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The Effect of Income Diversification on Bank Performance: In case of Selected Commercial Banks in Ethiopia

A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Master of Science in International Business (Msc)

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ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

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Addis Ababa, Ethiopia

STATEMENT OF DECLARATION

I, the undersigned, declare that this thesis entitled **"The Effect of Income Diversification on Bank Performance: In case of Selected Commercial Banks in Ethiopia "** is my own original work and that all sources have been accurately reported and acknowledged, and this document has not been submitted for a degree in any other universities.

Dessalegn Munach	_____	**10/01/2024**
Name of Author	Signature	Date

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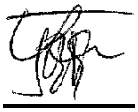
This is to certify that **Dessalegn Munach** has completed his thesis entitled **"The Effect of Income Diversification on Bank Performance: In case of Selected Commercial Banks in Ethiopia"** *is* his original work and is submitted for examination with my approval as a thesis.

Yohannes Workaferahu (PhD)		**10/01/2024**
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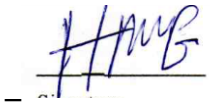
Hailemariam Gebremichael (PhD)		16/02/2024
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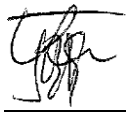
Yohannes Workaferahu (PhD)		10/01/2024
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ACRONYMS

EXR: Exchange rate

HHI: Herfindahl-Hirschman Index

HHINONII: Herfindahl-Hirschman Index of non-interest income

NBE: National bank of Ethiopia

NONIITA: Ratio of Non-Interest Income to Total Asset

NOI: Net operating Income

RE : Random Effect

FE: fixed Effect

SHFC: Share of fees and commissions

TA: Total Asset

LOANTA: Ratio of Loan to Total Asset

NI: Net Incme

ROA: Return on Asset

ROE: Return on Equity

OrI: Other Income

NII: Net Interest Income

OLS: Ordinary Least Square

Cov: Covariance

RBV: Resource Based View

ROIC: Return on Invested capital

WACC: Weighted Average Cost of Capital

FC: Fees and Commission

ABSTRACT

This thesis investigates the relationship between income diversification and bank performance based on financial performances of 17 commercial banks. Income diversification is the practice of raising a bank's proportion of fee, net trading profits and other non-interest income within its net operating income, in other words it is an expansion into new revenue-generating financial services, with the exception of conventional intermediation activities. The study sampled the financial performances of 17 commercial banks during the period of 2014 to 2021 and used explanatory research design, quantitative research approach and secondary data sources that were gained from National Bank of Ethiopia like annual reports, financial statements and company information. The model that employed in this thesis was Random Effect model. The panel data was presented by using inferential statistics. The proxy (dependent variable) is return on assets (ROA) that measures performance of the banks and the independent variables are Herfindahl Hirschman Index (HHI), Herfindahl Hirschman Index for non-interest income (HHINONII), ratio of non-interest income to total asset (NONIITA), Share of Fees and Commission over Non-interest income (SHFC), the ratio of loan to total asset(LOANTA)and exchange rate (EXR). The econometric results have shown positive and significant association between ratio of non-interest income to total asset (NONIITA) and bank performance (ROA) while Herfindahl Hirschman Index for net operating income (HHI) indicated negative and significant impact on bank performance this in part justifies policy actions to promote diversification. The coefficients of the remaining variables have shown positive but insignificant association with bank performance except HHINONII. From a policy point of view the finding suggests that bank regulations which might tend to increase the level of income diversification (non-interest income) should be evaluated carefully. Generally, the major findings reveal that income diversification has impact on return on asset of the banks i.e. an increase in income diversification leads to an increase in return on asset (ROA), which implies that banks are benefited from diversification of their activities beyond the traditional lending activities. Finally, the study recommends that Ethiopian commercial banks to diversify their income across non-interest income and to use it wisely by considering the right areas of diversification.

KEYWORDS: RETURN ON ASSET, INCOME DIVERSIFICATION, NON-INTEREST INCOME, HHI, BANK PERFORMANCE.

CHAPTER ONE

1. INTRODUCTION

This chapter deals about the background of the study, statement of the problem, objectives of the study, research hypothesis, Significance of the study, the scope and limitations of the study and finally, the organization of the study.

1.1. Background of the study

The banking industry is significant to consumers and regulators because of its force on macroeconomic aspects such as economic growth (Balcilar et al, 2018), enterprise, resource allocation, poverty reduction, education, and agriculture (Bustos et al, 2016). Moreover, monetary authorities converse macroeconomic policies via the financial system, making the banking sector one of the most profoundly regulated (Valla et al, 2006). As a result, an inefficient banking sector stymies economic growth by plummeting capital investment in the production of goods and services.

Income diversification is the practice of increasing a bank's percentage of fee, net trading profits, and other non interest income within its net operating income (Gurbuz et al, 2013). Furthermore, income diversification as an extension into new revenue-generating financial services, with the exclusion of conventional intermediation activities (Ebrahim and Hasan, 2008).Banks may diversify and alleviate their income by taking optional services, asset management services, and the sale of insurance and mutual fund products, payment products, electronic bill payments, and credit card sales (Mujeri and Younus, 2009). Noninterest income and interest income are uncorrelated, according to portfolio theory; hence income diversification contributes to income stability.

The global financial crisis highlighted several flaws in the present financial regulatory structure. predominantly concerning is the procyclicality of bank regulation, which, with increased economic fluctuations, not only made the bank itself riskier, but also amplified the impact of

prosperity and recession in the economic cycle, exacerbated the turmoil in the financial system, and ultimately laid up the banking system and macro financial stability (Gololo, 2018).

Now days, banks' performance gets a great deal of attention in the economic literatures bearing in mind that banks play a vital role in the economy. This attention has mature ever since the stream of bank failures experienced in the United States of America during the great depression (1940) and the recent global financial crisis of 2007/2008 that resulted in decline of financial inflows from the rest of the world to developing countries. These historical facts have confirmed the importance of bank performance not only for developed countries but also for developing one.

Non-interest income is more unpredictable. If the association between interest and non-interest revenue grows as a result of increasing cross-selling, the benefits of diversification may diminish (Stiroh, 2004), as well as DeYoung and Roland (2001). Non-interest revenue may increase the volatility of bank operating income for three reasons, a) Loan-based activities necessitate greater switching costs than fee-based activities; b) Lending activities necessitate lower operating leverage than fee-based activities; and c) Lending activities necessitate lesser financial leverage than fee-based activities (De Young and Roland ,2001).

In Ethiopia, banking industry has been seen gradually shifting away from traditional sources of revenue like loan-making etc., towards non-traditional activities that create fee income, service charges, trading revenue and other types of non-interest income (Tamirat, 2014). conversely, the trend of diversification of income source in Ethiopian commercial banks is varying from bank to bank across years. Despite researching on this issue has of vital importance both for banking industry and policy advice, it is not well investigated.

The existing research on the relationship between bank income diversification and performance has mostly focused on developed countries (DeYoung & Rice, 2004; Hsieh, Chen, Lee, & Yang, 2013; Stiroh, 2004) and a few on emerging countries (Brahmana, Kontesa, & Gilbert, 2018), with few studies on banks in developing countries like Ethiopia. Benefit from income diversification (Ahamed, 2017; Brahmana et al., 2018), others lament that income diversification ruins bank performance (Francis et al., 2018).

1.2. Statement of the Problem

The banking sector is an industry and a section of the economy devoted to the holding of financial assets for others and investing those financial assets as a leveraged way to create more wealth. Broadly, the banking system plays an important role in the modern economic world in collecting deposit (resources) and lend (allocate) them out to business- people. The global banking sector is still dealing with a slew of performance challenges, ranging from growing non-performing loans to severe regulations to technological transformation (Meng, Cavoli, & Deng, 2018).

Evidences showed that banks' with more diversified income source such as usage of transaction fees and fees for services provided like underwriting, insurance, trading and securitization, fiduciary duties will lead to a lower risk level and a higher risk-adjusted performance. The profitability of banks which depends on only interest income is highly affected by interest fluctuation and loan default risk. (Lepetit et al. 2008), For instance, an empirical study by Rumble (2006) in US commercial banks indicated there was significant and positive correlation between diversification of income source and bank performance. Yet, in the contrary, previous studies by (Stiroh, 2004; De Young & Rice, 2004 and Stiroh & Rumble 2006) indicate a worse risk-return trade-off for USA commercial banks venturing into income source diversification. In developing economy like Ethiopia, a financial sector is characterized by fragility, volatile interest rates, Khigh-risk investment and inefficiencies in the intermediation process (Shawn, 2002). Empirical evidence underline that the usage of diversified income source by this sector will in part improve banking industry performance (Sanya & Wolfe, 2011). Their finding on emerging economy countries showed that diversification across and within both interest and non-interest income generating activities decrease insolvency risk and enhance profitability. However, the trend of diversification of income source in Ethiopian commercial banks is varying from bank to bank across years. Yet, whether the issue has significant impact on banks performance is not well investigated. To the best of the researcher's knowledge, relatively similar empirical studies were investigated related to this issue are that of (Estifanos, 2014) and Habtamu, 2022). Using only eight commercial banks data, they have investigated the impact of non-interest income, proxy for diversification, on bank profitability. In this study, therefore, methodological issues and omitted variables by previous studies such as (Estifanos, 2014; Bahiru et.al.2020) have been

taken in to account. When banks move towards non-interest income sources from interest-based lending activities, they need to have the capacity, resources, skills, and a sophisticated technological scale (Hamdi et al., 2017; Meslier et al., 2014; Pennathur, Subrahmanyam, &Vishwasrao, 2012).

Therefore, the effect of diversification towards non-interest income on the performance of banks may vary across different categories of banks such as private versus public and big versus small banks. A recent strand of studies highlights the growing heterogeneity of banks relating to their performance e.g., (Pelletier, 2018; Yildirim, Kasman, & Hamid, 2021). Commercial banks may not be homogenous concerning their business models, strategies, and markets; so, they may exhibit different performances in non-traditional banking business. However, there is yet to be a study that specifically examines the impact of income diversification on the performance of different Commercial banks. In undeveloped nations, notably Ethiopia, there has been little research on this issue. Despite the fact that various studies have been conducted in our country, to the best of the researcher's knowledge, there is a scarcity of studies that have been conducted explicitly to investigate the effect of income source diversification on the performance of commercial banks in Ethiopia. Furthermore, there are also controversies whether Banks enlarge their operations towards non-interest income generating activities or only focus on traditional lending activities? (Lending and earning interest income and other financial services, which generate fees, trading income and other non-interest income). Therefore, this study attempts to investigate/analyze the effect of income diversification on Ethiopian commercial banks' performance by taking this issue into account.

1.3. Objectives of the Study

1.3.1. General Objective

The general objective of this study is to analyze the effect of income diversification on bank performance of selected commercial banks in Ethiopia.

1.3.2. Specific Objectives

- ✓ To investigate the relationship between income diversification and the banks' performance.
- ✓ To assess the tendencies of income diversification of commercial banks in Ethiopia.
- ✓ To determine the effect of income diversification on financial performance of selected commercial banks in Ethiopia.
- ✓ To analyse the relationship between Herfindahl Hirschman Index and bank performance.

1.4. Hypotheses of the study

The purpose of this study is mainly focusing on analyzing the effect of income (non-interest income) diversification on selected commercial bank's performance in Ethiopia. In order to analyze the effects of diversification, the following major hypotheses were postulated based on the previous study literature reviews.

Ho1: There is negative and insignificant relationship between HHI and ROA.

Ho2: There is negative and insignificant relationship between HHINONII and ROA.

Ho3: There is no positive and significant relationship between NONIIITA and ROA.

Ho4: There is no positive and significant relationship between LOANTA and ROA.

Ho5: There is no positive and significant relationship between SHFC and ROA.

Ho6: There is no positive and significant relationship between EXR and ROA.

1.5. Significance of the study

This study will have some significance to investigate the effect of income(non-interest income) diversification on bank's performance for bank managers, regulators, investors and policy makers, because understanding whether income diversification can create value for banks or not is very decisive for the mentioned decision makers in banking sector. Generally, this study will be useful to scholars, regulators, shareholders, employees and managers.

1.6. Scope of the study

This study is focused on the effect of income (non-interest income) diversification on selected 17 commercial banks' performance in Ethiopia. Non-interest income sources are considered as income differentiation in this study. On the other hand, the study is mainly concentrated on the non-interest income sources diversification, not on other types of diversification. In addition, the financial performance is only focused on return on asset (ROA). The research period covers since 2014 to 2021. As result, the researcher used only panel data of seven years and applied the explanatory research design for this study. The reason for picking the lower limit of the data time frame is owing to the availability of structured data as a particular year to address the issue of data inconsistency.

1.7. Organization of the Study

This study organizes in five chapters. The first chapter deals about introduction, statement of the problems, objectives of the study, significance of the study and scope of the study. Chapter two reviews pertinent literature on the study from both theoretical and empirical issues reviewed in the literature and then attempt to link it to the study. Chapter three discusses about the methodological issues of the study while chapter four discusses the analysis of the empirical results and finally chapter five summarizes the main findings of the study and provides suggestions and policy recommendations.

