, it maybe there is little evidence of autocorrelation. So, to solve this confusion to serial correlation the researcher followed the analysis with Prais- Winston command in Stata, specifying the Cochran – Orcutt option (see appendix 3.2.3). The DW transformed result was 2.4003013 which are between acceptable ranges of 1.5 up to 2.5. Therefore, the null hypothesis of no autocorrelation cannot be rejected.

4.5.3. Test for Multicollinearity

The multicollinearity test is the other test being used in this investigation. It aids in determining the relationship between independent variables and prevents the model's explanatory variable from being estimated biasedly.

The correlation between independent variables will always be non-zero in any practical setting, but this is usually acceptable because there will almost always be some degree of linkage between explanatory factors that does not result in a significant loss of precision. Therefore, the degree of their relationship—rather than its nature—is the cause for concern. Multicollinearity, on the other hand, is an

issue that arises when the explanatory variables have a very high correlation with one another. When some explanatory variables have a high degree of correlation, multicollinearity typically becomes an issue (Brooks, 2014).

Table 4.7 Correlation matrixes of independent variables

VAR	DI	BSZ	EQR	NPL	LAR	LIQ	GDP	INF
DI	1.0000							
BSZ	-0.0824	1.0000						
EQR	0.5146	-0.4446	1.0000					
NPL	-0.2718	-0.1101	-0.1890	1.0000				
LAR	-0.2718	-0.0294	-0.0109	0.1264	1.0000			
LIQ	-0.1565	-0.2074	-0.0423	-0.1780	0.0095	1.0000		
GDP	0.1092	-0.3164	0.0364	0.0140	-0.2491	0.0811	1.0000	
INF	0.0667	-0.2625	0.0643	-0.0989	-0.1115	0.0305	-0.1563	1.0000

Source: STATA 14 output results for sampled commercial banks from 2013-2023.

Table 4.7 displays the correlation matrices of a few chosen explanatory variables in order to observe the potential level of multicollinearity among them. Gujirati (2004) states that multicollinearity is a significant issue when the prais-wise or zero-order correlation coefficient between two independent variables is strong and exceeds 0.8. Additionally, according to Brooks (2014), multicollinearity would be an issue if the correlation between independent variables was greater than 0.8. In this case, the correlation figures above are much below it. As a result, no correlation coefficient is higher than or even nearer 0.80. Therefore, multicollinearity between the variables does not exist. Furthermore, a VIF test was conducted, which indicates that the data did not have any multicollinearity issues (see appendix 3.3).

4.5.4. Tests for Normality

The normality assumption, which the CLRM makes, states that each error term has a normal distribution with a mean of zero and constant variance. According to Brooks (2014), a data set's suitability for a normal distribution is assessed using normality tests. Ordinary least square estimation is simply derived and would be significantly more straightforward and valid with the normality

assumption. The most widely used test of normalcy, the Shapiro-Wilk W test for a particular study, has been used to evaluate both regression models for normality issues.

Ho: the error terms follow normal distribution.

H1: the error terms do not follow normal distribution.

Table 4.8: Normality test for return on asset (ROA)

Variable	Obs	W	V	Z	Prob>z
Error term	121	0.98620	1.337	0.651	0.25757

Source: STATA 14 output results for sampled commercial banks from 2013-2023.

Table 4.9: Normality test for risk adjusted return on asset (RAROA)

Variable	Obs	W	V	Z	Prob>z
Error term	121	0.98988	0.981	-0.044	0.51740

Source: STATA 14 output results for sampled commercial banks from 2013-2023.

The decision rule for normality test is that, there is no issue with normalcy if the P value is more than 0.05 (P > 0.05). Consequently, the Shapiro-Wilk W test for normal data has a P-value of 0.25757 for the second model (ROA) and a p-value of 0.51740 for the third model (RAROA), according to the normality tests for this study as indicated in tables 4.8 and 4.9.

It suggests that the error terms are normally distributed since the p-value of the Shapiro-Wilk W test for normal data for both models is higher than 0.05. Therefore, it is not necessary to reject the null hypothesis that the data is regularly distributed.

4.5.5. Model Specification Test

As per brooks (2014), The proper "functional form" must be linear, according to another premise of the traditional linear regression model. This implies that the proper model is thought to have linear parameters and that, in the case of invariancy, a straight line can be used to depict the relationship between the explanatory and dependent variables. The model will experience an issue of model

misspecification if one or more independent variables were not included in the study; thus, it will not be able to provide unbiased estimations. This implies that the explanatory variables' estimated coefficients might not be suitable.

Ramsey's (1969) RESET test, a generic and popular test for functional form misspecification, can be used to formally evaluate whether or not the model functional form is correctly described (Brooks, 2014). Thus, the researcher used the Ramsey RESET test to verify the model specification in order to choose the appropriate estimated model. The following was the formulation of the model specification hypothesis:

H0: the model specification is correct

H1: the model specification is incorrect.

Table 4.10: Ramsey RESET Tests for return on asset (ROA)

Ramsey RESET test using powers of the fitted values of roa Ho: model has no omitted variables	
F(3, 109)	0.55
Prob > F	0.6521

Source: STATA 14 output results for sampled commercial banks from 2013-2023.

Table 4.11: Ramsey RESET Tests risk adjusted return on asset (RAROA)

Ramsey RESET test using powers of the fitted values of raroa Ho: model has no omitted variables	
F(3, 109)	2.14
Prob > F	0.0874

Source: STATA 14 output results for sampled commercial banks from 2013-2023.

The decision rule is that, the null hypothesis is not rejected (i.e., the model is correctly described) if the F-test p-value is higher than 5%.

As can be seen from tables 4.10 and 4.11 above, the p values for ROA and RAROA are both more than the significance level of 0.05, indicating that the null hypothesis (H0) cannot be rejected in either model. As a result, it may be concluded that these models are appropriately described and that the predicted coefficients adequately explain the research.

4.5.6. Model Selection Test

In general, panel estimator methodologies can be divided into three divisions for use in financial research. These include the pooled ordinary least square (common effect) approach, fixed effects models, and random effects models. A Hausman test is used to choose between fixed effects and random effects approaches. The model selection process consists of two parts.

H0: random effects model is appropriate

H1: fixed effects model is appropriate.

First, The Lagrangian Multiplier test must then be used to ascertain whether the study is better served by a random effect or pooled ordinary least squares. Receive H1 if the p value is less than 0.05, indicating that random effect is the most effective estimating technique.

H0 indicates that pooled ordinary least squares is the most effective estimate technique if the p value is higher than 0.05.

Table 4.12: Hausman Tests for return on asset (ROA)

Hausman fe re	
chi2(8)	36.59
Prob>chi2	0.0000

Source: STATA 14 output results for sampled commercial banks from 2013-2023.

According to the Hausman test, the p value is less than 0.05, at 0.0000. This demonstrated that the Random Effect model's null hypothesis is inappropriate and should be rejected at the 5% significant level. Regression analysis will be conducted using fixed effect estimates for return on asset, indicating that the fixed effect model is suitable for this investigation if the alternative hypothesis is accepted.

Table 4.13: Hausman Tests for risk adjusted return on asset (RAROA)

Hausman fe re	
chi2(8)	7.43
Prob>chi2	0.9428

Source: STATA 14 output results for the sampled commercial banks from 2013-2023.

The Hausman specification test indicates that the models' P-value is 0.9428, which is greater than the 5% level of significance, as shown in table 4.13. This demonstrated that the Random Effect model's null hypothesis is appropriate and should not be rejected at the five percent significance level. Thus, after running the Hausman test if random effect acceptable, Using the Breusch and Pagan Lagrange multiplier test for random effects in comparison to the pooled ordinary least square approach is a crucial next step. When choosing between simple OLS regression and regression with a random effect, the LM test (Lagrange Multiplier test) is utilized. The null hypothesis, which states that there is no panel effect and no substantial difference among cross-sectional units, suggests that the random effects model is not suitable. The null hypothesis in favor of OLS is rejected since the LM test statistics for RAROA are 67.03 with a p-value of 0.0000, which, based on table (4.14), is less than 5 percent. Thus, the Random Effects model is chosen instead of the pooled ordinary least square.

Table 4.14: Breusch and Pagan Lagrange multiplier test for random effects

Breusch and Pagan Lagrangian multiplier test for random effects Test: Var(u) = 0	
chibar2(01)	67.03

Prob > chibar2	0.0000

Source: STATA 14 output results for sampled commercial banks from 2013-2023.

4.6. Regression Result and Analysis

4.6.1. Factors affecting lending diversification

In this study diversification index was taken as both dependent and independent variable. First, to identify factors that determine lending diversification, diversification index was used as a dependent variable. Then, to investigate the effect of lending diversification on financial performance diversification index was used as an independent variable.

Before discussing the main result of the study, the researcher analyzed the relationship between dependent variable diversification indexes (DI) which is the proxy of lending diversification with independent variables as per the study objective. The researcher ensured that the variables of interest (DI) did not capture other external effects that are likely to be related to financial performance by regressing all independent variables, including the diversification index, with the dependent variables (ROA & RAROA) in order to examine the impact of lending diversification on financial performance.

Table 4.14 Regression result of the first model (DI)

Linear regression, correlated panels corrected standard errors (PCSEs)			
Group variable: id	Number of obs	=	121

Time variable: year				Number of groups = 11		
Panels: correlated (balanced)				R-squared = 0.3987		
Autocorrelation: no autocorrelation						
DI	Coef.	Panel-corrected Std. Err.	**Z**	**P>|z|**	[95% Conf.	Interval]
BSZ	.0062257	.0025597	2.43	0.015 *	.0012088	.0112425
EQR	.9581942	.1249321	7.67	0.000 **	.7133317	1.203057
NPL	-.8678045	.4204942	-2.06	0.039*	-1.691958	-.0436511
LAR	-.1928063	.0521704	-3.70	0.000**	-.2950585	-.0905542
LIQ	-.0905809	.0286131	-3.17	0.002**	-.1466616	-.0345003
GDP	.5410329	.2133157	2.54	0.011*	.1229417	.959124
INF	.0298019	.0210654	1.41	0.157	-.0114857	.0710894
Cons.	.5572758	.0948349	5.88	0.000	.3714029	.7431487

Source: STATA 14 output results for sampled commercial banks from 2013-2023.

