Determinants of Banks Interest rate spread: An Empirical Evidence from Ethiopian Commercial Banks

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ABSTRACT

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The banking sector plays a fundamental role in economic growth, as it is the basic element in the channeling of funds from lenders to borrowers. Efficient financial intermediation is an important factor in economic development process as it has implication for effective mobilization of investible resources. A major indicator of banking sector efficiency is interest rate spreads. Thus, this study examines the bank, industry and macro-economic specific factors affecting banks interest rate spread for a total of eight commercial banks in Ethiopia, covering the period of 2004-2013. To this end, the study adopts a mixed research approach by combining document analysis and in-depth interviews. The findings of the study show that credit risk, liquidity risk, , operating cost, concentration, reserve requirement, gross domestic product , interest rate volatility and exchange rate volatility have statistically significant and positive relationship with banks interest rate spread. Conversely return on asset, non interest income and financial development indicator has a negative and statistically significant relationship with banks' interest rate spread. However, the relationship between management quality and inflation is found to be statistically insignificant. The study suggests that banks in Ethiopia should not only be concerned about internal structures and policies, but they should consider both the internal and external environment together in fashioning out strategies to improve their intermediary efficiency.

Key words: Interest rate spread, efficient financial intermediation, economic growth, commercial banks.

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List of Acronyms

AIB	Awash International Bank
BOA	Bank of Abyssinia
CBB	Construction and Business Bank
CBE	Commercial Bank of Ethiopia
CPI	Consumer Price Index
CLRM	Classical Linear Regression Model
CR	Credit risk
ERV	Exchange Rate Volatility
FDI	Financial development indicator
FEM	Fixed Effect Model
GDP	Gross Domestic Product
HHI	Herfindahl–Hirschman index
INFL	Inflation
IMF	International Monetary Fund
IRV	Interest Rate Volatility
LR	Liquidity risk
MQ	Management Quality
NBE	National Bank of Ethiopia
NIB	Nib International Bank

NII	Non Interest Income
NIM	Net Interest Margin
NPL	Non Performing Loan
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Square
OC	Operating Cost
REM	Random Effect Model
RES	Reserve Requirement
ROA	Return on Asset
SSA	Sub Sahara Africa
UB	United Bank
WB	Wegagen Bank

CHAPTER ONE

INTRODUCTION

The purpose of this chapter is to provide background information on the study. The remaining parts of the chapter are organized as follows. The first section presents background of the study. While the second section sets out statement of the problem. Section three and four presents the objectives of the research, and hypotheses of the study respectively. Then, fifth and six sections present the significance, and delimitation and limitation of the study. Finally, the structure of the report is presented at the end of the chapter.

1.1 Background of the Study

The banking sector plays a fundamental role in economic growth, as it is the basic element in the channeling of funds from lenders to borrowers. Efficient financial intermediation is an important factor in economic development process as it has implication for effective mobilization of investible resources. Consequently, banking sector efficiency plays significant role in an economy. A major indicator of banking sector efficiency is interest rate spreads, which have been found to be higher in African, Latin American and the Caribbean countries than in OECD countries (Randall, 1998; Brock and Suarez, 2000; Chirwa and Mlachila, 2004; Gelos, 2006; Crowley, 2007).

The prevailing margin between deposit-lending rates, the interest rate spreads in an economy has important implications for the growth and development of such economy, as numerous authors suggest a critical link between the efficiency of bank intermediation

and economic growth. Quaden (2004), for instance, argues that a more efficient banking system benefits the real economy by allowing ‗higher expected returns for savers with a financial surplus, and lower borrowing costs for investing in new projects that need external finance.' Therefore, if the banking sector's interest rate spread is large it discourages potential savers due to low returns on deposits and thus limits financing for potential borrowers (Ndung'u and Ngugi, 2000). Valverde et al (2004) elucidate by noting that because of the costs of intermediation between savers and borrowers, only a fraction of the savings mobilized by banks can be finally channeled into investments. An increase in the inefficiency of banks, increases these intermediation costs, and thereby increases the fraction of savings that is ‗lost' in the process of intermediation. This ultimately reduces lending, investment and economic growth (Folawewo and Tennant, 2008).