CHAPTER TWO

2. RELATED LITERATURE REVIEWS

2.1. INTRODUCTION

This chapter deals with theoretical literature review and the concept of income diversification, theories on diversification, empirical literature review of related studies carried on effect of income diversification on bank performance and the conceptual framework that describes the relationship between income diversification and bank performance.

2.2. Theoretical Literature Review

Traditionally the business of banking has been to accept deposits from customers and use these deposits to fund loans that they kept on their balance sheets until maturity. Although the interest margin banks earn by intermediating between depositors and borrowers continues to be a source of profits for most banks, they also earn significant amounts of non-interest income by charging their customers fees in exchange for a variety of financial services (DeYoung and Rice, 2004).

In recent years, the change from traditional activities to non-traditional activities (i.e. to non-interest income) is noticeable in banking industry all over the world. There are several

reasons for this shift, the most important technological advance, regulatory environment (in particular deregulation and liberalization) or globalization(David &Tuori (2000). So in this secion the researcher will try to give some issues which related to diversification.

2.2.1. Meaning of Diversification

Diversification is a corporate strategy to enter in to or start new products or product lines, new services or new market, involving considerably different skills, technology and knowledge. In finance, diversification means reducing risk by investing their assets in a variety of assets portfolio. If the asset values do not shift up and down in perfect synchrony, a diversified portfolio will have less risk than the weighted average risk of its constituent. In general, the

history of diversification dated back from a recognizable wisdom “Do not put all your eggs in one basket”. A review of the literature reveals that there is a great deal of variation in the way diversification is conceptualized, defined and measured.

Diversification as the area to which firms classified in one industry produce goods classified in another (Kamien and Schwartz,1975). In all these early definitions, industry or market boundaries are understood to be given. In distinction, (Pitt and Hopkins, 1982) However, recent attempts at defining diversification have shifted to the multidimensional nature of the diversification event. Diversification is a means of distribution the base of a business to achieve improved growth and or (a) reduce overall risk that includes all investment except those aimed directly supporting the competitiveness of offered business; (b) may take form of investments that a new products, services, customer segments, or geographic markets; and (c) may be accomplished by different methods including internal development, acquisitions, joint-ventures, licensing agreement (Booz, Allen and Hamilton ,1985). Diversification defined as the entry of a firm or business unit into new lines of activity, either by processes of internal business development or acquisition (Ramanujam &Varadarajan, 1989). These definitions seem to capture the goals of diversification, its direction, and the means by which it is accomplished.

Used the word ‘business’ rather than industry, defining diversification as the extent to which firms operate in different business simultaneously.

Related to banks, D’Souza and Lai (2004) indicated that diversification is particularly important for a bank, given its nature as a financial intermediary. The gaining from risk management in such financial firms will be enhanced to some extent. Moreover, some existing theories imply that increasing returns to scale linked to diversification. Banks acquire customer information during the process of making loans that can facilitate the efficient provision of other financial services, including the underwriting of securities. Likewise, securities and insurance underwriting, brokerage and mutual funds services, and other activities can produce information that improves loan making. In fact, diversification is not give guarantee of a reduced risk of failure or for better performance, D’Souza and Lai (2004). Rather it is just a tool that helps banks expanding their banking activities (business lines) and their regions (geographic lines).

2.2.2. Theories on Diversification

Firms, including banks, often pursue diversification for different motives including; the financial motive advanced in portfolio theory, the market power motive, the resource motive, the agency motive occasioned by managerial discretion, and the cost efficiency motive (Montgomery, 1994; Olo, (2009). Three theoretical perspectives that are particularly useful in explaining why firms pursue diversification are the Market power theory, the Agency theory and the Resource based view theory (Montgomery, 1994; Mulwaet al., 2015). According to Mulwaet al., (2015) the market power theory and the resource-based view theory are narrow and explain the motives of firm diversification based on profit maximization while Agency theory is managerial and emphasizes managerial choices and self-interest as a basis for diversification.

2.2.2.1. Market Power theory

The argument for market power theory was built from Porter (1980) opinion of positioning the company in its environment using a set of strategies that distinguishes a firm's position among the competitors. Diversification is one of the strategies to overcome competition Barney, (1991) and enables a firm to build market power surrendering it access to business powers. Firms are able to gain competitive power in the market by entering other markets through diversification. This is not because of their particular position in that market but because of their positions in their individual markets (Gribbin, 1976). Firms have three ways by which they can to yield market power through diversification: cross subsidization by using profits from one market to support vicious pricing in another; mutual tolerance of hard competition among competitors; and give-and-take buying among units of a multi-business firm which forecloses small competition (Montgomery, 1994; Palichet al., 2000). By this approach, firms are able to overcome competition thereby earning profits above the average market profits. So, market power theory hypothesis has a positive relationship between diversification and firm performance.

2.2.2.2 Resource Based View theory

The Resource Based View (RBV) theory is an action strategy to position a business unit as a foundation for a multi-business firm and emphasizes on the firm's ability to exploit the potential synergies between resources to produce higher performance (Werner felt 1984; Barney 1991;

Montgomery, 1994). RBV approach enlists the circumstances under which a firm's resources lead to high proceeds over longer periods of time using Porter's five competitive forces. It explains the resource-benefits accruing to a firm by envisage the existence of resource position barrier where by the holders of a resource are able to maintain a sustainable competitive advantage in relation to other holders and third persons since possession of a resource by one party affects the costs and or revenues of later acquirers unfavorably. In such a case the holder can be said to enjoy the safeguard of a resource position barrier or a first mover advantage (Lieberman and Montgomery, 1988).As such, diversification based on RBV focuses on resource allocation and sharing competencies across different business lines to boost performance by either cost reduction or by playing competitors out of the market as the absolute volume per period increases (Porter, 1980). This utilization of potential synergies expected from sharing functions, resources and competencies go ahead to generation of sustainable competitive advantages and thus profitability occasioned by cost reduction. Therefore, the RBV predicts a positive impact of diversification on a firm's financial performance.

2.2.2.3. Agency Theory

Agency theory hypothesizes the division between the owners and managers of company create divergence of interests which ultimately increase the agency cost. These costs refer to the aggregate of the agent incentive costs and monitoring costs incurred by the principals in limiting the variation of interest, bonding costs incurred to deter the principals from taking interest diverging actions and the welfare reduction or residual loss incurred by the principal as a result of the divergence between the agents decisions and welfare maximizing decisions expected by the principal (Jensen and Meckling ,1976).The theory posits that managers would often set up corporate assets for their own selfish interests rather than the interest of the stock holders which problems are usually exacerbated by risk preference differentials between the agents and the principals (Jensen, 1986). Often, shareholders are more concerned about non-diversifiable risk while managers are more interested in the diversifiable risk which conflicts are more noticeable in companies with substantial free cash flows. This is so because the managers will chose to invest the excess cash flows to optimize profits and not to increase cash payments to shareholders and diversification is usually a convenient vehicle for this managerial behavior (Jensen and Meckling, 1976).

Managers with free cash flows are likely to undertake value destroying or low benefit diversification to grow the size of their business territories, for managerial entrenchment or for reducing total firm risk which benefits their personal positions (Jensen, 1986). The consequences of these decisions anchor on agency costs because they can be viewed as managerial perquisites intended to decrease the risk associated with managerial human capital (Montgomery, 1994). Agency theory emphasizes the benefits accruing to managers at the expense of the stock holders as a result of the manager's decisions. Accordingly, the view explains why managers practice diversification and predicts a negative impact of diversification on firm performance (Mulwa et al., 2015).

2.2.2.4. Non-Interest income

Non-Interest Income, is the entire operating income and is composed of fee, trading uncategorized (non-fee & non-trading) income (Robert, 2014). In an effort of shaping theoretical set up by analyzing bank concentration (in terms of size) against non interest defined NONII as a ratio of Non-Interest Income divided by gross Interest Income, (Fariborz 2011).

The components or sub-components of non-interest income to specific activities of banks include ATM facilities, money transfer, demand draft/pay orders, demand account, online bill/tax payments, online ticket booking, third party product, sale of insurance, sale of mutual funds, sale of gold coins etc. (Eknath Kundlik, 2012).Stiroh (2002) classified non-interest income into a heterogeneous four categories that comprise many different activities.

i. Fiduciary income- is a returns related to the bank's fiduciary operations, e.g., administering investments for others.

ii. Service charges- include revenue directly related to deposit accounts like ATM or check usage fees.

iii. Trading revenues - incomes generated from trading cash instruments, off-balance contracts, and mark-to-market changes in the carrying value of assets and liabilities.

iv. Fees and other income- include all other non-interest income items, such as service charges, commissions, and fees not reported elsewhere. This includes fees for safe deposit boxes, insurance sales, bank drafts, money orders, etc., bill collection, savings bond redemption, execution of acceptances and letters of credit, mortgage servicing fees, and notary, consulting or advisory services), periodic credit card fees, merchant credit card charges, rental fees, and loan commitment fees. Also included here are net gains on sales of real estate, loans, or premises, data processing services, and sales of other assets, as well as non-interest income on other foreign transactions.

Existing theories of financial intermediation imply increasing returns to scale linked to diversification. From a theoretical standpoint, the decision to diversify income sources is desirable for both efficiency and risk management. The joint production of a wide range of financial services should increase a bank's efficiency, banks to economies of scope (Klein and Saidenberg 1997). Thus, generally speaking, diversification across new types of services should enhance profitability. Experts of diversification argue also that lenders such as banks and finance companies are typically highly levered and diversification across sectors reduces their chance of costly financial distress.

2.2.3. Empirical Literature Review

2.2.3.1 Dimensions of Diversification

Diversification in banking can take on different dimensions. While there are a variety of studies that analyze diversification within loan portfolio, diversification of income sources, more specifically interest and non-interest income, has attracted increasing attention in academic research. Generally, it is believed that diversification of income sources should reduce total risk, as diversification should stabilize operating income if income streams are negatively or imperfectly correlated. So this section tries to present some empirical literatures related to diversification and bank performance.

2.2.3.2 Related Evidences

DeYoung and Rice (2004) investigated the connection between non-interest income and financial performance in the United States banking sector for the period of 1989 to 2001. They found that there is a negative relationship between non-interest income and risk-adjusted financial performance of the U.S. banks. They showed that well managed banks, measured by a relative ROE measure, are less engaged in non-interest income while large banks that focus more on relationship banking are more dependent on non-interest income. They also found that marginal increases in non-interest income cause higher, but more volatile profits, and a decline in risk-adjusted profits.

Craig well and Maxwell (2006) also found that there is a positive impact of non-interest income on ROA and its volatility for Barbados banks between 1985 and 2001. Smith (2003) likewise empirically confirmed that European banks are able to seek diversification benefits through combining interest and non-interest income activities. In the case of European banks, the authors find that non-interest income is indeed more volatile than interest income but, in contrast to U.S. studies, there are negative correlations between these two income streams. Davis and Tuori (2000), also conclude that non-interest activities potentially stabilize bank earnings, for a number of European banks, including some in Germany.

Studies revealed that there is a positive association between income diversification and performance of banking industries Elsas et al. (2010) investigated effects of income diversification on both bank performance and market value and found that it improve bank profitability and market value. Rossi et al. (2009); and Lee et al. (2014) argued that bank risks were reduced through the revenue diversification and increase of bank performance.

Stiroh and Rumble (2006), Stiroh (2004b), Mercieca, (2007) and Chiorazzo, (2008) differentiate between a direct exposure effect (a greater reliance on non-interest activity) and an indirect diversification effect (change of concentration between the two income streams), whereby the latter is measured by the Herfindahl Hirschmann Index (HHI). Petersen (2004) complains that in the binary case, where the bank chooses between lending and non-interest activities, the HHI is merely a non-linear form of the non-interest income share. In particular, if the bank's non-

interest income share is less than 50%, which is true for most of the small banks, the correlation between HHI and non-interest income share is extremely large and, hence, empirically separating these two effects might be impossible. Stiroh (2004a) looks at American community banks, i.e., small banks that do not belong to any banking group, and examines the link between income diversification and risk return performance for the 1984 to 2000 time periods. He performs a regression analysis and shows that, broadly speaking, the increase in fee-based revenues caused a worsening in the risk return trade-off. However, he points out that there are significant differences between small and medium sized community banks, and that the smaller banks are able to reach higher levels of competitiveness when they shift from interest-based activities towards fee based one. His paper also found that U.S. banking industry is steadily increasing its reliance on non-traditional business activities that generate fee income, trading revenue and other types of non-interest income.

By using 755 small banks data set for the period of 1997 to 2003, Mercieca et al. (2007) examined the case of small European banks in terms of income diversification. They specifically investigated whether increased non-interest income activities could improve the performance of small European credit institutions or not. They found an inverse relationship between non-interest income and risk-adjusted bank performance. So, according to Mercieca et al. (2007), no direct benefit of diversification was found for small banks. Lepetit et al. (2008) looked at the same relationship for European banking industry from 1996 to 2002 and found a positive relationship between non-interest income and bank default risk. This means that the banks which have expanded into non-interest income activities have taken a higher level of risks as compared to the banks which are dealing in traditional activities.

In 2007, Baele et al. (2007) investigated whether income diversification could lead to a better performance/risk profile in European banks over the period of 1989 to 2004. There finding discloses the existence of a positive relationship between income diversification and the market's anticipation on future bank profits. They also stated that diversification could decrease total risk for most banks, but banks with higher non-interest income portions had more systematic risk. They shows that in fact banks with high proportions of non-interest income have higher market betas and therefore higher systematic risk.