According to the model-I R2 regression result, changes in the independent variables accounted for 39.87% of the variation in the dependent variable (diversification index).

According to the regression analysis, bank size significantly and favorably affects lending diversification. The positive coefficient means that the DI will rise by 0.006 units for every unit increase in bank size. The explanation for the positive correlation between bank size and DI was that as banks grew in size, they were able to lend to a wider range of industries. Moreover, when banks increase in their asset size, they have an access to reduce information cost about borrowers' behavior. Thus, this reduction of monitoring cost enables them to disburse loan to many sectors.

Equity ratio has significant and positive effect on DI with a coefficient value of 0.958. The positive coefficient signifies that for 1 unit increase in equity ratio will increase the DI by 0.958 units. The result

indicates that, increase in banks equity ratio is positively associated with diversification of loan to different sectors, because, they have much available funds to give loan to various sectors.

NPL has significant and negative relationship with DI**.** The coefficient result shows 1 unit increase in NPL leads to decrease in DI by 0.867 units. The result indicates when banks faces higher NPL they decreased the concentration of loan to few sectors. In other word, to reduce NPL banks allocate loans to various sectors.

Lending diversification and the loan to asset ratio are significantly and negatively correlated. According to the coefficient value, a one-unit increase in the loan-to-asset ratio results in a 0.192-unit drop in DI.

The probable reason was that banks with higher loan to asset ratio lead to high liquidity problem and high credit risk. Thus, to solve this problem banks may concentrate loan to selected sectors that needs short term loans and thereby it reduces lending diversification.

Liquidity ratio has significant and negative relationship on lending diversification with the coefficient value of 0.09. The result shows a unit increase in liquidity ratio leads to decrease in DI by 0.09 units. The probable reason may be that, banks with higher amount of liquidity indicates, they did not use their assets to disburse loan to sectors. Thereby it leads to reduce loan diversification.

Lending diversification and GDP are significantly and favorably correlated. According to the coefficient value, lending diversification increases by 0.54 units for every unit growth in GDP. The reason for positive relationship between GDP and DI was that, the increment in GDP leads to enhance many sectors growth. Thereby it enables banks to diversify loan to various sector.

Inflation has insignificant and positive relationship with lending diversification.

4.6.2. Factors affecting financial performance (main regression result)

Since one of the main elements influencing banks' financial success is loan diversity. As a result, the study expressed how lending diversification affects financial performance using models 2 and 3.

As stated in the previous chapter, two regression models were used in this study to examine how lending diversification affects financial performance. Following the completion of the first regression, a robust result was obtained.

The dependent variable in Model 2 is return on assets (ROA), while in Model 3, the dependent variable is risk adjusted return on assets (RAROA). Before selecting an estimation method, both models take

into account the outcomes of the aforementioned diagnostic tests.

The fixed effects model is suitable for the initial regression models, according to the Hausman test. Thus, the results of regression were presented on the following table by using fixed effect model.

Table 4.15: Regression result of return on asset (Model 2)

Fixed-effects (within) regression				**Number of obs = 121**		
R-sq:				**Number of groups = 11**		
within = 0.7342						
between = 0.5234						
overall = 0.5194						
ROA	**Coef.**	**Std. Err.**	**T**	**p>|t|**	**(95% Conf. Interval)**	
DI	.1121175	.0204925	5.47	0.000**	.0714707	.1527643
BSZ	.0002617	.0005584	0.47	0.640	-.0008459	.0013693
EQR	.08225	.0227763	3.61	0.000**	.0370734	.1274267
NPL	-.1191917	.040509	-2.94	0.004**	-.1995411	-.0388423
LAR	-.0257529	.0094116	-2.74	0.007**	-.0444208	-.007085
LIQ	.021136	.0095336	2.22	0.029*	.0022261	.0400459
GDP	.0195936	.0361572	0.54	0.589	-.0521241	.0913112
INF	.0007546	.0036434	0.21	0.836	-.0064719	.0079812
Constant	-.064049	.0226547	-2.83	0.006	-.1089845	-.0191134
Significant at 1% represented by ** and Significant at 5% represents represented *						
F(8, 102) = 35.21 Prob> chi2 = 0.0000						

Source: STATA 14 output results for sampled commercial banks from 2013-2023.

The regression analysis indicates that the panels were strongly balanced for this analysis. There were 121 total observations used in this study by considering eleven groups of entities implying strongly balanced panel data.

According to the regression result, this study's overall R2 is 0.5194. According to the R2 finding, changes in the independent variables accounted for 51.94% of the variation in the dependent variable (ECB ROAs). In other words, the change in diversification index, bank size, equity ratio, and NPL ratio, loan to asset ratio, liquidity ratio, Together, real GDP and inflation rate accounted for 51.94% of the variance in the ECBs' return on asset ratio. Therefore, it can be said that, taken as a whole, all of the independent factors utilized in this study were effective at explaining return on asset. Furthermore, at the 1% significance level (p-value of 0.0000), the null hypothesis of the F-statistic (the overall test of significance) that there is no statistically significant relationship between the independent and dependent variables (ROA) was rejected, demonstrating the validity and reliability of the model.

Table 4.15 shows that a variable used to quantify loan diversification (DI) has a statistically significant coefficient estimate of 0.1121175 at a 1% significance level (P-value of 0.000). This indicates that, with all other factors held constant, a 1 percent rise or decrease in DI leads to a statistically significant gain or fall of 11 percent in ROA of ECBs, respectively.

According to table 4.15's fixed effect regression result, the bank size's coefficient is 0.0002617 and its p-value is 0.640. Accordingly, a percentage increase or decrease in bank size typically results in a 0.02 percent gain or decrease in the ROA of ECBs, which is statistically negligible when all other factors are held constant.

According to the results of the regression study, the equity ratio's coefficient is 0.08225, and the p-value is 0.000. This suggests that, when all other factors are held constant, there is a positive correlation between the equity ratio and ROA. On average, a 1% increase or decrease in the equity ratio causes an 8.2% increase or decrease in ROA, which is statistically significant.

According to table 4.15's regression analysis results, the non-performing loan ratio has a p-value of 0.004 and a coefficient of -0.1191917. This suggests that there is a considerable negative correlation between NPL and ROA; when all other factors are held constant, an average increase or decrease in NPL causes an equivalent increase or decrease in ROA of 11.9 percent, which is statistically significant at the 1% level.

Regression analysis of the loan to asset ratio yielded a p-value of 0.007 and a coefficient of -0.0257529. This suggests that these variables have a negative connection, which is statistically significant at 1%. This indicates that, on average, a percentage rise or decrease in the loan to asset ratio results in a corresponding 2.57 percent increase or decrease in ROA, holding all other factors constant.

The results of the regression analysis for the liquidity ratio indicate a p-value of 0.029 and a coefficient of 0.021136. This implies that, there is direct relationship between liquidity and ROA, keeping other variables constant on average 1 percent increase or decrease in liquidity results an increase or decrease in ROA by 2.1 percent respectively and statistically significant at 5% level.

From macro-economic variables GDP has positive relationship with financial performance measurement which is ROA. The GDP coefficient is 0.0195936, and the p-value is 0.589. This demonstrates that, with all other factors held constant, an average percentage change in the real GDP growth rate causes a statistically negligible increase or drop in ROA of 1.9 percent.

The last variable used in the study is inflation and it has positive effect on ROA. The regression result of coefficient shows 0.0007546 and p-value of 0.836. This indicates the existence of weak direct relationship between inflation and ECBs ROA and is statistically insignificant. This means holding other variable constant on average a percentage increase or decrease in inflation leads to an increase or decrease in ROA by 0.07 percent respectively.

For the second model (RAROA), the Hausman and LPM test shows that random effects model is appropriate. Thus, results of regression were presented on the following table by using random effect model.

Table 4.16: Regression result of risk adjusted return on asset (Model 3)

Random-effects GLS regression	**Number of obs**	**=**	**121**
R-sq:	**Number of groups**	**=**	**11**
within = 0.6554			
between = 0.5907			

overall = 0.6155						
RAROA	**Coef.**	**Std. Err.**	**Z**	**p>|z|**	**(95% Conf. Interval)**	
DI	13.49846	2.543143	5.31	0.000***	8.513991	18.48293
BSZ	.1911544	.0816786	2.34	0.019**	.0310673	.3512415
EQR	6.902747	3.556679	1.94	0.052*	-.0682154	13.87 371
NPL	-14.35491	7.272376	-1.97	0.048**	-28.60851	-.1013191
LAR	-5.419272	1.486785	-3.64	0.000***	-8.333317	-2.505227
LIQ	5.973988	1.297313	4.60	0.000***	3.431301	8.516675
GDP	10.18817	6.466573	1.58	0.115	-2.486077	22.86242
INF	.9350579	.643773	1.45	0.146	-.326714	2.19683
Constant	-10.78978	3.215048	-3.36	0.001	-17.09115	-4.488398
Significant at 1% represented by ***, **Significant at 5%** represents represented ** and **Significant at 10%** represented by *. Wald chi2(8) = 202.02 Prob > chi2 = 0.0000						

Source: STATA 14 output results for sampled commercial banks from 2013-2023.

The regression result shows the overall $\mathbf{R^2}$ of this model is 0.6155. According to the R2 finding, changes in the independent variables accounted for 61.55% of the variation in the dependent variable (ECB RROAs). Once more, it can be said that the independent factors utilized in this study were all effective at explaining the risk-adjusted return on asset. The regression model is viable overall, as indicated by the Wald chi2-statistic 202.02, which is highly significant at 1% with a p-value of 0.0000.

With a p-value of 0.000, the random effect regression result in table 4.16 shows that the DI coefficient was 13.49846 and statistically significant. This indicates that, on average, a 1 unit rise or decrease in DI causes a 13.49846-unit increase or decrease in RAROA, holding all other factors constant. The outcome suggests that DI and bank performance are strongly correlated.

Bank size has a p-value of 0.019 and a coefficient of 0.1911544. The outcome shows that bank size and RAROA have a substantial and favorable association.

