ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF ACCOUNTING AND FINANCE

DETERMINANT OF INCOME DIVERSIFICATION: EVIDENCE FROM 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 Degree of Master of Science in Accounting and Finance.

By:

Negasew Worku

Advisor: Degefe Duressa (PhD)

February 2019

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Statement of Declaration

I, Negasew Worku, hereby declare that this thesis work entitled determinant of non-interest income diversification: Evidence from commercial Banks in Ethiopia submitted by me for the award of the degree of Master of Science in Accounting and Finance of Addis Ababa University is my own work and it has not previously been submitted for the award of any other degree.

Name: Negasew Worku

Signature: _____

Date: _____

Place: Addis Ababa University

Date: February 2019

Statement of Certification

This is to certify that the thesis prepared by Negasew Worku, entitled: The determinants of Income Diversification: Evidence From Ethiopian Commercial Banks and submitted in partial fulfillment of the requirements for the degree of Master of Science in Accounting and Finance complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Approved by:

External
Examiner_____Signature_____Date_____

Internal
Examiner_____Signature_____Date_____

Advisor _____Signature_____Date_____

Abstract:

This thesis presents an analysis of the determinants Ethiopian commercial banks non-interest income diversification decisions. The objective of this study was to investigate the effect of both bank specific and macro-economic factors on non-interest income diversification. This aimed to identify the most relevant bank specific and macro-economic factors that affect commercial banks income diversification in Ethiopia. For this purpose, a panel dataset comprising eleven Ethiopian commercial banks from 2002/03 to 2016/17 were selected and analyzed. The study used fixed effect regression technique, correlation analysis and descriptive statistics to analyze the data using STATA statistical software. The dependent variable used to measure non-interest income diversification was Non-interest income ratio. The researcher used bank size, net-interest margin, lending leverage, insolvency risk, capital adequacy and efficiency as bank specific independent variables. The researcher also used real GDP growth rate and inflation rate as macro-economic independent variables. From the result of this thesis, the researcher finds that banks income diversification decision reflects a variety of managerial abilities to manage: insolvency risk, net-interest margin, capital adequacy, lending leverage and efficiency. The empirical result of this study shows that insolvency risk has a positive and significant effect on non-interest income diversification of commercial banks in Ethiopia from 2002/03 to 2016/17. Meanwhile, capital adequacy, lending leverage, net-interest margin and efficiency have a significant negative impact on non-interest income diversification decision. Moreover, bank size, inflation rate and real GDP growth rate have insignificant positive effect on non-interest income diversification of commercial banks in Ethiopia. Furthermore, net-interest margin, insolvency risk, capital adequacy, lending leverage and efficiency were the major factors that affect income diversification decision of commercial banks in Ethiopia and management and regulators of Ethiopian commercial banks need to consider these factors while setting rules and procedures on income diversification decision.

Key Words: Income diversification, Non-interest income, Commercial banks, Ethiopia

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List of Acronyms

AB	Awash bank
BOA	Bank of Abyssinia
BSZ	Bank size
CAR	Capital adequacy ratio
CBO	Cooperative Bank of Oromia
CBE	Commercial bank of Ethiopia
CR	Cost ratio
CLRM	Classical linear regression model
DB	Dashen bank
EFF	Efficiency
FEM	Fixed effect model
GDP	Gross domestic product
Ha	Alternate hypothesis
Ho	Null hypothesis
INF	Inflation rate
INSR	Insolvency risk
LDR	Loan-deposit ratio
LENLEV	Lending leverage
MOF	Ministry of finance
NBE	National bank of Ethiopia
NIB	NibInternational bank
NIIR	Non-interest income ratio
NIM	Net-interest margin

OBS	Off balance sheet activities
OIB	Oromia International bank
OLS	Ordinary least square
REM	Random effect model
SdROA	Standard deviation of Return on Asset
VIF	Variance inflation factor
WB	Wegagen bank
ZB	Zemen Bank

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Chapter one

Introduction

This chapter presents the background of the study, statement of the problem, research objectives, as well as research hypothesis. Additionally, the chapter also gives highlights about the significance of the study, delimitations or scope as well as limitations of the study.

1.1 Back ground of the study

Banks play an important and significant role in an economy and their role became more and more vital. As financial intermediary, banks are the most important channel of money circulation between individuals, firms and financial markets. They become the backbone of the economic development. The last few decades shows a rapid trend to globalization of financial market and the creation or formation of globally integrated and coordinaed economy. During these times, financial markets have emerged fastly and financial innovations have developed at a rapid rate. Barriers or restrictions to international investment and finance have been declined aggresivley and access to financial services is becoming ever easier than before. This new environment followed by the fastest growing in information and Communication Technology (ICT) in the recent period have transformed the banking sector to diversify their revenue sources more aggresively. This sector has shown some radical change characterized by: The entry of non-bank financial institutions in to traditional banking markets.

In Ethiopia, following the change of Government in 1991 and the change of economic policy directions, financial institutions were re-organized to operate towards a market oriented policy framework. Proclamation No. 83/1994 that had allowed the establishment of private banks has marked the beginning of new era in the Ethiopian banking sector development. Commercial Banks both public and private are currently operational in line with Banking Proclamation No. 592/2008. After the establishment of the banking legislations in the country in the 1990s, a number of private banks have been established. For example, now, in the 2017/18 fiscal year the total number of banks already operational in the country is seventeen. Of these banks, sixteen are private and the one is government owned.

According to (Zhrekar, 2012) historically, commercial banks have been considered as institutions which accept deposits and give loans, and therefore making profits from the interest spread that is the difference between interest earned on loans and interest paid on deposits. According to (Rice, 2004) in recent years, banking companies have taken advantage of deregulation and technological innovation to generate substantial amounts of noninterest income from non-traditional activities like investment banking, securities brokerage, insurance agency and underwriting, and mutual fund sales. Today banks generate an increased portion of their income from non-traditional and non- interest activities (Zhrekar, 2012).

Nowadays, banks conduct a wide variety of business than traditional financial intermediation of collecting deposits and making loans Banks have become financial services enterprises and in many advanced or developed financial service economies, off balance sheet income (OBS) of banks exceeds income earned from traditional financial intermediation business. Banks start to be subject to substantial structural and operational change. As a result, some of the traditional monopolies and inherent comparative advantages possessed by banks have been being eroded or declined (Llewellyn–1999). In addition, the last few decades shows a rapid trend to globalization of financial market and the creation of globally integrated and coordinated economy. During these times, financial markets have emerged fastly and financial innovations have developed at a rapid rate. Barriers or restrictions to international investment and finance have been declined aggressively and access to financial services is becoming ever easier than before. This new environment followed by the fastest growing in information and Communication Technology (ICT) in the recent period have transformed the banking sector to diversify their revenue sources more aggressively.

Diversification is a business strategy, in which an entity enters into new field of business with diversified products and services with the objective of reducing risk and improving returns. Diversification is also considered as a competitive strategy for banking businesses across the world (Yigit and Turis, 2012). There are a number of ways in which a particular bank can diversify its operation. The most important and popular one is to diversify its source of income mainly by increasing the share of Non-Interest income to the total operating income, thus increasing the contribution of non-interest earning sources of income. According to Deyoung and Roland (2001), revenue diversification in banking sector refers to increasing share of non-

traditional banking activities like service fees, net trading profits and other non-interest income within net operating income of a bank.

According to (Stiroh, 2004), a bank which generates its income in a large part from traditional banking activities (interest income) can be called a focused-bank‟ whereas one which has a fair share of non-interest income can be said to have diversified income sources. The simple way of measuring income diversification is to take the ratio of total non-interest income to total operating income of a bank. The increase in noninterest income can be associated with deregulation of the banking system and to technological advancement and financial innovation, which enable banks to surrender a much wider range of services and products to its clients. This shift towards non-traditional income sources has increased bank revenues. Non-interest income can be described as income generated from non-traditional (fee-based activities) which include transaction fees and fees for services provided, for example, underwriting, insurance, trading and securitization, fiduciary duties etc. Multiple empirical studies have showed that banks have steadily increased their non-interest income all over the world (Stiroh 2004).

Due to the new banking environment, characterized by high competition and pressure, banks were moved towards the diversification of their income generating activities and they launched new products and services. In France, for example, banks have become the one stop shop; they offer telecommunication services, all kind of insurance, mortgage and many other financial and non-financial services. In Korea, a legislation on the integration of the capital market of 2009 allowed banks to expand further into financial services activities unrelated to traditional bank intermediation (Kim and Kim 2010). As a result, the interest income, which is the chief indicator of the banking profit, has decreased dramatically and noninterest revenue diversification increased surprisingly. In Ethiopia, banks also engaged in several non-banking services predominantly in giving insurance services externally and giving auxiliary banking services other than primary banking services like utility bill collection, fund transfer service and other agency service.

Recently the Ethiopian banking industry is steadily shifting away from traditional sources of revenue like loan making and toward nontraditional activities that generate fee income, service charges, trading revenue, and other types of noninterest income (Tamirat Shawul, 2014). For

example the income statements of Ethiopian commercial banks shows that the share of OBS income to total income is increasing from year to year and holding about 30 to 50 percent of the total income.(Tamirat Shawel, 2014). In addition, According to Estifanos Yilma (2015), founds that non-interest income of Ethiopian commercial banks are increased through time and is varying from bank to bank and again, with the same bank, it varies from year to year. Some banks earn more income from non-interest income while others get very low amount of non-interest income. Generally, it cannot be predetermined from year to year. Therefore, most banks are going to diversify their source of income to non-interest income and the proportion of non-interest income is volatile and the amount of non interest income is increase in quantitative figures.

1.2 Statement of the Problem

Bank's operating income is primarily generated from two sources namely; interest income from loans and non- interest income derived from fees and charges from surrendering other financial services (Kwast, 1989). Commercial banks differ significantly in their reliance on the sources of income. Some focus largely on business lending, like mortgages and business finance lending while others on household lending, and some on fee-earning activities. Previously, most banks largely depended on traditional banking, which generated interest incomes; however, recently commercial banks in today's world introduce new banking products in order to diversify their incomes (De Young, 2003).

The revenue generated from interest on loan for long period was the dominant source of income as the only means for the existence of commercial banks. However, this trend was failed due to various internal and external impeding factors on traditional business activities. In order to sustain and continue in the market banks looks another risk free fee generating activities for the last two decades (Robert et al, 2014). Several empirical studies have also showed that banks gradually increased their non-interest income because of the pervasive factors on traditional banking business (Stiroh, 2004). There are a number of ways in which a commercial bank can diversify its operation. The most common one is to diversify its source of income mainly by increasing the share of their non-interest income to the total operating income thereby increasing the contribution of non-interest earning sources of income (Matthias, 2013). However, the factor

that leads to non-interest income diversification decision in Ethiopian banking industry is under study.

The benefit of income diversification is unquestionable because being uncorrelated or least correlated, income diversification reduced the volatility of overall income of banks (Chiorazzo, Milani, & Salvini, 2008). Furthermore, banks can increase shareholders' value by shifting their focus from traditional income sources to non-interest income sources (Gurbuz, Yanik, & Ayturk, 2013). In addition, theoretically it is assumed that income diversification improve the financial performance of commercial banks because of economies of scale and economies of scope, risk reduction, etc. but it does really improve the performance as expected. Various studies have already been done on this matter. However, no more comprehensive analysis or studies exist to explicitly describe factors that affect non-interest income diversification

As described above, many of the existing empirical studies mainly focuses on the effects of non-interest income diversification on financial performances of banks look (Deyoung and Rice 2004; Stiroh 2004) even if, no common agreement has been reached as to whether diversified banks have performed better or not (Berger, Hasan and Zhou 2010). Moreover empirical investigation on non-interest income diversification of banking sector primarily focuses on the US, European, and Asian financial institutions. This means that little emphasis has been paid to the banking sector in developing countries like Ethiopia. Due to the rapid growing of financial institutions and commercial banks fastest expansion in to non-traditional banking activities in Ethiopia, a better understanding of the forces that derive income diversification decision of commercial banks can help us to know the nature of the banks diversification strategies as well as its future direction.

In addition, the effect of some bank specific factors on non-interest income diversification is a controversial issues among various empirical studies. Forexample, the effect of capital adequacy on non-interest income diversification is positive which means that banks with adequate capital tries to expand their operation and this inturn increases their non-interest income (Landi, Venturelli, and Berengario 2001). On the other hand, some empirical studies, supports the negative effect of capital adequacy on non-interest income by arguing that banks diversify their income sources by increasing their non-interest income to leverage their capital (Calomiris (1998)).

While it is well known that income diversification is helpful in reducing the risk of overall income volatility the trend of non interest income shares shows up and down from year to year in the case of commercial banks in Ethiopia. Thus, instead of supplementing another piece of empirical evidence on the effect of income diversification in the banking industry, introducing the other side of the coin may provide more insight. Therefore, this study aims at giving response to the question: what determines or drives banks income diversification decision? In sum, the above issues supplemented with the gap in the literature call for research on the determinant of non-interest income diversification. To this end, this study provides insight in to the factors that influence non-interest income diversification in the Ethiopian banking industry.

1.3 Research Objectives

1.3.1 General Objectives

The broad objective of this study was to examine the factors affecting non-interest income diversification decision in the case of commercial banks in Ethiopia.

1.3.2 Specific Objectives

The specific objectives were;

a) To analyze the effect of bank size on non-interest income diversification of commercial banks in Ethiopia.
b) To explain the impact net-interest margin on non-interest income diversification of commercial banks in Ethiopia
c) To evaluate the effect of efficiency on non-interest income diversification of commercial banks in Ethiopia.
d) To explain the impact of lending leverage on non-interest income diversification of commercial banks in Ethiopia.
e) To examine the effect of insolvency risk on non-interest income diversification of commercial banks in Ethiopia.
f) To analyze the effect of capital adequacy ratio on non-interest income diversification of commercial banks in Ethiopia.

g) To examine the effect of inflation rate on non-interest income diversification of commercial

h) To explain the effect of GDP growth rate on non-interest income diversification of commercial banks in Ethiopia.

1.4 Research hypothesis

The main purpose of this study is to examine the determinants of non-interest income diversification of commercial banks in Ethiopia. The empirical studies conducted in different countries provide various results on determinant of non-interest income diversification decision of commercial banks. Several empirical literatures reviewed shows that there is no a common agreement among international researches on the sign of coefficient of estimate of some selected bank specific as well as macroeconomic factor. Based on studies conducted in some countries on determinants of non-interest income diversification eight explanatory variables are selected. Then the established hypotheses are tested to differentiate and identify which determinants of non-interest income diversification are relevant and significant in Ethiopian context. These variables are Bank size, efficiency, lending leverage, insolvency risk, net-interest margin, capital adequacy, GDP growth rate and inflation. Thus, the researcher has developed the following hypothesis to estimate the significance of relationship between bank specific and macro economic variables with non-interest income ratio of commercial banks in Ethiopia.

Bank Size

Bank size is one of the factors that affect income diversification. In the empirical studies of Deyoung and Hunter (2003) bank size has a significant positive effect on banks income diversification towards non-interest income because large banks tends to be more advantageous from diversification because of their large branch operation, better client relationship and credibility. In addition, Joon-Ho Hahm (2008), by using a dataset of 662 relatively large commercial banks in 29 OECD countries from 1992 to 2006, find that banks with relatively large asset sizes, tend to diversify their revenue sources more aggressively by increasing their non-interest income shares. Thus, based on these studies the following hypothesis is formulated:

Ho: Bank size has a negative and insignificant effect on non-interest income ratio.

Ha: Bank size has a positive and significant effect on non-interest income ratio.

Efficiency

The banks efficiency ratio or cost of production is measured by cost-to-asset ratio which is calculated as operating expense divided by total asset. The higher the cost to asset ratio reflects the less efficient banks. According to (Glaser and Muller, 2010) who finds that in order of banks to improve operating efficiency one useful tool is to scale down operation arising from non-traditional activities since these activities compares mostly of fixed costs. This indicates that there is a negative effect of efficiency on income diversification. Since efficiency is measured by cost to asset ratio and cost to asset ratio is negatively related with efficiency, there is a positive relationship between cost to asset ratio and non-interest income ratio. Thus, the researcher formulated the hypothesis as follows:

Ho: Efficiency has a positive and insignificant impact on non-interest income ratio.

Ha: Efficiency has a negative and significant impact on non-interest income ratio.

Net-interest margin

Net interest margin is one of the relevant factors, which affect non-interest income diversification decision. As per, Rogers and Slinky (1999) net-interest margins has a significant negative impact on income diversification towards non-interest income. Banks with fewer core deposits and lower net-interest margins earn less revenue from traditional interest income sources, so they must move into non-traditional banking in order to remain profitable. This is because banks with low deposit level cannot disburse enough amount of loan to generate traditional source of interest income and therefore they look non-traditional source of income and this in turn increases their income diversification towards non-interest income. Thus, the researcher develops the following hypothesis.

Ho: Net interest margin has a positive and insignificant effect on non-interest income ratio.

Ha: Net interest margin has a negative and significant effect on non-interest income ratio.

Capital adequacy ratio

Capital adequacy is amount of capital required by the banks to enable them to withstand the risks such as credit, market and operational risks they are subject to in order to absorb the potential loses and protect the bank's debtors. Capital adequacy is a measure of the overall financial strength of a bank. However, there is a debate about the effect of capital adequacy on non-traditional income diversification decision of commercial banks. As Calomiris (1998) explains, banks expand non-banking business to leverage their capital. However, evidence from European banks does not support this argument. The capital adequacy is measured by equity capital to asset ratio and positively associated with non-interest income, which reflects that banks do not expand their businesses to save capital; on the other hand; more capital is necessary by the business for expansion (Landi, Venturelli, and Berengario 2001). Thus the researcher develops the hypothesis as follows:

Ho: Capital adequacy has a negative and insignificant impact on non-interest income ratio.