The financial systems in most of the developing and underdeveloped countries are subject to structural, informational and institutional inefficiencies that ultimately lead to high margins between lending and borrowing rates of commercial banks. These high spreads emanate from elevated and volatile lending rates and leads to a higher cost of capital for the borrowers, consequently reducing investments or promoting only short term high risk ventures. The impact of relatively higher banking spreads could be devastating for businesses with less financial flexibility especially small and medium enterprises. Lastly, sustained high spreads is a vital indicator of the poor performance of financial system inter alia inadequacy of banking regulation and can ultimately retard economic growth (Afzal, 2011).

A wide deposit-lending rate margin is not only indicator of banking sector inefficiency; it also reflects the level of development of the financial sector. In Ethiopia there is no any scientific research conducted in this area to the knowledge of the researcher. Therefore, in order to measure the desirable state of efficiency in banking system of Ethiopia, it is vital to study Bank, industry and macroeconomic specific determinants of interest rate spreads which is used as proxy variable for measuring intermediary efficiency for commercial banks.

1.2 Statement of the problem

Economic development critically hinges on patterns and levels of resource mobilization and allocation in any country. Resources are mobilized through savings which at the level of macro economy pave way for the allocation of resources for the purpose of consumption and investment. Similarly, investment depends critically on banking credit and the underlying lending system which enables the investors to borrow for the purpose of investing in real capital to enhance existing businesses or for establishment of a new business entity. In this way banking credit contributes to the generation of economic activity and eventually leads to higher national income and growth. Therefore, all economic players including households, businesses and public sector are sensitive towards the efficient flow of resources from surplus to deficit units (Afzal, 2011).

A key variable in the financial system is the spread between lending and deposit interest rates. When it is too large, it is generally regarded as a considerable hurdle to the expansion and development of financial intermediation, as it discourages potential savers with low returns on deposits and limits financing for potential borrowers and this ultimately reduce feasible investment opportunities and therefore the growth potential of

the economy. Financial systems in developing countries have been shown to exhibit significantly and persistently larger intermediation spreads on average than those in developed countries (Hanson and Rocha, 1986).

Higher net interest margins usually imply lower banking sector efficiency, marked by higher costs due to inefficient control of operating expenses, and have a negative impact on financial developments, resulting in lower investments and slower economic activity. On the other hand, lower net interest margins usually mark deeper and more developed financial markets, encourage investment activities and support economic growth (Dumicic and Ridzak, 2013).

In connection with research studies that have been conducted on determinants of interest rate spread, there are exhaustive studies examined this issue in different level of economies. In developed economies (Angbazo, 1997; Maudos and Guevara, 2003; and Gunter et, al, 2013). In emerging economies , (Barajas et al ,1998 ; Afanassieff et al ,2000; Khawaja and Din ,2007; Norris and Floerkemeir, 2007 ; Maudos and Solis, 2009; Khan ,2010; Afzal ,2011; and Dumicic and Ridzak ,2013). In developing and sub-Saharan African countries, (Ramful, 2001; Chirwa and Mlachila, 2002; Folawewo and Tennant, 2008; Beck and Hesse, 2009; Akinlo, 2012; Were and Wambua, 2013; and Ahokpossi 2013) conducted their studies on determinants of interest rate spread and net interest margin. While we see in Ethiopia there is no any empirical study conducted on this issue to the knowledge of the researcher.

Generally the studies conducted in developed, emerging, developing and Sub-Saharan African countries found different bank, industry and macroeconomic specific factors that affect interest rate spread of banks, but it depict variation in results since, countries differ

each other by their economic, financial, regulatory and operating environments. For instance Maudos and Solis (2009) found interest rate volatility as a significant factors that affect the interest rate spread of Mexican banking sector, it was inconsistent with Afzal (2011) which found interest rate volatility as insignificant factors for determining interest rate spread of Pakistan's banking sector, and also Beck and Hesse (2009) found GDP and inflation as the main determinants of interest rate spread of Ugandan banking sector, it was inconsistent with Were and Wambua (2013) which found GDP and inflation as insignificant variable for determining Kenyan banks interest rate spread. Furthermore, the literature revealed that all of the prior researchers adopt a quantitative research approach only without considering a lot of limitations of it. Therefore, further empirical evidence could provide additional insight about the determinants of interest rate spread by using much recent dataset, mixed research approach and it needs further investigation in Ethiopian context.