This means, holding other independent variables constant, when bank size increase or decrease by one unit on average it leads to increase or decrease RAROA by 0.1911544 unit and statistically significant. According to the study, banks with a big number of branches, substantial capital base, large loan book, and large customer deposits have a positive and high RAROA compared to banks with a small number of branches, tiny capital base, small loan book, and small customer deposits.

Table 4.16's regression analysis reveals that the equity ratio's coefficient is 6.902747, with a p-value of 0.052. This suggests that, with all other factors held constant, an average rise or reduction of one unit in the equity ratio causes a corresponding increase or drop of 6.902747 units in RAROA, indicating a large impact on RAROA.

The regression analysis result of table 4.16 shows that non-performing has coefficient of -14.35491 and p-value of 0.048. This means, keeping other variables constant a unit increase or decrease in NPL results a decrease or increase in RAROA by 14.35491 units respectively and significantly affects RAROA.

Regression analysis of the loan to asset ratio yielded a p-value of 0.000 and a coefficient value of -5.419272. This suggests that, when all other factors are held constant, a one-unit increase or decrease in loan to asset results in a 5.596184-unit increase or decrease in RAROA, which is statistically significant at 1%.

Based up on the regression analysis result of table 4.16, liquidity has coefficient of 5.973988 and p-value of 0.000. This indicates that, on average, a unit increase or reduction in the liquidity ratio causes a corresponding 5.973988 unit rise or decrease in the RAROA of the sampled ECBs, with all other variables held constant. This difference is statistically significant at the 1% significance level.

GDP and inflation have positive relationship with RAROA with a coefficient of 10.18817 and 0.9350579 statistically insignificant.

4.7. Discussion of the main regression result

The detailed study of the regression results for each explanatory variable and their impact on financial performance, specifically ROA and RAROA, is discussed in this part. The comparison with previous empirical data about loan diversity and its effect on banks' financial performance is also included in the discussion, along with the study's findings and hypotheses.

4.7.1 Lending Diversification and financial performance

The result of the regression shows that there is positive and significant relationship between DI and both financial performance measurements (ROA and RAROA) which is a proxy measure of lending diversification of sampled Ethiopian commercial banks. The possible reason for positive relationship between DI and ECBs financial performance was that, when banks diversify loan to different economic sectors, since borrowers are essentially dispersed over several economic sectors, they are able to eliminate the impact of idiosyncratic shocks (particular risk) on their credit portfolios, which lowers non-performing loans and boosts profitability.

Based on the regression result it can be concluded that loan portfolio diversification has positively related to Ethiopian commercial banks' financial stability, because when they engaged in various loan activities that have low or negative correlations, it helps to reduces the chance of costly financial distress and increases risk-adjusted returns.

The outcome also shows that banks that diversify their loan portfolio are better able to lower the danger of going bankrupt than those who concentrate their loan-making on specialized fields. The results support Dimond's (1994) traditional banking theory, which holds that bank profitability and credit portfolio diversity are positively correlated. The reason for this positive correlation between bank performance and credit portfolio diversification is that when the bank extends its lending operations to new and diverse economic sectors, the quality of its credit portfolio will rise as the likelihood of default decreases.

Empirically the study result is similar to (Aarflot & Arnegård, 2017; Atahau & T. Cronje (2017; Beck & De Jonghe, 2023; Foster & Bailey, 2015; Samuel, 2018) they found positive relationship between diversification index (DI) and bank performance.

Consequently, the researcher was unable to rule out the study's initial hypothesis. The premise was that loan diversity and commercial banks' financial performance were significantly and favorably correlated. Accordingly, the regression analysis's outcome supported the hypothesis.

4.7.2. Bank size and financial performance

The results of the regression were consistent with the actual data and the earlier hypothesis that economies of scale may allow larger banks to pay less for effective information collection, processing, and analysis. The regression result revealed that when Ethiopian commercial banks getting bigger in their asset size, the more profitable they become. Because, banks with large size enables to effectively diversify their assumed risks and respond more quickly to changes in market conditions. The finding of Musah (2017) supports the finding of this study, it's finding was that an increase in total asset such as increasing the number of branches and the adoption of new technologies enables the commercial banks to decrease the cost of gathering and processing information as well as it makes lending activity easy then return on asset would be increase. Large bank size has associated with enhancing diversification and it can reduce default risk there by increase profitability of commercial banks. This suggests that banks with large total assets should use asset quality and financial leverage management strategies to control their risks.

The increment of bank size has positively associated with banks performance. The association is however very strong for RAROA as compared to ROA. There is positive and significant relationship between bank size and RAROA. This result shows that the banks with high total assets are expected to manage their risks through asset quality. This is an indicator that large banks size could be associated with enhancing diversification can reduce default risk thereby increase profitability of commercial banks.

The finding is similar to (Athanasoglou, 2005; Elefachew & Rao, 2016; Mester, 2010; Musah, 2017) that bank size is positive relationship with banks performance.

The study's hypothesis was that Ethiopian commercial banks' financial performance and bank size were significantly positively correlated. Regression analysis results are consistent with the hypothesis that, when banks' performance was measured by RAROA, there was a positive and significant relationship between bank size and financial performance. With risk-adjusted return on asset, the notion that there is a substantial positive correlation between bank size and financial performance is thus accepted.

The study's hypothesis was that Ethiopian commercial banks' financial performance and bank size were significantly positively correlated. Regression analysis results are consistent with the hypothesis that, when banks' performance was measured by RAROA, there was a positive and significant relationship between bank size and financial performance. With risk-adjusted return on asset, the notion that there is a substantial positive correlation between bank size and financial performance is thus accepted.

4.7.3. Equity ratio and financial performance

Regression analysis of both models showed that the equity ratio significantly and favorably affects banks' financial performance. The magnitude of the coefficient estimate was statistically significant for both ROA and RAROA. According to the findings, a bank with a larger capital ratio is assumed to be less risky, which reduces funding expenses and enhances a bank's financial performance.

The findings also suggest that capital strength was a key component of Ethiopian banks' performance, supporting the notion that banks with adequate capital have lower costs of losses, which lowers funding costs, or require less outside funding, which raises profitability. Furthermore, Ethiopian commercial banks that have a greater equity ratio are more profitable because they can more easily comply with regulatory capital requirements, which allows them to lend out excess capital and earn extra revenue. This finding is consistent with previous studies with (Athanasoglou et al., 2005; Ally & Zhang, 2016; Belguith & Bellouma, 2017; Belayneh, 2011; Brighi & Ventrally, 2014). According to those studies, banks with strong capital positions are better equipped to seize chances than those with weak capital positions. They also have more time and flexibility to handle issues that arise from unforeseen losses, which results in improved financial performance.

The study's hypothesis was that the equity ratio and financial performance were significantly and favorably correlated. Accordingly, the regression analysis's outcome supported the hypothesis. As a result, the premise that the equity ratio and financial performance have a substantial positive relationship is accepted.

4.7.4. Non-performing loan and financial performance

NPL coefficient estimations showed a statistically significant and negative correlation with banks' financial performance. This suggests that NPLs play a significant role in explaining the fluctuations in ECBs' financial performance. The result shows that NPL has negatively affected Ethiopian commercial banks financial performance. The reason behind this result was, as well know banks mainly generated income by giving credit to different sectors. If the borrowers are unable to pay their debt on the due date, the banks profit has significantly decreased.

Based on the regression result as well as the annual reports of ECBs the author concludes that, Ethiopian commercial banks faced higher NPL as a result of their loans were concentrated to few sectors and this leads to reduce their profitability. Traditional banking theory supports the finding.

Given that the bank's probability of default would be decreased by expanding their credit lines to new industries, this theory recommends that banks diversify their loan portfolio in order to lower credit risk. This is also consistent with portfolio theory.

The finding of this result is the same with (Jellouli et al. 2023; Jiminez & Saurina, 2006; Samuel, 2018; Vogiazas & Nikolaidou; 2011; Zelalem, 2023) found negative and significant relationship between NPL and financial performance. The researcher also hypothesizes that there is a significant and negative relationship between NPL with that of the bank's financial performance. Therefore, the researcher failed to rejects the hypothesis that there is significant and negative relationship between NPL and banks performance.

4.7.5. Loan to asset ratio and financial performance

Loan to asset ratio has expected to have a positive relation with financial performance. Surprisingly, the regression result reveals that negative and significant effect on both ROA and RAROA. The possible reason for negative relationship between loans to asset ratio and banks financial performance was that loans are more illiquid and riskier than other assets in a bank's asset portfolio, and banks with a high loan to asset ratio may be at a higher exposure of credit risk. Moreover, a higher level of this ratio implies an increase in risks of failure, which may increase the financing costs and reduce the profitability of banks. Ethiopian commercial banks faced problem due to higher value of loan to asset ratio, especially banks that disbursed higher amount of long-term loan like GLOBAL BANK, it leads to reduce their profitability. The finding is also supported by Prabowo et al. (2018), they argued that the higher loan to asset ratio means that existing funds are widely used for credit allocation and less for short term needs, this leads to decrease banks return. And also, in Ethiopia Yonas (2015) argued high value of this ratio is the indicator of possible deterioration of the bank assets' quality with a negative effect upon profitability. Based on the analysis's findings, the researcher gets to the conclusion that a higher level of this ratio can only result in a higher return provided banks have effective risk management in place to reduce credit risks, particularly those arising from loan concentration.

The finding is consistence with (Alper and Anbar, 2011; El- Ansary and Megahed, 2016); Goddard et al., 2023; Petria et al., 2015) found negative and significant relationship among loan to asset ratio and financial performance. However, the finding has contradicted with empirical finding of (Adzobu, 2017; Tan & Floros, 2016) and the hypothesis of the study.

Thus, the hypothesis of significant positive relation between loan to asset ratio and financial performance is rejected.

4.7.6. Liquidly and financial performance

The result reveals that liquidity is positively related with both ROA and RAROA in a significant manner. This result indicates that Ethiopian commercial banks with sufficient liquidity leads to have readily funds are available and this help to their ability to readily fulfill their growing requirements as well as ability of banks to constantly meet cash, cheque, withdrawal commitments this increased banks reliability by customers and satisfy loan demands of their customers. Thus, this positive association between liquidity and financial performance (ROA & RAROA) shows that banks that hold reasonable amount of liquid assets has improved profitability. Moreover, the reason for this positive association was that, among Ethiopian commercial banks that hold higher liquid asset enables to reduced banks liquidity risk and financial crisis. On the other hand, among Ethiopian commercial banks that maintains lower liquid asset faced liquidity problem (cash shortage) and thereby reduced their return on asset and risk adjusted return on asset like Cooperative Bank of Oromia in 2016 and GLOBAL BANK in 2018 & 2019.