Ha: Capital adequacy has a positive and significant impact on non-interest income ratio.

Insolvency risk:

The capacity of the bank to mitigate risk is an important factor to individual banks and regulators. The banking literature tries to assume that risk and diversification go in the same direction. Z-score is used to measure insolvency risk, by measuring the amount of standard deviation that profit declines to make a bank insolvent (Stiroh and Rumble 2006). A positive relationship between insolvency risk and income diversification is predicted primarily due to volatility in banks profitability may force banks to tap non-interest income for potential profits. Thus, the researcher formulated the hypothesis as follows:

Ho: Insolvency risk has a negative and insignificant effect on non-interest income ratio.

Ha: Insolvency risk has a positive and significant effect on non-interest income ratio.

Lending leverage

It is measured as loan to deposit ratio. A high loan to deposit ratio indicates that a high leverage in lending, and banks might not cover the unforeseen fund requirements. Through

diversification, banks are able to finance less liquid assets with liquid liabilities (Cerasi and Daltung 2000). Thus, the researcher develops the hypothesis as follows:

Ho: Lending leverage has a negative and insignificant impact on non-interest income ratio.

Ha: Lending leverage has a positive and significant impact on non-interest income ratio.

GDP growth rate

It is measured by real GDP growth rate and considered as one of the explanatory variable. Nilsson and Rovelli (2001) find that a strong macroeconomic environment could positively affect foreign investment and financial innovation. Therefore, higher GDP growth rate is expected to have a positive effect on banks income diversification.

Ho: GDP growth rate has a negative and insignificant effect on non-interest income ratio.

Ha: GDP growth rate has a positive and significant effect on non-interest income ratio.

Inflation

It is measured by annual consumer price index and considered as one of the explanatory variable. Nilsson and Rovelli (2001) also find that a weak macroeconomic environment could negatively affect foreign investment and financial innovation. Therefore, higher inflation is expected to have a negative effect on banks income diversification.

Ho: Inflation has a positive and insignificant effect on non-interest income ratio..

Ha: Inflation has a negative and significant effect on non-interest income ratio.

1 .5 Significance of the Study

The main contribution of this paper is to empirically investigate the determinants of banks non-interest income diversification decision by giving special attention on the effects of bank specific versus macro economic variables on income diversification decision. It also gives a better insight to different stakeholders like bank managers, employees, regulators and shareholders about the factors that have different influences on banks non-interest income diversification decision. We also investigate whether

a) There are systematic differences in the motivations of income diversification between large and small banks.

b) There is a differential effect of several macro economic factors on banks income diversification decision.

 This study provide bank managers and employees with an understanding of the factors affecting banks income diversification towards non-interest income , which also aid them in formulating strategy for dealing with such factors in order to improve their income diversification position.

 This study also assist shareholders to increase their knowledge of the factors affecting non-interest income diversification, which will help them in understanding the nature of the banks diversification strategy whether it is focused or diversified since diversification affects the value of the bank.

 This study provide policy makers and regulators with an understanding of the factors affecting income diversification towards non-interest income, which will help them in policy making and regulating commercial banks activities engaging in non-traditional activities.

 The study also help others researchers in academic and other disciplines as relevant literature, insights and understanding of non-interest income diversification dimensions with in Ethiopia's banking industry.

1.6 Scope of the study

The conceptual framework of this study is to examine the factors affecting non-interest income diversification decision of commercial banks in Ethiopia. Whereas, the geographical scope of this study is to analyze data for eleven selected commercial banks in Ethiopia that were in operation between 2002/03 to 2016/17 financial years.

1.7 Limitation of the study:

In this study, the researcher considers only fifteen fiscal years data i.e. from 2002/03 to 2016/17 for analyzing the determinants of income diversification decision of the following eleven commercial banks. This includes Commercial Bank of Ethiopia, Awash Bank S.c, Bank of Abyssinia, Wegagen Bank S.c, United Bank S.c, Lion International Bank S.C, Nib International

Bank S.C, Zemen Bank S.C, Cooperative Bank of Oromia, Oromia International Bank S.C and Dashen Bank S.C. One of the limitations of this study is that of it did not include very recent data of the year 2017/18 due to unavailability of data. In addition, since it is not feasible to incorporate all factors affecting non-interest income diversification decision of commercial banks in one study, only six banks specific and two macro economic factors are included in this study.

1.8 Organization of the Study

The paper has divided in to five major chapters. The first chapter includes the background of study, statement of the problem, research objectives, research hypothesis, significance of the study, and the scope and limitation of the study. The second chapter provides a review of the related literatures. The third chapter presents research design and methodology of data analysis. The fourth chapter provides analysis of collected data and the last chapter gives the summary of finding, conclusion and discusses the recommendations drawn from findings of the data collected and analyzed

CHAPTER TWO

LITERATURE REVIEW

The purpose of this chapter is to review the literature on income diversification. The chapter is organized as follows: first provides history on development of commercial banks; then reviews of theoretical and empirical literatures on the determinant of commercial banks income diversification, the next section explains and identifies research gap, gives adopted research conceptual framework and the final section Summarizes the chapter.

2.1 History of the banking sector development in Ethiopia

The National bank of Ethiopia shows that modern banking in Ethiopia starts from the establishment of bank of Abyssinia in the year of 2005 (NBE, 2010). Bank of Abyssinia was established under a fifty-year franchise agreement with the National bank of Egypt, and then which the British owned. To aggravate its access in the country the bank had widen its branch operation in Dire dawa, Gore and Dessie. It had also agency and transit office in Gambella and at the port of Djibouti respectively. After its formal liquidation on August 29, 1931, the Bank of Ethiopia replaced the bank of Abyssinia. As per NBE, 2010 Bank of Ethiopia, this was also known as Banque National Ethiopienne, was a national bank and one of the first indigenous banks in Africa. The bank of Ethiopia operated until 1935 and then stops its operation due to Italian invasion. During the five years of the Italian invasion (1936-41), many branches of the Italian Banks like Banco d'italia, Banco de-Roma, and Banco Di-Napoli and Banco National del lavoro were operated in the major towns of Ethiopia. After defeating of Italians, the State Bank of Ethiopia was established on November 30, 1943 with a capital of one million Maria Theresa dollars. In line with the Monetary and Banking Law of 1963 the State Bank of Ethiopia that had provide service as both a central and a commercial bank was dissolved and split into the National Bank of Ethiopia and Commercial Bank of Ethiopia Share Company. Accordingly, the central banking functions and the commercial banking activities were given to the National Bank of Ethiopia and the Commercial Bank of Ethiopia Share Company respectively.

In addition, according to NBE (2010), due to removal of government in 1974, and the command economic system, which had designed in the country, the Commercial Bank of Ethiopia S.C. and

other banks and financial institutions were nationalized on January 1, 1975. The nationalized banks were re-organized as follows. There is one commercial bank i.e. the Commercial Bank of Ethiopia; two specialized banks- the Agricultural and Industrial Bank (AIB), renamed as the Development Bank of Ethiopia (DBE) and a Housing and Savings Bank (HSB) previously named as the Construction and Business Bank (CBB) and now merged with commercial bank of Ethiopia. In addition to the above banks there is also one insurance company, the Ethiopian Insurance Corporation (EIC) were formed. During the period of state socialism (1974-1991), Ethiopia's financial institutions were empowered with executing the national economic plan; state enterprises received bank finance in accordance with the plan's priorities. This system based on the template of the Soviet Union, saw little need to establish the tools and techniques of financial systems (NBE, 2008). Following the change of Government in 1991 and the change of economic policy directions, financial institutions were re-organized to operate towards a market oriented policy framework. Proclamation No. 83/1994 that had allowed the establishment of private banks has marked the beginning of new era in the Ethiopian banking sector development. Commercial Banks both public and private are currently operational in line with Banking Proclamation No. 592/2008.

Following the establishment of the banking legislations in the country in the 1990s, a number of private banks have been established. For example, now, in the 2016/17 fiscal year the total number of banks already operational in the country is eighteen. Of these banks, sixteen are private and the other two are government owned.

The Ethiopian commercial banking industry has changed dramatically over the past twenty-five years following the financial institution liberalization, and these changes have been result in a dramatic change in banking activities. One notable change is in the composition of bank businesses and product lines toward non-interest income diversification activities. This shift stems from a more competitive market environment in which banks are actively seeking strategies to cut costs and enhance revenue. Indeed, widespread deregulations on non-traditional banking activities accompanied by technological development have reshaped the profit structure of several commercial banks. There now, exist more efficient means of production of financial information and better techniques for assessing and pricing risks, which have shifted firms' financial demands from traditional bank loans to non-bank funding sources such as corporate

bonds. At the same time, there have been changes in the structure of financial savings, with household portfolios moving away from bank deposits towards more diverse non-bank and capital market-related products (Davis and Tuori 2000). Under increased competition and with the increased demand for diverse financial products, commercial banks have been increasingly diversifying their financial services as a means of maintaining profitability by realizing scope of economies.

2.2 Theoretical literature review

2.2.1 What is income diversification

Income diversification generally by definition refers to having a heterogeneous type of income that is earned through many different activities, broken down into two primary components such as interest income and non-interest income like fiduciary income, service charges, trading revenue, and fees and other income (Kwast, 1989).

In the last few years, several banks all over the world have diversified their revenue by providing or offering nontraditional banking activities. Off balance sheet (OBS) activities have been expanding at increasing rate (Clark and Siems 2002; Lozano-vivas and Pasiouras 2010). It finds that non-interest income has contributed over 40% of total operating income in the U.S commercial banking industry since the early 1990s (Deyoung and Rice 2004). Most of the present literature studies on income diversification in the banking industry give more emphasis on the link between diversification and profitability of banks or the effect of bank income diversification on risk behavior (Stiroh 2004). This clearly reflects that banking income stability and their risk reduction capacity are the major interest of regulators and supervisors especially in the times of financial transformation. However, not only is there any consensus thus far as to whether income diversification will improve banks profitability or reduce the risk, but there is lack of systematic understanding of why noninterest income varies across banks (Deyoung and Rice 2004). Several studies gives evidence that diversification mitigate or reduce firms risk and improve financial performance (Vennet 2002 and Calmes and Theoret 2010, Elsas, Hackethal and Holzhauser 2010; Sanya and Wolfe 2011). Other studies support the opposite conclusion (Demsetz and Strahan 1997; Berger, Hasan and Zhou 2010).

Banks diversify their income sources if the benefits of diversification outweigh its cost (Campa and Kedia (2002). In this view, motivation for multidisciplinary operations could be endogenous in the banking industry (Calmes and Theoret 2010).Banks may introduce new businesses or products before having authorization, which later promotes deregulation. In the process of diversification, some banks develop in to universal banking business with low-unit –cost of marketing and production techniques while other may focus in strengthening person-to-person relationship with certain types of customer. This could result in the difference in the magnitude of diversification. Given its changing operating environment, Ethiopia provides a useful natural experiment to investigate this issue where regulatory changes were introduced around 1991 in the banking industry allowing banks to move into non-traditional business activities.

2.2.2 Diversification theory in relation with non-interest income

The concept of income diversifications follows the concepts of portfolio theory which states that individuals can reduce firm specific risk by diversifying their revenue sources. Harry Markowitz first founded modern Portfolio diversification theory in 1952 and the predecessor named the theory "portfolio theory". The theory was developed based on the assumptions that all investors are risk-averse and all investor are in business to maximize their expected returns. In 1970, William Sharpe reformulates the portfolio theory by adding up an assumption on the asset-pricing model and the additional assumption proved useful in assessing investors' exposure.

Portfolio is a term used to refer to a different combination of assets, options and securities that the investors have stake on. According to (Encyclopedia of finance, 2006) diversification is a strategy used by investors and management by investing in different assets of different nature rather than concentration on single asset .Diversification yields benefits when unrelated assets are combined in a portfolio, this refers to asset and securities that are not perfectly positively correlated.

The analysis of income diversification become difficult when applying modern portfolio theory to banks .Because, in addition to allocating resources among alternative assets, financial institution requires explicit inclusion of the features of their liabilities in the analysis (Elton and Gruber 1997). It can be believed that a diversified bank tries to increase its tendency to risk and hides their risk return tradeoff (Deyoung and Rice 2004; Stiroh 2004; Stiroh 2006; Stiroh and Rumble 2006; Leptit et al 2008; Nurullah and Staikouras 2008). From the perspective of

strategic management literature, behavioral theory and agency theory assumes that corporate diversification could be a value reduction decision by self-interest management, which produces a diversification discount in financial conglomerates (Jensen and Mackling 1976; Fox and Hamilton 1994; Leaven and Levine 2007; Porter and Xu 2009).

According to (De young, 2009), previously banks have diversified from offering traditional services only, but recently they moved in to non-traditional banking services. In addition, the author stated that diversification into non-interest income generating activities attract with it unsystematic risk arising of non-interest income generators.

2.2.3 Traditional and non-traditional banking activities

As per De young and Tara, (2004) in their article How do banks create money? Put out 3-6-3 rule, which shows that banks paid a 3 percent rate of interest on deposits, collect 6 percent rate of interest on loans, and then headed to the golf course at 3 o'clock. (Roland and Chanelle, 2005) pointed out that the function of traditional banks has focused on the collection of net interest income through two core bank activities; namely, the collection of deposits on which banks pay interest and the granting of loans for which they generate interest income.

Similarly,(Anita, et al, 2010) found that banks are continually pursuing in improving their profitability; one strategy to increase income is to diversify away from traditional sources of revenue like loan making and toward activities that generate non-interest income like service charges, trading revenue, and other types of non-interest income. As per (Jones and Wayne,2014) who argued that banks are continually shifting from net interest income into a multiple source of income called noninterest income which can either instigate financial stability or financial instability depending on the way the source is handled.

2.2.4 Overview of non-interest income

According to (Meier, 2011), non-interest income or fee income can be defined as the earnings of the bank that are not directly related to interest generating activities, which includes service charges on deposit accounts, fiduciary income, and servicing fees. As per (Peter and Sylvia, 2010) non-interest income can be defined as the sources of income other than revenues from loans and investments.

In addition (Barbara, Philip and Claudia, 2006) explained that non-interest income is income generated through fee income, commissions and trading income and this income has become significant due to increased emphasis on this source of income in recent years. (Letitia, et al, 2008) also defined net non-interest income as the difference between non-interest income and non-interest expenses and net operating income is the sum of net interest income and non-interest income.

Generally, non- interest income relate to bank and creditor income derived primarily from fees. Examples of non-interest income include deposit and transaction fees, insufficient funds (ISF) fees, trading fees, monthly account service charges; check and deposit slip fees, among others. Institutions charge fees that provide non- interest income as a way of generating revenue and ensuring liquidity in the event of increased default rates. Non-interest income makes up a significant portion of most banks revenue (Stiroh, 2004).

2.2.4.1 Components of Non -Interest Income

According to (Brunnermeier, et al, 2010) non-interest income components have been categorized into sub-groups namely: trading and securitization fees, investment banking and advisory fees, brokerage commissions, venture capital, and fiduciary income, and gains on non-hedging derivatives. According to (Couto, 2002) the composition of non-interest income also includes activities such as income from trading and securitization, investment banking and advisory fees, brokerage commissions, venture capital, and fiduciary income, and gains on non-hedging derivatives.

As per (Kohler, 2013), who shows that non-interest income composition differs among banks in that some banks generating almost all of their operating income entirely from non-interest income activities, while other banks depend out entirely on net-interest income. This means that the composition of non-interest income is rather heterogeneous and it differs among banks, regions and countries. In addition, (Stiroh, 2002), grouped non-interest income into four primary sub categories – fiduciary income, service charges, trading revenue, and fees and other income.

As per (Tapper, 2010) who also examined noninterest income components for Jamaican banks and concluded by sub dividing non-interest income into service charges, transaction fees and

commissions, dividends and trading profits on securities, foreign exchange gains and losses and other income.

2.2.5 Major risks involved to Commercial banks:

2.2.5.1 Credit risk

As per the bank for international settlements (BIS), credit risk is described as the probability that a bank borrower or debtor will fail to satisfy its obligations in line with the agreed terms. Credit risk is most likely initiated by loans, acceptances, interbank transaction, trade financing, foreign exchange transactions, financial futures, swaps, bonds, equities, options, and in the extension of commitments and guarantees and the settlement of transactions. In simple words, if person X borrows loan from a bank and is becomes default to repay the loan because of insufficient income, loss in business, death, unwillingness or any other reasons , the bank faces credit risk.

Hence, to reduce the credit risk on the banks end, the interest rate will be higher for borrowers if they are linked with higher credit risk. Factors such as unsteady income, low credit score, employment type, collateral assets and others affect the level of credit risk associated with a borrower.

2.2.5.2 Market risk

According to Mckinsy market risk is defined as the potential risk of losses in the banks trading book due to changes in equity prices, interest rates, credit spreads, and foreign-exchange rates, commodity prices, and other factors values are set in a public market. Bank for international settlements (BIS) defines market risk as the risk of losses in on-or off balance sheet positions that results from fluctuation in market prices.