In Ethiopia, the banking sector plays a dominant role in the financial sector, particularly with respect to mobilization of savings and provision of credit, but the interest rate spread[1] is high 6.48% (NBE, 2012) as compared to East African countries average i.e. 5.48% (IMF, 2012), and vis-à-vis international standards 5% as cited in Afzal (2011). However, no empirical research have been conducted in Ethiopia on this issue to the knowledge of the researcher, as a result understanding the determinants of banks interest rate spread is important to improve intermediary efficiency of banks and achieving financial deepening. Therefore this paper is designed to fill the knowledge gap by investigating Bank, industry and Macroeconomic specific factors that could possibly affects the variability of interest rate spread of Ethiopian commercial Banks.

[1] It is the difference between average lending and average deposit rate

1.3 Objectives of the study

In the framework of the problems highlighted above, the study has the following general and specific objectives:

1.3.1 General Objective

The general objective of this study was to examine the major determinants of commercial banks interest rate spread in Ethiopia.

1.3.2 Specific Objectives

To achieve the general objective, the researcher also includes the following specific objectives;

- To examine the effects of Bank specific factors on interest rate spread of Ethiopian commercial banks.
- To analyze the effects of industry-specific factors on interest rate spread of Ethiopian commercial banks.
- To investigate the effects of macroeconomic factors on interest rate spread of Ethiopian commercial banks.

1.4 Hypothesis and Research Question

In order to attain the aforementioned broad objectives, the following thirteen hypotheses and one research question are devised.

H_1: There is a significant positive relationship between credit risk and banks‘ interest rate spread.

H_2: There is a significant positive relationship between liquidity risk and banks interest rate spread.

H_3: There is a significant negative relationship between return on asset and banks interest rate spread.

H_4: There is a significant negative relationship between noninterest income and Banks interest rate spread.

H_5: There is a significant positive relationship between operating cost and banks interest rate spread.

H_6: There is a significant positive relationship between management quality and banks interest rate spread.

H_7: There is a significant positive relationship between concentration and banks interest rate spread.

H_8: There is a significant positive relationship between reserve requirement and banks interest rate spread.

H_9: There is a significant positive relationship between GDP and banks interest rate spread.

H_{10}: There is a significant positive relationship between Inflation and banks interest rate spread.

H_{11}: There is a significant positive relationship between interest rate volatility and banks interest rate spread.

H_{12}: There is a significant positive relationship between exchange rate volatility and banks interest rate spread.

H_{13}: There is a significant negative relationship between financial development indicator and banks interest rate spread.

Research question: *What are the determinants of banks interest rate spread in Ethiopia and how do those factors influence the interest rate spread of Ethiopian banks?*

1.5 Significance of the study

The significance of this research includes the following:

- First, the study shows the degree of the bank, industry and macroeconomic specific factors in what extent it affects commercial banks interest rate spread.
- Second, as it is explained in the statements of the problem part, in Ethiopia there is no any scientific research conducted in this area to the knowledge of the researcher. As a result, this study contributes towards extended research in the area of determinants of interest rate spread of banks in Ethiopia.
- Third, the study identifies the factors affecting bank interest rate spread significantly. Thus, it gives signal to the management of the banks and policy makers to consider the main factors that influence interest rate spread of banks; as a result it helps them to improve their intermediary efficiency and achieving financial deepening.

1.6 Delimitation and limitation of the study

Under this sub-section the delimitation and limitation of the study has presented.

1.6.1 Delimitation of the study

There are eighteen commercial banks in Ethiopia both public and private which are fully engaged in commercial banking activity. But to make the study more manageable, the scope of the study focused on eight commercial banks, among those two of them are state owned (Commercial bank of Ethiopia and Construction and Business bank) and six private banks (Awash bank, Dashen bank, Bank of Abyssinia, Wegagen bank, United bank and Nib International Bank) which is fully operated from the year 2004-2013. And the study is concentrated on the bank, industry and macroeconomic specific measurable factors of interest rate spread only.

1.6.2 Limitation of the study

The researcher analyzed bank, industry and macroeconomic specific factors of interest rate spread of eight commercial banks in Ethiopia. The generalization of the results to the broader context, eighteen commercial banks in Ethiopia is limited and lack of relevant and up to date published literatures mainly in the context of Ethiopia and absence of consistent information from each source of data affects the outcome of this paper.