The result is similar with Kosmidou (2008), Olangunji et al. (2012), Warrad et al. (2015) and Ibrahim (2017) in their study found that there is a significant positive relationship between bank liquidity and its performance.

The study's hypothesis was that liquidity and financial success were significantly and favorably correlated. Additionally, the regression analysis's outcome supported the hypothesis. As a result, the premise that liquidity and financial performance have a substantial positive relationship is not rejected.

4.5.7. GDP and financial performance

The gross domestic product was measured using by annual GDP growth rate. The researcher developed the idea that the amount of cash kept by families or firms will rise in tandem with an increase in economic activity overall. These factors helped to raise the probability of banks' financial results.

The finding shows there is positive association between GDP and financial performance. The result reveals the growth of GDP contributes positive effect on banks financial performance. However, both measurements show the relationships are insignificant. Thus, the increment of GDP has minimal direct effect on banks performance. It is undeniable truth that Banks performance is largely depends on country’s macroeconomic situations. However, in our country case banks performance does not highly

followed the trend of GDP. This shows that even though It improves bank performance; in Ethiopian commercial banks, bank-specific factors have a greater impact on financial performance than GDP. This could be the cause of GDP's statistically little impact on Ethiopian banks' financial performance.

The finding is similar with (Nassreddine et al., 2023; Tewodros & Gedion, 2019) found insignificant positive relation between GDP and banks financial performances.

Thus, the hypothesis of significant positive relation between GDP and financial performance is rejected.

4.7.8. Inflation and financial performance

At a coefficient of 0.0007546 and a p-value of 0.836 for ROA and a coefficient of 0.9350579 and a p-value of 0.146 for RAROA, inflation and financial success are positively correlated. At the national level, the consumer price index (CPI) is used to measure inflation. The outcome demonstrates that, at the specified level of confidence interval, inflation has a positive and negligible relationship. This could be because banks' revenue is increasing faster than their expenses, which means inflation will likely have a beneficial impact. This is fairly simple that, inflation raises interest rates and higher interest rates provide more spread for banks this leads to increase their profit. Moges (2017) supports the conclusion, stating that a greater disparity between lending and deposit interest rates may be the reason for inflation's beneficial effects on financial performance. The nominal interest rate that banks charge on loans is higher than the rate of inflation, yet the interest rate that they charge on deposits is very low. As a result, banks typically charge their clients higher nominal rates when inflation is higher in order to profit from a wider difference between lending and borrowing rates.

The finding is consistence with (Fesha, 2007; Samuel, 2015), found insignificant positive relation between GDP and banks financial performances. However, the finding is contradicted to previous empirical works of (Elefachew & Rao, 2016; Belguith & Bellouma, 2017) and hypothesis of the study. Thus, the hypothesis of significant positive relation between inflation and banks financial performance is rejected.

In general, it is important to understand that the profitability of the banks is not only benefited for the banks themself rather all sectors are benefited, because banks serve as the main source of finance for the sectors, especially in developing countries like Ethiopia. Thus, our country’s economy has also benefited by banks loan portfolio diversification strategy. On the other hand, loan portfolio concentration strategy does not promote all sectors development, because this strategy promotes higher

amount of loans are disbursed to single or few selected sectors and other sectors that are not selected by the banks are not benefited. Thus, for the banks' enhancement of financial performance as well as the development of the economy, loan portfolio diversification strategy is better strategy than concentration strategy in our country context.

The insignificance of macroeconomic variables such as GDP and inflation in influencing the financial performance of Ethiopian banks can be attributed to several structural factors specific to the country's economic context. In Ethiopia, the banking sector's performance may not be as closely tied to macroeconomic conditions as one might expect in more developed economies. This could be due to the following structural factors:

The study found that bank-specific factors have a greater impact on financial performance than macroeconomic factors like GDP and inflation. These factors include the banks' management efficiency, capital structure, operational costs, and loan portfolio management. In Ethiopia, where the banking sector is relatively young and often faces challenges such as limited competition and less market integration, individual banks' internal factors might outweigh the effect of broader economic conditions.

In many developing countries, including Ethiopia, banks operate under strict regulatory frameworks that limit their ability to fully capitalize on macroeconomic conditions. Interest rates, lending practices, and monetary policies are often controlled by central banks, which can limit the effect of inflation and GDP growth on financial performance.

The Ethiopian financial market is still developing, and the banking sector remains less integrated into global financial markets. This lack of market depth means that external factors like global economic trends or inflation might not influence the banks as much as they do in more developed economies.

The Ethiopian banking sector relies primarily on traditional banking products (e.g., loans and deposits), and many banks lack diversified portfolios of financial products that could better respond to changes in inflation or GDP. In advanced economies, banks can hedge against inflation or other macroeconomic shifts using sophisticated financial instruments, but this is not yet prevalent in Ethiopia.

Many households and businesses in Ethiopia do not have access to formal banking services, and those that do often face limited options for credit and loans. This results in a situation where even macroeconomic changes, such as GDP growth or inflation fluctuations, might have a muted impact on

the overall financial performance of banks, as they serve a limited customer base that does not fully reflect the broader economy.

. GDP and Financial Performance: Hypothesis: A significant positive relationship between GDP and banks' financial performance. The hypothesis suggests that as GDP grows, economic activity increases, leading to higher demand for banking services, which should boost financial performance. Findings: The results show a positive but statistically insignificant relationship between GDP and bank performance in Ethiopia. This contradicts the hypothesis that a significant positive relationship would exist. It also contradicts Diamond's Theory of Financial Intermediation, which suggests that as the economy grows, banks can benefit from increased economic activity (i.e., more loans, deposits, and transactions).

The finding may suggest that the impact of GDP growth on Ethiopian banks is limited, possibly due to structural factors like low financial market depth, limited diversification in bank portfolios, and high dependence on non-economic factors such as political and regulatory changes.

Inflation and Financial Performance: Hypothesis a significant positive relationship between inflation and banks' financial performance. Higher inflation could lead to higher nominal interest rates, which might benefit banks by increasing their interest margins (the difference between lending and deposit rates).

Findings: The study found a positive but statistically insignificant relationship between inflation and bank financial performance. This result also contradicts the hypothesis, which suggested that inflation would significantly influence banks' profitability. The reason for this may lie in the low level of inflation responsiveness in the Ethiopian banking sector. While inflation theoretically increases interest margins, the sector may not have the ability to adjust lending rates quickly enough to capitalize on inflationary pressures. Additionally, the regulatory environment in Ethiopia may constrain banks' ability to adjust their interest rates, limiting the impact of inflation.

According to Diamond's theory, financial intermediaries (such as banks) play a crucial role in channeling savings to productive investments, especially when economic conditions are favorable. In a growing economy, banks are expected to perform better by facilitating increased economic activity.

The results of this study, however, indicate that in Ethiopia, macroeconomic factors such as GDP and inflation do not significantly influence financial performance. This implies that the Ethiopian banking system may not be fully functioning as a financial intermediary, as expected by Diamond's theory. The

banks in Ethiopia may not be fully integrated into the economy's growth dynamics, potentially due to structural barriers like limited financial instruments, government control over interest rates, and low levels of financial inclusion.

The study's findings highlight the importance of considering country-specific factors when analyzing the relationship between macroeconomic variables and financial performance. While GDP and inflation are expected to influence bank performance, these variables are insignificant in Ethiopia's context due to a combination of internal bank factors, regulatory constraints, and an underdeveloped financial market. This contrasts with the theoretical predictions of Diamond's model, which suggests a stronger link between economic growth and bank performance. Thus, future research could focus on exploring the unique structural challenges faced by Ethiopian banks and how these may distort the relationship with broader macroeconomic variables.

Table 4.17: Comparison of test result with expectation

Independent Variables	Expected result	Actual result	Level of significant	Conclusion
DI	Positive	Positive	Significant	Failed to reject
Bank size	Positive	Positive	Significant	Failed to reject
Equity ratio	Positive	Positive	Significant	Failed to reject
NPL	Negative	Negative	Significant	Failed to reject
Loan to asset ratio	Positive	Negative	Significant	Rejected
Liquidity ratio	Positive	Positive	Significant	Failed to reject
GDP	Positive	Positive	Insignificant	Rejected
Inflation rate	Negative	Positive	Insignificant	Rejected

Source: compiled by researcher based on the study finding (2024)

5.CHAPTER FIVE

5. 1. SUMMARY OF FINDING, CONCLUSIONS AND RECOMMENDATIONS

This chapter's goal is to go over the findings and suggestions. As a result, the chapter is divided into two sections, the first of which contains the study's findings. Additionally, the recommendations based on the study's findings are presented in the second section.

5.1.1 SUMMARY OF FINDING

The result of the regression shows that there is positive and significant relationship between DI and both financial performance measurements (ROA and RAROA) which is a proxy measure of lending diversification of sampled Ethiopian commercial banks.

The results of the regression were consistent with the actual data and the earlier hypothesis that economies of scale may allow larger banks to pay less for effective information collection, processing, and analysis. The regression result revealed that when Ethiopian commercial banks getting bigger in their asset size, the more profitable they become.

Regression analysis of both models showed that the equity ratio significantly and favorably affects banks' financial performance. The magnitude of the coefficient estimate was statistically significant for both ROA and RAROA. According to the findings, a bank with a larger capital ratio is assumed to be less risky, which reduces funding expenses and enhances a bank's financial performance.

NPL coefficient estimations showed a statistically significant and negative correlation with banks' financial performance. This suggests that NPLs play a significant role in explaining the fluctuations in ECBs' financial performance. The result shows that NPL has negatively affected Ethiopian commercial banks financial performance.

Loan to asset ratio has expected to have a positive relation with financial performance. Surprisingly, the regression result reveals that negative and significant effect on both ROA and RAROA. The possible reason for negative relationship between loans to asset ratio and banks financial performance was that loans are more illiquid and riskier than other assets in a bank's asset portfolio, and banks with a high loan to asset ratio may be at a higher exposure of credit risk.