Market risk can best be explained by classifying it in to four categories depending on the potential cause of the risk:

a) Interest rate risk:

It refers to the potential risk of losses due to fluctuations in interest rate. In other words, the group’s operations are subject to the risk of interest rate fluctuations to the extent that interest

earning assets and interest bearing liabilities mature or reprice at different times or in differing amounts.

b) Currency risk:

It is the risks of losses exist due to fluctuations in international currency exchange rates. In other words, the company is exposed to currency risk through transactions in foreign currencies. It means that the companies' transactional exposures give rise to foreign currency gains and losses that are recognized in profit or loss.

2.2.5.3 Operational risk

As per the bank for international settlements (BIS), operational risk can be defined as the potential risk of loss resulting from inadequate or failed internal processes, people and systems or from external factors. Operational risk is most likely occurring in banks due to human errors or mistakes. Operational risk may be due to incorrect information filled in during clearing a check or other financial information leaked due to system failure.

Operational risk can be classified into three categories for a better understanding.

√ Human risk: refers to the potential risk of losses due to a human error, done intentionally or unconsciously.

√ System risk: is the potential risk of losses due to system failures or programming errors.

√ processes risk: it is also the potential risk of losses due to improper information processing, leaking or hacking of information and inaccuracy of data processing.

2.2.5.4 Liquidity risk

According to investopedia liquidity risk defined as the risk arises from the lack of marketability of an investment that cannot be easily bought or sold quickly enough to control or reduce a loss. In other words, liquidity risk is the risk that makes a bank disable from conducting their day-to-day cash transactions. For example, person X going to a bank to withdraw from his/her account and the bank saying that it does not have cash temporarily.

2.2.5.5 Reputational risk

According to the financial times, Lexicon reputation risk is defined as the possible risk of losses of the organizations reputational capital. The Federal Reserve board in the US defines reputational risk as the potential loss in reputational capital due to either real or perceived losses in reputational capital. Just like any other organization, a bank subject to reputational risk that may be caused by banks activities, rumors about the bank, conscious or unconscious non-compliance with rules and regulations, data manipulation, bad customer service and decisions taken by banks during critical conditions.

2.2.5.6 Business risk

As per investopedia, business risk is defined as the probability that a company will have lower than planned profits, or that it will face a loss rather than a profit. In the case of a bank, business risk is the risk linked with the failure of banks long-term strategy, anticipated forecasts of revenue and number of other things related to profitability. To be minimized, business risk requires flexibility and adaptability to market conditions. Long-term strategies are good for banks but they should consider change. Therefore, long-term strategies must have backup plans to reduce business risk.

2.3 Empirical literature review

2.3.1 Advantage of non-interest income diversification

Income diversification is a widely used concept by commercial banks to minimize the volatility or fluctuation of their earnings (Demsetz and Strahan 1997). Considering the significance or importance of income diversification for banking sector; the relationship between income diversification and profitability or performance has been empirically modeled or studied in many countries throughout the world, but mixed results have been found.

Income diversification has been appear to have either a positive or negative effect on bank performance, Efficiency, Risk, Risk return tradeoff, bank capital prices and bank value (Liang and Rhoades 1991; Demsetz and Strahan 1997). Several Studies seems to give emphasis on the one-way deal- the effect of income diversification on banks profitability (Berger, Hasan, and Zhou 2010). Little emphasis has been given to the relationship between non-interest activities

and banks financial performance (Busch and Kick 2009). Few empirical investigations describe why non-interest income varies between different banks or what factors contribute to its increase.

Moreover, various other factors that affect income diversification as a driving force are highlighted in empirical research. Financial institutions provide a wide range of financial products and services to gain potential diversification benefits (Stiroh and Rumble 2006). The major advantages associated with income diversification includes boosting profitability, mitigating risk, and achieving economy of scale (Landi, Venturelli, and Berengario 2001; Deyoung and Rice 2004; Calmes and Theoret 2010; Lozano-Vivas and Pasiouras 2010). As effect, Size, Risks and Profitability are potentially leading factors for diversification. The above advocators about the benefits of income diversification particularly address the significance of income diversification from the following perspective.

2.3.1.1 Increasing banks income stability

As per Chiorazzo et al. (2008) who studied about the impact of income diversification on performance of Italian banks and he finds that risk adjusted return of banks increases with the increase in income diversification through enhancing their incomes stability throughout the given period of time. In addition, they further show that income diversification significantly improves the risk adjusted return for the large bank. Income diversification increases the risk adjusted return for the large bank but the benefits of non-interest income reduces as the size of the bank become larger.

Similarly, Kohler, 2013 founds that diversification ensures a healthy income structure and diversified bank are not easily affected by economic shocks or economic instability because banks should not immensely depend on one income stream. Furthermore (Kohler, 2013,p.17) indicates that the impact of non-interest income on risk significantly depends on the activities used to generate non-interest income with retail-oriented activities being significantly less risky than investment-oriented activities such as those pertaining to capital markets activities.

2.3.1.2 Risk reduction

According to Stiroh (2004) who shows that banks in US are getting benefits of income diversification in the form of reduced risk through shifting their income generating activities from interest income to non-interest income. (Leaven and Levine, 2009) diversification helps to

reduce unsystematic risk which is the risk associated inherently with the asset or securities itself, however the benefits and the extent on which diversification strategy can apply is limited to its inability to curb or reduce systematic risk (macro-economic risk).

Similarly, (Gorener and Choi, 2013) finds out that income diversification into non-interest income is only associated with increased systematic risk, however the extent to generalize the riskiness of the non-interest income is limited at best since there is no empirical evidence to point out the relationship between non-interest income to other forms of risk such as credit risk, interest rate risk or idiosyncratic risk. As per (Stiroh, 2001) who also concluded that diversification into non-interest income results in the banks shifting away from traditional banking activities as a result this can reduces credit and interest risk levels of the bank. The author also concluded that diversification into non-interest income can shift banks' income mix toward fee based activities which in turn increases the portfolio diversification advantages through the integration of products and services with different correlation.

2.3.1.3 Improve banks profitability

Lee, Hsieh, and Yang (2014) show the impact of income diversification on 29 Asia Pacific countries. As per their findings, income diversification positively affects the bank performance in bank-based countries. In addition, Craigwell and Maxwell (2006) study the determinants of non-interest income diversification and its effect on financial performance of banks in Barbados between the periods of 1985-2001. Their results indicate that there is a positive effect of non-interest income diversification on the financial performance or profitability of banks with more non-interest income weight have more profits but it also aggravates the volatility of operating earnings and or income.

According to Sheng and Wang, 2007, who studies the effect of non-interest income diversification on commercial banks in China and concluded that the increasing demand for financial services has brought an increase in noninterest income which has resulted in to good performance for commercial banks in China. According to (Jahan, 2012), who also examined the merits allied to shareholders depends on non-interest income and concluded that investment in banks with large exposure of non-interest income generating activities is more benefit shareholders since portfolio diversification is enhanced with regard to non-interest income .

2.3.1.4 Economies of scale and Economies of scope

According to Meier, 2011 there are many synergies formed by merging similar activities. Larger banks with significant networks can gain benefit from economies of scope and scale by broadening their activities into other services. Secondly, expanding or broadening the number of services a bank offers enables customers to execute all of their financial needs in one central location. Commercial banks then accumulate more information through a variety of activities, which enhances traditional intermediation activities. In terms of size, large banks are more diversified than small ones, which is clearly reflects that economy of scale is one of the major driving forces for non-interest income diversification (Demsetz and Strahan 1997).

2.3.2 Dis Advantage of non-interest income diversification

According to Demirguc-Kunt and Huizinga, (2009, p.29) using data for 1334 banks in 101 countries over the financial crisis in 2007 period, finds that traditional banks with a heavy reliance on interest-income generating and deposit funding are safer than banks that have high non-interest income generation activities and funding through the wholesale capital market. In conclusion, Demirguc-Kunt and Huizinga, (2009) also finds that greater reliance on non-deposit funding and non-interest income is very risky banking strategy.

In addition to the above literature, Delpachitra and Lester (2013) explored the impact of non-interest income diversification on financial performance of Australian banks and found that noninterest income diversification negatively affect the profitability or financial performance of commercial banks. This implies that, over reliance on non-interest income did not increase the profitability and the risk of default. In addition to that, Turkmen and Yigit (2012) reported the negative impact of sectoral and geographic diversification on performance measures of banks operating in Turkey.

As per De Jonghe (2011) who also documents that interest income is less risky than all other revenue streams. In addition, he also pointed out that different components of non-interest income namely trading income, fees and commissions and other operating income does not differ significantly from one another. In conclusion, he finds that profitable banks are the one that focuses more on lending activities or traditional activities and these banks are less vulnerable to systematic risk than diversified banks.

According to (Staikouras, et al,2000,Stiroh and Rumble, 2006) also concluded that reliance on non-interest income as a diversification strategy for financial holding companies (FHCs) are more than offset by increased exposure to wards non-interest generating activities, which are more volatile but not more profitable than lending activities. Similarly(Couto, 2002) who also pointed out that the more the income of a bank comes from sustainable core-business sources, the more reliable and stable are its earnings. On the same note, (Couto, 2002) also finds that reliance on non-recurring income is a sign of earnings weakness and may mean that the bank is engaging in risky practices in an attempt to boost earnings. The author also stated that income arising from non-traditional banking activities is regarded as beneficial if the revenue earned exceeds operating expenses, provisions and contributions to tax expenses. As per (Brunnermeier,et al., 2010) who also pointed out that banks with higher non-interest income composition in relation to total operating income have higher systemic risk as compared to banks that rely on net interest income. The author used covariance proxy as measure for systematic risk and establishes a relationship of one standard deviation from net-interest income is followed by 5.2% coefficient variance change in systematic risk.

According to Williams and Rajaguru, 2007 who revealed that banks with management that is risk averse turn to shun from diversification into non-interest activities because of the unstableness characteristics of that income stream process. Similarly (Gorener and Choi, 2013) argued that diversification into non-interest income is like shooting in the dark because the income stream is volatile in nature and difficult to monitor. The author also regarded interest income as a transparent source of revenue with an example on how changes in capital structure initiated by credit losses are easily traceable to the source: loan delinquency, loan classification, loan provisioning, and loan charge-off (Gorener and Choi, 2013, p.125).

2.3.3 Factors affecting non-interest income diversification

From the existing available literature, there appears to be a general acceptance that financial deregulation, advanced technologies, and consolidation can improve non-interest income diversification (Esho, Kofman, and Sharpe 2005; Leptit et al. 2008; Calmes and Theoret 2010). Calomiris (1998) proposes four pillars of banking philosophy on income diversification:

1) Having a competitive position with both domestic and international competitors, with a special emphasis on customer convenience and expense control;

2) Improving capabilities on the supply of diversified products;

3) Actively participating in financial markets to share market generating profits and leverage capital; and

4) Perfectly anticipating customers need that banks best meet.

By adopting from Calomiris (1998), we classify the determinants of income diversification in to two categories, namely bank specific characteristics and broader macro-economic factors. The non-interest income diversification is measured by non-interest income ratio (Xiangnang Meng, Tony Cavoli and Xin Deng (2018)).

NIIR=$\frac{Non-interest\ income}{Net\ operating\ income}$, where NIIR= Non-interest income ratio

Net operating income= Net-interest income+ Non-interest income

From the above equation, we can show the effects of two dimensions of explanatory variables, bank specific variables and macro economic variables on non-interest income diversification decision of banks.

2.3.3.1 Bank Specific factor

Bank specific factors are those factors that are within the discretion or control of commercial banks and can affect the level of commercial banks non-interest income diversification. Bank specific factors include bank size, Net interest margin, Capital adequacy ratio, lending leverage, Efficiency and Insolvency risk.

I) Bank Size

The size of bank is one of the most important factors that can affect the income diversification towards non-interest income. In the literature, a positive impact of size on income diversification is usually expected. Large banks tend to be more advantageous from diversification due to their

large branching networks, better client relationship and credibility. A positive relationship between size and income diversification is expected. Joon-Ho Hahm (2008), by using a dataset of 662 relatively large commercial banks in 29 OECD countries from 1992 to 2006, find that banks with relatively large asset sizes, tend to diversify their revenue sources more aggressively by increasing their non-interest income shares.

De Young and Hunter (2003) and De Young et al. (2004) also argue that bank size has a positive relationship with the degree of non-interest income expansion. According to them, relatively large banks make use of economies of scale in order to dominate the production of consumer loans. Despite their low unit costs, however, the market for these products is highly competitive, and large banks must supplement their revenue stream with non-interest income. Smaller banks are able to earn higher interest margins despite their relatively high unit costs, because they can charge higher interest rates due to higher switching costs on the part of borrowers and pay lower interest rates due to their relatively loyal customer bases. Therefore, non-interest income is less important for smaller banks than for larger banks.

As per Meier (2011) stated that bank size is one of the significant determinants of non-interest income diversification. In addition, Demirguc-Kunt and Huizinga, (2009) also stated that large and fast-growing banks tend to have higher non-interest income and non-deposit funding composition. Similarly, Deyoung (2009) noted that small banks struggle to stand with the technological advancement that will be happening in the financial sector, henceforth this restrict the capacity for small banks to generate large amounts of noninterest income.

According to (Bonfim and Dai, 2010) large banks have a great advantage when borrowing loans from credit line because of size collateral and because of these relationship large banks, grants more loan transaction than small banks. In the process of granting loans, non-interest income is generated inevitably through mortgage servicing charges and mortgage penalty charges. Similarly, Chunhachinda and Li (2012) also found that a positive correlation exist between bank size and non-interest income diversification, the authors also examined components of non-interest income and concluded that income arising from fees and commissions is largely dependable on the volumes of transactions and the size of the bank. In the same manner (Stiroh, 2002) pointed out that large banks can generate disproportionately more non-interest income from securitizing and servicing mortgage loan.

II) Net interest margin

The other factor is interest margin, which reflects the profitability of intermediary business. Through combining interest income and noninterest income, William and Rajaguru (2007) explains that the increase in noninterest income is used to compensate a decline in the net interest margin in Australian banking industry, concluding that the up and down of the net interest margin may affect banks expansion to non-traditional business activities. The same relationship is also found in European banks (Landi, Venturelli, and Berengario 2001, Smith, Staikouras, and Wood 2004). As per Albertazzi and Gambacorta (2006) as cited by Uzhegova (2010) also noted that the decline in interest margins, has forced banks to look in to alternative sources of revenues, leading to diversification in to trading activities, other services and non-traditional financial activities.

Rogers and Slinky (1999) find that core deposits and net-interest margins are both negatively correlated with income diversification towards non-interest income, while bank size is positively correlated with income diversification towards non-interest income. Banks with fewer core deposits and lower net-interest margins earn less revenue from traditional interest income sources, so they must move into non-traditional banking in order to remain profitable. This is because banks with low deposit level cannot disburse enough amount of loan to generate traditional source of interest income and therefore they look non-traditional source of income and this in turn increases their income diversification towards non-interest income.

In addition, Joon-HoHahm (2008), by using a dataset of 662 relatively large commercial banks in 29 OECD countries from 1992 to 2006, find that banks with low net interest margins tends to diversify their revenue sources more aggressively by increasing their non-interest income shares. Leptit et al. (2008), in the case of 602 European banks during the period (1996-2002), also find that there is a negative relationship between interest margin and non-interest income. The authors assume that banks use loans as a loss leader to expand their non-interest income through cross selling. Therefore, from the above literature we can understand that banks with high net interest margin would have low level of income diversification than commercial banks with low level of net interest margin.

According to Busch and Kick (2009), regarding diversification theory stated that banks financial performance could only be improved when all income components are negatively or weakly correlated. Similarly, as per Smith and Wood, (2003) who performed a study on the bank portfolio diversification for European banks and he concludes that a negative correlation exists between interest and non-interest income in several countries, although in varying degrees; non-interest income seems to stabilize total operating income, with the partial exception of two European countries. Therefore, the expansion of the bank's range of activities reduces the variability of its earnings stream (Smith and Wood, 2003).

In contrast, (Chiorazzo et al.2008) assured that there is a positive correlation exist between two income streams and diversification into non-interest income activity proved to reduce the risk adjusted performance measures for Italian banks between (1993-2003).

III) Capital Adequacy ratio

The other factor is the capital position or capital adequacy. The difference between total assets and total liabilities is called capital. It is the amount of own fund available to support the bank's business and act as a buffer in case of adverse situation. It shows the ability of the firm that liability could be privileged. Capital adequacy is amount of capital required by the banks to enable them to withstand the risks such as credit, market and operational risks they are subject to in order to absorb the potential loses and protect the bank's debtors. Capital adequacy is a measure of the overall financial strength of a bank. It is vital for maintaining soundness of the banking system since it acts as a cushion against panic or bank run or uncertainties (Keovongvichith, 2012). The adequacy of capital is measured based on the ratio of total equity capital to total assets (capital/asset) and it also affects income diversification towards non-interest income.

However, there is still debate about the effect of capital adequacy on non-traditional income diversification decision of commercial banks. As Calomiris (1998) explains, banks expand non-banking business to leverage their capital. However, evidence from European banks does not support this argument. The capital adequacy is measured by equity capital to asset ratio and positively associated with non-interest income, which reflects that banks do not expand their

businesses to save capital; on the other hand; more capital is necessary by the business for expansion (Landi, Venturelli, and Berengario 2001).