1.7 Structure of the study

The study focuses on the investigation of the major determinants of banks interest rate spread in Ethiopia. With the intent of the above broad objective's attainment, the study structure has presented as follows; chapter two presents a review of the literature including theoretical, empirical and research gap. The research design and methodology are presented in chapter three. Chapter four presents the results of survey and in-depth interviews concurrently and this is followed by an analysis of the results of the different methods. Finally, chapter five presents conclusions and recommendation of the study.

CHAPTER TWO

LITERATURE REVIEW

The review has four sections. Section 2.1 presents theoretical framework of the study. This is followed by a review of the relevant empirical studies on determinants of interest rate spread in section 2.2, then section 2.3 presents conclusions on the literature review and knowledge gaps and finally, conceptual framework of the study is presented in section 2.4.

2.1 Theoretical Framework

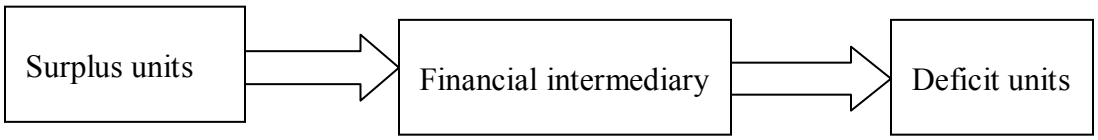
In this section the concept of financial intermediation, the rational of the existence of financial intermediaries concept interest rate spread, accounting analysis of net interest margin and theoretical determinants of interest rate spread were presented.

2.1.1 Concept of financial intermediation

Financial intermediation is defined as a process of channeling funds from surplus sectors of the economy towards the deficit sectors. The institutions that perform this function are known as financial intermediaries. Banks are the most popular financial intermediaries in the world. The cost of performing intermediary services is termed as the cost of financial intermediation (COFI). As financial intermediaries, banks play a crucial role in the operation of most economies. The efficacy of financial intermediation can also affect economic growth. Crucially, financial intermediation affects the net return to savings, and the gross return for investment. The spread between these two returns mirrors the bank interest margins, in addition to transaction costs and taxes borne directly by savers and

investors. This suggests that bank interest spreads and net interest margin can be interpreted as an indicator of the efficiency of the banking system (Levine, 1996).

Figure 2.1 Financial intermediation



Source: Matthews and Thompson (2005, p.34)

2.1.2 The rationale of the existence of financial intermediaries

The rationale of the existence of financial intermediaries and contribution in economic development can be classified into three main categories. These include information problems (theory of asymmetric information), transaction costs (financial services) and regulatory factors (agency theory).

2.1.2.1 Theory of asymmetric information

The primary reason for financial intermediation is informational asymmetries between participants of financial system. There could be ex ante asymmetries that would lead to adverse selection, interim ones, causing moral hazards and ex post, warranting need for audit or other costly monitoring or enforcement mechanisms. Financial intermediaries are expected to mitigate these explicit and implicit costs. Leland and Pyle (1977) demonstrate that financial intermediaries reduce asymmetric costs by acting as information sharing coalitions. Diamond and Dybvig (1983) proposed financial intermediation as risk absorption capacity for depositors against idiosyncratic shocks that would negatively impact their liquidity. Diamond (1984) advocates the role of financial intermediaries as monitoring agents on behalf of surplus units, where households will place deposits with

intermediaries who in turn would extend credit to deficit units and monitor their activities.

2.1.2.2 Transaction cost

The existence of transaction costs is the second reason (in fact exogenous) for evolution of financial intermediation. The financial institutions would act on behalf of lenders and borrowers and exploit economies of scale and scope. The transaction costs would include monetary costs (Tobin 1963) and search costs, monitoring and audit costs (Benston and Smith 1976). The intermediaries would transform financial claims of depositors to advances portfolio while maintaining liquidity and diversification. This would enhance the efficiency, while mitigating transaction costs, between borrower and lender which is difficult to achieve in absence of financial intermediaries (Holmstrom and Tirole 2001). Therefore, with role of intermediation, savers and investors are likely to interact optimally at considerable low cost with more effective screening and monitoring of current and expected default risk.

2.1.2.3 Agency theory

The third justification of financial intermediaries relates to their role to regulate money creation and financing of an economy (Fama 1980 and Merton 1995). The inherent risks and concerns of solvency in a financial system require the monetary and prudential supervision that is not possible in direct interaction of savers and investors. Although, regulatory supervision of financial intermediaries is expensive but the potential benefits that emanate in form of safety for depositors are immense and considered as main economic rent extracted from monitoring and control (Matthews and Thompson, 2005).