The result reveals that liquidity is positively related with both ROA and RAROA in a significant manner. This result indicates that Ethiopian commercial banks with sufficient liquidity leads to have readily funds are available and this help to their ability to readily fulfill their growing requirements as well as ability of banks to constantly meet cash, cheque, withdrawal commitments this increased banks reliability by customers and satisfy loan demands of their customers.

The finding shows there is positive association between GDP and financial performance. The result reveals the growth of GDP contributes positive effect on banks financial performance. However, both measurements show the relationships are insignificant. Thus, the increment of GDP has minimal direct effect on banks performance.

At a coefficient of 0.0007546 and a p-value of 0.836 for ROA and a coefficient of 0.9350579 and a p-value of 0.146 for RAROA, inflation and financial success are positively correlated. At the national level, the consumer price index (CPI) is used to measure inflation. The outcome demonstrates that, at the specified level of confidence interval, inflation has a positive and negligible relationship.

5.1.2. CONCLUSIONS

Examining how lending diversity affects Ethiopian commercial banks' financial performance was the main goal of the study. Over the course of eleven years (2013–2023), a sample of eleven banks was selected using panel data. Each bank's audited financial reports and NBE provided the data utilized for the bank-specific elements, while MoF and NBE All diagnostic tests, including multicollinearity, heteroscedastic, model specification, normality, and autocorrelation, are performed on the classical linear regression model using Stata 14 prior to regression analysis. In order to understand the regression results, the fixed effects model for return on asset (ROA) and the random effects model for risk adjusted return on asset (RAROA) were chosen based on the Hausman model selection test. The study was conducted by building a balanced panel regression model using OLS.

Sectoral loan diversification or diversification index (DI) and financial performance has positive and significant relationship. This implies when Ethiopian commercial banks relatively diversify their loan to different economic sectors, they enable to eliminate the effect of idiosyncratic shocks (specific risk) on their credit portfolios because of borrowers are essentially spread across different economic sectors, this leads to decrease in NPL and thereby increased profitability.

Bank size affects Ethiopian commercial banks financial performance positively. It implies that Ethiopian commercial banks become more lucrative as their asset sizes increase. This is because larger banks are better able to diversify the risks they take on and react faster to shifts in the market.

Equity ratio has significant and positive effect on banks financial performance. This shows that high equity to assets ratio (EAR) making banks relatively safe in liquidation events, and reducing dependence on external funding and then the opportunity to increase profits is greater. Furthermore, Ethiopian commercial banks that have a greater equity ratio are more profitable because they can more easily meet regulatory capital requirements, which allows them to lend out excess capital and earn extra revenue.

The financial performance of Ethiopian banks is significantly impacted by non-performing loans. The result shows borrowers' unpaid loan either partly or in full negatively affects banks financial performance. Banks concentration lending leads to higher amount of NPL and leads reduction of ECBs profitability.

Remarkably, there is a negative and substantial correlation between the loan to asset ratio and both ROA and RAROA. A higher level of this ratio results in less money available and a higher chance of failure, which could raise financing costs and lower bank profitability.
The liquidity ratio significantly and favorably affects the financial performance of Ethiopian banks. A higher liquidity ratio makes it possible for banks to easily meet their expanding needs and consistently fulfill their withdrawal agreements, which boosts consumer trust and value and boosts profits.

The macro-economic variables GDP and inflation has positive but insignificant relation with banks performance. Although GDP and inflation leads to increase banks return, their effect is minimal and they are not considered as powerful explanatory variables to define the effect of lending diversification on Ethiopian commercial banks financial performance.

This study contributes to the ongoing diversification-concentration debate in Ethiopia by highlighting the importance of loan portfolio diversification for improving both the financial performance of banks

and the broader development of the economy. The findings suggest that diversification in bank loan portfolios can lead to a more stable and robust banking sector, which can withstand the economic volatility associated with concentrating loans in a few sectors. In Ethiopia, where certain sectors such as agriculture dominate the economy, over-concentration in these areas may limit the growth opportunities for banks and the economy as a whole. Therefore, the study advocates for loan portfolio diversification as a strategy for enhancing banks' financial performance while simultaneously contributing to economic development by supporting a wider array of sectors.

To enhance your conclusion and provide clear, actionable recommendations, you can revise your findings and suggestions as follows:

The findings of this study suggest that loan portfolio diversification plays a significant and positive role in enhancing the financial performance of Ethiopian commercial banks. Specifically, the positive relationship between the Diversification Index (DI) and key financial performance metrics, such as Return on Assets (ROA) and Risk-Adjusted Return on Assets (RAROA), supports the notion that banks with diversified loan portfolios are better equipped to manage risks and improve profitability. This conclusion aligns with Dimond's (1994) traditional banking theory, which emphasizes that bank profitability is positively correlated with diversified credit portfolios. The regression results indicate that as banks extend lending operations to various economic sectors, the quality of their credit portfolios improves, and the likelihood of defaults decreases.

Additionally, the study reveals that factors such as bank size, equity ratio, and liquidity are key contributors to Ethiopian banks' financial performance. Larger banks, with higher total assets, can diversify their risks more effectively and improve profitability. Similarly, banks with a higher equity ratio are less risky, leading to reduced funding costs and better financial outcomes. The study also highlights that while non-performing loans (NPLs) have a significant negative impact on financial performance, banks with sufficient liquidity are better positioned to handle financial challenges and ensure stable profitability.

The study's results contribute to the diversification-concentration debate in Ethiopia by demonstrating that loan portfolio diversification is more beneficial than concentration, especially in improving bank performance and enhancing economic stability. Furthermore, the findings emphasize the importance of managing credit risk, asset quality, and liquidity for sustained financial success.

5.2. RECOMMENDATIONS

Based on the findings of the study the following recommendations were forwarded:

- According to the finding as well as the annual banks report, high level of credit risk has arises as a result of large amount of loans are distributed to few sectors. Thus, it is recommendable that management bodies of commercial Banks try monitor concentrations of credit risk by economic sector. In addition, to improve credit quality it is better to diversify loan to various sectors, because, it minimized idiosyncratic risk and thereby it helps to enhance banks financial performance.
- Regarding to bank size, the researcher recommends to increase banks asset size by various ways such as opening more branches in different parts of the country to take the advantage of economic of scale with putting in mind that as some times banks become larger, they might suffer on inefficiencies and this leading to negatively affect financial performance.
- The researcher also recommends ECBs to increase their capital amount this is in line with the finding as a bank with a sound capital position is able to pursue business opportunities more effectively and has more time and flexibility to deal with problems arising from unexpected losses and it leads to achieve higher financial performance.
- Non-performing loan has negatively affected ECBs financial performance. So, it is advisable that Ethiopian commercial banks critically assess the character and capacity of the borrowers to pay or meet contractual obligations, current exposures to the borrowers and its probable future developments, credit history and the likely recovery ratio in case of default obligations-value of collateral and follow up the borrowers' activity. Moreover, in terms of sectoral loan distribution, it is better that Bank's credit portfolio covered a wide range of economic sectors to reduce specific risk and thereby it leads to reduce NPL. It is also better that banks focus on major loan cases that have high contribution for the total NPL.
- The study implies loan to asset ratio has negatively affected banks financial performance. The higher this ratio leads to a high negative impact on current activity. Thereby it affects current income of banks. Thus, to get benefit from this important ratio the bank give only reasonable amount of loan to sectors in order to minimize the current liquidity problem. In addition, banks also try to establish good risk management system to minimize credit risks unless, the higher this ratio leading to higher non-performing ratio.

- Liquidity is one of the crucial financial performance measures since liquidity problem in a bank has cause of crisis in the banking industry. Thus, it is advisable to banks not to hold minimum cash as well as managed the amount of loan disbursement. To increase or optimize the liquidity of banks as per national bank regulation, managers of commercial banks check daily amount of liquidity of their banks and they do not hold excess cash at the expense of fixed assets that can improve financial performance. Rather than holding excess cash, commercial banks are recommended to invest in short term investment to generate additional revenue and to solve sudden withdrawal of depositors. Therefore, Ethiopian commercial banks need to have optimal level of liquidity which enables banks to meet their contractual obligations and increased profitability.
- Finally, it is advisable that Ethiopian government control macro-economic variables to support the activity of ECBs. Even though real GDP growth does not have a significant effect on commercial banks financial performance the government should certify that, these important macroeconomic variable needs to well managed because of its growth would support growth in different sectors of the economy. Regarding to inflation the government also highly gives attentions to manage this variable unless; if this variable increased rapidly, it has adverse effect on banks financial performances.
- Regulatory Incentives for Sectoral Diversification of the Ethiopian regulatory authorities should consider offering incentives for banks that diversify their loan portfolios across various sectors. These could include:Tax breaks for banks that lend to underrepresented sectors (e.g., manufacturing, services, or technology) that are critical for long-term economic growth. Capital reserve requirements that encourage banks to diversify their portfolios, reducing over-reliance on specific sectors, such as agriculture.
- Promote Financial Literacy and Access to Credit for Financial literacy campaigns could be launched to encourage smaller businesses in diverse sectors to access credit. Banks may be more inclined to lend to these businesses if there is a broader market base. Increased financial inclusion programs could be developed, aiming to provide underserved sectors or regions with better access to banking services, fostering economic growth and more balanced loan portfolios.
- Develop a More Inclusive Credit Risk Model to the development of an inclusive credit risk model could help banks assess creditworthiness across various sectors more effectively. This would reduce the risks associated with lending to less traditional sectors and would encourage them to diversify their loan portfolios.

- Promote Private Sector Growth Beyond Agriculture: Ethiopian policymakers should incentivize growth in non-agricultural sectors, such as manufacturing and technology. This can be achieved through targeted fiscal policies like subsidies or grants for start-ups and small businesses in these sectors. By doing so, the economy will have more diversified industries for banks to lend to.
- Enhance the Stability of the Banking Sector: Regulations that promote stability and reduce risk, such as increased capital adequacy requirements and better risk management frameworks, could be implemented to help Ethiopian banks navigate the uncertainties associated with loan concentration in volatile sectors (e.g., agriculture).
- Based on the findings, the following actionable policy recommendations are proposed to enhance the performance of Ethiopian commercial banks:
- Promote Sectoral Diversification: Regulatory authorities should incentivize banks to diversify their loan portfolios across various economic sectors. This can be achieved through tax incentives, risk-sharing mechanisms, or reduced capital requirements for banks that demonstrate well-diversified portfolios.
- Strengthen Risk Management: Banks should implement robust risk management frameworks to manage risks arising from sectoral concentration. This includes leveraging data analytics to assess credit risks, improving monitoring systems, and ensuring effective loan diversification strategies.