The connection between capital and diversification should give some implication on motivation for banks to expand in to non-traditional business. More specifically, a negative relationship between capital ratio and non-interest income indicates that undercapitalized banks tends to expand product lines that require less capital (Landi, Venturelli, and Berengario 2001). A positive sign should imply that non-traditional activities still requires large amount of capital in order to maintain or develop the business. Due to regulatory control, banks with large capital are more capable of mitigating shocks from the financial market, and thus are more likely to obtain a license to engage in a non-banking business, especially in insurance companies. Due to the tight regulation on cross-sectoral business operations, a positive relationship is expected in Ethiopia's banking industry.

IV) Lending leverage

It is measured as loan to deposit ratio. A high loan to deposit ratio indicates that a high leverage in lending, and banks might not cover the unforeseen fund requirements. Through diversification, banks are able to finance less liquid assets with liquid liabilities (Cerasi and Daltung 2000). Deyoung and Yom (2008) shows that interest rate, liquidity and credit risk can be managed through off-balance-sheet activities by risk transfer instruments. Thus, loan to deposit ratio is expected to have a positive relationship between non-interest incomes ratio.

V) Efficiency ratio

The banks cost of production or efficiency can be measured as the ratio of operating expense to total asset. More inputs, which are linked with higher costs such as personal training and development, could enhance banking services and therefore increase non-interest income (Deyoung and Roland 2001; Leptit et al. 2008). In addition to that, cost of production is also used as a measure of efficiency. Since banks do not hold capital against off-balance-sheet activities, inefficient banks may charge higher interest and/ or fees and commissions to compensate the cost of production and to leverage capital (Sangeeta and shubpreet 2009). Therefore, a higher cost of production, try to force banks to generate more non-interest income.

According to (Glaser and Muller, 2010) pointed out that in order of banks to improve operating efficiency one useful tool is to scale down operation arising from non-traditional activities since these activities compares mostly of fixed costs. (Demirguc-Kunt and Huizinga, 2009) identified that a positive correlation between fee generating activities and operational costs, the research underlined that an increase in non-interest income likewise leads to higher fee income and banking overheads.

VI) Insolvency risk:

Banks, which are selected as monitors for depositors, should generate risky assets in to safe and liquid claims (Hughes and Mester 1998). The capacity of the bank to mitigate risk is an important factor to individual banks and regulators. The banking literature tries to assume that risk and diversification go in the same direction. To show how the risk levels affect the components of banking income, we include Z-score as one of the independent factors. It is calculated as follows:

$$\text{Z-score}=\frac{ROA+CAR}{sdROA}$$

Where, ROA reflects return on asset

CAR also reflects capital asset ratio and sdROA is a measure of standard deviation of return on asset.

Z-score is used to measure insolvency risk, by measuring the amount of standard deviation that profit declines to make a bank insolvent (Stiroh and Rumble 2006). Lower value of Z-score reflects higher probability of insolvency and a negative relationship is predicted primarily due to volatility in banks profitability may force banks to tap non-interest income for potential profits. In the model, a log transformed Z-score is used to minimize the distance of the magnitude between the Z-score and other explanatory variables.

2.3.3.2 The Macro economic factors:

Although the relationship between economic development and bank stability is well existed in the literature, determinants of banks non-interest income diversification strategies are not clearly established. Banks strategic decision to wards non-traditional activities may arise from the

changes in financial systems and regulations and the macroeconomic environment. Therefore, in addition to the bank level variables, factors that describe features of the financial system should also be discussed. It is clearly reflects that the flexible regulation on non-traditional activities may be the most important factors that enables banks to diversify their revenue sources. However, the focus of this study is to identify the effect of other macro-economic factors in banks non-interestvincome diversification decision in a changing regulatory environment, and it is not easy to capture the regulatory variable with the fast changing regulation. Banks expansion towards non-traditional business is mainly a strategic response to uncertainties in intermediary business (Boot 2003; Elsas, Hackethal, and Holzhauser 2010). The macro-economic factors that affect commercial banks income diversification include the following explanatory variable. These are:

I) Inflation rate

It is measured as annual consumer price index and considered as one of the explanatory variable. Nilsson and Rovelli (2001) find that a weak macroeconomic environment could negatively affect foreign investme-nt and financial innovation. Therefore, higher inflation is expected to have a negative effect on banks income diversification.

II) Real GDP growth rate

It is measured as real GDP growth rate and considered as one of the explanatory variable. Nilsson and Rovelli (2001) also find that a strong macroeconomic environment could positively affect foreign investment and financial innovation. Therefore, higher GDP growth rate is expected to have a positive effect on banks income diversification.

2.4 Variable definitions and measurement

2.4.1 Dependent variable

Non-Interest income ratio:

Income diversification is measured through the non-interest income ratio; it is calculated by dividing noninterest income by net-operating income. The elements of net operating income of banks include net interest income and non-interest income, net interest income includes net

revenue from lending activities whereas non-interest income includes, commission fee, trading revenue and other non-interest income. A fair higher value of non-interest income ratio indicates higher level of income diversification, whereas lower value of non-interest income ratio indicates lower level of income diversification.

2.4.2 Independent variable

2.4.2.1 Non-interest Income diversification and Net interest margin (NIM):

The net interest margin is simply calculated as the difference between the interest that has been earned by the banks on the loans disbursed and the interest that has been paid out by banks on their deposits or liabilities standardized by interest earning assets.

Therefore, NIM=$\frac{Net\ Interst\ Income}{Interest\ earningAsset}$

The Interest earning assets from the perspective of Ethiopian commercial banks include total loans and advances granted by the bank, deposits held with foreign bank, treasury bills purchased from the government of Ethiopia and other investments made by the bank in different securities or financial assets.

From the literature review explained previously, banks with low interest margin tries to diversify their income sources at a rapid rate through increasing their non-interest income components (Joon-HoHahm, 2008). In addition, Leptit et al. (2008), in the case of European banks during the period 1996-2002, also find that there is a negative relationship between interest margin and non-interest income due to the assumption that banks use loans as a loss leader to expand their non-interest income through cross selling.

2.4.2.2 Non-interest Income diversification and Efficiency

According to (Mabwe and Webb, 2010:p39) CR is used to Measures the costs incurred to generate asset or income or of banks. That is how expensive it is for the bank to generate a given level of revenue or asset. The lower CR is the reflection of better the efficiency of the bank. It can be calculated as follows:

$$CR=\frac{\text{Operating Expenses}}{\text{Total Asset}}$$

Where, operating expenses of commercial banks include employee benefit and salaries, provision for doubtful account and general expense.

As per (Glaser and Muller, 2010) argues that in order of banks to enhance operating efficiency one useful way is to scale down operation arising from non-traditional activities since these activities compares mostly of fixed costs. (Demirguc-Kunt and Huizinga, 2009) identified that a positive relationship between noninterest income generating activities and operational costs, the research underlined that an increase in non-interest income likewise leads to higher fee income and banking overheads.

2.4.2.3 Non-interest Income diversification and Lending leverage

It is calculated by loans as a ratio of total deposits in percentage. i.e.

$$LDR=\frac{\text{Total Loan}}{\text{Total Deposit}}$$

In this case, total loans include all loans and advances disbursed by the bank to its customers. Moreover, the total loan is divided by total deposits of the banks to arrive at loan to deposit ratio of the bank.

From the above literature, through income diversification, banks are capable to finance its less liquid assets with liquid liabilities (Cerasi and Daltung 2000). Deyoung and Yom (2008) shows that interest rate, liquidity and credit risk can be managed through off-balance-sheet activities by risk transfer instruments.

2.4.2.4 Non-interest Income diversification and Bank Size:

Bank size can be measured by either the market share of a bank which is estimated by dividing individual banking assets by the total assets of the banking industry or the natural logarithm of individual banking total asset i.e. BS= $\frac{Individual\ banking\ asset}{total\ banking\ asset}$ or ln of individual banking asset.

Theoretically and empirically, (Joon-Ho Hahm 2008), by using a dataset of 662 relatively large commercial banks in 29 OECD countries from 1992 to 2006, find that banks with relatively large asset sizes, tend to diversify their revenue sources more aggressively by increasing their non-interest income shares.

2.4.2.5 Non-interest Income diversification and Insolvency risk:

Banks insolvency risk is measured by the natural logarithm of Z-score and is expected to have a positive relationship with income diversification (Hughes and Mester 1998).

2.4.2.6 Non-interest Income diversification and capital adequacy ratio:

The capital ratio is calculated as the ratio of book value capital to total assets. The relationship between capital and diversification should give some implication on interest for banks to move in to non-traditional business. Particularly, a negative relationship between capital ratio and non-interest income indicates that undercapitalized banks tends to expand product lines that require less capital (Landi, Venturelli and Berengario 2001).

2.4.2.7 Non-interest Income diversification and GDP:

It is determined as real GDP growth rate and founds to be one of the explanatory variables. Nilsson and Rovelli (2001) also find that a strong macroeconomic environment could negatively affect foreign investment and financial innovation. Therefore, higher GDP growth rate is expected to have a positive effect on banks income diversification.

2.4.2.8 Non-interest income diversification and inflation rate:

According to Nilsson and Rovelli (2001), inflation rate, which is measured as annual consumer price index, has a negative effect on income diversification towards non-interest income.

2.5 Summary of literature review

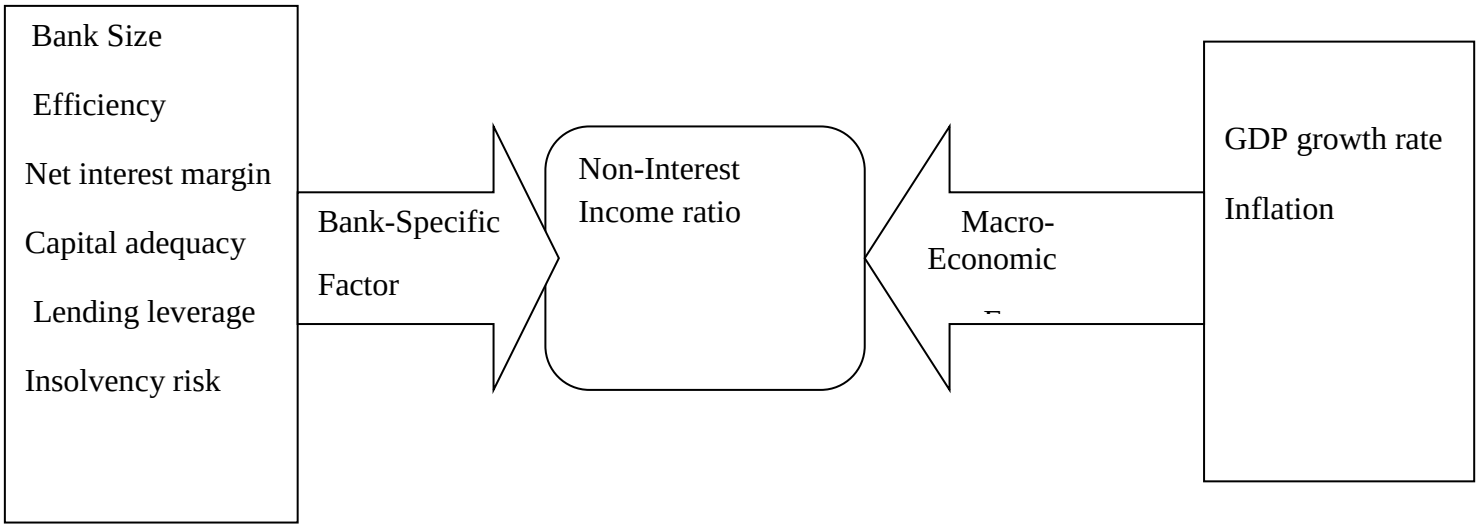
Many empirical studies has been done regarding on determinants of non-interest income diversification. Review of the literature showed that the researches on the determinant of income diversification towards non-interest income had been comprehensively studied in developed countries like USA, Europe and China and in some emerging countries like Pakistan. Besides, in

Ethiopia no more comprehensive studies conducted on the determinants of commercial banks non-interest income diversification. Different scholars using empirical investigation on the determinants of non-interest income diversification resulting in different results as deeply described in the literature reviewed above.

2.6 Conceptual Framework for the Study

From the literature review discussed above, the researcher developed the following conceptual framework to summarize the focus and scope of this study in terms of dependent and independent variables included.

Figure 1: Conceptual Framework



CHAPTER-THREE

RESEARCH DESIGN AND METHODOLOGY

These chapters has outlines a description on how the research has been carried out, data has been collected and procedures undertaken during the study. It has also highlight the research methodology adopted and the rationale for its use including how the information has been collected and analyzed. Aspects such as the research design, sample design, data sources and data collection instruments used are the focus of this chapter, and then followed by model specification and ends with describing Operationalization of study variables.

3.1 Research Design

According to (Rajasekar et al, 2013) a research is defined as a logical and systematic search for new and useful information on a particular topic. Kumar, 2011 defined a research design as a procedural plan that is designed by the researcher in answering the research question validly, objectively, accurately and economically. Using research design, the researcher prepare a ground plan on how to administer the study or research method, on the ways how to collect the information, techniques or methods used to analyze collected data and methods used to communicate the research results or findings. (Teddlie & Tashakkori, 2009) also explained that a research design could be used to integrate both qualitative and quantitative approaches to data gathering, analysis, interpretation, and communication or presentation.

According to Schindler and Cooper (2001) explanatory research, unlike descriptive research go beyond observing and describing the event or condition and tries to examine the reason for the phenomena. Explanatory research is used to explain the causal relationships between dependent and independent variables. As a result, the quantitative data gathering techniques are useful especially when a study needs to measure a cause and effect relationships between pre selected and discrete variables (Addisu, 2011). The major reason for using this method is that of it assists the researcher to explain the reason behind the phenomena of non-interest income diversification decision in Ethiopian commercial banks. In addition, the other advantage of this method is that it goes beyond the description of the phenomena in the banking industry about non-interest income diversification and it allows the researcher to use theory based expectations on how and why variables should be related.

The main objective of this study is to conduct an empirical analysis on important determinants of non-interest income diversification of Ethiopian commercial banks. To accomplish this objective explanatory research design is used in the study. The explanatory type of research design is important to identify and evaluate the causal relationship between variables under study (Marczyk et al, 2005). Therefore, it is an explanatory research explaining the relationship between dependent variable (Non-interest income ratio) with bank specific independent variable (efficiency ratio, capital adequacy, net interest margin, insolvency risk, lending leverage and bank size) and with macro-economic factors (real GDP growth rate and inflation rate).The study also describes the result by comparing with empirical evidence.

3.2 Research approach

When conducting study the researcher has to make a choice between different methods. According to Creswell (2009), there are different methods of dealing with the problem fundamentally, quantitative, qualitative and mix of quantitative and qualitative methods. The quantitative method and quantitative empirical research is often deals with establishing relationship between variables (Theobald et al, 2002). As per Patel and Davidson, (2003), a quantitative research approach means that measurements are done when gathering data. This is then followed by statistical processing and analysis method that is based on collected data. Additionaly, according to Aliaga and Gunderson, (2002) quantitative research method is used to explain phenomena by collecting numerical data that are analyzed using mathematical based methods.

The objective of this study is to generalize the fact found in the sampled Ethiopian commercial banks about the determinants of their non-interest income diversification. This generalization under quantitative method can be obtained through a systematic way of seeking facts and causes of phenomena, focuses on analysis of quantitative data and statistically analyzing to test the stated hypothesis. The researcher collected quantitative data of variables from financial reports of fifteen consecutive years from eleven Ethiopian commercial banks. The research followed a quantitative approach to analyze those phenomena of a company that affect the non-interest income diversification decision, and STATA 11 statistical software package and multiple linear regression model has used to analyze the collected data.

3.3 Data type

Numerical data reported on the sampled commercial banks financial statements are used in this study. The data's are quantitative or numerical and secondary in nature can be best fit to the panel data analysis. According to Brook, (2008) the panel data requires the pooling of observation on a cross section of units over several time periods and gives results that are easily not detectable in pure cross section or pure time series studies.

According to Brook, (2008), panel data set has two basic advantages; first, it can approach a broader range of issue and solve more complex problem than pure time series or pure cross sectional data alone and by organizing the model in appropriate way, the researcher can avoid the impact of certain types of omitted variable bias in the regression result. Second, it is often

explained how the relation-ship between variable changes. Thus, by combining time series and cross sectional data, the researcher can increase the number of degree of freedom, and thus power of test, by collecting information on the dynamic behavior a large number of entities at same time. In addition, Hsiao (2003), explain panel or longitudinal data set is one that follows a given sample of observation over time, and hence provides multiple observations on each individual in the sample.

3.4 Data collection and sampling technique

3.4.1 Data collection

Data collection procedure plays a critical role in a research, as it is the source of most essential information for a study. In addition, the accuracy of the research is entirely based on the precision of the collected data. Data can be classified in to two; primary and secondary data.

Primary data are those data that are original data and are not published. The techniques used to collect primary data are surveying, experiment, questionnaire and interview. Most researchers choose to use primary data due to its credibility as it is based on first hand data sources. On the other hand, secondary data are data that has been published or available to the public in the form of books, articles, journals, e- journals etc. Since secondary data is second hand, data it is less costly and time consuming as compared with primary data.

Since, the objective of this study is to examine the effect of bank specific and macro economic factors affecting non-interest income diversification decision it uses secondary data, which are collected from National bank of Ethiopia published annual reports of eleven Ethiopian commercial banks included in the sample for the period of fifteen years (2002/03-2016/17) and from ministry of finance.