However, Elsas et al. (2010) investigated effects of income diversification on both bank performance and market value by using a panel data of nine countries over 1996 to 2008 and find that diversification increases profitability and bank value. Busch and Kick (2009) also analyzed the effects of fee-based income activities on risk-adjusted performance measures of German universal banks between 1995 and 2007. They empirically found that higher fee-based income could increase risk-adjusted returns of German universal banks. On the other hand Anya and Wolfe (2011) analyzed income diversification of banks in emerging countries. They found evidence that income diversification had a positive effect on risk-adjusted performance of emerging market banks.

Ali Osman Gürbüz, et.al (2013) concluded that income diversification strongly increases the risk-adjusted financial performance of the Turkish deposit banks over the period of 2005 – 2011. That means increase in non-interest income leads to an increase in RAROA and RAROE. Depending on the results of their RAROA and RAROE models, they concluded that Turkish depository banks benefit from diversifying their activities beyond the traditional lending activities. They also found that positive relationships between control variables (size, assets growth, crisis dummy variable, public ownership dummy variable) and risk-adjusted bank performance. In addition to that they find one main implication for bank managers, regulators and investors that income diversification in Turkish banks can create value for stakeholders. The positive effect of income diversification on banking financial performance may be a result of increased income of the bank or reduced operating costs of the bank from diversifying operations. Since net trading income, fee income and other non-interest income generally are not perfectly correlated with net interest income, an increase in income diversification lowers the variations in operating income.

Smith (2003) analyzes the variability of interest and non-interest income and their correlation, for the banking systems of the 15 EU countries during the 1994–1998 periods. For each country, Smith (2003) considers commercial, savings, cooperative, and mortgage banks on the one hand and large and small banks on the other, and study the correlation of income sources. They find that in the majority of the cases, the increased reliance on activities that generate non-interest income has stabilized profits.

Damankah Basil Senyo et al. (2015), on the title of "Income Diversification and Financial Stability of Banks in Ghana" they found that non-interest revenue is becoming increasingly relevant and contributes to bank profit stability. The increasing reliance of banks in Ghana on non-traditional income however comes with volatility in their earnings. Banking sector supervisors and regulators not only be aware of the role a particular bank plays in each line of business, but must understand the risk management strategy of the whole banking organization in order to evaluate the risk exposures of a particular bank. Considering the diversity and complexity of banking operations in recent times, the Central Bank ought to continuously strengthen its controls by closely monitoring and assessing the increasing levels of risks assumed by banking companies and require the requisite capitals to protect the interest of all stakeholders in the industry.

Berger, A. et al(2010),and others' on the title "Does Diversification Increase or Decrease Bank Risk and Performance?, Evidence on Diversification and the Risk-Return Tradeoff" founds that performance tends to be non-monotonically related with diversification strategy, and the marginal effects of the focus indices on banks' performance are also nonlinearly associated with the level of risk and foreign ownership. Specifically, they found that the banks tend to enjoy higher profits and lower risk when they move from a complete diversification strategy towards less diversification. However, the benefit of being less diversified tends to be negated when the extent of focus exceeds a certain threshold. Further, we find that the diversification strategy tends to have a stronger impact on performance when banks operate at higher risk level. As for the role of foreign ownership, our results suggest that there is a range of foreign ownership in which banks benefit most from being focused. When foreign ownership is very high or very low, banks tend to benefit more from being diversified.

Paul Rotich et al. (2011), on the title of "Income Source Diversification and Financial Performance of Commercial Banks in Kenya "found that there is statistically significant positive linear relationship between HHI level and financial performance measures (NOI, EBIT, ROA and ROE) and consistent with USA study's findings Rumble, (2006) while contrast to European banks (Staikouras and Wood 2003), hence income source diversification improves financial performance of commercial banks in Kenya. Larger banks have greater ability to diversify risk and should be safer in operation and thus have lower cost of funding than smaller ones. Hence,

larger banks may have relatively better profitability than smaller ones. Based on too-big-to-fail argument, larger banks may take on riskier activity than smaller ones and decrease their cost of funding and may have developed risk management techniques or may be involved in fundamentally different types of activities with different distributions (McAllister and McManus 1993).

In developing economy like Ethiopia, a financial sector is characterized by fragility, volatile interest rates, high-risk investment and inefficiencies in the intermediation process Shawn, (2002). This high-risk investment and inefficiencies of banking industry in developing countries will likely affect, negatively their performance. Empirical evidence from Sanya& Wolfe, (2011), underline that the usage of diversified income source by this sector will in part improve banking industry performance. Their finding on emerging economy countries showed that diversification across and within both interest and non-interest income generating activities decrease insolvency risk and enhance profitability.

However, the trend of diversification of income source in Ethiopian commercial banks is varying from bank to bank across years. Yet, weather the issue has significant impact on banks performance is not well investigated. To the best of the researcher's knowledge, relatively similar empirical study that investigated the issue is that of Estifanos Yilma (2014) and Habtamu (2022), using commercial banks data, have investigated the impact of non-interest income diversification on bank profitability. They indicated that bank relative performance and loan quality from bank-specific factors and exchange rate volatility from macro-economic factors are the most influential factors on non-interest income of Ethiopian commercial banks.

2.2.4. Return on asset (ROA)

Return on asset (ROA) is a financial ratio that indicates how profitability a company is in relation to its total asset. There are different ways to measure profitability such as: return on asset (ROA), return on equity (ROE) and return on invested capital (ROIC). ROA gives us an idea as to how efficient management is in using its assets to generate earnings whereas ,ROE measures a company's profitability which reveals how much profit a company generates with the money shareholders have invested. ROIC is a measure used to assess company's efficiency in allocating

the capital under its control in profitable investments. This measure gives a sense of how well a company is in using its money to generate returns. Comparing a company's ROIC with its weighted average cost of capital (WACC) reveals whether invested capital is used efficiently or not.

There is criticism to make about Return on Equity (ROE) is that this performance measurement lacks attachment to risk, i.e. leverage, funding and liquidity profile. Other risk elements are also missing in the ROE figure, such as the quality of assets, the cost of risk, the risk concentration, and the solvency situation. ROE is definitely not a stand-alone performance measure and, at the very least, needs to be decomposed to establish where most of its changes come from and, eventually, to identify distortions over time. Indeed, as ROE may be artificially swelled by a worsening in solvency, it has to be linked to capital ratios.

The recent crisis has shown how ROE failed to discriminate between the best performing banks and the others (in the sense of banks being able to generate sustainable profits) since, a quarter before the crisis, figures pointed to a great homogeneity in terms of banks' profitability (a high level of ROE). In some cases, the banks with the highest ROE were those worst hit by the crisis. Thus, ROE did not make it possible to identify the best performing banks in terms of sustainability of their results. ROE is a short-term indicator and must be interpreted as a snapshot of the current shape of institutions. So, for this study purpose the researcher used returns on asset (ROA) as dependent variable this is due the fact that it is the best overall measure of the performance of a bank is relative to its total asset. (European central bank, 2010)

ROA_{it} = NI/TA*100 ---------- (1)

2.2.4.1. Herfindahl Hirschman Index (HHI)

Herfindahl Hirschman Index (HHI) is a generally accepted measure of market concentration, used to verify market competitiveness. It is the measurement of income diversification levels that contains two main components of a bank's net operating income. These are net interest income (NII) and non-interest income (NONII). NII (net interest income) variable is calculated as total interest revenues minus total interest expenses, while NONII (non-interest income) variable calculated by summing of Service Charge & Commission Income and other non-interest

income(OrI). The sum of the NII and NONII variables give us net operating income (net interest income plus noninterest income) of a bank. For income diversification, a bank must diversify its sources of net operating income among net interest income and non-interest income components. When the values of net interest income and non-interest income are equal to each other in a bank, this bank is accepted as fully diversified. In order to measure income diversification level of each bank, the researcher used Herfindahl Hirschman Index (HHI) for all banks. By considering the shares of net interest income and non-interest income in total net operating income, HHI's measurement is calculated as follows:

$HHI = (NONII/NOI)^{2} + (NII/NOI)^{2}$---------- **(2)**

Net operating income (NOI) captures the total value of NII and NONII. The justification of HHI index is as follows: HHI varies between 0.50 and 1.00. HHI value of 0.50 indicates complete diversification in a bank, while HHI value of 1.00 represents the lowest level of income diversification. As HHI rises the bank becomes more concentrated and focused on one source of income and less diversified Hence, a well-diversified banks are reflected by a small HHI index or the smaller the index, the more diversified the bank income.

2.2.4.2 Herfindahl Hirschman Index of Non-Interest Income (HHINONII)

Herfindahl Hirschman Index of Non-Interest Income (HHINONII**):-** is the sum of the square of the share of Fees and Commissions and the share of Other Income over Non-Interest Income (NONII). The value of HHINONII varies between 0.50 and 1.00. The HHINONII value of 0.50 indicates complete diversification of Non-interest income in a bank and HHINONII value of 1.00 represents the lowest level of Non-interest income diversification. As HHINONII rises the bank becomes more concentrated and focuses on one source of non-interest income and the smaller the index, the more diversified on the non-interest income (J. Kiweu2012). It is calculated as follows.

$HHINONII = (SHFC/NONII)^{2} + (OrI/NONII)^{2}$----------(3)

2.2.4.3. The Ratio of non-interest income to Total Assets

NONIITA:–The Ratio of non-interest income to Total Assets (NONII/TA) is financial metrics that measures the proportion of bank's income generated by non interest related activities as a percentage of its total asset. This ratio is useful for assessing a bank's diversification and overall financial performance, as it indicates how much of the bank's income comes from non interest source.

2.2.4.4 The ratio of Loan to Total asset (LOANTA)

LOANTA: -is the ratio of Loan to Total asset (LOAN/TA). Extending loans is one of the most important roles of commercial banks. The interest raised from the loans is the most important source of income for commercial banks. However, inherent with bank's loan is liquidity risk as well as credit risk. In this respect, in extending loans, banks should properly manage such risks. In general, it is expected that the more loans, the more interest income, and the more profitable the bank, Sastrosuwito and Suzuki (2011).

2.2.4.5 Ratio of Fees and Commission (SHFC)

SHFC (Ratio of Fees and Commission**): -** it is the ratio of fees and commission to the total non-interest income (FC/NONII) which determines the level of diversification among Non- interest income.

2.2.4.6 Exchange Rate (EXR)

EXR: - The researcher used this variable because of its direct relation with non-interest income. Exchange rate is the key factors which explain the performance of non-interest income. Hence, increasing of exchange rate leads the bank to encourage earnings from international trade activities.

2.2.5 Conceptual Framework

This conceptual framework describes the relationship between income diversification and bank performance, and as well as the relationship between the independent variables and dependent variable. This relationship has been described in the following diagram as follows:

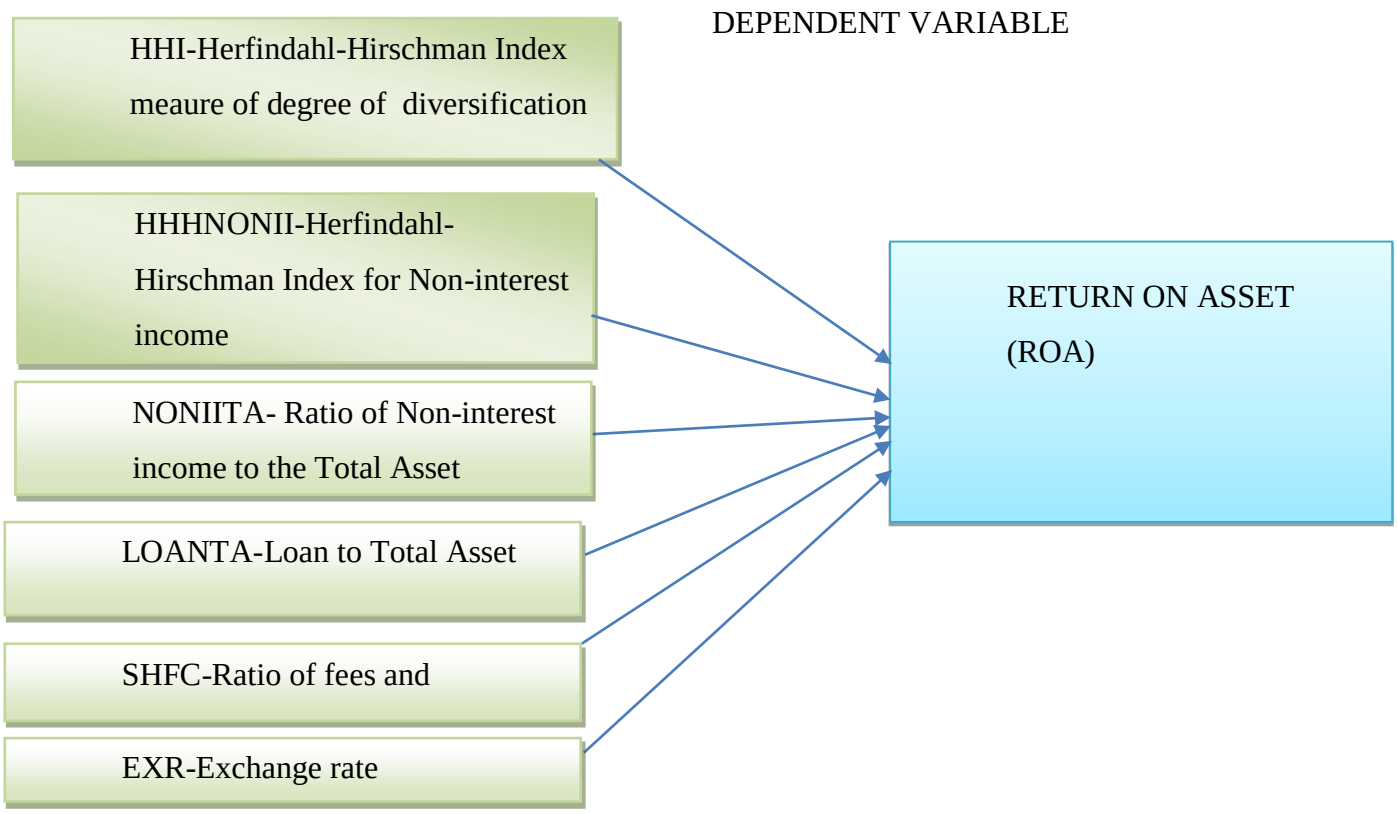


Figure 2.1: Schematic Conceptual Framework

Source: own construction based on literature reviews

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

3.1. Research Design

A research design is a master plan specifying the methods and procedures for collecting and analyzing the needed data/information. Zikmund et al., (2013) define research design as methods and procedures for collecting and analyzing the needed information comprising of sampling methodologies, data collection techniques, data analysis, and cost schedules. In this study, the research methodology that has been developed to investigate the objective of this study is the explanatory research design since the study is sought to establish the effect of income diversification on selected commercial banks' performance in Ethiopia. The explanatory research design has been preferred because of its complete description of the situation as it is, making sure that there is minimum bias in the collection of data and to reduce errors in interpreting the data that was collected. More in particular for this research design, random effect model has been adopted to measure the effect of income diversification on bank performance of the selected commercial banks in Ethiopia.

3.2. Research Approach

In this study, the researcher used quantitative approach in which its techniques have descriptive statistics like percentage (%), ratio and tables that show the results of the analysis and facilitate the interpretation of data.

3.3. Data Sources and Target Population

In this study, secondary source of data were used to investigate the objective of the study. Accordingly, the study were used a panel data that comprised annual financial reports of 17 commercial banks in Ethiopia during the period of 2014 to 2021 which was obtained from National Bank of Ethiopia. Those banks are: Abay Bank S.C. Addis International Bank, Awash Bank, Bank of Abyssinia, Birhan bank, Bunna international Bank, Commercial bank of Ethiopia, Cooperative Bank of Oromia (S.C.), Dashen Bank, Debub Global Bank, Enat Bank S.C. Lion

International Bank, Nib International Bank, Oromia Bank, United Bank, Wegagen Bank and Zemen Bank. Hence the target populations of this study are selected 17 commercial banks in Ethiopia. According to the National Bank of Ethiopia (NBE) report in 2019/20, there are 16 private commercial banks and two governments owned bank are operating in the country. The rationale for choosing the lower limit of time frame of the data is due to the availability of structured data as of the specific year. Given the quantitative nature of the study, different documents, reports and other supportive materials were used to give a clear picture of study.

3.4. Data Gathering Tools

The tools that the researcher used to collect secondary source of data for this study was reviewing of records and documents such as Annual reports, Financial Statements and Customer details of the banks and searching of different websites on Internet where extra information and explanations are easily found. After reviewing of records, documents and websites the next duty is to organize and interpret the collected data.

3.5. Model Specification

The researcher used the multiple linear regression and random effect model. Modeling is based on panel data techniques which comprises cross-sectional elements reflected different Ethiopian commercial banks .The study used a panel regression technique to analyze the relationship between income diversification and bank performance. The superiority of panel data in question is because it contains more information; it incorporates variability among cross section units (Gujarati, 2004).

Accordingly, the following variants are specified in pooled OLS (POLS) model as follows.

$$ROA_{it} = \beta_0 + \beta_1 HHI_{it} + \beta_2 HHINONII_{it} + \beta_3 NONIITA_{it} + \beta_4 LOANTA_{it} + \beta_5 SHFC_{it} + \beta_6 EXR_{it} + \varepsilon_{it} \quad \ldots\ldots (1)$$

Where,

ROA_{it}: stands for Value of total income per total asset, in i bank at time t.

β_0 -Constant

$\beta_1 HHI_{it}$: -The sum of the square of the share of net interest income and the share of non-interest income over net-operating income

$\beta_2 HHINONII_{it}$: The sum of the square of the share of Fees and Commissions and the share of Other Income over Non-Interest Income

$\beta_3 NONIITA_{it}$: Ratio of Non-interest Income to Total Asset (NONII/TA)

$\beta_4 LOANTA_{it}$: stands for Ratio of Loan to total asset (LOAN/TA)

$\beta_6 EXR_{it}$: stands for value of exchange rate in ETB

$\beta_5 SHFC_{it}$: The Ratio of Fees and commission to Non-Interest Income (FC/NONII

$\boldsymbol{\varepsilon_{it}}$: is an error term, which is uncorrelated with explanatory variables

Here, the very assumption of Pooled OLS model in equation (1) assume the homogeneity of the effect of time and individual fixed characters on the performance of banks under question. However, there are unobserved factors known to banks that might affect banks' performance. For instance, inflation rate, GDP, Interest rate, number of branches, and Banks managerial ability are of such factors that might affect banks performance. In this case, ignoring the influence of noises arising from unobserved heterogeneity might leads to omission of unobservable variable bias in POLS estimation. One of the remedies for such problem is the usage of fixed effect estimator (FE) (Wooldridge 2004).

Accordingly, something that within the individual may affect the previous POL model has been specified as follows:

$$ROA_{it} = \beta_0 + \beta_1 HHI_{it} + \beta_2 HHINONII_{it} + \beta_3 NONIITA_{it} + \beta_4 LOANTA_{it} + \beta_5 SHFC_{it} + \beta_6 EXR_{it} + \alpha_{it} + u_{it} \quad \ldots\ldots (2)$$

Where,$a_i$is time invariant unobservable deposit factors fixed effects and u_{it} is time variant idiosyncratic error term assumed to be exogenous E($u_{it}|x_{it}$) = 0. FE model allows time-invariant unobserved performance factors, a_i to correlate with explanatory variables E ($a_i|x_{it}$) ≠ 0. Thus, using FE model those time-invariant characteristics can be removed using differencing the model or can be controlled by adding dummy variable. Therefore, the net impact of income diversification that vary over time can be captured if E ($u_{it}|x_{it}$) = 0 in FE model.

Along with flexibility of showing how effect of variables change over time, estimation in differenced model will wipe out individual fixed that result omission of variable bias in OLS estimation. Accordingly, differenced model in fixed effect specified as follows:

$$ROA_{it} = \beta_0 + \beta_1 HHI_{it} + \beta_2 HHINONII_{it} + \beta_3 NONIITA_{it} + \beta_4 LOANTA_{it} + \beta_5 \text{SHFC} + \beta_6 EXR_{it-1} + u_{it-1} \quad (3)$$

Estimation with fixed effect and differenced model cannot control unobserved fixed factors that do not change over time but affect performance of banks. Sex and race of employee, managers and other demographic factors of banks that often hardly change over time are of such factors. To account for this, random effect model is specified as follows

$$ROA_{it} = \beta_0 + \beta_1 HHI_{it} + \beta_2 HHINONII_{it} + \beta_3 NONIITA_{it} + \beta_4 LOANTA_{it} + \beta_5 SHFC_{it} + \beta_6 EXR_{it} + \alpha_{it} + u_{it} \quad (4)$$

3.6. Definition of variables and measurements

The definitions of variables used in this study will often are similar among financial empirical studies. Yet, there is no principle on how they are measure. Different proxies adopted from previous literatures to measure a set of variables use in the current study. These variations arise either due to the scope of methodology they adopted or due to lack of available data to choose proper proxy for the variable under question. Hence, in the subsequent section, proper measuring items for variables are discussed and select in line with existing knowledge on the issue within the scope of the current study.

3.6.1. Dependent variable

There are different ways to measure profitability such as: return on asset (ROA), return on equity (ROE) and return on invested capital (ROIC). ROA is an indicator of how profitable a company is relative to its total assets. It gives us an idea as to how efficient management is in using its assets to generate earnings whereas ROE measures a company's profitability which reveals how much profit a company generates with the money shareholders have invested. ROIC is a measure used to assess company's efficiency in allocating the capital under its control in profitable investments.

This measure gives a sense of how well a company is in using its money to generate returns. Comparing a company's ROIC with its weighted average cost of capital (WACC) reveals whether invested capital is used efficiently or not. There is criticism to make about Return on Equity (ROE) is that this performance measurement lacks attachment to risk, i.e. leverage, funding and liquidity profile. Other risk elements are also missing in the ROE figure, such as the quality of assets, the cost of risk, the risk concentration, and the solvency situation. ROE is definitely not a stand-alone performance measure and, at the very least, needs to be decomposed to establish where most of its changes come from and, eventually, to identify distortions over time. Indeed, as ROE may be artificially swelled by a worsening in solvency, it has to be linked to capital ratios.

The recent crisis has shown how ROE failed to discriminate between the best performing banks and the others (in the sense of banks being able to generate sustainable profits) since, a quarter before the crisis, figures pointed to a great homogeneity in terms of banks' profitability (a high level of ROE). In some cases, the banks with the highest ROE were those worst hit by the crisis. Thus, ROE did not make it possible to identify the best performing banks in terms of sustainability of their results. ROE is a short-term indicator and must be interpreted as a snapshot of the current shape of institutions. So, for this study purpose the researcher used returns on asset (ROA) as dependent variable this is due the fact that it is the best overall measure of the performance of a bank is relative to its total asset. (European central bank, 2010)

ROA_{it} = NI/TA*100 ---------- (1)

3.6.2. Independent variables

Herfindahl Hirschman Index (HlHI):- is the measurement of income diversification levels that contains two main components of a bank's net operating income. These are net interest income (NII) and non-interest income (NONII). NII (net interest income) variable is calculated as total interest revenues minus total interest expenses, while NONII (non-interest income) variable calculated by summing of Service Charge & Commission Income and other non-interest income(OrI). The sum of the NII and NONII variables give us net operating income (net interest income plus noninterest income) of a bank. For income diversification, a bank must diversify its sources of net operating income among net interest income and non-interest income components. When the values of net interest income and non-interest income are equal to each other in a bank, this bank is accepted as fully diversified. In order to measure income diversification level of each bank, the researcher used Herfindahl Hirschman Index (HHI) for all banks. By considering the shares of net interest income and non-interest income in total net operating income, HHI's measurement is calculated as follows:

$$HHI = (NONII/NOI)^{2} + (NII/NOI)^{2} \quad \textbf{(2)}$$

Net operating income (NOI) captures the total value of NII and NONII. The justification of HHI index is as follows: HHI varies between 0.50 and 1.00. HHI value of 0.50 indicates complete diversification in a bank, while HHI value of 1.00 represents the lowest level of income diversification. As HHI rises the bank becomes more concentrated and focused on one source of income and less diversified Hence, a well-diversified banks are reflected by a small HHI index or the smaller the index, the more diversified the bank income. Therefore, we can formulate a hypothesis for this variable as follows:

H_o1: There is negative and insignificant relationship between ROA and HHI

Herfindahl Hirschman Index of Non-Interest Income (HHINONII):- is the sum of the square of the share of Fees and Commissions and the share of Other Income over Non-Interest Income (NONII). The value of HHINONII varies between 0.50 and 1.00. The HHINONII value of 0.50 indicates complete diversification of Non-interest income in a bank and

HHINONII value of 1.00 represents the lowest level of Non-interest income diversification. As HHINONII rises the bank becomes more concentrated and focuses on one source of non-interest income and the smaller the index, the more diversified on the non-interest income (J. Kiweu2012). It is calculated as follows.

$HHINONII = (SHFC/NONII)^2 + (OrI/NONII)^{2-}$ ----------(3)

Therefore, we can formulate a hypothesis for this variable as follows:

Ho2: There is negative and insignificant relationship between ROA and HHINONII

NONIITA:–The Ratio of non-interest income to Total Assets (NONII/TA)

So, we can formulate a hypothesis for this variable as follows:

Ho3: There is no positive and significant relationship between ROA and NONIITA

LOANTA: -is the ratio of Loan to Total asset (LOAN/TA). Extending loans is one of the most important roles of commercial banks. The interest raised from the loans is the most important source of income for commercial banks. However, inherent with bank's loan is liquidity risk as well as credit risk. In this respect, in extending loans, banks should properly manage such risks. In general, it is expected that the more loans, the more interest income, and the more profitable the bank, Sastrosuwito and Suzuki (2011).Therefore, we can formulate a hypothesis as follows:

Ho4: There is no positive and significant relationship between ROA and LOANTA

SHFC (Ratio of Fees and Commission): - it is the ratio of fees and commission to the total non-interest income (FC/NONII) which determines the level of diversification among Non-interest income. Therefore, we can formulate a hypothesis for this variable as follows:

H_o5: There is no positive and significant relationship between ROA and SHFC

EXR: - The researcher used this variable because of its direct relation with non-interest income. As per Estifanos Yilma (2014) exchange rate is the key factors which explains the performance

of non-interest income. Hence, increasing of exchange rate leads the bank to encourage earnings from international trade activities. So, we can formulate a hypothesis for this variable as follows:

Ho6: There is no positive and significant relationship between ROA and EXR.