2.1.3 Concept of interest rate spread and its measurement

The one thing that typically distinguishes banks from other financial institutions is the provision of loans and deposit products. Deposits are liabilities while loans are asset for banks. A bank‘s core activity is to act as financial intermediary. It pays interest to depositors, while it receives income from borrowers; the difference between these two rates is termed as interest rate spread. The interest rate spread, or the financial intermediation spread is an important indicator for the banking system and the intermediation process. The financial intermediation is associated with cost of intermediation. Interest rate between lending and deposit rate used for making judgment on banks efficiency in case of individual bank spread, or banking system‘s efficiency in case of overall spread of banking system (Maudos and Solis, 2009).

Issues in measuring banking spread:

While the concept of cost of financial intermediation (COFI) is straightforward, there is no single measure to gauge COFI in its true sense. In practice, it is proxy by margins or banking spreads indicating gap between some sort of representative lending and deposit rates of financial intermediaries. The most widely used indicators are the net interest margin gap between interest earned and interest paid normalized by average earning assets or total assets and the banking spread gap between lending and deposits rates bank (Arshad, 2011).

According to Brock and Suarez (2000) four different indicators of banking spread have been computed to highlight definitional issues. These indicators are broadly classified into two categories according to the coverage of banks‘ assets and liabilities. Specifically, narrowly defined indicator is based on banks‘ loans and advances. On the other hand,

broad definition of indicators take into account larger share of banks‘ assets and liabilities compared to the narrow definition. Narrow and wide definitions of spread are presented as follows.

Narrowly defined spread

SN1 = ((Interest earned on loans/Average loans) – (Interest paid on loan/Average deposit))*100

Broadly defined spreads

SW1 = ((Interest earned/ Average interest bearing asset) – (Interest paid/Average interest bearing liabilities))*100

SW2 = ((Interest plus commission earned/Average interest bearing assets) - (Interest paid/interest bearing liabilities))*100

SW3 = (Interest earned – Interest paid)/Average Assets

Where n is used to reflect the narrow definitions of spread and w represent wide definitions.

While there is no consensus on specific definition of banking spread and a meaningful benchmark, the SW1 definition of banking spread is more appropriate for the analysis as it takes in to account the earning assets and interest bearing liabilities of the bank (Arshad, 2011).

2.1.4 Concept and accounting analysis of net interest margin

Net interest margin serves as a measure of banks‘ efficiency and it is calculated as the proportion of net interest income to total assets or earning assets. For analyzing the interest margins some kinds of analyses may be carried out, one of which is the accounting decomposition first developed by Hanson and Rocha (1986). Using the banks‘ profit and loss statements, the following equation is derived:

NI = NII – (OE – NNII – NEI) – LLP – T…….. (1)

Where, NI (Net Income) represents the net result of banks (after taxes), NII stands for Net Interest Income, OE corresponds to the Operating Expenses, NNII represents the Net Non-Interest Income, NEI stands for the Net Extraordinary Income, LLP represents the Loan Loss Provisions and T stands for Taxes.

If we make a rearrangement of the equation (1) and express them as percentage against total assets (TA), there can be noticed the items that mostly impact the determination of Net Interest Margin (NIM), which here is calculated as net interest income to total assets.

$$NIM = \frac{(OE - NNII - NEI)}{TA} + \frac{LLP}{TA} + \frac{T}{TA} + \frac{NI}{TA} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

According to equation (2) we can conclude that the net interest income (which is the numerator of the net interest margin formula) is influenced by the operating expenses not covered by the other (non interest) incomes, the level of provisioning for nonperforming loans, the taxes paid to the state and the amount of profits realized(Kalluci,2007).