Table 3.4.1 Data sources:

Types of Data	**Sources**
Macro Economics (External) Factors	

Gross Domestic Products (GDP)	Ministry of Finance (MOF)
Inflation rate	Ministry of Finance (MOF)
Bank-Specific(Internal) Factors	
Capital adequacy ratio (CAR)	National Bank of Ethiopia Annual Reports
Lending leverage	National Bank of Ethiopia Annual Reports
Efficiency	National Bank of Ethiopia Annual Reports
Net interest margin	National Bank of Ethiopia Annual Reports
Insolvency risk	National Bank of Ethiopia Annual Reports
Bank size	National Bank of Ethiopia Annual Reports

Source: developed by the researcher

3.4.2 Population and sampling technique

3.4.2.1 Target Population

A population is the total collection of elements about which the researcher wants to make inference. In other word, the collection of all possible observations of particular characteristics of interest is called the population, where as a collection of elements, which represents only a portion of the population called a sample. The target population of this study was all commercial banks operating in Ethiopia and registered by NBE. Currently seventeen commercial banks exist in Ethiopia (as presented in appendix 1).

3.4.2.2 Sampling design and Size:

The sampling technique selected for this research is purposive sampling. Specifically the researcher adopts criterion sampling in which the banks size in terms of its market share is set as

a major selection criterion. To generalize and make inference about the population a large sample size is important and to make that, this study has used eleven commercial banks out of seventeen commercial banks operating currently in Ethiopia. As stated above, eleven commercial banks were included in this study using purposive sampling technique by considering size as a selection criterion. On average, the sampled commercial banks represent more than 75% of market shares of Ethiopian banking industry during the study period

Due to the above selection criteria, the researcher has included Commercial Bank of Ethiopia, Awash Bank S.c, Bank of Abyssinia, Wegagen Bank S.c, United Bank S.c, Lion International Bank S.C, Nib International Bank S.C, Zemen Bank S.C, Cooperative Bank of Oromia, Oromia International Bank S.C and Dashen Bank S.C in the sample to conduct the study.

3.5 Methods of data analysis

To achieve the objective of this study, the researcher collects the needed quantitative data from ministry of finance, National bank of Ethiopia, and annual reports of commercial banks in accordance with the description set in the above table. After collecting the data, it was rearranged and calculated in order to make it complete data for this study. After that, the collected panel data was analyzed using descriptive statistics and multiple linear regression analysis methods. The descriptive statistics include mean, maximum and minimum values and standard deviation, which reflects the general trends of the data from 2002/03 to 2016/17 also used. A multiple linear regression model was used to identify the relative importance of each explanatory variable in explaining the variation of non-interest income ratio in Ethiopian commercial banks. Moreover, the regression analysis was conducted using STATA 11 statistical software package.

3.6 Model specification:

As per William et al., (2008), model development involves specifying relationship between two or more variables, and then extends to the establishment of descriptive or predictive equation. In order to accomplish the objectives of this study, the multiple regression model is used. Panel data involves pooling of observations on a cross section of units over several time periods and gives results that are simply not traceable in pure time series or pure cross section studies (Freeman et al, 1982). The general form of the panel data model can be described as:

$$Y_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it}$$

In this model, Yit represents the dependent variable, which is the banks non-interest income ratio and the set of regressors are represented by X*it* in the equation. The subscripts *i&t* represent cross section and time series dimension respectively. Moreover, ε taken as a constant over time t and specific to the individual cross sectional unit i.

In line with the above model, and on the base of selected variables, the following general multiple regression models is adopted from different studies conducted on this study area.

NIIR=β0+β1BSZ*it*+β2CR*it*+β3NIM*it*+β4LENLEV*it*+β5CAR*it*+β6INSR*it*+B7GDP*it*+B8INFR*it* +ε*it*

Where, NIIR= Non-interest income ratio

β0=Constant term

B1, 2…8 are parameters to be estimated

BSZ=Bank size = Natural logarithms of total asset

CR=Efficiency=Operating expense/Net operating income

NIM =Net interest margin=Net interest income/Interest earning asset

LENLEV=Lending leverage=Loan/Deposit

CAR=Capital adequacy ratio=Capital/Asset

INSR=Insolvency risk=ln-Zsore

GDP = Real GDP growth rate

INFR=Inflation rate=Annual consumer price index

ε=the error component for company i at time t assumed to have mean zero

i= commercial banks =1….11 and

t=the time period covered

3.7 Operationalization of study variables

Table 3.7 Variable notation, Names, Definition and Expected signs:

Notation	Variable names	Definition	Expected signs
NIIR	Non-interest income ratio	Non-interest income/Net-operating income	
INSR	Insolvency Risk	(ROA + Equity/Asset)/sdROA	+
CR	Efficiency	Operating expenses/Total Asset	+
CAR	Capital adequacy ratio	Equity capital/total assets	+
LENLEV	Lending leverage	Loan/deposit	+
BSZ	Bank size	Ln-Banks total asset	+
NIM	Net interest margin	Net int. income/Int. bear. Asset	-
INFR	Inflation rate	Annual consumer price index	-
GDP	Gross domestic product	Real GDP growth rate	+

Source: developed by the researcher

3.8 Conclusion:

Chapter 3 included the research design and methodology adopted to conduct data analysis in chapter four. This study used quantitative secondary data and analyzed by multiple-linear regression method to test the significant effect of bank specific and macro economic factors on non-interest income diversification decision in Ethiopian commercial banks.The next chapter shows in detail about the result of multiple linear regression model, hypothesis testing and diagnostic tests carried out for the collected data.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

INTRODUCTION

The purpose of this chapter is to describe findings and discussion on the results of analysis. The chapter has been organized as follows. The first part presents descriptive analysis on variables of the study; then second section provides the result of the fulfillment of the classical linear regression model (CLRM) assumptions and the third and last section presents the results of regression analysis that includes the main findings of this study.

4.1 Descriptive statistics:

Table 4.1 presents a summary of the descriptive statistics of the dependent variable and independent variables for eleven commercial banks in Ethiopia between 2002/03 to 2016/17 with total observation of 146. The table shows the number of observation, mean, standard deviation, minimum and maximum for dependent variable of non-interest income ratio and independent variable bank size(BS), Efficiency(CR), Lending leverage(LDR), Insolvency risk(LNZSCORE), Capital adequacy ratio(CAR), Real GDP growth rate(GDP) and Inflation rate(INFR). The

following table provides a summary of descriptive statistics about dependent variable and independent variable.

Table 4.1 Descriptive Statistics

```
. xtsum NIIR BSZ NIM CR LENLEV INSR CAR GDP INFR
```

Variable		Mean	Std. Dev.	Min	Max	Observations
NIIR	overall	.5102815	.1427933	.043659	.9245961	N = 146
	between		.1077609	.3813216	.7962732	n = 11
	within		.1095323	.1726189	.7799666	T-bar = 13.2727
BSZ	overall	8.707946	1.433694	4.859812	12.85802	N = 146
	between		1.021212	7.643828	11.33096	n = 11
	within		1.049568	5.92393	10.84679	T-bar = 13.2727
NIM	overall	.0307616	.0098978	.001938	.0559947	N = 146
	between		.0059695	.0158399	.0373518	n = 11
	within		.0083985	.0001755	.0542323	T-bar = 13.2727
CR	overall	.031405	.0106769	.0087189	.0760399	N = 146
	between		.0075019	.0140563	.039415	n = 11
	within		.0079858	.0029602	.06838	T-bar = 13.2727
LENLEV	overall	.6304086	.1636101	.0534914	1.285714	N = 146
	between		.1005765	.4196779	.762346	n = 11
	within		.1331603	.1742823	1.259997	T-bar = 13.2727
INSR	overall	2.527768	.509337	1.388114	3.688084	N = 146
	between		.4639853	1.690775	3.18181	n = 11
	within		.255351	1.890565	3.995773	T-bar = 13.2727
CAR	overall	.1397461	.089138	.0385564	.8682171	N = 146
	between		.0488549	.0581438	.2298013	n = 11
	within		.0760264	-.004465	.7781619	T-bar = 13.2727
GDP	overall	.1007808	.0307456	-.021	.135	N = 146
	between		.0028356	.0986429	.1072308	n = 11
	within		.0306299	-.0195525	.137138	T-bar = 13.2727
INFR	overall	.1482375	.1361652	.0238299	.5524132	N = 146
	between		.0124893	.1238727	.1652995	n = 11
	within		.1357798	.0100067	.5516154	T-bar = 13.2727

Source: STATA 11 Outputs

The study conducted a descriptive statistics analysis by using STATA 11 software in order to provide the reader more understanding about the study variables that are being analyzed. As per Raheman and Naser, (2007) Descriptive statistics is the first step in analyzing average indicators of variables calculated from the financial statements and the standard deviation that reflects how much dispersion occurs from the average value. According to Brooks, (2008) a low standard deviation reflects that the data point tends to be very close to the average value. In contrast, high standard deviation is an indication of the data point that is spread out over a large range of values.

As describes in previous chapter, non-interest income ratio was measured as the ratio of non-interest income to net operating income. Table 4.1 shows means value of 0.51 for non-interest income ratio with standard deviation of 0.142 indicating that on average, commercial banks in Ethiopia has diversify their income sources towards non-interest income by 51% with 14.2% ups and downs for the period covering from year 2002/03 to 2016/17. The minimum and maximum value of non-interest income ratio is that of 0.043 and 0.924 respectively, which reflects that the minimum and maximum level of non-interest income ratio during the sample period was 4.3% and 92.4% respectively.

With respect to size of the bank natural logarithm of total assets were used as a proxy for measurement of the size of Ethiopian commercial banks. As per the above descriptive statistics table, the average value of bank size over the study period were 8.70 with a standard deviation of 1.433. This reflects eleven Ethiopian commercial banks have assets on average of Br 6 billion over the study period with a variation of 1.433 or Br 3 million from the mean value. In addition, the minimum and maximum values were 4.85 and 12.85 respectively. This indicates that large banks have a total asset of Br 380 billion and small banks have a total asset of Br 125 million over the study period.

The net interest margin of commercial banks in Ethiopia from 2002/03 to 2016/2017, shows an average value of 0.0307 with a standard deviation of **0**.0098, which means that the average net interest income earned from interest earning asset during the study period were 3.07% with ups and downs of 0.98%. The minimum and maximum values of net interest margin from interest earning asset of commercial banks in Ethiopia during the study period were 0.0019 and 0.055

respectively. This indicates that commercial banks in Ethiopia with high interest earning asset have interest margin of 5.5%, in contrast banks with low interest earning assets have interest margin of 0.19% during the study period between 2002/03 and 2016/17.

The descriptive statistics for efficiency of commercial banks as measured by cost ratio shows an average value of 0.0314 with a standard deviation of 0.0106. This implies that eleven commercial banks in Ethiopia on average has incurred 3.14% of costs to generate one birr in total asset with a variation of 1.06% during the study period from 2002/03 to 2016/17. The minimum and maximum values for cost ratio from the descriptive statistics were 0.0087 and 0.0760 respectively. This reflects that less efficient commercial banks have a cost ratio of 7.6%, where as commercial banks that are more efficient have a cost ratio of 0.87% over the study period.

The descriptive statistics for lending leverage as measured by the ratio of total loan to total deposit has an average value of 0.6304 with a variation of 0.1636. This reflects that on average, commercial banks in Ethiopia has disbursed 63.04% of their deposit in the form of loans with 16.16% deviation from the average value during the sample period covering from 2002/03 to 2016/17. The minimum and maximum values of loan to deposit ratio of commercial banks in Ethiopia during the study period were 0.0534 and 1.285 respectively. This reflects that highly leverage commercial banks in lending have a loan deposit ratio of 128.5%, where as less leverage commercial banks in lending have a loan deposit ratio of 5.34% in Ethiopia during the period under study.

The descriptive statistics for insolvency risk as measured by natural logarithm of Z-score shows an average value of 2.52 with a variation of 0.509 during the study period. This indicates that the average solvency risk score of Ethiopian commercial banks is 2.52 with ups and downs of 0.509 from the average value. The minimum and maximum value of insolvency risk as measured by ln -Zsore is 1.38 and 3.68 respectively. This reflects that the most risky commercial banks have a Z-score of 1.38 and less risky commercial banks have a Z-score of 3.68 over the study period.

The average capital adequacy ratio of the sampled Ethiopian commercial banks as shown in the descriptive statistics table is 0.1397 as measured by capital divided by total asset with a standard deviation 0.0891. This indicates that 13.97% of one birr investment in total asset is financed through the banks own equity capital with 8.91% ups and downs from the average value of 13.97%. The minimum and maximum capital adequacy ratio of Ethiopian commercial banks was 0.0385 and 0.8682. This reflects that banks with high capital adequacy have a capital ratio of 86.82 %, whereas commercial banks with low capital have a capital position of 3.85% during the study period.

The descriptive statistics for GDP of Ethiopia shows an average value of 0.1007 with a variation of 0.0307 from 2002/03 to 2016/17. This shows that the Average real GDP growth rate of Ethiopia during the study period were 10.07% with ups and downs of 3.07%. The minimum and maximum values for GDP growth rate during the study period were -0.021 and 0.135 respectively. This indicates that the lower level and high level of real GDP growth rate is -2.1% and 13.5% respectively during the period under study.

The descriptive statistics for inflation rate of Ethiopia shows an average value of 0.148 with a variation of 0.1361 from 2002/03 to 2016/17. This shows that the Average inflation rate of Ethiopia during the study period were 14.8% with ups and downs of 13.61%. The minimum and maximum values for inflation rate of .0238 and 0.5524 respectively. This indicates during a low inflationary economic environment the inflation rate is 2.38% and during a high inflationary economic condition, the Ethiopian inflation rate becomes 55.24%.

4.2 Correlation Analysis:

This part of the study presents the outputs and discussions of the correlation analysis. To show the relationship between non-interest income ratio of commercial banks in Ethiopia and (Bank size, efficiency, lending leverage, Net interest margin, insolvency risk, capital adequacy ratio, GDP growth rate and inflation rate) correlation coefficients were used. The values of the correlation coefficient were always between -1 and +1. A correlation coefficient of -1 indicates that the two variables have a perfect negative relationship, whereas a correlation coefficient of 0 indicates that the two variables have no linear relationship. Furthermore, a correlation coefficient

of +1 reflects that the two variables have a perfect positive relationship with each other (Gujarati, 2004).

According to (Wajahat, 2010) prior to conducting regression analysis it is useful to check the correlation test between dependent and independent variable. However, in correlation analysis the primary objective is to measure the strength or degree of linear association between variables. Furthermore, there is no distinction between dependent and independent variable in correlation analysis. This implies that correlation analysis does not allow the researcher to make cause and effect inferences with respect to the relationship between the identified variables. Therefore, in analyzing the effect of selected independent variable on income diversification the regression analysis, which is discussed in the forthcoming part of these chapters, gives solution to overcome the limitation of correlation analysis. The correlation matrix between dependent and independent variables are depicted in the following table.

Table 4.2 Correlation Analysis of Variables

```
. corr NIIR BSZ NIM CR LENLEV INSR CAR GDP INFR
(obs=146)
```

	NIIR	BSZ	NIM	CR	LENLEV	INSR	CAR	GDP	INFR
NIIR	1.0000								
BSZ	-0.0084	1.0000							
NIM	-0.5787	0.3112	1.0000						
CR	-0.0594	-0.2405	0.3490	1.0000					
LENLEV	-0.3448	-0.4298	0.3783	0.2484	1.0000				
INSR	-0.2297	-0.2807	0.1669	-0.0564	0.4064	1.0000			
CAR	-0.2952	-0.5640	-0.2693	0.0811	0.0785	0.4017	1.0000		
GDP	0.0490	0.0522	-0.0186	-0.1796	-0.1320	0.0605	0.1050	1.0000	
INFR	0.0908	-0.0755	-0.0844	-0.1050	-0.0127	0.0579	0.0219	0.1226	1.0000

Source: STATA 11 Outputs

According to the above correlation efficiency, lending leverage, net interest margin, bank size, insolvency risk and capital adequacy ratio are negatively related with non-interest income ratio of commercial banks in Ethiopia. This implies that the increase in these factors leads to decrease in non-interest income ratio whereas decreases in these factors leads to the increase in non-interest income ratio of commercial banks in Ethiopia during the study period.

While real GDP growth rate and inflation rate are positively related with non-interest income ratio of commercial banks with estimated coefficient of 0.0490 and 0.0908 respectively. This indicates that the increase in these factors results in increase in non-interest income ratio and in reverse the decrease in these factors leads to the decrease in non-interest income ratio of commercial banks in Ethiopia during the study period.

4.3 Choosing between Random effects (RE) and Fixed effects (FE) model:

Since these study uses panel data to analyze the effect of some selected independent variable on non-interest income ratio of commercial banks in Ethiopia, there are two types of panel data models widely used. These two models of panel data are random effect (RE) model and fixed effect (FE) model. Therefore, there is a need to choose one model that gives consistent estimates for this study to show the cause and effect relationship between independent and dependent variables. To do so, the Hausman specification test or Lagrange Multiplier test for random effect method is applied and the hypothesis is developed as follows:

Ho: Random effect model is appropriate.

Ha: Fixed effect model is appropriate.