3.7. Method of data analysis

In this research, econometric measures that underlining the panel data model will employ to prevent estimation problems that may otherwise generate biased and inefficient estimates. For instance, autocorrelation and heteroscedastic were managed by the Durbin Watson (DW) test, White's test and Conventional Housman test proposed by Wooldridge (2004) was also used. All the analyses were done with the help of *STATA 15*. It is chosen due to its flexibility and dynamic-ability for data manipulation. It is among the most popular static tools used by econometricians (Cameron,A.C and P. K.trivedi.2009)

3.8. Ethical Consideration

Ethical considerations in research are a set of principles that guide your research designs and practices. These principles include voluntary participation, informed permission, J, confidentiality, and results communication. Therefore, the researcher considers some important shared values for the responsible conduct of research like;

Honesty — conveying information truthfully and honoring commitments

Accuracy — reporting findings precisely and taking care to avoid errors

Efficiency — using resources wisely and avoiding waste, and

Objectivity — letting the facts speak for themselves and avoiding improper bias

CHAPTER FOUR

4. ECONOMETRICS RESULT DISCUSSION AND ANALYSIS

4.1. INTRODUCTION

Under this chapter, the descriptive results and the empirical findings of the study are presented. Both descriptive and econometric tools have been used in analyzing the data. The first section deals with the descriptive statistics and summarizes the main features of the study variables in terms of mean, maximum, minimum, and standard deviation. The second section deals with the correlation analysis and shows the degree of association between the studied variables. The third section of this chapter regression result reports of random effect model (RE) estimation output of the regression.

4.2. Descriptive Statistics of the Panel Data Set

This analysis is based on the balanced panel data set of selected commercial banks in Ethiopia with (136) observation over seven years (2014-2021). Detail of the panel data set has been presented as follows.

4.2.1. Summary Statistics of study Variables

In this section, the study presents the descriptive statistic results for the dependent variable Return on asset (ROA), and the independent variables of non-interest income Diversification result Index for total operating income (HHI), Diversification result Index for Non-interest income (HHINONII), Fees and commission ratio (SHFC), non-interest income over total assets (NONIIITA), and as well as loan ratio to total asset (LOANTA), and exchange rate (EXR). Table 4.1 bellow depicts summary statistics for within and between variables in the final panel data set.

Table 4.1 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	136	.027	.008	.003	.051
HHI	136	.336	.164	.108	.935
HHINONII	136	.747	.735	.5	7.41
NONIITA	136	.033	.015	.003	.08
LOANTA	136	.507	.115	.049	1.101
SHFC	136	.728	.284	.061	2.626
EXR	136	.269	.064	.196	.382

Source: Stata output results and author's computation, 2023

4.2.2. Summary statistics for the dependent variable (ROA)

To measure the financial performance of the selected Commercial Banks in Ethiopia, ROA is considered as a better measure of bank performance in this study. As clearly indicated in the earlier chapters, ROA is a ratio of net income to a total asset. In addition, return on assets measures the overall efficiency of management and it gives an idea of how efficient management is using its assets to generate earnings. According to the analysis of descriptive statistics in the above table 4.1, the average value of return on asset (ROA) for the sampled Banks is (mean=0.027) with a maximum and minimum value of 0.051 and 0.003, respectively and its standard deviation is 0.008 from the mean value**.**

The mean value of profitability measured by ROA on average is 2.7 percent. It means that Ethiopian commercial banks generate on average 2.7 percent of their total asset employed. The higher the value of return on assets indicates that banks are effective in generating profit from its asset employed and the management is efficiently utilizing its resources and the reverse is true for lower the value in return on assets. The standard deviation of return on asset (ROA) is 0.8 percent and it shows that the value of return on the asset can vary on both sides by 0.8 percent from the mean. Its minimum value is 0.3 percent while the maximum is 5.1 percent. This implies

the presence of moderate variations among the values of profitability across banks included in this study.

4.2.3. Summary Statistics for the Independent Variables

This section deals with the analysis of the independent variables which are going to be considered for this study as variables that affect the financial performance of selected commercial banks concerning income diversification.

According to the descriptive statistics of table 4.1 above, the Mean value of HHI for the sampled commercial banks is 0.336 which indicates that Ethiopian commercial banks are more concentrated on the interest income-generating activities over the sample period. But this is not properly showing that Ethiopian commercial banks not diversifying their income since HHI is 0.336. The minimum maximum and values of HHI in the sample period are 0.108 and 0.935 respectively with a standard deviation of 0.164. HHI index mainly varies between 0.50 and 1.00. The HHI value of 0.50 indicates complete diversification in the bank income portfolio while the HHI value of 1.00 represents no income diversification or concentrates on one source of income (either interest or non-interest income). So, in our cases the highest HHI figure i.e. 0.935 shows the lowest income diversification. According to (Estifanos 2014) the mean value of HHI was 1.08 with standard deviation of 30.749. So this indicates that there is no income diversification in the selected commercial banks.

According to table 4.1, the mean value of HHINONII for the sampled commercial banks is 0.747 and its minimum and maximum values are 0.5 and 7.41 with a standard deviation of 0.735. According to Estifanos (2014), the mean of diversification index of non-interest income (HHINONII) for the sampled commercial banks is 0.6399.The maximum and minimum amounts of HHI for Non- Interest income in the sample period are 0.98 and 0.05 with a standard deviation of 0.159.The maximum value of HHINONII shows that the sampled commercial banks tried to concentrate on one type of non-interest income while the minimum value of HHINONII shows that the sampled commercial banks have a well-diversified non-interest income.

As shown in the table 4.1, the mean value of ratio of non-interest income to the total asset (NONIITA) for the sampled commercial banks is 0.033 as well as its maximum and minimum

values are 0.08 and 0.003 with a standard deviation of 0.015.Related study (brook 2008) shows that the mean of ratio of non-interest income over the total asset (NONIITA) of the sampled commercial bank is 0.04344. The minimum and maximum amounts of NONIITA in the sample period are 0.141 and 0.183 with a standard deviation of 0.020. The result shows that the total asset of the sampled banks; share of non-interest income is not yet satisfactory

According to table 4.1, the mean value of loan to total asset ratio (LOANTA), during the sample period is 0.507.The minimum and maximum shares of loan to asset in the sample period are 0.049 and 1.101 with a standard deviation of 0.115. Other study shows that the mean value of loan in the sample period is 0.5289 and the maximum and minimum shares of loan in the sample period are 1.6 and 0.279 with a standard deviation of 0.2483 (Estifanos 2014).This indicates that loan ratio increase from time to time in commercial banks.

As indicated in the table 4.1 above, the mean value of the portion of fees and commission over non-interest income **(**SHFC) is 0.728 and its maximum and minimum values in the sample period are 2.626 and 0.061 with a standard deviation of 0.284. This means that out of the total Non- interest Income 72.8% is covered by fees and commission and 27.2% is covered by other income. Other empirical results show that as per the annual financial figures the mean values of fees and commission and other income are 0.65 and 0.35 respectively. The maximum and minimum values of share of fees and commission over Non- interest income in the sample period are 0.90 and 0.27 with a standard deviation of 0.23 (brook, 2008).This means that out of the total Non- interest Income 65% is covered by fees and commission and 35% covered by other income this numerical figure shows that the Ethiopian commercial banks are diversifying their portion of income within non-interest income.

As shown in the table 4.1 above, the mean value of exchange rate (EXR) during the sample period is 0.269. The minimum and maximum amount of exchange rate during the sample period is 0.196 and 0.382 with a standard deviation of 0.064.

4.3. Correlation Analysis

As noted by Gujarati (2004), correlation analysis is made to describe the strength of relationship or degree of linear association between two or more variables. The purpose of under taking correlation analysis is to check whether there is multi- co linearity problem in the model and to indicate whether the variables move together or not in the same direction and the correlation coefficient indicates the strength of a linear relationship between two variables. In the Pearson correlation matrix, the value of the correlation coefficient ranges between -1 and +1.

A correlation coefficient close to either –1 or +1indicates that there is a strong inverse or direct relationship between variables respectively; whereas a correlation coefficient of zero indicates that the variables are uncorrelated. In this section, Correlation analysis is conducted to analyze and examine the relationship between bank performance measurement i.e. ROA with HHI, SHFC, HHINONII, NONIITA, LOANTA and EXR.

The correlation matrix also shows the linear relationships between each independent variable and control variables used in the study. Table 4.2 below presents the result of the correlation analysis of bank performance measurement i.e. ROA with HHI, SHFC, HHINONII, NONIITA, LOANTA and EXR. Based on the strata output, SHFC, HHI, HHINONII, LOANTA, and EXR are negatively correlated with return on asset (ROA). So the negative correlation figure shows that when the independent variables increase ROA is decreased. In addition, the dependent variable, return on the asset has a positive correlation with NONIITA. This shows that if the share of non-interest income increases returns on asset also increases due to the total profit portfolio increases.

Table 4.2 Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) ROA	1.000						
(2) HHI	-0.601	1.000					
(3) HHINON	-0.240	0.141	1.000				
(4) NONIITA	0.641	-0.159	-0.253	1.000			
(5) LOANTA	-0.153	0.254	-0.045	-0.200	1.000		
(6) SHFC	-0.232	0.168	0.794	-0.271	0.011	1.000	
(7) EXR	-0.267	0.365	0.152	-0.324	0.573	0.257	1.000

Source: Stata output results and author's computation, 2023

4.4. Testing Assumptions of Classical Linear Regression Model

To answer the research questions, it is to be recalled that the paper constructed an econometric model in the previous chapter. The researcher also knows theoretically, that an econometric model should pass pre and post-estimation tests or diagnostic tests. In the way to make sure the model is valid, consistent, and reliable the researcher applied the following tests.

4.4.1. Tests for Normality

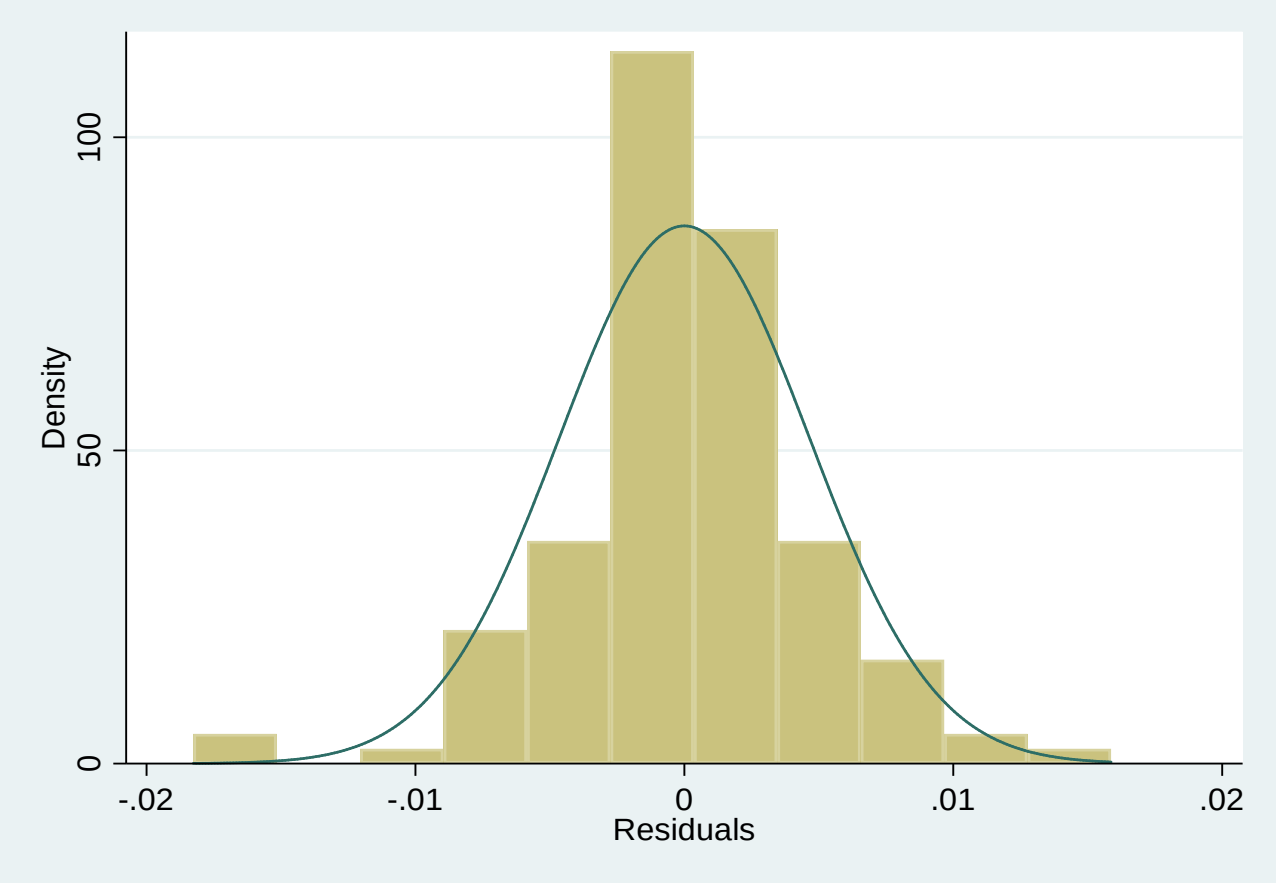
Before applying statistical methods that assume normality such as least square regression, it is necessary to perform a test on residuals for normality. The researcher hypothesized that the data follows a normal distribution, and only rejects this hypothesis if we have strong evidence to the contrary i.e. if the test is significant, the distribution is non-normal. According to Brooks (2008), if the residuals are normally distributed, the histogram should be bell-shaped. The kurtosis must be no by far large from three. This means that the p-value should be greater than 0.05 not to reject the null hypothesis of normality at 5% level. The test result for the model provides a p-value of greater than 5% evidencing that residuals are normally distributed and the histogram is bell shaped.