- Enhance Capital Adequacy: Banks should maintain higher capital ratios to reduce the likelihood of financial distress and to ensure they are well-positioned to meet regulatory capital requirements. Regulators could also create guidelines encouraging banks to strengthen their capital buffers.
- Focus on Liquidity Management: Banks should prioritize liquidity management to maintain sufficient reserves, reducing the likelihood of liquidity crises. This could involve strategies for improving cash flow management and maintaining higher levels of liquid assets.
- Address Non-Performing Loans (NPLs): Banks need to adopt proactive measures to reduce NPLs, such as more stringent credit evaluations, restructuring bad loans, and engaging in financial education programs for borrowers.
- Improve Data Availability and Research: Future studies should address the limitations in data availability and sample size, as these factors could affect the generalizability of the findings. Expanding the scope of future studies to include more banks and a longer time frame would enhance the robustness of the results.

5.3. Suggestions for Further Research

The following issues regarding the impact of lending diversifications on banks' financial performance were brought up in this study. The study is not well investigated in Ethiopia and there is empirical literature shortage. So, to fill the gap future researchers are recommended to the same issue with border range of variables and samples. There is no study conducted related to loan diversification on microfinance institutions thus, the researcher also recommends to investigate this title on microfinance institutio

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ID	YEAR	ROA	RAROA	HHI	BSZ	EQR	NPL	LAR	LIQ	GDP	INF
1	2013	0.03237	5.097638	0.748665	24.80817	0.085279	0.037	0.318797	0.165749	0.1	0.364
1	2014	0.02652	4.25	0.715086	25.03044	0.075076	0.0394	0.348797	0.178258	0.1057	0.028
1	2015	0.02498	4.003205	0.706479	25.46511	0.055488	0.0416	0.396345	0.157709	0.114	0.181
1	2016	0.03422	5.183974	0.756885	25.79094	0.098661	0.0261	0.364219	0.197684	0.087	0.341
1	2017	0.0299	4.791667	0.714215	25.99854	0.047069	0.032	0.356759	0.17677	0.099	0.135
1	2018	0.02822	4.522436	0.71818	26.22096	0.045436	0.041	0.365698	0.162881	0.1035	0.081
1	2019	0.03275	5.060737	0.746891	26.44382	0.073665	0.027	0.393722	0.186087	0.104	0.077
1	2020	0.02428	3.891026	0.707932	26.67571	0.041866	0.037	0.359735	0.158029	0.08	0.097
1	2021	0.02107	3.376603	0.665403	26.90898	0.084815	0.038	0.377479	0.145156	0.101	0.074
1	2022	0.02378	3.620833	0.676414	27.06103	0.090774	0.035	0.341594	0.195741	0.077	0.146
1	2023	0.01643	2.80633	0.680126	27.29134	0.070225	0.041	0.376685	0.135349	0.09	0.126
2	2013	0.02998	4.36875	0.768423	22.68794	0.116736	0.035	0.430391	0.170871	0.1	0.364
2	2014	0.02744	4.275	0.744406	22.92304	0.106323	0.041	0.42863	0.150543	0.1057	0.028
2	2015	0.03252	5.51625	0.770496	23.12926	0.14052	0.037	0.435948	0.189774	0.114	0.181
2	2016	0.03005	5.390625	0.761069	23.2978	0.12976	0.028	0.419392	0.180299	0.087	0.341
2	2017	0.02466	4.26025	0.728905	23.60156	0.103864	0.034	0.453682	0.140194	0.099	0.135
2	2018	0.02797	4.974063	0.75444	23.81913	0.117475	0.028	0.415101	0.145537	0.1035	0.081
2	2019	0.0256	4.30001	0.747234	23.95053	0.126337	0.035	0.495113	0.153415	0.104	0.077
2	2020	0.02388	4.2625	0.736045	24.16201	0.126313	0.043	0.496049	0.133267	0.08	0.097
2	2021	0.02377	4.28125	0.738549	24.41281	0.13551	0.039	0.495768	0.140144	0.101	0.074
2	2022	0.02701	4.944063	0.746865	24.73546	0.137531	0.051	0.486407	0.136649	0.077	0.146
2	2023	0.026	4.58187	0.774896	25.03588	0.129147	0.021	0.433242	0.130731	0.09	0.126
3	2013	0.02567	4.503509	0.780074	22.99875	0.093366	0.042	0.457382	0.203267	0.1	0.364
3	2014	0.02623	4.601754	0.790959	23.2372	0.090934	0.038	0.487011	0.215863	0.1057	0.028
3	2015	0.03274	5.392982	0.807733	23.40837	0.115254	0.039	0.424332	0.27419	0.114	0.181
3	2016	0.03722	5.952982	0.826355	23.58661	0.134332	0.034	0.436868	0.22074	0.087	0.341
3	2017	0.03073	5.391228	0.808372	23.70628	0.119595	0.033	0.448789	0.220991	0.099	0.135
3	2018	0.03244	5.791228	0.81972	23.81259	0.121828	0.034	0.437471	0.219157	0.1035	0.081
3	2019	0.02944	5.164912	0.772141	23.93265	0.118071	0.032	0.465476	0.156244	0.104	0.077
3	2020	0.02544	4.463158	0.751309	24.07585	0.117503	0.031	0.444251	0.181633	0.08	0.097

3	2021	0.02263	3.970175	0.780532	24.30679	0.09288	0.044	0.506268	0.156244	0.101	0.074
3	2022	0.02045	3.587719	0.773995	24.53934	0.129148	0.043	0.512619	0.146873	0.077	0.146
3	2023	0.01809	3.173684	0.753506	24.62264	0.118678	0.039	0.519461	0.136175	0.09	0.126
4	2013	0.01833	4.800633	0.678901	22.42376	0.094808	0.048	0.494641	0.149873	0.1	0.364
4	2014	0.02239	5.085443	0.698423	22.56056	0.093238	0.039	0.502146	0.359923	0.1057	0.028
4	2015	0.02486	5.867089	0.706574	22.70806	0.107939	0.034	0.455604	0.391744	0.114	0.181
4	2016	0.02625	6.306962	0.714587	22.83221	0.11003	0.041	0.473014	0.440291	0.087	0.341
4	2017	0.02993	6.522152	0.729802	23.04174	0.109018	0.031	0.462797	0.476402	0.099	0.135
4	2018	0.02442	5.727848	0.70247	23.14598	0.10559	0.044	0.457013	0.427869	0.1035	0.081
4	2019	0.02734	5.753165	0.750861	23.33829	0.124704	0.046	0.438671	0.499123	0.104	0.077
4	2020	0.0226	4.151899	0.693257	23.54631	0.106243	0.041	0.482609	0.435261	0.08	0.097
4	2021	0.01973	4.724367	0.67132	23.97682	0.099043	0.046	0.542003	0.395854	0.101	0.074
4	2022	0.0176	4.56962	0.67315	24.18847	0.083738	0.013	0.562517	0.365247	0.077	0.146
4	2023	0.01977	4.756329	0.68543	24.39435	0.115982	0.035	0.54403	0.407169	0.09	0.126
5	2013	0.03529	5.212784	0.764235	22.35609	0.163416	0.036	0.412711	0.18765	0.1	0.364
5	2014	0.03889	5.524148	0.782386	22.47106	0.183166	0.026	0.370843	0.233783	0.1057	0.028
5	2015	0.0401	5.696023	0.765601	22.8103	0.195903	0.029	0.361006	0.267846	0.114	0.181
5	2016	0.04021	5.711648	0.773411	22.84519	0.192177	0.028	0.427172	0.27015	0.087	0.341
5	2017	0.03272	4.947727	0.756589	23.06448	0.161073	0.0339	0.351244	0.23992	0.099	0.135
5	2018	0.02762	3.923295	0.732142	23.16811	0.145988	0.037	0.399385	0.181268	0.1035	0.081
5	2019	0.0257	3.650568	0.713542	23.34149	0.136086	0.039	0.442838	0.164887	0.104	0.077
5	2020	0.0342	4.929545	0.752145	23.50765	0.173305	0.029	0.46364	0.196622	0.08	0.097
5	2021	0.02483	3.526989	0.724513	23.76289	0.153711	0.036	0.49261	0.16326	0.101	0.074
5	2022	0.02897	4.115057	0.741241	24.03348	0.169701	0.033	0.449366	0.182173	0.077	0.146
5	2023	0.02086	3.963068	0.719817	24.11677	0.144226	0.042	0.526134	0.220473	0.09	0.126
6	2013	0.02012	3.678245	0.743823	22.26066	0.111764	0.042	0.462762	0.236622	0.1	0.364
6	2014	0.02959	5.409506	0.764521	22.49758	0.128129	0.037	0.443268	0.250473	0.1057	0.028
6	2015	0.03001	5.862888	0.780639	22.76778	0.151667	0.033	0.424178	0.263438	0.114	0.181
6	2016	0.0339	6.197441	0.791495	22.89652	0.162538	0.028	0.464942	0.259251	0.087	0.341
6	2017	0.02824	5.162706	0.760127	23.02445	0.130283	0.036	0.471737	0.212462	0.099	0.135
6	2018	0.02342	4.281536	0.786208	23.19782	0.119639	0.039	0.426866	0.206172	0.1035	0.081