Table 4.3.1 Result of model selection test: Hausman specification test

```
. hausman fixed .

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |    fixed       random       Difference          S.E.
-------------+------------------------------------------------------------
         BSZ |   .0117087    .0007148       .0109939                .
         NIM |  -12.55327   -11.87237       -.6809008                .
          CR |   1.928866    3.386077        -1.45721                .
      LENLEV |  -.1098852   -.1484169        .0385317                .
        INSR |   .3177292    .0914868        .2262424          .0322047
         CAR |  -1.952273   -1.197172       -.7551016          .0832991
         GDP |   .1395605    .4671941       -.3276336                .
        INFR |   .0098691    .0388666       -.0289974                .
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =      148.99
                Prob>chi2 =      0.0000
                (V_b-V_B is not positive definite)
```

Source: STATA 11 output

Table 4.3.2 Result of model selection test: Lagrange multiplier test for random effect

```
Breusch and Pagan Lagrangian multiplier test for random effects

        NIIR[companycode,t] = Xb + u[companycode] + e[companycode,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+------------------------------
                    NIIR |   .0203899       .1427933
                       e |   .0026465       .0514439
                       u |   .0004698       .0216752

        Test:   Var(u) = 0
                                 chi2(1) =    74.87
                              Prob > chi2 =     0.0000
```

Source: STATA 11 output

The Hausman specification and Lagrange Multiplier test for random effect p-value of a model show 0.0000, which is less than 5% significance level. The null hypothesis is that of random effect model is appropriate and alternate hypothesis is that of fixed effect model is appropriate. Since the p-value is less than 5%, level of significance we reject the null. Therefore fixed effect model is appropriate than random effect model to estimate the effect of different selected independent variable on non-interest income ratio of commercial banks in Ethiopia.

4.4 Diagnostic tests of the classical linear regression model assumptions:

For best, linear and unbiased estimators (BLUE) of the variables and to make a valid inference, the diagnostic testing of the assumption of CLRM is required. According to (Brook, 2008) the five basic assumptions of CLRM includes errors have zero mean, constant variance of errors (Homoskedasticity), No autocorrelation, No multicolleneourity between explanatory variables and Normal distribution. Consequently, the result of diagnostic test is presented as follows.

4.4.1 The errors have zero mean (ε=0)

As per brooks (2008), if the regression model includes a constant term, this assumption will never be violated. Accordingly, these models constitute a constant term and therefore, this assumption is not violated.

4.4.2 Homoskedasticity (variance of the error term is constant (var (μt) = σ2 <∞)

The assumption of Homoskedasticity is the condition residual are approximately equal for all explained dependent variable scores i.e. the variance of the error is constant. In other word, classical linear regression model assumes that all observations are equally reliable i.e. the error variance is constant. In the case where the error does not have a constant variance, it is said that the assumptions of Homoskedasticity has been violated or the problem of heteroskedasticity exists. Heteroskedasticity is a systematic pattern in the errors where the variances of the errors are not constant. The hypothesis for Heteroskedasticity is presented as follows:

Ho: There is no heteroskedasticity problem in the model

Ha: There is heteroskedasticity problem in the model

The presence of heteroskedasticity does not make the regression estimates BLUE even if the estimators are still linear and unbiased. Further, more; heteroskedasticity makes the regression estimates not efficient which means that there is some other linear estimator, which has a low variance. Finally, the existence of heteroskedasticity makes to have incorrect standard error, this ultimately results in incorrect values of t-test, and F-test leads to wrong conclusion. The Whites test and Breusch -pagan is the most popular method to detect the presence of Heteroskedasticity and the P-value should be bigger than 0.05 to not reject the null of homoskedasticity at the 5% significance level. In this study, the Breusch -pagan test was used to detect the existence of heteroskedasticity and the result is presented as follows:

Table 4.4.2 Results of Heteroskedasticity test

```
. hettest

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

         chi2(1)      =     1.27
         Prob > chi2  =   0.2597
```

Source: STATA 11 Outputs

As the result in table 4.4.2 shows, the P-values for Chi^2 are 0.2597 and this versions of the test statistic gives the same conclusion that supports the absence of heteroskedasticity since the P-

values is greater than 0.05. This indicates that the assumptions of homoskedasticity or errors have a constant variances is not violated.

4.4.3 Normality Assumption

Normality test is used to identify whether the error term is normally distributed. According to Brooks (2008), the Jarque-bera statistic would be significant for disturbance term which is not normally distributed around the mean. The objective of Jarque-bera test is to ensure that the data set is well modeled by a normal distribution. The data is said to be normally distributed when the skeweness and kurtosis is approximately zero and three respectively (Brooks 2008). The hypothesis for the normality test is established as follows:

Ho: Error term is normally distributed

Ha: Error term is not normally distributed

Decision rule: Reject Ho if P-value of JB test is less than 0.05 at 5% significant level. Otherwise, do not reject Ho.

Table 4.4.3 Result of Normality test: Jarque-Bera (skeweness-kurtosis test)

```
. predict uhat, residual
. sktest uhat
```

Skewness/Kurtosis tests for Normality

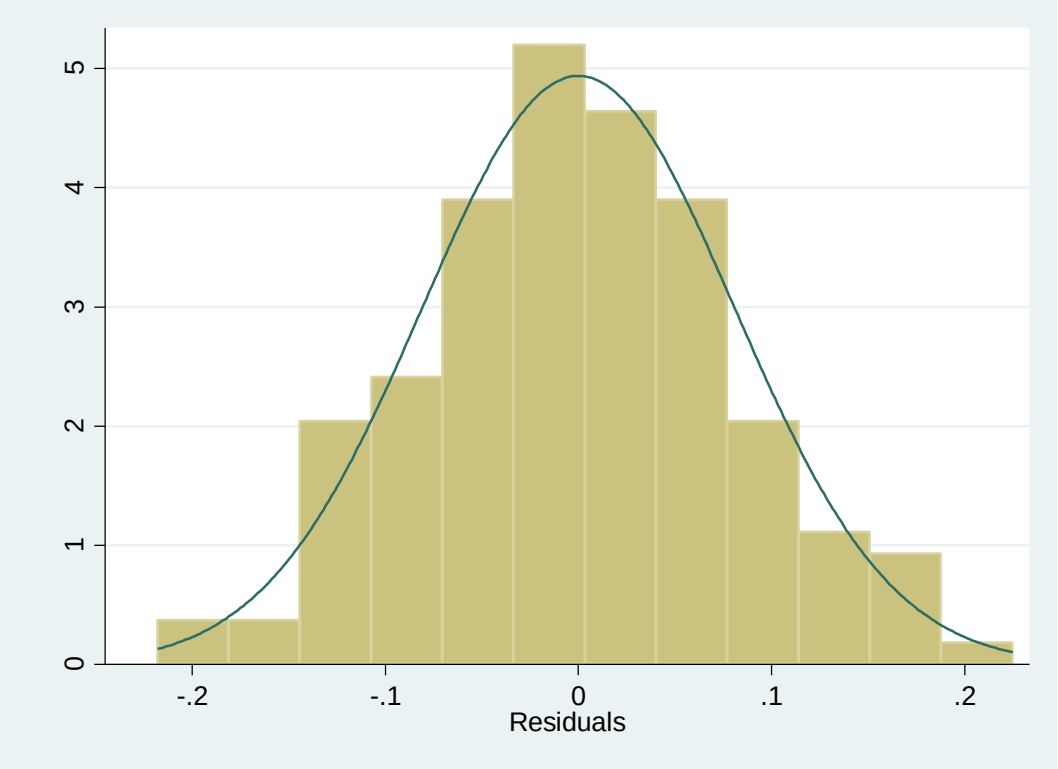
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	joint Prob>chi2
uhat	146	0.6605	0.8526	0.23	0.8925

Source: STATA 11 outputs

Table 4.3.4 reflects that distribution of the panel observations is symmetric about its mean. The skeweness-kurtosis (SK) test has a joint p-value of 0.8925 indicates that there was no evidence for the presence of normality problem in the data. Thus the researcher fails to reject the null hypothesis that the data is normally distributed since the p-value was greater than 0.05.

In addition to the skeweness kurtosis analysis for testing normality the following histogram shows the absence of normality problem.

Figure 2: Histogram for normality test



Source: STATA 11 outputs

```
. summ uhat, detail

                            Residuals
-------------------------------------------------------------
      Percentiles      Smallest
 1%    -.1921386      -.2179802
 5%    -.1234496      -.1921386
10%    -.1095476      -.1683071       Obs                 146
25%    -.0563335      -.1652654       Sum of Wgt.         146

50%    -.0016374                      Mean           -1.55e-10
                      Largest         Std. Dev.       .0807874
75%     .0517936      .1691315
90%     .1049518      .1807855       Variance        .0065266
95%     .1437702       .183247       Skewness        .0852566
99%      .183247      .2248304       Kurtosis        2.966438
```

4.4.4 No perfect Multicolleneourity

This assumption reflects the fact that there is no perfect relationship between explanatory variable. The best regression models are those in which the predictor variables each correlate highly with the dependent variable but correlate –at most- only minimally with each other (Gujarati (2004). According to Hair et. al (2006) the correlation coefficient below 0.9 may not cause serious multicolleneourity problem. Additionally Cooper and Schendlar (2009) suggested that a correlation above 0.8 should be corrected for. Furthermore Malhotra (2007) argues that the problem of multicolleneourity exists where the correlation coefficient among explanatory variables should be greater than 0.75.

The presence of multicolleneourity results in large variance and standard error in regression coefficient estimates and this result in low t-statistics and insignificant coefficients. Furthermore the existence of multicolleneourity among explanatory variables results in misleading sign of regression coefficient and significant F-test with insignificant individual coefficients. The presence of multicolleneourity among independent variables is detected by either Pearson correlation matrix or variance inflation factor (VIF). In this study the two methods of Pearson correlation matrix and variance inflation factors are used to detect multicolleneourity. VIF measures how much the variance of an estimated regression coefficient increases if predictors are correlated (multicolleneourity). According to wooldrige (2004), when VIF is greater than 10, then the regression coefficients are poorly estimated and imperfect multicolleneourity is likely. The results of both methods are presented as follows:

Table 4.4.4.1 Results of Multicolleneourity test using Pearson correlation matrix

```
. corr BSZ NIM CR LENLEV INSR CAR GDP INFR
(obs=146)
```

	BSZ	NIM	CR	LENLEV	INSR	CAR	GDP	INFR
BSZ	1.0000							
NIM	0.3112	1.0000						
CR	-0.2405	0.3490	1.0000					
LENLEV	-0.4298	0.3783	0.2484	1.0000				
INSR	-0.2807	0.1669	-0.0564	0.4064	1.0000			
CAR	-0.5640	-0.2693	0.0811	0.0785	0.4017	1.0000		
GDP	0.0522	-0.0186	-0.1796	-0.1320	0.0605	0.1050	1.0000	
INFR	-0.0755	-0.0844	-0.1050	-0.0127	0.0579	0.0219	0.1226	1.0000

Source: STATA 11 Outputs

The correlation matrix result in the above table shows the correlation value among the explanatory variable is less than even 0.6. However, As per Malhotra (2007) who argues that the problem of multicolleneourity exists where the correlation coefficient among explanatory variables should be greater than 0.75. Therefore, it can be concluded that the regressors in this study are not perfectly correlated.

Table 4.4.4.2 Results of Multicolleneourity test using VIF (variance inflation factor)

```
. vif
```

Variable	VIF	1/VIF
BSZ	2.89	0.345553
NIM	2.34	0.427948
LENLEV	2.22	0.449812
CAR	1.91	0.524464
INSR	1.63	0.613949
EFF	1.57	0.637740
GDP	1.09	0.913703
INFR	1.04	0.960646
Mean VIF	1.84	

Source: STATA 11 output

Since the variance inflation factor is not greater than ten it is possible to conclude that there is no perfect multicolleneourity among the explanatory variable.

4.5 Regression results:

The following table shows the output of fixed effect (with-in) regression model:

Table: 4.5.1 Results of fixed effect (with-in) regression model with CBE

```
. xtreg NIIR BSZ NIM CR LENLEV INSR CAR GDP INFR, fe

Fixed-effects (within) regression               Number of obs      =       146
Group variable: companycode                     Number of groups   =        11

R-sq:  within  = 0.8068                         Obs per group: min =         9
       between = 0.0450                                        avg =      13.3
       overall = 0.2833                                        max =        15

                                                F(8,127)           =     66.29
corr(u_i, Xb)  = -0.6525                        Prob > F           =    0.0000
```

NIIR	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
BSZ	.0117087	.0077505	1.51	0.133	-.0036281	.0270454
NIM	-12.55327	.8932161	-14.05	0.000	-14.32078	-10.78576
CR	1.928866	.6977911	2.76	0.007	.5480637	3.309669
LENLEV	-.1098852	.0471758	-2.33	0.021	-.2032375	-.0165328
INSR	.3177292	.0395044	8.04	0.000	.2395571	.3959013
CAR	-1.952273	.1374966	-14.20	0.000	-2.224354	-1.680192
GDP	.1395605	.1524563	0.92	0.362	-.1621231	.4412441
INFR	.0098691	.0327986	0.30	0.764	-.0550334	.0747716
_cons	.2573278	.0966364	2.66	0.009	.0661018	.4485538
sigma_u	.16286603					
sigma_e	.05144387					
rho	.90927985	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(10, 127) =    23.06                 Prob > F = 0.0000
```

Source: STATA 11 outputs

Table 4.5.2 Results of fixed effect regression without CBE

Since it is assumed that CBE is the largest bank in Ethiopia and as a result the researrcher wants to see the result with excluding it and the result shows that there is no material difference on the output.

```
. xtreg niir bsz nim cr lenlev insr car gdp infr, fe

Fixed-effects (within) regression               Number of obs      =       132
Group variable: bankcode                        Number of groups   =        10

R-sq:  within  = 0.7974                         Obs per group: min =         9
       between = 0.0221                                        avg =      13.2
       overall = 0.2162                                        max =        15

                                                F(8,114)           =     56.08
corr(u_i, Xb)  = -0.7062                        Prob > F           =    0.0000

------------------------------------------------------------------------------
        niir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         bsz |   .0095009   .0081598     1.16   0.247    -.0066637    .0256655
         nim |   -12.1635    .943075   -12.90   0.000    -14.03172   -10.29528
          cr |   2.151338   .7422634     2.90   0.005     .6809203    3.621757
      lenlev |   -.122229   .0492025    -2.48   0.014    -.2196988   -.0247592
        insr |   .3564012   .0458654     7.77   0.000     .2655421    .4472602
         car |  -2.043075   .1541318   -13.26   0.000    -2.348409   -1.737741
         gdp |   .1557433   .1691436     0.92   0.359    -.1793289    .4908154
        infr |   .0101773   .0352049     0.29   0.773    -.0595634     .079918
       _cons |    .173433   .1081358     1.60   0.112    -.0407832    .3876491
-------------+----------------------------------------------------------------
     sigma_u |  .18754376
     sigma_e |  .05239203
         rho |  .92760813   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(9, 114) =    21.53                 Prob > F = 0.0000