Table 4.3 Normality Test for ROA

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
Residuals	136	0.0000	3.00	12.28	0.051

Source: Stata output results and author's computation, 2023

Figure 4.1: Distribution of residuals



Source: Stata output results and author's computation, 2023

4.4.2. Test for Multi-co linearity

The term Multi-co linearity indicates the existence of exact linear association among some or all explanatory variables in the regression model. When independent variables are multi collinear, there is over lapping or sharing of predictive power. Thus, if multi-co linearity is perfect, the regression coefficients of the independent variables are undetermined and their standard errors are immeasurable (Gujarati, 2004). The multi-co linearity makes significant variables insignificant by increasing the p-value since an increased p-value lowers the t-statistics value. Thus, the panel regression results with multi-co linearity will show significant variables as insignificant variables. Kennedy (2008) suggests that any correlation coefficient above 0.7 could cause a serious multi-co linearity problem leading to inefficient estimation and less reliable results. The correlation matrix of the six independent variables of this study has been depicted in the table below 4.4. The highest correlation is 0.794 which is found between the LOANTA and SHFC as shown in the table

Table 4.4: Matrix of Independent Variables correlation

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) HHI	1.000					
(2) HHINON	0.141	1.000				
(3) NONIITA	-0.159	-0.253	1.000			
(4) LOANTA	0.254	-0.045	-0.200	1.000		
(5) SHFC	0.168	0.794	-0.271	0.011	1.000	
(6) EXR	0.365	0.152	-0.324	0.573	0.257	1.000

Source: Stata output results and author's computation, 2023

To test problem of multi-co linearity VIF was used. Since the mean value of VIF is less than 10 multi-co linearity problem was not happened here. Hence, Multi-co linearity problem is not the concern of this dataset.

Table 4.5 Variance Inflation Factor

	VIF	1/VIF
SHFC	2.877	.348
HHINONI	2.762	.362
EXR	1.813	.552
LOANTA	1.552	.644
NONIITA	1.182	.846
HHI	1.172	.854
Mean VIF	1.893	.

Source: Stata Output and Author's Computation, 2023

4.4.3. Test for Heteroscedasticty

The first assumption that is required here is the average value of the errors is zero. If a constant term is included in the regression equation, the assumption will never be violated. As a result, if the constant term is included in the regression equation, the average value of the error term in this study is expected to be zero.

It is assumed that the variance of the errors is constant. This is known as the assumption of Homoscedasticity. If the errors do not have a constant variance, they are said to be heteroscedastic. To test this assumption, the White's test for homoscedasticity has been used having the null hypothesis of homoscedasticity. Here, there is no evidence for the presence of heteroscedasticity since the *p*-values is considerably more than 0.05. As a result of this, we couldn't reject the null hypothesis of Homoscedasticity. In the following table, the P-value for the model is greater than 0.05 which is 0.0978. Thus, we couldn't reject the null hypothesis of White's test for homoscedasticity.

White's test for Ho: homoscedasticity

against Ha: unrestricted heteroscedasticity

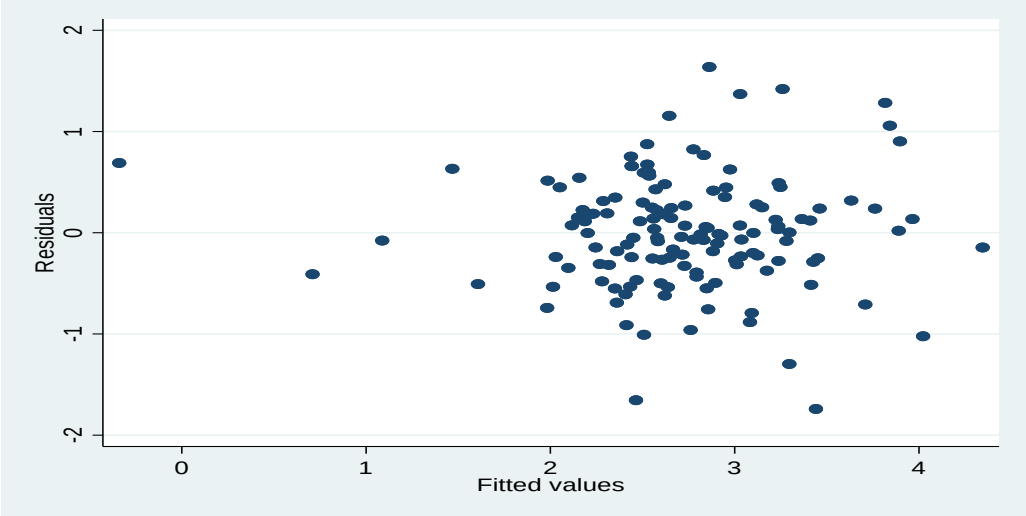
chi2(27) = 36.86

Prob > chi2 = 0.0978

Cameron & Trivedi's decomposition of IM-test

Source	chi2	Df	P
Heteroskedasticity	36.860	27	0.0978
Skewness	10.260	6	0.114
Kurtosis	3.480	1	0.062
Total	50.600	34	0.033

Figure 4.2.: Test of Constant variance of residuals.



Source: Stata output results and author's computation, 2023

4.4.4. Auto correlation Test

Furthermore, the researcher tested the autocorrelation assumptions that imply zero covariance of error terms over time. That means errors associated with one observation are uncorrelated with the errors of any other observation. As noted by Gujarati (2004), the best-renowned test for detecting serial correlation is the Durbin Watson test. Accordingly, when the ''d'' computed is nearest to 2 on DW table with a 5% level, it is assumed that there is no autocorrelation problem. Thus, as shown in the table below the computed "d" in this study on the model is 1.686639 which is nearest to 2 and implies the absence of autocorrelation problem (see dw test). So, this

shows that the error terms are not correlated with one another for different observations in this study.

gen time=_n
time variable: time, 1 to 136
delta: 1 unit
Dwstat
Durbin-Watson d-statistic(7, 136) = 1.686639

Table 4.6. Auto correlation Test

Breusch-Godfrey LM test for autocorrelation

lags(*p*)	chi2	df	Prob > chi2
1	3.215	1	0.0730

H0: no serial correlation

4.5. Choosing Random Effect (RE) versus Fixed Effect (FE) Models

To determine the appropriate model Fixed Effect, and Random Effect models regression has been run. The summary regression output of Fixed Effect and Random Effect models has been presented in the table 4.9 below.

Table 4.7 Hausman Specification Test

```
. hausman fe re
```

	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
HHI	-.02668	-.0278293	.0011493	.0021558
HHINONII	.0002803	-.0006754	.0009557	.0006334
NONIITA	.3971634	.3317801	.0653834	.0534508
LOANTA	-.0013534	.0033623	-.0047157	.0037554
SHFC	-.0003861	.001275	-.0016611	.0018424
EXR	.0214095	.0125544	.0088551	.0057966

```
                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(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        5.89
                Prob>chi2 =      0.4357
```

Source: Stata output results and author's computation, 2023

As shown above table 4.9, Housman test result of the p-value for is 0.4357 which is greater than 5%, provides evidence in favor of the random effect model and it supports the recommendation that the random effects (RE) method is an efficient estimator for the panel models (Baltagi, 2005).So since the p-value is greater than 5%. So we don't reject our null hypothesis (random effect model is appropriate).

After conducted the regression of Fixed Effect and Random Effect Models, the author decided also to conduct Breush and Pagan Langrangian Multiplier (LM) test

H_o: Variance across entities is zero

H_1: No significant difference across units (i.e no panel effect)

As shown from table below, Breush and Pagan Langrangian Multiplier (LM) test shows that the acceptance of null hypothesis i.e. variance across entities is zero. Therefore, the result of discussion and analysis in the random effect model is appropriate

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        ROA[Code,t] = Xb + u[Code] + e[Code,t]

        Estimated results:
                     |       Var     sd = sqrt(Var)
             ---------+------------------------------
                 ROA |    .0000679       .0082424
                   e |    .0000229       .0047876
                   u |          0               0