6	2019	0.01959	3.581353	0.78335	23.38777	0.117419	0.038	0.477693	0.196127	0.104	0.077
6	2020	0.01963	3.588665	0.780093	23.57223	0.120006	0.03	0.492702	0.214498	0.08	0.097
6	2021	0.01766	3.228519	0.775434	23.81463	0.112802	0.039	0.549753	0.185718	0.101	0.074
6	2022	0.02046	3.740402	0.785343	24.05657	0.105377	0.0325	0.537472	0.167901	0.077	0.146
6	2023	0.02105	3.848263	0.795725	24.29943	0.108002	0.047	0.507885	0.152488	0.09	0.126
7	2013	0.03205	5.61296	0.825272	22.29324	0.151633	0.036	0.461934	0.195718	0.1	0.364
7	2014	0.03365	5.89317	0.837067	22.5101	0.153506	0.0325	0.426452	0.179862	0.1057	0.028
7	2015	0.03653	6.068301	0.859201	22.68502	0.194628	0.029	0.389004	0.197067	0.114	0.181
7	2016	0.03459	6.057793	0.830737	22.83659	0.184631	0.027	0.448168	0.181916	0.087	0.341
7	2017	0.0313	5.481611	0.825908	22.93642	0.192177	0.041	0.496798	0.176699	0.099	0.135
7	2018	0.02919	4.811208	0.810949	23.09792	0.182777	0.039	0.513944	0.157687	0.1035	0.081
7	2019	0.02543	4.45359	0.820925	23.30773	0.164289	0.045	0.527997	0.137834	0.104	0.077
7	2020	0.02253	3.945709	0.791562	23.48519	0.159059	0.051	0.483069	0.128767	0.08	0.097
7	2021	0.02339	4.096322	0.814454	23.77311	0.140484	0.035	0.513053	0.120712	0.101	0.074
7	2022	0.01929	3.378284	0.7814	24.00751	0.126659	0.044	0.51347	0.118929	0.077	0.146
7	2023	0.02138	3.443082	0.80216	24.24128	0.158002	0.034	0.51657	0.121004	0.09	0.126
8	2013	0.023	2.184591	0.654561	20.74589	0.129201	0.052	0.526606	0.187668	0.1	0.364
8	2014	0.01419	1.138844	0.618962	21.29346	0.106865	0.046	0.408101	0.167408	0.1057	0.028
8	2015	0.0189	1.516854	0.625324	21.6397	0.110832	0.045	0.520713	0.171772	0.114	0.181
8	2016	0.02779	2.230337	0.639087	22.02366	0.11666	0.036	0.476905	0.183961	0.087	0.341
8	2017	0.02895	2.323455	0.647602	22.60082	0.126462	0.034	0.523682	0.197532	0.099	0.135
8	2018	0.02981	2.756822	0.668302	22.71802	0.138343	0.028	0.505073	0.181265	0.1035	0.081
8	2019	0.02726	2.187801	0.637266	23.16231	0.123094	0.029	0.587881	0.14014	0.104	0.077
8	2020	0.00366	0.29374	0.579452	23.09233	0.084242	0.048	0.578003	0.157842	0.08	0.097
8	2021	0.01904	1.52809	0.611758	23.60057	0.114335	0.031	0.558799	0.197183	0.101	0.074
8	2022	0.01751	1.405297	0.605396	24.12072	0.108487	0.0329	0.504081	0.170619	0.077	0.146
8	2023	0.01574	1.263242	0.600445	24.45594	0.095871	0.0417	0.529146	0.180016	0.09	0.126
9	2013	0.00392	0.430769	0.665213	20.67457	0.071333	0.051	0.493604	0.278416	0.1	0.364
9	2014	0.02901	4.187912	0.72084	21.0334	0.137322	0.036	0.428269	0.312079	0.1057	0.028
9	2015	0.0242	2.859341	0.715096	21.31552	0.125194	0.039	0.374066	0.285694	0.114	0.181
9	2016	0.03061	4.363736	0.724816	21.62466	0.134342	0.032	0.394093	0.335391	0.087	0.341

9	2017	0.03282	5.156044	0.751727	21.8025	0.144183	0.041	0.367951	0.352373	0.099	0.135
9	2018	0.02005	2.203297	0.723961	22.0079	0.113751	0.037	0.432295	0.287955	0.1035	0.081
9	2019	0.03426	5.964835	0.742393	22.49131	0.140309	0.029	0.391234	0.348643	0.104	0.077
9	2020	0.03221	5.13956	0.737942	22.8175	0.131769	0.033	0.406548	0.314358	0.08	0.097
9	2021	0.02113	2.321978	0.710352	23.11786	0.126511	0.041	0.508174	0.292886	0.101	0.074
9	2022	0.02729	2.998901	0.72416	23.33849	0.146321	0.035	0.528035	0.318678	0.077	0.146
9	2023	0.02643	2.904396	0.706725	23.73839	0.125516	0.038	0.529961	0.31922	0.09	0.126
10	2013	0.02131	2.120637	0.743254	19.60351	0.128725	0.035	0.447058	0.218643	0.1	0.364
10	2014	0.01719	1.882444	0.72584	20.83532	0.108954	0.041	0.473299	0.185443	0.1057	0.028
10	2015	0.02267	2.163758	0.745631	21.39715	0.120888	0.039	0.437308	0.213319	0.114	0.181
10	2016	0.01776	1.911704	0.727147	21.74837	0.117022	0.043	0.465788	0.184803	0.087	0.341
10	2017	0.01996	2.024641	0.726971	22.08714	0.120008	0.034	0.414506	0.197834	0.099	0.135
10	2018	0.02509	2.287988	0.739157	22.53999	0.13167	0.033	0.417004	0.256535	0.1035	0.081
10	2019	0.02326	2.194045	0.719833	22.97822	0.118136	0.035	0.499974	0.234063	0.104	0.077
10	2020	0.02201	2.129877	0.709672	23.14644	0.116811	0.031	0.466099	0.202492	0.08	0.097
10	2021	0.01834	1.941478	0.69762	23.51043	0.101723	0.044	0.444755	0.216351	0.101	0.074
10	2022	0.02658	2.569815	0.726935	23.89281	0.128899	0.029	0.442768	0.251161	0.077	0.146
10	2023	0.02347	2.204825	0.701614	24.18208	0.116824	0.036	0.490762	0.195122	0.09	0.126
11	2013	0.01976	2.099396	0.767944	19.95237	0.155668	0.044	0.407984	0.161351	0.1	0.364
11	2014	0.03965	4.994467	0.79231	20.7774	0.150237	0.032	0.336867	0.194043	0.1057	0.028
11	2015	0.04249	4.940342	0.80628	21.20193	0.149146	0.025	0.339791	0.215562	0.114	0.181
11	2016	0.03607	4.314386	0.786911	21.59633	0.137198	0.03	0.352969	0.192581	0.087	0.341
11	2017	0.02898	3.257746	0.765409	21.90145	0.151913	0.08	0.42163	0.159984	0.099	0.135
11	2018	0.026	3.163984	0.786811	22.09057	0.167401	0.08	0.436434	0.165824	0.1035	0.081
11	2019	0.03035	3.384809	0.791898	22.30725	0.176915	0.036	0.358364	0.193152	0.104	0.077
11	2020	0.0275	2.3833	0.775329	22.7315	0.135883	0.048	0.461592	0.131625	0.08	0.097
11	2021	0.0227	2.37173	0.768244	23.0012	0.138366	0.046	0.428927	0.120598	0.101	0.074
11	2022	0.02179	2.096076	0.758174	23.24409	0.126409	0.038	0.449452	0.116339	0.077	0.146
11	23	0.023293	2.656439	0.778186	23.41037	0.158801	0.0338	0.429495	0.157363	0.09	0.126

Appendices

Appendix 1- Descriptive Statistics

```
. sum roa raroa di bsz eqr npl lar liq gdp inf
```

Variable	Obs	Mean	Std. Dev.	Min	Max
roa	121	.0259016	.0065862	.00366	.04249
raroa	121	3.946232	1.422767	.29374	6.522152
di	121	.7405094	.0543759	.5794522	.859201
bsz	121	23.27118	1.376507	19.60351	27.29134
eqr	121	.1251451	.0307272	.0418656	.1959032
npl	121	.0363165	.0091346	.013	.08
lar	121	.452787	.0586555	.3187969	.587881
liq	121	.2142614	.0813214	.1163386	.4991226
gdp	121	.0964727	.0109995	.077	.114
inf	121	.15	.103833	.028	.364

Appendix 2- Correlation Matrixes

```
. corr roa raroa di bsz eqr npl lar liq gdp inf
(obs=121)
```

	roa	raroa	di	bsz	eqr	npl	lar	liq	gdp	inf
roa	1.0000									
raroa	0.7139	1.0000								
di	0.5485	0.5772	1.0000							
bsz	-0.0673	0.1628	-0.0824	1.0000						
eqr	0.4948	0.2453	0.5146	-0.4446	1.0000					
npl	-0.4828	-0.4411	-0.2718	-0.1101	-0.1890	1.0000				
lar	-0.5358	-0.3205	-0.2718	-0.0294	-0.0109	0.1264	1.0000			
liq	0.1018	0.3209	-0.1565	-0.2074	-0.0423	-0.1780	0.0095	1.0000		
gdp	0.2046	0.1534	0.1092	-0.3164	0.0364	0.0140	-0.2491	0.0811	1.0000	
inf	0.1287	0.0958	0.0667	-0.2625	0.0643	-0.0989	-0.1115	0.0305	-0.1563	1.0000

Appendix 3: Classical Linear Regression Model diagnostic tests

Appendix 3.1.1- Hetroscedacity Test for return on asset (ROA)

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of roa

         chi2(1)      =     1.20
         Prob > chi2  =   0.2731
```

Appendix 3.1.2- Hetroscedacity Test for risk adjusted return on asset (RAROA)

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of raroa

         chi2(1)      =     2.97
         Prob > chi2  =   0.0847
```

Appendix 3.2.1 -Autocorrelation Test for return on asset (ROA)

```
 . dwstat

 Durbin-Watson d-statistic(  9,   121) =  1.559599
```

Appendix 3.2.2 -Autocorrelation Test for risk adjusted return on asset (RAROA)

```
. dwstat

Durbin-Watson d-statistic(  9,   121) =  1.188001
```