.
```

Source: STATA 11 output

The above table 4.5.1 shows the regression results of fixed effect model between the explained variable (non-interest income ratio) and the explanatory variable (Bank size, Efficiency, Lending leverage, Net interest margin, Insolvency risk, Capital adequacy ratio, Real GDP growth rate and Inflation rate). According to (Brooks, 2008) the R-squared value is used to measure how well the regression model explains the actual variation in the explained variable. The within R-squared values were 0.8068 and it shows that 80.68 % of variations in non-interest income ratio of commercial banks in Ethiopia were explained by explanatory variables included in the model. In other words, the remaining 19.32 % of variations in non-interest income ratio of commercial banks in Ethiopia are caused by factors other than the factor included in the model. Moreover,

the value of F-stat shows 66.29 with a probability of 0.0000 reflects that the overall model is adequate even at 1% significant level that all independent variables are jointly significant in causing variation in non-interest income ratio of commercial banks in Ethiopia.

Moreover, from table 4.5 net-interest margin, efficiency, lending leverage, insolvency risk and capital adequacy ratio have significant effect on non interest income ratio at 5% significant level since the P-values for those variable were 0.000, 0.007, 0.021, 0.000, and 0.000 respectively. In contrast, bank size, GDP growth rate and inflation rate have insignificant impact on non-interest income ratio even at 10% significant level since the P-values for those variables is greater than 0.1.

4.6 Discussion on findings:

From the above table of fixed effect model regression result (table 4.5), the following model have been developed and then discussed as follows:

NIIR=0.2573278+0.0117087BSZ-12.55327NIM+1.928866CR-

0.1098852LENLEV+0.3177292INSR-1.952273CAR+0.1395605GDP +0.0098691INFR+ε

4.6.1 Bank size and Non-interest income ratio

The regression output displayed in table 4.5 showed that, the coefficient of bank size as measured by natural logarithm of total asset is 0.0117and its P-value is 0.133. This indicates that on average, holding other explanatory variable constant, a one percent increase in bank size results in 0.011 percent increase in non-interest income ratio of commercial banks in Ethiopia and it is statistically insignificant at 5% significant level.

Thus, the result rejects the null hypothesis that bank size has a positive impact on non-interest income ratio. This indicates that there is no sufficient evidence to support the negative effect of bank size on income diversification of commercial banks in Ethiopia. This finding is consistent with the alternate hypothesis as described in previous chapter which indicating that large Ethiopian commercial banks are more likely to diversify their income sources more aggressively than small banks. This finding is also similar with various previous studies like, De Young and Hunter (2003) and De Young et al. (2004). However, as per empirical finding of this study, bank size is considered as less significant factor that affect income diversification decision of commercial banks in Ethiopia. The justification for the positive effect of bank size on income

diversification is because large banks have large branch operation, greater accessibility and greater technological advancement and this helps the bank to diversify their income sources towards non-interest income.

4.6.2 Net interest margin and Non-interest income ratio

The regression output in table 4.5 presented that, the coefficient of net interest margin (NIM) is -12.55327with a P-value of 0.000. This indicates that, on average when net interest margin increased by 1% non interest income ratio decreases by 12.5% holding other independent factors remain constant and it is statistically significant at 95% confidence level or 5% significant level.

Therefore, the study rejects the null hypothesis that net-interest margin has a positive effect on non-interest income ratio. This means that there is no sufficient evidence to support the positive impact of net- interest margin on non-interest income diversification. This result is consistent with the alternate hypothesis described in previous chapter that indicates banks with high net-interest margin are less likely to diversify their income sources. This result is also consistent with previous studies of (Joon-HoHahm, 2008). In addition, the result is also consistent with the finding of, Leptit et al. (2008 who supports that there is a negative relationship between net-interest margin and non-interest income in the case of European banks during the period 1996-2002, due to the assumption that banks use loans as a loss leader to expand their non-interest income through cross selling. The result is justified by the fact that banks with high interest margin means that banks which are more profitable in traditional banking activities or lending activities. Therefore, banks with high interest margin do not have motivation to engage in non-traditional banking activities and this ultimately reduces their tendency towards income diversification.

4.6.3 Efficiency and Non-interest income ratio

From the regression output depicted in table 4.5 the coefficient of cost ratio used to measure efficiency is 1.928866with a P-value of 0.007. Since cost ratio is inversely related with efficiency and from the above table we conclude that, on average when efficiency increases by 1% non-interest income ratio of Ethiopian commercial banks decreases by 1.92% keeping other independent variables constant and it is statistically significant at 95% confidence level.

Therefore, this study rejects the null hypothesis that efficiency has a positive and insignificant effect on non-interest income ratio. This indicates that there is no sufficient evidence to support the significant positive effect of efficiency on non-interest income ratio. This is consistent with the alternate hypothesis described in previous chapter which implies that commercial banks that are more efficient are less likely to diversify their income sources aggressively. The justification for this result is that of less efficient commercial banks with high operating expense tries to impose high service charge, commission and trading fees to compensate their higher expenses by using the advantage of deregulation found in Ethiopian financial system regarding non-traditional banking activities.

4.6.4 Lending leverage and Non-interest income ratio

The regression output from table 4.5 shows that the coefficient of lending leverage as measured by loan to deposit ratio is -0.1098852 with p-values of 0.021. This reflects that on average, when lending leverage is increased by one percent non-interest income ratio is decreased by 0.10% holding other factors constant and it is statistically significant at 5% significant level.

Therefore, the study fails to rejects the null hypothesis that lending leverage has a negative effect on non-interest income ratio. In other words, it indicates that there is no sufficient evidence to support the positive effect of lending leverage on non-interest income diversification. This result is inconsistent with the alternate hypothesis as explained in previous chapter that indicates that more flexible commercial banks in lending are less likely to diversify their income sources. This finding is not consistent with various previous studies like (Cerasi and Daltung 2000) and (Deyoung and Yom (2008). The justification for this result could be the fact that since commercial banks with more lending capability earns more interest income and they become reluctant to engage in non-interest income generating activity in the case of commercial banks in Ethiopia.

4.6.5 Insolvency risk and Non-interest income ratio:

From the above regression table 4.5 insolvency risk as measured by ln-Zsore has a coefficient of 0.3177292with a P-value of 0.000. This indicates that on average when insolvency risk increases

by one percent, non-interest income ratio also increases by 0.31% holding other independent variables constant and it is statistically significant even at 90% confidence level or 10% significance level.

Therefore, the study rejects the null hypothesis that insolvency risk has a negative effect on non-interest income ratio of commercial banks. This reflects that there is no sufficient evidence to support the negative effect of insolvency risk on non-interest income diversification. The result is consistent with the alternate hypothesis described in previous chapter and with several other studies see, (Stiroh and Rumble 2006). This result is also consistent with the finding of Xiangnan Meng, Tony Cavoli and Xin Deng (2018) that insolvency risk has a positive effect on non-interest income diversification. The result of this finding reflects the fact that banks with high insolvency risk does not have sufficient position to attract and retain new and existing customers. These have a direct negative effect on their deposit position and loan granting capacity. Therefore, banks with low loan granting ability due to insufficient deposit sources tries to aggressively participate in non-traditional banking activities to generate non-interest income to cope with loan granting problem.

4.6.6 Capital adequacy and Non-interest income ratio:

From the above regression table of 4.5 the capital adequacy as measured by capital asset ratio has a coefficient of -1.952273with a P-value of 0.000. This reflects that on average when capital adequacy ratio of commercial banks in Ethiopia increases by one percent, their non-interest income ratio decreases by 1.95% holding other independent factors remain unchanged and it is statistically significant at 95% confidence level or 5% significance level.

Therefore, the study fails to rejects the null hypothesis that capital adequacy has a negative effect on non-interest income ratio of commercial banks. This indicates that there is no sufficient evidence to support the positive effect of capital adequacy on non-interest income ratio. The result is consistent with the null hypothesis developed in previous chapter. The result is also consistent with the finding of (Xiangnan Meng, Tony Cavoli and Xin deng (2018)). The reason for the negative effect of capital on non-interest income diversification in Ethiopia might be the fact that banks in Ethiopia uses non-interest income to leverage their capital which indirectly

reflects that banks in Ethiopia does not use their capital efficiently to expand their buinesses in order to diversify their income sources.

4.6.7 Inflation and Non-interest income ratio:

The regression table 4.5 shows the coefficient of inflation 0.0098691with a P-value of 0.764. This result shows that on average when inflation rate increases by one percent, non-interest income ratio also increases by 0.0098% keeping other regressors remain unchanged and it is statistically insignificant even at 10% significance level.

Therefore, the study fails to reject the null hypothesis that inflation has a positive effect on non-interest income ratio. This indicates that there is no sufficient evidence to support the negative effect of inflation on non-interest income ratio. The result is inconsistent with the alternate hypothesis developed in previous chapter and several studies conducted in various countries that weak macro-economic environment negatively affects non-interest income ratio see, DeYoung and Rice (2004) and Xiangnan Meng, Tony Cavoli and Xin Deng (2018). The justification for the positive effect of inflation on non-interest income ratio in Ethiopia is due to the fact that inflation increases the value of goods and services traded. The service charge on international trade like service charge on letter of credit, telegraphic transfer etc would obviously increases since those service charges are imposed on invoice price of those goods and services traded.

4.6.8 GDP growth rate and income diversification:

From the above regression table 4.5 the coefficient of GDP is 0.1395605with a P-value of 0.362. This indicates that on average, when real GDP growth rate increases by one percent non-interest income ratio also increases by 0.36% keeping other explanatory variable constant and it is statistically insignificant even at 90% confidence level.

Thus the finding reject the null hypothesis that real GDP growth rate has a negative impact on non-interest income ratio, which means that there is no sufficient evidence to support the negative effect of real GDP growth rate on non-interest income diversification. The result is also consistent with the alternate hypothesis developed in previous chapter and various studies conducted in different countries in that high real GDP growth rate has a positive effect on non-interest income diversification see, Deyoung and Rice (2004) and Xiangnan Meng, Tony Cavoli

and Xin Deng (2018). This is because banks in countries with high real GDP growth rate have an opportunity to expand their income sources towards non-interest income.

4.7 Summary

The objective of the chapter is to present findings and discussions on analysis of the results. STATA 11 statistical package was used to run the regression, diagnostic analysis, descriptive statistics, and correlation analysis results with predicted model were obtained in much more detail. The result indicates that insolvency risk and efficiency have a positive and significant effect on non-interest income diversification. This implies that the higher those factor the higher the income diversification towards non-interest income holding other factors remain unchanged. On the other hand, net interest margin, lending leverage and capital adequacy ratio have a significant negative effect on non-interest income diversification. This reflects that the higher those factor the lower level of income diversification holding other factors constant. The other variables, bank size, real GDP growth rate and inflation rate have a positive and insignificant effect on non-interest income diversification keeping other factors constant.

CHAPTER- FIVE

SUMMARY OF FINDING, CONCLUSION AND RECOMMENDATION

The objective of this chapter is to is to describe the conclusions drawn based on the result of research findings and then to give possible recommendations. The first part of this chapter provides Summary of finding, then conclusion of research findings and the last section of the chapter forwards relevant and necessary recommendation based on the finding of this research. Additionally this chapter provides for other researcher suggested areas of study for further analysis and investigation about the subject matter under study.

5.1 Summary of finding

This thesis examines the factors affecting non-interest income diversification decision of commercial banks in Ethiopia by using the financial statement of eleven commercial banks from 2002/03 to 2016/17. Accordingly, this part of the thesis summarizes the major findings on the issues of non-interest income diversification and its determining factors.

For the purpose of this thesis the researcher, consider Non-interest income ratio as dependent variable used to measure non-interest income diversification. On the other hand, the researcher uses both bank specific and macro-economic variables as explanatory variable including bank size, net-interest margin, efficiency, lending leverage, insolvency risk, capital adequacy, GDP growth rate and inflation rate. Therefore, the major findings are as follows:

Δ The coefficient of bank size in the model is positive and statistically insignificant at 5% significance level for non-interest income ratio. Therefore, this indicates that there is insignificant positive relationship between non-interest income diversification and bank size.

Δ Net interest margin has a significant negative effect on non-interest income ratio of commercial banks in Ethiopia during the study period and this reflects that there is a negative relationship between ne-interest margin and non-interest income diversification.

Δ The coefficient of cost ratio, which is used to measure efficiency have a significant positive effect on non-interest income ratio of commercial banks in Ethiopia during the study period. This

indicates that there is a significant negative relationship between efficiency and non-interest income diversification of commercial banks in Ethiopia.

Δ The effect of lending leverage as measured by loan to deposit ratio is negative and significant on non-interest income ratio of commercial banks in Ethiopia during the period under study. This indicates the more flexible banks in lending are less likely to engage in non-traditional banking activities in Ethiopia.

Δ The effect of insolvency risk on non-interest income ratio is positive and statistically significant at 5% significance level. This indicates that banks, which are less solvent, are more likely to diversify their income sources by increasing the share of non-interest income.

Δ The coefficient of capital adequacy as measured by capital asset ratio on non-interest income ratio is negative and this indicates that commercial banks in Ethiopia engages in non-traditional banking activities to increases their level of capital. Therefore, the lower the level of capital adequacy motivates the bank to diversify their income sources.

Δ The coefficient of GDP growth rate and inflation rate is positive and statistically insignificant at 5% significant level. This reflects that GDP growth rate and inflation rate have a positive insignificant effect on non-interest income diversification decision of commercial banks in Ethiopia during the study period.

Based on the regression result the researcher summarizes the finding in the following table:

Table 5.1 Summary of finding

Independent variables	Null hypothesis on Non-interest income ratio	Actual effect
BSZ	BSZ has a negative and insignificant relationship with NIIR	Positive and insignificant
NIM	NIM has a positive and insignificant relationship with NIIR	Negative and significant
EFF	EFF has a positive and insignificant relationship with NIIR	Negative and significant
LENLEV	LENLEV has a negative and insignificant relationship with NIIR	Negative and significant
INSR	INSR has a negative and insignificant relationship with NIIR	Positive and significant
CAR	CAR has a negative and insignificant relationship with NIIR	Negative and significant
GDP	GDP has a negative and insignificant relationship with NIIR	Positive and insignificant
INFR	INFR has a positive and insignificant relationship with NIIR	Positive and insignificant

5.1 Conclusion