        Test:   Var(u) = 0
                            chibar2(01) =     0.00
                          Prob > chibar2 =   1.0000
```

Source: Stata output results and author's computation, 2023

4.6. Empirical Results Discussion

ROA=0.02β0+-0.028β1HHI+-0.001β2HHINONII +0.332β3NONIITA +0.003β4LOANTA +0.001β5SHFC+0 .013β6EXR+β136ε+μ

Table 4.8 Random Effect Model Regression results

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
HHI	-.028	.003	-10.30	0	-.033	-.023	***
HHINONII	-.001	.001	-0.73	.465	-.002	.001	
NONIITA	.332	.03	10.95	0	.272	.391	***
LOANTA	.003	.004	0.76	.45	-.005	.012	
SHFC	.001	.002	0.52	.602	-.004	.006	
EXR	.013	.009	1.46	.145	-.004	.029	
Constant	.02	.003	7.07	0	.015	.026	***

Mean dependent var	0.027	SD dependent var	0.008
Overall r-squared	0.682	Number of obs	136
Chi-square	276.907	Prob > chi2	0.000
R-squared within	0.583	R-squared between	0.905

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

Source: Stata output results and author's computation, 2023

The output of the econometrics model of random effect shows that strong explanatory power of the model based on the result of R^2. The R^2 measures the success of the regression in predicting the values of the dependent variable in the sample. In standard settings, R2 values indicate the explanatory power of the model and in this study adjusted R^2 value which takes into account the loss of degrees of freedom associated with adding extra variables were inferred to see the explanatory powers of the models.

As shown above table 4.10, the value of R^2 is 0.682.There is a rule of thumb that can be used to determine the R^2 value is as follows: 0.1: poor fit, 0.11 to 0.30: modest fit, 0.31 to 0.50: moderate fit, >0.50: strong fit (Muijs, 2004). Here study R^2 of 0.682 indicates that the formula is the strong fit for predicting the ROA. This indicates that the independent variables are collectively 68.2 percent related to the dependent variable ROA. Another way is that of changes that occur in the dependent variable, 68.2% are attributable to the independent variables.

In the regression outputs, the beta coefficient may be negative or positive; beta indicates each variable's level of influence on the dependent variable. The positive beta coefficient means that the variable has a positive impact on your dependent variable, and a negative one has anegative impact on the dependent variable. It tells us on average when the independent variable increase by 1 percent the dependent variable is increased by beta amount but the independent variables should have a statistically significant impact on the dependent variable. As the result shows that HHI and HHINONII have a negative impact on ROA and LOANTA, SHFC, NONIITA and EXR have a positive impact on ROA.

On the other hand, the P-value indicates at what percentage or precession level of each variable is significant or insignificant in explaining ROA. The regression output of HHI and NONIITA has a significant impact on ROA at 5% significance level. This result is consistent with Sherene A. Bailey-Tapper (2010), Estifanos Yilma (2014) and Abraham Shibru (2019).

The β_0 is the constant, where the regression line intercepts the y axis, representing the amount the dependent variable when all the independent variables are 0. Here C is 0.02 the probability of the coefficient is significant.

The random effect model regression result in the table 4.10 clearly shows that there is a strong

and significant relationship between the dependent variable of ROA and independent variable of NONIITA (+ve, and significant) which is modeled in this study.

The expected and actual results of each explanatory variables have been presented as follows.

H_O1: There is negative and insignificant relationship between ROA and HHI

Depending on the random effect regression result of the above table 4.10, HHI has negative and significant relationship with return on asset (ROA) since its p-value is 0.00 which is significant at p-value is less than a 5% significance level. Therefore, HHI can be taken as one of the major determinant factors that affect financial performances of the banks. Therefore, we can reject the assumption of H_O. This finding is consistent with Hydenet.al (2007) and Estifanos Yilma (2014) conclusion that says diversification tends to be associated with reductions in banks' returns.

H_O2: There is negative and insignificant relationship between ROA and HHINONII

Based on the regression result of table 4.10, HHINONII has negative and insignificant impact on Return on Asset since its p-value is 0.465 which is greater than 5 percent level of significance. Therefore, the researcher doesn't reject the null hypothesis assumption of insignificant impact on return on asset (ROA).

H_O3: There is no positive and significant relationship between ROA and NONIITA

According to the result of table 4.10, NONIITA has positive and significant impact on Return on Asset since its p-value is 0.00. Therefore, the researcher rejects the null hypothesis assumption of there is no significant impact on bank performance and accept the alternate hypothesis(there is positive and significance relationship between ROA and NONIITA). The estimated co-efficient of NONIITA produced a positive estimate of 0.332 indicating that an increase in the share of non-interest income by 1% would result in an increase of 0.332% in the return on assets of the sampled commercial banks. The empirical result shows that Ethiopian commercial banks are benefited from increasing the share of non-interest income over the total asset. The Regression result shows that NONIITA has positive and significant relationship at 1% level of significance on ROA. This result is consistent with finding of, Badar Nadeem Ashraf, ET. Al. (2018).

H_O4: There is no positive and significant relationship between ROA and LOANTA

LOANTA - this Variable is the Share of loan income to total asset. Extending loan provision is one of the most important role of commercial banks. The interest raised from the loans is the most important source of income for commercial banks. However, inherent with bank‘s loan provision is liquidity risk as well as credit risk should be managed properly. Even though, it is expected that the more loans, the more interest income, and the more profitable the bank, Sastrosuwito and Suzuki (2011).Based on the regression result, we can say that there is positive but insignificant relationship between loans and ROA since its p-value is 0.45.which makes the researcher to reject the assumption of H_O.

H_O5: There is no positive and significant relationship between ROA and SHFC

According to the result of table 4.10, SHFC (share of Fees and commission on total Non-interest income) has positive but insignificant impact on Return on Asset since its p-value is 0.444 which enables the researcher to reject the null hypothesis assumption of significant impact on bank performance (ROA).

H_O6: There is no positive and significant relationship between ROA and EXR

As shown in the above regression result (table 4.10), there is positive but insignificant relationship between EXR and return on asset (ROA) since its p-value is 0.145 which is insignificant at 5 percent level of significance. So, this insignificant parameter indicates that foreign currency exchange rate does not affect the financial performance of Ethiopian commercial banks. So, the researcher rejects the assumption of H_O.

Table 4.9 Summary of actual and expected signs of explanatory variables on the ROA

Independent variables	Null Hypothesis on ROA	Actual Results	Decision
HHI	-ve and Insignificant	-ve and significant	Reject HO
HHINONII	-ve and Insignificant	-ve and insignificant	Not Reject HO
NONIITA	-ve and Insignificant	+ve and significant	reject HO
LOANTA	-ve and Insignificant	+ve and insignificant	Reject HO
SHFC	-ve and Insignificant	+ve and insignificant	Reject HO
EXR	-ve and Insignificant	+ve and insignificant	Reject HO

Source: Stata output results and author's computation, 2023

CHAPTER FIVE

5. SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDETION

The basic intention of this chapter is to present the general overviews of the research by summing the main findings of the analysis part and give future research directions. Accordingly, the chapter starts with its discussion by briefly sum up the overviews of the study and its main findings. In section two based on the study finding the researcher high light some recommendations for the target populations the study pivoting on.

5.1. Summary of Findings

The main objective of this study is to examine the effect of income diversification on bank performance of selected commercial banks in Ethiopia. The panel data of 17 commercial banks with total of 136 observations was used in this study analysis based on their financial performances for the period of seven years since 2014-2021. The average performance or the mean value of profitability that measured by ROA was 0.027 with standard deviation of 0.008, the mean value of HHI is 0.336 with standard deviation of 0.164, the mean value of SHFC is 0.728 with a standard of 0.284, the mean value of HHINONII is 0.747 with standard deviation of o.735, the mean value of NONIITA is 0.033 with standard deviation of 0.015, the mean value of LOANTA is 0.507 with a standard deviation of 0.0.115 and the mean value of EXR is .269 and with standard deviation of 0.064.

The study found that NONIITA and HHI have a significant effect on the return on asset of the banks. It also found that the effect of HHINONII on return asset of selected commercial banks is negative and insignificant while,the effects of HHI on return on asset of the banks are negative and significant. Plus to this, NONIITA has positive and significant effect on return on asset.

The output of the econometrics model of random effect shows that strong explanatory power of the model based on the result of R^2. The R^2 measures the success of the regression in predicting the values of the dependent variable in the sample the adjusted coefficient of determination R^2 was 0.682. Accordingly HHI, HHNONII, SHFC, NONIITA, LOANTA and EXR are explained by 68.2% of the variation in return on asset (ROA) of selected commercial banks while the other variation is explained by other factors.

5.2. Conclusion

This thesis analyzed the effect of income diversification on bank performance of Ethiopian commercial banks by using the financial statements of 17 banks. The proxies (dependent variables) used to estimate performances are return on assets (ROA). The researcher used Herfindahl Hirschman Index (HHI), Herfindahl Hirschman Index for non-interest income (HHINONII), Share of Fees and Commission over Non-interest income (SHFC) and non-interest income to total asset ratio (NONIITA) as an independent variables. Especially the researcher ran panel regressions of return on asset with income diversification measure that was derived from Herfindahl–Hirschman Index of specialization. The study used a total of 17 commercial banks' panel data since 2014 to 2021 and used random effect (RE) panel regression model through the help of hausman specification test. The figures of the sampled data were presented by using descriptive statistics.

The finding reveals that income diversification has an impact on return on asset of the Ethiopian commercial banks over the period of 2014 – 2021 since the coefficient of NONIITA, LOANTA, SHFC and EXR have positive impacts. This shows that an increase in income diversification leads to an increase in return on asset (ROA). It means that selected Commercial banks are benefited from diversification of their activities beyond the traditional lending activities.

In addition, HHI and HHINONII have a negative impact on return on asset of the selected commercial banks. As the share of these variables increased the return on asset is decreased. On the other hand when banks increase the share of total Non-interest income to total asset (NONIITA), return on asset is increased. According to the regression result, Herfindahl Hirschman Index is negative and significant impact on return on asset. The study also found that negative and insignificant impact of Herfindahl Hirschman Index for non interest incomes (HHINONII) on return on asset. According to the result, LOANTA, SHFC and EXR have positive but insignificant impact on ROA of selected commercial banks.

5.3. Recommendation

In the analysis part of this study, the researcher concluded that income diversification could increase the bank performance in term of return on asset. There are so many variables that may affect the bank performance proxies. But for this research purpose the researcher tried to analyze the effect of income diversification (non-interest income) on bank performance. Therefore, based on the research conclusions above, the following recommendations have been drown.

➢The finding of this thesis recommended that to improve bank performance, banks should intensify efforts to consolidate the gains in both interest and non-interest income activities. In order to increase the bank performances commercial banks are advised to diversify their income across non-interest income and diversification can be consent for all Ethiopian commercial banks if they use it wisely considering the right areas of diversification. Banks must consider their competencies and proficiency while deciding the areas of income diversification to have proper benefits of diversification.

➢ Nevertheless, the finding regarding impact of income i.e. non-interest income diversification on bank performance exhibit mixed results, an optimum combination of banking activities enhance its performance, thereby well diversified activities and calculated risk-return trade-off balance. Since banks that only generate revenue from traditional sources such as interest paid on deposits and interest received from loans have faced risks associated with those flows such as liquidity risk associated with deposits, credit risk associated with loans, market risk associated with fixed income securities, and interest rate risk associated with the relative maturities of deposits, loans, and securities. The study focused on banking sector only which excludes other financial institutions, and future studies should consider other sectors such as insurance firms and microfinance institutions. Furthermore, the study considered only profitability measure as a proxy for bank performance, so future research should consider cost efficiency of non interest and interest income activities in Ethiopian banking sector.

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Appendix

Appendix A

Bank	Code	YEAR	ROA	HHI	HHINONII	NONIITA	LOANTA	SHFC	EXR
AB	1	2014	0.0220	0.4710	0.5400	0.0408	0.4614	0.6389	0.1959
AB	1	2015	0.0320	0.2720	0.5100	0.0465	0.5044	0.5644	0.2058
AB	1	2016	0.0270	0.3230	0.5100	0.0349	0.4968	0.5596	0.2173
AB	1	2017	0.0230	0.2300	0.5000	0.0344	0.4901	0.5484	0.2387
AB	1	2018	0.0300	0.2600	0.7300	0.0355	0.0486	0.8414	0.2743
AB	1	2019	0.0370	0.1970	0.6000	0.0475	0.5029	0.7215	0.2907
AB	1	2020	0.0280	0.2820	0.6800	0.0258	0.5748	0.8014	0.3493
AB	1	2021	0.0340	0.2540	0.6800	0.0267	0.6623	0.8017	0.3815
ADIB	2	2014	0.0410	0.2350	0.7300	0.0675	0.4003	0.8362	0.1959
ADIB	2	2015	0.0391	0.2540	0.7000	0.0651	0.4445	0.8142	0.2058
ADIB	2	2016	0.0395	0.2290	0.6900	0.0577	0.4264	0.8108	0.2173
ADIB	2	2017	0.0314	0.3150	0.7000	0.0520	0.4573	0.8140	0.2387
ADIB	2	2018	0.0296	0.2880	0.6800	0.0470	0.4835	0.8038	0.2743
ADIB	2	2019	0.0327	0.2570	0.7100	0.0473	0.4803	0.8274	0.2907
ADIB	2	2020	0.0335	0.2200	0.7100	0.0482	0.5315	0.8248	0.3493
ADIB	2	2021	0.0353	0.2430	0.6100	0.0554	0.5064	0.7392	0.3815
AWB	3	2014	0.0340	0.1560	0.5000	0.0415	0.4478	0.5425	0.1959
AWB	3	2015	0.0290	0.1860	0.5000	0.0352	0.5139	0.5156	0.2058
AWB	3	2016	0.0280	0.2170	0.5000	0.0301	0.5087	0.4943	0.2173
AWB	3	2017	0.0280	0.2290	0.5000	0.0280	0.5300	0.5471	0.2387
AWB	3	2018	0.0310	0.2300	0.5700	0.0218	0.5618	0.6899	0.2743
AWB	3	2019	0.0380	0.1720	0.5400	0.0279	0.6278	0.6476	0.2907
AWB	3	2020	0.0320	0.2520	0.5700	0.0262	0.6303	0.6861	0.3493
AWB	3	2021	0.0310	0.2510	0.5700	0.0297	0.6685	0.6842	0.3815
BOA	4	2014	0.0253	0.2040	0.5300	0.0247	0.4488	0.6175	0.1959
BOA	4	2015	0.0234	0.2560	0.8900	0.0259	0.4321	0.9438	0.2058

BOA	4	2016	0.0236	0.3220	0.9300	0.0318	0.4761	0.9661	0.2173
BOA	4	2017	0.0271	0.3010	0.9300	0.0312	0.5499	0.9650	0.2387
BOA	4	2018	0.0196	0.5250	0.8800	0.0173	0.5559	0.9373	0.2743
BOA	4	2019	0.0218	0.4390	0.7800	0.0200	0.5960	0.8746	0.2907
BOA	4	2020	0.0175	0.8640	0.8200	0.0145	0.6468	0.9000	0.3493
BOA	4	2021	0.0167	0.7620	0.8900	0.0226	0.7265	0.9390	0.3815
BRB	5	2014	0.0180	0.3130	0.9200	0.0307	0.4141	0.9602	0.1959
BRB	5	2015	0.0297	0.2380	0.5900	0.0389	0.4495	0.7141	0.2058
BRB	5	2016	0.0468	0.1710	0.6200	0.0453	0.5144	0.7439	0.2173
BRB	5	2017	0.0373	0.1980	0.7200	0.0455	0.5009	0.8292	0.2387
BRB	5	2018	0.0267	0.3980	0.6800	0.0309	0.5023	0.8033	0.2743
BRB	5	2019	0.0276	0.2740	0.7000	0.0346	0.5233	0.8195	0.2907
BRB	5	2020	0.0273	0.4330	0.6500	0.0367	1.1011	0.7696	0.3493
BRB	5	2021	0.0081	0.9350	0.5800	0.0327	0.6338	0.7053	0.3815
BIB	6	2014	0.0310	0.2510	0.6100	0.0384	0.4460	0.7338	0.1959
BIB	6	2015	0.0360	0.2350	0.5900	0.0310	0.4318	0.7176	0.2058
BIB	6	2016	0.0330	0.2540	0.6100	0.0357	0.5325	0.7379	0.2173
BIB	6	2017	0.0240	0.3250	0.6300	0.0299	0.5297	0.7522	0.2387
BIB	6	2018	0.0280	0.2980	0.6000	0.0276	0.5254	0.7246	0.2743
BIB	6	2019	0.0340	0.2590	0.6300	0.0380	0.5622	0.7546	0.2907
BIB	6	2020	0.0260	0.4510	0.6500	0.0267	0.6022	0.7752	0.3815
BIB	6	2021	0.0300	0.3820	0.7000	0.0272	0.6913	0.8171	0.3493
CBE	7	2014	0.0313	0.1080	0.5500	0.0238	0.3559	0.6646	0.1959
CBE	7	2015	0.0319	0.1130	0.5600	0.0211	0.3541	0.6678	0.2058
CBE	7	2016	0.0242	0.1770	0.5200	0.0156	0.3582	0.5932	0.2173
CBE	7	2017	0.0219	0.2050	0.6600	0.0128	0.3066	0.7870	0.2387
CBE	7	2018	0.0101	0.5120	7.4100	0.0028	0.3014	2.6258	0.2743
CBE	7	2019	0.0179	0.2960	0.6400	0.0121	0.2889	0.7854	0.2907
CBE	7	2020	0.0124	0.4370	1.4100	0.0140	0.2954	1.1829	0.3493
CBE	7	2021	0.0148	0.3390	1.0300	0.0151	0.2895	1.0112	0.3815

CBO	8	2014	0.0490	0.1390	0.7500	0.0625	0.4958	0.8533	0.1959
CBO	8	2015	0.0330	0.2560	0.6200	0.0458	0.5729	0.7404	0.2058
CBO	8	2016	0.0035	0.4780	0.5900	0.0238	0.5475	0.7140	0.2173
CBO	8	2017	0.0150	0.4500	0.6200	0.0231	0.5461	0.7457	0.2387
CBO	8	2018	0.0180	0.5670	0.5000	0.0220	0.5926	0.5381	0.2743
CBO	8	2019	0.0180	0.6750	0.5200	0.0215	0.5122	0.6053	0.2907
CBO	8	2020	0.0250	0.4620	0.5000	0.0301	0.5589	0.4822	0.3493
CBO	8	2021	0.0200	0.6360	0.5100	0.0321	0.6591	0.4467	0.3815
DB	9	2014	0.0340	0.1450	0.7100	0.0457	0.4294	0.1775	0.1959
DB	9	2015	0.0310	0.1910	0.7100	0.0445	0.4576	0.1773	0.2058
DB	9	2016	0.0270	0.2300	0.7100	0.0424	0.4367	0.1736	0.2173
DB	9	2017	0.0240	0.3260	0.6900	0.0388	0.5117	0.1953	0.2387
DB	9	2018	0.0230	0.3590	0.5700	0.0261	0.5076	0.6868	0.2743
DB	9	2019	0.0200	0.4120	0.6200	0.0187	0.5757	0.7480	0.2907
DB	9	2020	0.0250	0.4130	1.0600	0.0202	0.6163	1.0302	0.3493
DB	9	2021	0.0210	0.4390	5.7100	0.0096	0.6748	2.1146	0.3815
DGB	10	2014	0.0290	0.6640	0.5500	0.0460	0.3048	0.3378	0.1959
DGB	10	2015	0.0170	0.9060	0.7600	0.0547	0.2929	0.8585	0.2058
DGB	10	2016	0.0420	0.3040	0.7200	0.0796	0.4577	0.8341	0.2173
DGB	10	2017	0.0300	0.4480	0.8800	0.0619	0.3785	0.9380	0.2387
DGB	10	2018	0.0400	0.3010	0.5500	0.0635	0.4765	0.6600	0.2743
DGB	10	2019	0.0480	0.2120	0.6100	0.0681	0.4376	0.7383	0.2907
DGB	10	2020	0.0300	0.7010	0.5100	0.0744	0.5730	0.5846	0.3493
DGB	10	2021	0.0200	0.6700	0.5100	0.0530	0.7131	0.5514	0.3815
EB	11	2014	0.0370	0.7630	0.5000	0.0549	0.3575	0.5124	0.1959
EB	11	2015	0.0290	0.2210	0.6500	0.0325	0.5131	0.7763	0.2058
EB	11	2016	0.0290	0.2250	0.7000	0.0406	0.4989	0.8183	0.2173
EB	11	2017	0.0230	0.3020	0.9800	0.0414	0.5054	0.9920	0.2387
EB	11	2018	0.0280	0.2130	0.5900	0.0404	0.5112	0.7088	0.2743
EB	11	2019	0.0260	0.2330	0.5900	0.0261	0.5536	0.7073	0.2907

EB	11	2020	0.0200	0.4040	0.6700	0.0252	0.5755	0.7931	0.3493
EB	11	2021	0.0180	0.3750	0.8900	0.0254	0.6131	0.0612	0.3815
LIB	12	2014	0.0290	0.2220	0.5100	0.0368	0.4265	0.4222	0.1959
LIB	12	2015	0.0320	0.2870	0.5300	0.0533	0.4831	0.3762	0.2058
LIB	12	2016	0.0280	0.3250	0.5600	0.0453	0.5300	0.3205	0.2173
LIB	12	2017	0.0280	0.2850	0.5000	0.0254	0.4998	0.5242	0.2387
LIB	12	2018	0.0310	0.2920	0.5000	0.0233	0.5150	0.4716	0.2743
LIB	12	2019	0.0310	0.2950	0.5200	0.0268	0.5700	0.4063	0.2907
LIB	12	2020	0.0250	0.4980	0.5000	0.0136	0.6004	0.4557	0.3493
LIB	12	2021	0.0110	0.3280	0.8400	0.0055	0.6778	0.9131	0.3815
NIB	13	2014	0.0290	0.1490	0.5900	0.0261	0.5032	0.7108	0.1959
NIB	13	2015	0.0280	0.2310	0.5600	0.0242	0.5201	0.6679	0.2058
NIB	13	2016	0.0270	0.2660	0.5300	0.0183	0.4745	0.6268	0.2173
NIB	13	2017	0.0240	0.2450	0.6000	0.0213	0.5096	0.7273	0.2387
NIB	13	2018	0.0220	0.3680	0.6700	0.0152	0.5058	0.7905	0.2743
NIB	13	2019	0.0240	0.3400	0.7600	0.0141	0.5709	0.8622	0.2907
NIB	13	2020	0.0270	0.3030	0.6400	0.0151	0.6022	0.7646	0.3493
NIB	13	2021	0.0250	0.4010	0.7300	0.0108	0.6313	0.8376	0.3815
OB	14	2014	0.0310	0.2340	0.6000	0.0239	0.2766	0.7185	0.1959
OB	14	2015	0.0280	0.2760	0.5800	0.0346	0.4936	0.6964	0.2058
OB	14	2016	0.0150	0.7170	0.8300	0.0243	0.4579	0.9053	0.2173
OB	14	2017	0.0210	0.4730	0.5100	0.0358	0.4322	0.5601	0.2387
OB	14	2018	0.0360	0.2150	0.5300	0.0347	0.4870	0.6120	0.2743
OB	14	2019	0.0270	0.3130	0.6600	0.0262	0.5417	0.7864	0.2907
OB	14	2020	0.0260	0.3610	0.6400	0.0201	0.5073	0.7666	0.3493
OB	14	2021	0.0230	0.4900	0.7400	0.0176	0.5983	0.8461	0.3815
UB	15	2014	0.0250	0.2280	0.6000	0.0274	0.4207	0.7262	0.1959
UB	15	2015	0.0210	0.3620	0.5600	0.0269	0.4719	0.6753	0.2058
UB	15	2016	0.0210	0.3760	0.5700	0.0259	0.4877	0.6900	0.2173
UB	15	2017	0.0190	0.4390	0.6000	0.0211	0.5409	0.7203	0.2387

UB	15	2018	0.0230	0.3800	0.6500	0.0216	0.5305	0.7719	0.2743
UB	15	2019	0.0240	0.4700	0.8200	0.0155	0.6048	0.9004	0.2907
UB	15	2020	0.0230	0.4870	0.8700	0.0151	0.6345	0.9291	0.3493
UB	15	2021	0.0210	0.4580	0.8600	0.0188	0.6571	0.9214	0.3815
WB	16	2014	0.0290	0.2050	0.5700	0.0355	0.3927	0.3069	0.1959
WB	16	2015	0.0280	0.2630	0.5600	0.0345	0.4428	0.3236	0.2058
WB	16	2016	0.0250	0.3160	0.5400	0.0314	0.4636	0.3571	0.2173
WB	16	2017	0.0290	0.2810	0.5600	0.0381	0.4886	0.3275	0.2387
WB	16	2018	0.0330	0.2540	0.7800	0.0355	0.5398	0.8750	0.2743
WB	16	2019	0.0220	0.5000	0.9000	0.0232	0.5407	0.9449	0.2907
WB	16	2020	0.0240	0.4670	0.9500	0.0307	0.6093	0.9766	0.3493
WB	16	2021	0.0030	0.5590	0.9500	0.0272	0.6566	0.9760	0.3815
ZB	17	2014	0.0510	0.1450	0.5400	0.0637	0.3322	0.6347	0.1959
ZB	17	2015	0.0350	0.1820	0.5400	0.0491	0.4425	0.6349	0.2058
ZB	17	2016	0.0330	0.1900	0.5300	0.0456	0.4413	0.6283	0.2173
ZB	17	2017	0.0290	0.2220	0.9900	0.0520	0.4107	0.9940	0.2387
ZB	17	2018	0.0240	0.2150	0.6300	0.0339	0.4043	0.7565	0.2743
ZB	17	2019	0.0360	0.1380	0.6600	0.0387	0.5180	0.7853	0.2907
ZB	17	2020	0.0450	0.1230	0.6700	0.0369	0.5270	0.7894	0.3493
ZB	17	2021	0.0440	0.1340	0.6000	0.0429	0.5577	0.7266	0.3815

Table 1.Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) ROA	1.000						
(2) HHI	-0.601	1.000					
(3) HHINON	-0.240	0.141	1.000				
(4) NONIITA	0.641	-0.159	-0.253	1.000			
(5) LOANTA	-0.153	0.254	-0.045	-0.200	1.000		
(6) SHFC	-0.232	0.168	0.794	-0.271	0.011	1.000	
(7) EXR	-0.267	0.365	0.152	-0.324	0.573	0.257	1.000

Table 2: Pooled OLS