Appendix 3.2.3 Autocorrelation test by removing outlier observation for RAROA

```
. prais raroa di bsz eqr npl lar liq gdp inf,corc

Iteration 0:  rho = 0.0000
Iteration 1:  rho = 0.4029
Iteration 2:  rho = 0.6264
Iteration 3:  rho = 0.7296
Iteration 4:  rho = 0.7773
Iteration 5:  rho = 0.7958
Iteration 6:  rho = 0.8021
Iteration 7:  rho = 0.8042
Iteration 8:  rho = 0.8048
Iteration 9:  rho = 0.8050
Iteration 10:  rho = 0.8051
Iteration 11:  rho = 0.8051
Iteration 12:  rho = 0.8051
Iteration 13:  rho = 0.8051
Iteration 14:  rho = 0.8051

Cochrane-Orcutt AR(1) regression -- iterated estimates

      Source |       SS           df       MS      Number of obs   =       120
-------------+----------------------------------   F(8, 111)       =     15.46
       Model |  52.4642832         8   6.5580354   Prob > F        =    0.0000
    Residual |  47.0822053       111  .424164011   R-squared       =    0.5270
-------------+----------------------------------   Adj R-squared   =    0.4929
       Total |  99.5464885       119  .836525113   Root MSE        =    .65128

------------------------------------------------------------------------------
       raroa |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          di |    5.165218    2.79832     1.85   0.068    -.3798405    10.71028
         bsz |    .0603502     .08276     0.73   0.467    -.1036443    .2243448
         eqr |    14.37224   3.737262     3.85   0.000     6.966605    21.77787
         npl |   -20.65701   6.911955    -2.99   0.003    -34.35351   -6.960511
         lar |    -2.56187   1.554221    -1.65   0.102    -5.641664     .517923
         liq |    5.698132   1.428899     3.99   0.000     2.866674     8.52959
         gdp |   -2.393455   4.573737    -0.52   0.602    -11.45662     6.66971
         inf |   -.2375238   .5347441    -0.44   0.658    -1.297155    .8221074
       _cons |   -2.255568   3.231562    -0.70   0.487    -8.659124    4.147988
-------------+----------------------------------------------------------------
         rho |      .80509
------------------------------------------------------------------------------

Durbin-Watson statistic (original)    1.188001
Durbin-Watson statistic (transformed) 2.400313
```

Appendix 3.3- Multi-Collinearity Test both correlation and VIF

```
. corr di bsz eqr npl lar liq gdp inf
(obs=121)
```

	di	bsz	eqr	npl	lar	liq	gdp	inf
di	1.0000							
bsz	-0.0824	1.0000						
eqr	0.5146	-0.4446	1.0000					
npl	-0.2718	-0.1101	-0.1890	1.0000				
lar	-0.2718	-0.0294	-0.0109	0.1264	1.0000			
liq	-0.1565	-0.2074	-0.0423	-0.1780	0.0095	1.0000		
gdp	0.1092	-0.3164	0.0364	0.0140	-0.2491	0.0811	1.0000	
inf	0.0667	-0.2625	0.0643	-0.0989	-0.1115	0.0305	-0.1563	1.0000

```
. vif
```

Variable	VIF	1/VIF
bsz	1.98	0.503790
eqr	1.97	0.508458
di	1.66	0.601251
gdp	1.39	0.717816
inf	1.27	0.789121
npl	1.26	0.792574
lar	1.22	0.821234
liq	1.19	0.841958
Mean VIF	1.49	

Appendix 3.4.1- Normality Test for return on asset (ROA)

```
. swilk residual

                Shapiro-Wilk W test for normal data
```

Variable	Obs	W	V	z	Prob>z
residual	121	0.98620	1.337	0.651	0.25757

Appendix 3.4.1- Normality Test for risk adjusted return on asset (RAROA)

```
. swilk residual

                  Shapiro-Wilk W test for normal data

    Variable |        Obs       W           V         z       Prob>z
-------------+-------------------------------------------------------
    residual |        121    0.98988      0.981    -0.044    0.51740
```

Appendix 3.5.1 Ramsey reset test for ROA

```
. ovtest

Ramsey RESET test using powers of the fitted values of roa
       Ho:  model has no omitted variables
                 F(3, 109) =      0.55
                  Prob > F =      0.6521
```

Appendix 3.5.2 Ramsey reset test for RAROA

```
. ovtest

Ramsey RESET test using powers of the fitted values of raroa
       Ho:  model has no omitted variables
                 F(3, 109) =      2.24
                  Prob > F =      0.0874
```

Appendix 5.6.1Hausman test for ROA

```
. hausman fe re

                 ---- Coefficients ----
                |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
                |       fe           re         Difference          S.E.
----------------+----------------------------------------------------------------
             di |    .1121175     .0381014        .0740161        .0168482
            bsz |    .0002617     .0007492       -.0004875        .0003724
            eqr |      .08225     .0898084       -.0075584        .0133392
            npl |   -.1191917    -.1703054        .0511137              .
            lar |   -.0257529    -.0419402        .0161873        .0053685
            liq |    .021136     .0169399        .0041961        .0072355
            gdp |    .0195936     .0648767       -.0452831              .
            inf |    .0007546     .0042792       -.0035245              .
----------------------------------------------------------------------------------
                          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(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       36.59
                Prob>chi2 =      0.0000
                (V_b-V_B is not positive definite)
```

Appendix 5.6.2Hausman test for RAROA

```
. est store re

. hausman fe re
```

	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
di	14.29414	13.49846	.7956808	2.355548
bsz	.0095985	.1911544	-.1815559	.0474441
eqr	11.88238	6.902747	4.979628	1.481121
npl	-13.73718	-14.35491	.6177298	.
lar	-5.628703	-5.419272	-.2094312	.5692439
liq	3.546786	5.973988	-2.427202	.9579636
gdp	1.995602	10.18817	-8.192569	.
inf	.0953232	.9350579	-.8397347	.

```
                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(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                        =        2.86
              Prob>chi2 =      0.9428
              (V_b-V_B is not positive definite)
```

Appendix 5.6.3 Breusch and pagan LM test for RAROA

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        raroa[id,t] = Xb + u[id] + e[id,t]

        Estimated results:
```

	Var	sd = sqrt(Var)
raroa	2.024265	1.422767
e	.2958037	.5438784
u	.1615901	.4019827

```
        Test:   Var(u) = 0
                            chibar2(01) =    67.03
                          Prob > chibar2 =   0.0000
```

Appendix: 6.2 Regression result for ROA

```
. xtreg roa di bsz eqr npl lar liq gdp inf,fe

Fixed-effects (within) regression               Number of obs     =       121
Group variable: id                              Number of groups  =        11

R-sq:                                           Obs per group:
     within  = 0.7342                                         min =        11
     between = 0.5234                                         avg =      11.0
     overall = 0.5194                                         max =        11

                                                F(8,102)          =     35.21
corr(u_i, Xb)  = -0.7351                        Prob > F          =    0.0000

------------------------------------------------------------------------------
         roa |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          di |   .1121175   .0204925     5.47   0.000     .0714707    .1527643
         bsz |   .0002617   .0005584     0.47   0.640    -.0008459    .0013693
         eqr |     .08225   .0227763     3.61   0.000     .0370734    .1274267
         npl |  -.1191917    .040509    -2.94   0.004    -.1995411   -.0388423
         lar |  -.0257529   .0094116    -2.74   0.007    -.0444208    -.007085
         liq |    .021136   .0095336     2.22   0.029     .0022261    .0400459
         gdp |   .0195936   .0361572     0.54   0.589    -.0521241    .0913112
         inf |   .0007546   .0036434     0.21   0.836    -.0064719    .0079812
       _cons |   -.064049   .0226547    -2.83   0.006    -.1089845   -.0191134
-------------+----------------------------------------------------------------
     sigma_u |  .00534935
     sigma_e |  .00321524
         rho |  .73461117   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(10, 102) = 5.61                     Prob > F = 0.0000
```

Appendix: 6.2 Regression result for RAROA

```
. xtreg raroa di bsz eqr npl lar liq gdp inf,re

Random-effects GLS regression                   Number of obs     =       121
Group variable: id                              Number of groups  =        11

R-sq:                                           Obs per group:
     within  = 0.6554                                         min =        11
     between = 0.5907                                         avg =      11.0
     overall = 0.6155                                         max =        11

                                                Wald chi2(8)      =    202.02
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =    0.0000

------------------------------------------------------------------------------
       raroa |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          di |   13.49846   2.543143     5.31   0.000     8.513991    18.48293
         bsz |   .1911544   .0816786     2.34   0.019     .0310673    .3512415
         eqr |   6.902747   3.556679     1.94   0.052    -.0682154    13.87371
         npl |  -14.35491   7.272376    -1.97   0.048    -28.60851   -.1013191
         lar |  -5.419272   1.486785    -3.64   0.000    -8.333317   -2.505227
         liq |   5.973988   1.297313     4.60   0.000     3.431301    8.516675
         gdp |   10.18817   6.466573     1.58   0.115    -2.486077    22.86242
         inf |   .9350579    .643773     1.45   0.146     -.326714     2.19683
       _cons |  -10.78978   3.215048    -3.36   0.001    -17.09115   -4.488398
-------------+----------------------------------------------------------------
     sigma_u |  .40198268
     sigma_e |  .54387841
         rho |  .35328435   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Appendix 6.3 Robust regression result for DI

```
. xtpcse di bsz eqr npl lar liq gdp inf

Linear regression, correlated panels corrected standard errors (PCSEs)

Group variable:   id                          Number of obs     =       121
Time variable:    year                        Number of groups  =        11
Panels:           correlated (balanced)       Obs per group:
Autocorrelation:  no autocorrelation                        min =        11
                                                            avg =        11
                                                            max =        11
Estimated covariances      =        66        R-squared         =    0.3987
Estimated autocorrelations =         0        Wald chi2(7)      =    182.53
Estimated coefficients     =         8        Prob > chi2       =    0.0000
```

di	Panel-corrected Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
bsz	.0062257	.0025597	2.43	0.015	.0012088	.0112425
eqr	.9581942	.1249321	7.67	0.000	.7133317	1.203057
npl	-.8678045	.4204942	-2.06	0.039	-1.691958	-.0436511
lar	-.1928063	.0521704	-3.70	0.000	-.2950585	-.0905542
liq	-.0905809	.0286131	-3.17	0.002	-.1466616	-.0345003
gdp	.5410329	.2133157	2.54	0.011	.1229417	.959124
inf	.0298019	.0210654	1.41	0.157	-.0114857	.0710894
_cons	.5572758	.0948349	5.88	0.000	.3714029	.7431487