The main objective of the study was to analyze the underlying determinant of income diversification strategies of commercial banks in Ethiopia. In doing so, quantitative research were used to conduct the study. In addition, secondary data obtained from National bank of Ethiopia and published annual reports were used to carry out this study. Eleven commercial banks have been selected from the total population of seventeen commercial banks recently operating in Ethiopia by using purposive sampling for fifteen years covering from 2002/03 to 2016/17. Empirical results indicate that income diversification is associated with bank specific determinants as well as external macro-economic factors.

Sanya and Wolfe (2011) argue that non-interest income diversification can benefit emerging countries as long as banks are not over-diversified. A large body of literature has examined the effect of income diversification on bank risks and performance, but to gauge a priori path on banking diversification, a better understanding of the driving factor is necessary. This research improves our understanding on the impact of size, efficiency, net-interest margin, capital adequacy, lending leverage and other macro-economic variable on banks income diversification decision towards non-interest income, hence providing insights for the banks manager as well as policy makers and regulators on what further regulation is needed.

Several empirical studies describe many variables as an influential factor of non-interest income diversification. Based on this background, this study examines the effect of those explanatory variables and their relative importance in determining non-interest income diversification decision of Ethiopian commercial banks. Besides this eight hypothesis were formulated to be tested under the study and the following variables; bank size, net-interest margin, efficiency, capital adequacy ratio, lending leverage, insolvency risk, real GDP growth rate and inflation rate were regarded as explanatory variable and non-interest income ratio were considered as dependent variable to measure non-interest income diversification.

The study was conducted through using panel data estimation technique particularly fixed effect model were used to estimate the equation. Additionally, the study conducted misspecification or diagnostic tests like multicolleneourity, heteroskedasticity and normality to achieve the objective of the study by using STATA 11 statistical software. The result of the diagnostic test shows that the data founds to be homoskedastic, free of multicolleneourity and normally distributed.

The result of the regression analysis shows that there is a significant relationship between non-interest income ratio, net-interest margin, lending leverage, efficiency, insolvency risk and capital adequacy ratio. Specifically, the negative effect of lending leverage on non-interest income ratio indicates that banks which are less leverage in lending more diversify their income sources than more leverage commercial banks in lending. The effect of net-interest margin on non-interest income ratio is negative, this is reflections that banks, which are more profitable in lending, are less likely to diversify their income sources, and the reverse is true. The negative

effect of efficiency on non-interest income diversification also founds from the regression result and this reflects that less efficient commercial banks tends to diversify their income sources aggressively than more efficient commercial banks. Finally, the negative effect of capital adequacy ratio is also displayed from the regression result and this reflects that commercial banks with high capital adequacy are less diversified banks than banks with less capital adequacy, which reflects banks in Ethiopia uses non-interest income diversification to increase their capital.

In addition, there is insignificant effect of bank size, Real GDP growth rate and inflation rate on non-interest income ratio is found from the regression table. The positive effect of bank size on non-interest income ratio from the regression result indicates that large banks tend to diversify their income sources more aggressively than small banks. The impact of real GDP growth rate on non-interest income ratio is also positive and insignificant this reflects that banks in high level of real GDP growth rate are more diversify than banks in low level of real GDP growth rate. Inflation rate also have insignificant positive effect on non-interest income ratio, which shows that banks in high level of inflation are more, diversified than banks in low level of inflation.

5.2 Recommendation

Because banks with diversified income sources are capable to cope with the negative effect of relying on single income sources in terms of risk and earning volatility, the model in this study predicts non-interest income ratio with its determining factor. The finding of this study have provided insight in to the explanatory variable that have an important effect in explaining the variation in non-interest income diversification of commercial banks in Ethiopia. Therefore, understanding factors affecting non-interest income diversification decision has significant implications to different stakeholders like policy makers, commercial banks regulators and banks management depending on their non-interest income diversification preference. Based on the finding of this study, the researcher has forwarded the following recommendations

√ To make an informed decision on non-interest income diversification, policy makers who are trying to predict the trend of commercial banks income diversification position might need to look the banks specific factors in terms of, Net interest margin, lending leverage, insolvency risk,

efficiency and capital adequacy ratio. This is due to the reason that, these factors have significant effect on income diversification decision of Ethiopian commercial banks.

√ Regulators of Ethiopian commercial banks (National bank of Ethiopia) also considers the significant bank specific factors that affect banks income diversification decision to make a wise and sustainable regulation regarding non-traditional banking activities.

√ Managers of Ethiopian commercial banks shall also consider efficiency, net interest margin, capital adequacy ratio, lending leverage and insolvency risk when determining income diversification decision. This will help them to make their income diversification decision efficiently, effectively and reasonably, which in the long run will help them to achieve their objective in maximization of their owners and shareholders wealth and solvency position as well as employees need.

√ Credit managers of commercial banks also manage and follow ther loan-deposit position before deciding to diversify non-interest income since loan deposit ratio have a significant effect on non-interest income.

√ The risk manager of commercial banks also measures and predicts the risk level of banks such as insolvency risk inorder to protect the bank from insolvency by diversifying their income sources since insolvensy risk has a significant effect on non-interest income diversification.

√ The findings and analysis of this study also initiates some other questions which needs to be answered in future studies. More company specific and macro-economic factors than the ones included in this study like interest spread, level of financial intermediation, financial performance etc may have a significant effect on non-interest income diversification. It is also helps other researcher to investigate the determinants of non-interest income diversification with different sample size and time period coverage.

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Appendix 1: List of Commercial banks in Ethiopia

No	Name of Banks	Year of Establishment
1	Commercial bank of Ethiopia	1943
2	Awash International Bank	1994
3	Dashen Bank	1995
4	Bank of Abyssinia	1996
5	Wegagen Bank	1997
6	United Bank	1998
7	Nib International bank	1999
8	Cooperative Bank of Oromia	2004
9	Lion International Bank	2006
10	Zemen Bank	2008
11	Oromia International Bank	2008
12	Buna International Bank	2009
13	Berhan International Bank	2009
14	Abay Bank S.C	2010
15	Addis International Bank S.C	2011
16	Debub Global Bank S.C	2012
17	Enat Bank S.C	2012

Source: National Bank of Ethiopia

Appendix 2 List of variables with their numerical values

NIIR	BSZ	NIM	CR	LENLEV	INSR	CAR	GDP	INFR	Bank Name	Year
0.600	10.094	0.017	0.014	0.433	1.599	0.053	-0.021	0.178	CBE	2003
0.588	10.239	0.015	0.018	0.369	1.458	0.053	0.117	0.024	CBE	2004
0.676	10.409	0.011	0.009	0.377	1.388	0.043	0.126	0.107	CBE	2005
0.650	10.487	0.015	0.010	0.329	1.443	0.042	0.115	0.108	CBE	2006
0.640	10.680	0.016	0.017	0.297	2.043	0.097	0.118	0.151	CBE	2007
0.587	10.828	0.020	0.011	0.461	2.047	0.090	0.112	0.552	CBE	2008
0.461	10.992	0.029	0.009	0.481	2.050	0.085	0.100	0.027	CBE	2009
0.467	11.214	0.027	0.013	0.440	1.912	0.075	0.106	0.073	CBE	2010
0.496	11.646	0.026	0.014	0.424	1.709	0.055	0.135	0.380	CBE	2011
0.492	11.975	0.032	0.012	0.534	1.747	0.049	0.087	0.208	CBE	2012
0.369	12.191	0.036	0.014	0.469	1.649	0.046	0.099	0.074	CBE	2013
0.404	12.390	0.036	0.017	0.454	1.584	0.045	0.103	0.085	CBE	2014
0.352	12.628	0.039	0.019	0.450	1.605	0.043	0.104	0.104	CBE	2015
0.285	12.858	0.039	0.019	0.358	1.438	0.039	0.080	0.075	CBE	2016
0.573	7.245	0.023	0.041	0.687	2.408	0.098	-0.021	0.178	AB S.C	2003
0.596	7.479	0.021	0.033	0.634	2.361	0.088	0.117	0.024	AB S.C	2004
0.478	7.708	0.027	0.027	0.665	2.517	0.102	0.126	0.107	AB S.C	2005
0.506	7.991	0.030	0.023	0.729	2.608	0.103	0.115	0.108	AB S.C	2006
0.457	8.251	0.040	0.020	0.807	2.764	0.113	0.118	0.151	AB S.C	2007
0.543	8.481	0.030	0.023	0.707	2.773	0.124	0.112	0.552	AB S.C	2008
0.563	8.768	0.024	0.024	0.547	2.674	0.117	0.100	0.027	AB S.C	2009
0.721	8.980	0.019	0.023	0.515	2.746	0.118	0.106	0.073	AB S.C	2010
0.742	9.222	0.018	0.021	0.515	2.849	0.129	0.135	0.380	AB S.C	2011
0.535	9.387	0.032	0.025	0.598	2.856	0.135	0.087	0.208	AB S.C	2012

0.531	9.606	0.036	0.032	0.615	2.872	0.135	0.099	0.074	AB S.C	2013
0.576	9.905	0.031	0.031	0.610	2.802	0.126	0.103	0.085	AB S.C	2014
0.505	10.080	0.034	0.034	0.674	2.785	0.129	0.104	0.104	AB S.C	2015
0.441	10.296	0.039	0.036	0.677	2.771	0.129	0.080	0.075	AB S.C	2016
0.413	10.645	0.040	0.036	0.738	2.652	0.111	0.109	0.088	AB S.C	2017
0.352	7.195	0.026	0.035	0.752	2.381	0.112	-0.021	0.178	BOA	2003
0.277	7.368	0.043	0.025	0.755	2.618	0.122	0.117	0.024	BOA	2004
0.395	7.629	0.035	0.018	0.758	2.678	0.123	0.126	0.107	BOA	2005
0.307	7.949	0.044	0.020	0.902	2.795	0.142	0.115	0.108	BOA	2006
0.314	8.130	0.042	0.033	0.847	2.564	0.119	0.118	0.151	BOA	2007
0.374	8.359	0.037	0.054	0.810	2.249	0.098	0.112	0.552	BOA	2008
0.440	8.608	0.030	0.027	0.603	2.369	0.095	0.100	0.027	BOA	2009
0.605	8.745	0.021	0.023	0.614	2.385	0.093	0.106	0.073	BOA	2010
0.542	8.893	0.029	0.027	0.546	2.388	0.091	0.135	0.380	BOA	2011
0.438	9.017	0.035	0.027	0.576	2.548	0.110	0.087	0.208	BOA	2012
0.438	9.223	0.029	0.022	0.553	2.511	0.109	0.099	0.074	BOA	2013
0.519	9.330	0.037	0.031	0.556	2.800	0.136	0.103	0.085	BOA	2014
0.423	9.523	0.035	0.034	0.531	2.671	0.132	0.104	0.104	BOA	2015
0.454	9.731	0.038	0.042	0.588	2.632	0.126	0.080	0.075	BOA	2016
0.444	10.140	0.039	0.042	0.673	2.566	0.115	0.109	0.088	BOA	2017
0.500	6.790	0.028	0.039	0.811	2.297	0.105	-0.021	0.178	WB S.C	2003
0.478	7.039	0.042	0.041	0.842	2.493	0.113	0.117	0.024	WB S.C	2004
0.547	7.388	0.036	0.040	0.778	2.503	0.111	0.126	0.107	WB S.C	2005
0.541	7.723	0.038	0.040	0.896	2.526	0.113	0.115	0.108	WB S.C	2006
0.509	8.155	0.037	0.032	0.791	2.561	0.116	0.118	0.151	WB S.C	2007
0.563	8.325	0.036	0.037	0.791	2.729	0.147	0.112	0.552	WB S.C	2008
0.614	8.541	0.029	0.026	0.567	2.829	0.163	0.100	0.027	WB S.C	2009
0.649	8.656	0.030	0.030	0.631	2.931	0.183	0.106	0.073	WB S.C	2010
0.699	8.995	0.027	0.032	0.489	2.878	0.166	0.135	0.380	WB S.C	2011
0.575	9.030	0.036	0.030	0.619	2.970	0.192	0.087	0.208	WB S.C	2012

0.470	9.249	0.040	0.031	0.621	2.878	0.176	0.099	0.074	WB S.C	2013
0.487	9.327	0.038	0.039	0.549	2.907	0.191	0.103	0.085	WB S.C	2014
0.457	9.526	0.041	0.042	0.615	2.838	0.176	0.104	0.104	WB S.C	2015
0.427	9.692	0.042	0.044	0.678	2.809	0.173	0.080	0.075	WB S.C	2016
0.476	9.950	0.042	0.046	0.730	2.759	0.160	0.109	0.088	WB S.C	2017
0.480	6.151	0.028	0.038	1.010	3.239	0.194	-0.021	0.178	UB S.C	2003
0.543	6.513	0.024	0.037	0.722	2.948	0.142	0.117	0.024	UB S.C	2004
0.608	6.978	0.027	0.029	0.686	2.931	0.116	0.126	0.107	UB S.C	2005
0.567	7.377	0.026	0.023	0.823	2.933	0.119	0.115	0.108	UB S.C	2006
0.461	7.688	0.038	0.030	0.915	3.199	0.165	0.118	0.151	UB S.C	2007
0.502	8.086	0.033	0.028	0.761	3.086	0.144	0.112	0.552	UB S.C	2008
0.525	8.445	0.026	0.027	0.595	2.816	0.112	0.100	0.027	UB S.C	2009
0.639	8.682	0.025	0.027	0.553	2.857	0.108	0.106	0.073	UB S.C	2010
0.601	8.952	0.025	0.021	0.540	2.922	0.117	0.135	0.380	UB S.C	2011
0.494	9.081	0.036	0.026	0.604	2.991	0.125	0.087	0.208	UB S.C	2012
0.463	9.208	0.035	0.035	0.584	2.871	0.120	0.099	0.074	UB S.C	2013
0.358	9.382	0.037	0.034	0.569	2.922	0.133	0.103	0.085	UB S.C	2014
0.407	9.572	0.039	0.041	0.581	2.840	0.117	0.104	0.104	UB S.C	2015
0.390	9.757	0.041	0.042	0.655	2.859	0.120	0.080	0.075	UB S.C	2016
0.336	9.994	0.042	0.041	0.727	2.807	0.115	0.109	0.088	UB S.C	2017
0.316	5.583	0.010	0.033	0.615	3.008	0.508	0.118	0.151	LIB S.C	2007
0.409	6.353	0.023	0.042	0.485	2.545	0.298	0.112	0.552	LIB S.C	2008
0.432	6.859	0.022	0.036	0.668	2.182	0.202	0.100	0.027	LIB S.C	2009
0.598	7.218	0.027	0.030	0.574	2.212	0.177	0.106	0.073	LIB S.C	2010
0.570	7.500	0.027	0.029	0.521	2.263	0.195	0.135	0.380	LIB S.C	2011
0.578	7.809	0.031	0.030	0.559	2.224	0.179	0.087	0.208	LIB S.C	2012
0.531	7.987	0.038	0.031	0.626	2.273	0.184	0.099	0.074	LIB S.C	2013
0.496	8.192	0.037	0.039	0.574	2.171	0.174	0.103	0.085	LIB S.C	2014
0.586	8.676	0.038	0.052	0.635	2.004	0.140	0.104	0.104	LIB S.C	2015
0.507	9.002	0.044	0.054	0.679	1.930	0.132	0.080	0.075	LIB S.C	2016

0.348	9.303	0.048	0.041	0.625	1.932	0.132	0.109	0.088	LIB S.C	2017
0.074	4.860	0.002	0.011	0.200	3.688	0.868	0.126	0.107	CBO S.C	2005
0.044	5.412	0.021	0.040	1.286	3.197	0.545	0.115	0.108	CBO S.C	2006
0.278	6.050	0.031	0.038	0.852	2.691	0.307	0.118	0.151	CBO S.C	2007
0.289	6.519	0.040	0.034	0.649	2.422	0.218	0.112	0.552	CBO S.C	2008
0.251	6.930	0.032	0.040	0.745	1.987	0.152	0.100	0.027	CBO S.C	2009
0.529	7.478	0.027	0.037	0.513	1.768	0.107	0.106	0.073	CBO S.C	2010
0.651	7.824	0.021	0.032	0.397	1.732	0.098	0.135	0.380	CBO S.C	2011
0.539	8.208	0.031	0.029	0.487	1.930	0.114	0.087	0.208	CBO S.C	2012
0.638	8.786	0.026	0.029	0.466	1.928	0.106	0.099	0.074	CBO S.C	2013
0.589	8.903	0.044	0.042	0.669	2.228	0.148	0.103	0.085	CBO S.C	2014
0.482	9.347	0.049	0.053	0.891	1.993	0.123	0.104	0.104	CBO S.C	2015
0.296	9.271	0.056	0.076	0.697	1.713	0.115	0.080	0.075	CBO S.C	2016
0.298	9.783	0.044	0.048	0.678	1.583	0.086	0.109	0.088	CBO S.C	2017
0.527	6.786	0.029	0.041	0.935	3.013	0.141	-0.021	0.178	NIB S.C	2003
0.474	7.128	0.033	0.023	0.945	3.086	0.139	0.117	0.024	NIB S.C	2004
0.468	7.457	0.034	0.026	0.926	3.017	0.129	0.126	0.107	NIB S.C	2005
0.422	7.614	0.037	0.023	1.016	3.085	0.141	0.115	0.108	NIB S.C	2006
0.367	7.866	0.040	0.023	0.967	3.218	0.163	0.118	0.151	NIB S.C	2007
0.420	8.202	0.041	0.026	0.856	3.239	0.164	0.112	0.552	NIB S.C	2008
0.491	8.478	0.037	0.027	0.674	3.178	0.152	0.100	0.027	NIB S.C	2009
0.621	8.695	0.030	0.030	0.617	3.193	0.154	0.106	0.073	NIB S.C	2010
0.603	8.870	0.030	0.027	0.537	3.250	0.165	0.135	0.380	NIB S.C	2011
0.536	9.021	0.034	0.026	0.635	3.343	0.185	0.087	0.208	NIB S.C	2012
0.421	9.121	0.042	0.030	0.683	3.318	0.182	0.099	0.074	NIB S.C	2013
0.421	9.282	0.036	0.026	0.683	3.300	0.183	0.103	0.085	NIB S.C	2014
0.353	9.492	0.044	0.035	0.705	3.200	0.164	0.104	0.104	NIB S.C	2015
0.279	9.670	0.047	0.035	0.605	3.166	0.159	0.080	0.075	NIB S.C	2016
0.316	9.953	0.046	0.035	0.652	3.120	0.141	0.109	0.088	NIB S.C	2017
0.884	6.138	0.004	0.052	0.680	1.625	0.197	0.100	0.027	ZB S.C	2009
0.925	6.962	0.008	0.040	0.558	1.950	0.151	0.106	0.073	ZB S.C	2010

0.889	7.386	0.012	0.034	0.555	1.929	0.149	0.135	0.380	ZB S.C	2011
0.817	7.781	0.015	0.032	0.565	1.643	0.117	0.087	0.208	ZB S.C	2012
0.837	8.086	0.015	0.056	0.547	1.789	0.152	0.099	0.074	ZB S.C	2013
0.733	8.275	0.023	0.031	0.472	1.954	0.167	0.103	0.085	ZB S.C	2014
0.655	8.492	0.026	0.034	0.564	1.822	0.157	0.104	0.104	ZB S.C	2015
0.677	8.906	0.022	0.031	0.593	1.697	0.136	0.080	0.075	ZB S.C	2016
0.749	9.177	0.017	0.033	0.542	1.747	0.136	0.109	0.088	ZB S.C	2017
0.667	5.771	0.003	0.019	0.614	3.058	0.336	0.100	0.027	OIB S.C	2009
0.769	7.020	0.013	0.039	0.449	2.671	0.189	0.106	0.073	OIB S.C	2010
0.752	7.582	0.015	0.033	0.434	2.486	0.151	0.135	0.380	OIB S.C	2011
0.615	7.933	0.024	0.039	0.482	2.480	0.157	0.087	0.208	OIB S.C	2012
0.511	8.272	0.034	0.046	0.531	2.373	0.140	0.099	0.074	OIB S.C	2013
0.493	8.725	0.037	0.039	0.506	2.323	0.122	0.103	0.085	OIB S.C	2014
0.407	9.163	0.038	0.041	0.646	2.171	0.103	0.104	0.104	OIB S.C	2015
0.342	9.331	0.047	0.051	0.553	2.225	0.117	0.080	0.075	OIB S.C	2016
0.500	9.698	0.036	0.048	0.053	2.110	0.102	0.109	0.088	OIB S.C	2017
0.500	7.596	0.026	0.034	0.782	2.395	0.065	-0.021	0.178	DB S.C	2003
0.497	7.892	0.028	0.027	0.776	2.489	0.064	0.117	0.024	DB S.C	2004
0.396	8.137	0.032	0.025	0.788	2.556	0.071	0.126	0.107	DB S.C	2005
0.417	8.422	0.038	0.025	0.857	2.782	0.085	0.115	0.108	DB S.C	2006
0.421	8.706	0.038	0.022	0.820	2.841	0.090	0.118	0.151	DB S.C	2007
0.492	8.966	0.033	0.022	0.712	2.859	0.093	0.112	0.552	DB S.C	2008
0.577	9.183	0.024	0.021	0.562	2.811	0.093	0.100	0.027	DB S.C	2009
0.673	9.422	0.019	0.021	0.498	2.798	0.091	0.106	0.073	DB S.C	2010
0.709	9.593	0.019	0.022	0.525	2.865	0.095	0.135	0.380	DB S.C	2011
0.629	9.771	0.028	0.024	0.578	2.984	0.104	0.087	0.208	DB S.C	2012
0.600	9.891	0.027	0.026	0.559	2.922	0.104	0.099	0.074	DB S.C	2013
0.639	9.997	0.026	0.028	0.533	3.035	0.118	0.103	0.085	DB S.C	2014
0.597	10.117	0.030	0.036	0.582	3.014	0.118	0.104	0.104	DB S.C	2015
0.608	10.260	0.027	0.036	0.558	2.984	0.118	0.080	0.075	DB S.C	2016
0.539	10.452	0.033	0.044	0.651	2.945	0.115	0.109	0.088	DB S.C	2017

Appendix 3 Result of pooled OLS regression

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. regress NIIR BSZ NIM CR LENLEV INSR CAR  GDP INFR
```

Source	SS	df	MS
Model	2.01018244	8	.251272805
Residual	.946356448	137	.006907711
Total	2.95653889	145	.020389923

Number of obs	146
F(8, 137)	36.38
Prob > F	0.0000
R-squared	0.6799
Adj R-squared	0.6612
Root MSE	.08311

NIIR	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
BSZ	-.0044486	.0081897	-0.54	0.588	-.0206432	.011746
NIM	-12.25427	1.065976	-11.50	0.000	-14.36217	-10.14638
CR	4.86231	.8094981	6.01	0.000	3.261583	6.463037
LENLEV	-.1426047	.062901	-2.27	0.025	-.266987	-.0182223
INSR	.0700654	.0172947	4.05	0.000	.0358664	.1042644
CAR	-1.090488	.1069208	-10.20	0.000	-1.301916	-.8790591
GDP	.6090863	.2348541	2.59	0.011	.1446783	1.073494
INFR	.0379586	.0517172	0.73	0.464	-.0643087	.1402259
_cons	.7714512	.1071749	7.20	0.000	.5595202	.9833821