```
. reg ROA HHI HHINONII NONIITA LOANTA SHFC EXR
```

Source	SS	df	MS	Number of obs	=	136
				F(6, 129)	=	46.15
Model	.006256755	6	.001042793	Prob > F	=	0.0000
Residual	.002914778	129	.000022595	R-squared	=	0.6822
				Adj R-squared	=	0.6674
Total	.009171534	135	.000067937	Root MSE	=	.00475

ROA	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
HHI	-.0278293	.0027021	-10.30	0.000	-.0331754	-.0224832
HHINONII	-.0006754	.0009247	-0.73	0.466	-.0025049	.0011541
NONIITA	.3317801	.0303109	10.95	0.000	.2718093	.3917509
LOANTA	.0033623	.0044479	0.76	0.451	-.0054379	.0121626
SHFC	.001275	.0024471	0.52	0.603	-.0035668	.0061167
EXR	.0125544	.0086063	1.46	0.147	-.0044733	.0295821
_cons	.0201866	.0028568	7.07	0.000	.0145343	.0258389

Table 3 Random Effect Model Regression results

```
. xtreg ROA HHI HHINONII NONIITA LOANTA SHFC EXR, re

Random-effects GLS regression                   Number of obs     =       136
Group variable: Code                            Number of groups  =        17

R-sq:                                           Obs per group:
     within  = 0.5835                                         min =         8
     between = 0.9053                                         avg =       8.0
     overall = 0.6822                                         max =         8

                                                Wald chi2(6)      =    276.91
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =    0.0000
```

ROA	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
HHI	-.0278293	.0027021	-10.30	0.000	-.0331253	-.0225333
HHINONII	-.0006754	.0009247	-0.73	0.465	-.0024877	.001137
NONIITA	.3317801	.0303109	10.95	0.000	.2723718	.3911883
LOANTA	.0033623	.0044479	0.76	0.450	-.0053554	.01208
SHFC	.001275	.0024471	0.52	0.602	-.0035213	.0060712
EXR	.0125544	.0086063	1.46	0.145	-.0043136	.0294224
_cons	.0201866	.0028568	7.07	0.000	.0145873	.0257858
sigma_u	0					
sigma_e	.00478756					
rho	0	(fraction of variance due to u_i)				

HO: Random Model is Appropriate

H1: Fixed Effect Model is Appropriate

Table 4 Hausman Specification Test

```
. hausman fe re

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |       fe           re         Difference          S.E.
-------------+----------------------------------------------------------------
         HHI |    -.02668    -.0278293        .0011493        .0021558
    HHINONII |    .0002803    -.0006754        .0009557        .0006334
     NONIITA |    .3971634     .3317801        .0653834        .0534508
      LOANTA |   -.0013534     .0033623       -.0047157        .0037554
        SHFC |   -.0003861      .001275       -.0016611        .0018424
         EXR |    .0214095     .0125544        .0088551        .0057966
------------------------------------------------------------------------------
                           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(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        5.89
                Prob>chi2 =      0.4357
```

Table 5 Random Effect Model Regression results

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
HHI	-.028	.003	-10.30	0	-.033	-.023	***
HHINONII	-.001	.001	-0.73	.465	-.002	.001	
NONIITA	.332	.03	10.95	0	.272	.391	***
LOANTA	.003	.004	0.76	.45	-.005	.012	
SHFC	.001	.002	0.52	.602	-.004	.006	
EXR	.013	.009	1.46	.145	-.004	.029	
Constant	.02	.003	7.07	0	.015	.026	***

Mean dependent var	0.027	SD dependent var	0.008
Overall r-squared	0.682	Number of obs	136
Chi-square	276.907	Prob > chi2	0.000
R-squared within	0.583	R-squared between	0.905

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

Source: Stata output results and author's computation, 2023