2.1.5 Factors affecting interest rate spread

The theory of net interest margin is developed first by Ho and Saunders (1981) and is called the dealer model. The way it works can be briefly explained as follows: the banks are considered as risk-averse agents that accept deposits and make loans, which arrive randomly and the probability of arrival depends on the margins that banks fix and on the elasticity of loan demand/deposit supply. The random nature of loan demand and deposit supply exposes the bank to interest rate risk. Let‘s suppose that a new deposit reaches the bank and owing to the lack of the simultaneously demand for loan, this latter shall be invested in the money market. In such a case the bank encounters the re-investment risk at the end of the maturity period when it should re-invest this amount. On the other side, if a new loan demand is financed in the money market, the bank will encounter the re-financing risk as at the end of the maturity period, it has to provide funds once again. In this case, in addition to interest rate risk, the bank will encounter the credit risk too. Hence, a risk-averse financial intermediary shall request as recompense a higher margin. Ho and Saunders (1981) modeled the behavior of a bank that acts as intermediary between lenders and borrowers. The theoretical model indicates that the optimum bank interest margin depends on four factors: the degree of risk aversion, the market structure, the average size of bank transactions and the variance of the interest rate on loans and deposits. There are different variables that affect interest rate spread; those variables are explained as follows.

2.1.5. 1. Risk factors

Banks are exposed to various risks, including interest risk, credit risk, foreign exchange and liquidity risk, as a result of uncertainty, information asymmetry and the policy environment. For example, when banks hold unmatched maturities of deposits and loans they are exposed to interest rate risk. This especially, happen when banks raise funds through short-term deposits to finance long-term loans or purchase security with longer maturity. Interest rate risk is also defined by variability of the market interest rate. Banks are exposed to credit risk due to information asymmetry and moral hazard. Banks do not know ex ante the proportion of loans that will perform and even when they carry out appraisals, credit losses are not fully eliminated. As the probability of defaults on loans increases, the bank margins rises to compensate for the losses. Foreign exchange risk arises especially when banks fund themselves abroad, while liquidity risk which represents the risk of not having sufficient cash to satisfy unexpectedly high withdrawal of deposits or new loan requests, pushing up banks to borrow funds at excessive cost this leads to high spread to compensate the risk (Ngugi, 2001).

2.1.5.2. Market power

The structure of the market in which banks operate plays an important role in influencing bank spreads. Economic theory posits that competitive pressures that result from conditions of free entry and competitive pricing will raise the efficiency of intermediation by decreasing the spreads between deposits and lending rates. On the other hand interest rate spreads are positively related to market power i.e the more concentrated the banking industry (i.e. the less competitive) the higher the banks‘ spreads (Grenade, 2007).

2.1.5.3. Regulation

Non-interest bearing reserves impose an implicit financial tax on banks thereby reducing commercial banks revenues. Banks can either pass on this loss of revenue to depositors, who will receive lower interest rates on deposits, or they can pass it on to borrowers who will face higher interest rates on loans, thereby increasing the spread between the two rates (Grenade, (2007).

2.1.5.4. Macroeconomic environment

The macroeconomic environment affects the performance of the banking sector by influencing the ability to repay borrowed loans; the demand for loans with the unpredictable returns from investment and the quality of collateral determine the amount of premium charged and therefore the cost of borrowed funds to the investors. With an unstable macroeconomic environment and poor economic growth, investors face uncertainty about investment return and these raise the lending rates as the level of nonperforming loans goes up, squeezing the bank margin. For example, poor output prices reduce firm profitability while reduced asset prices reduce the value of assets for collateral and therefore the credit-worthiness of the borrowers. As a result, return on investment declines, increasing the level of non-performing loans, and banks charge high-risk premiums to cover their default risk (Ngugi, 2001).

2.2 Empirical review

A number of studies have examined the determinants of banks‘ interest rate spread and interest margins in many countries around the world. Most of the studies consider internal factors (i.e., banks‘ specific) and external factors (i.e., industry-specific and macroeconomic factors) and examine either a particular country or a number of countries and a number of explanatory variables have been proposed for three categories, according to the nature and purpose of each study. In the following section the researcher review determinants of interest rate spread with respect to developed, emerging and developing countries.

2.2.1 Determinants of interest rate spread in developed countries

There are three studies that have been reviewed from developed economies. These are Angbazo (1997); Maudos and Guevara, (2003); and Gunter et, al (2013). The aforementioned researcher has conducted their study in US, European banking sector and Austria respectively.

Angbazo (1997) examined the determinants of bank net interest margins for a sample of US banks using annual data for 1989- 1993 in a country specific basis. The results for the pooled sample suggested that the proxies for default risk, opportunity cost of non-interest bearing reserves, leverage and management efficiency are all statistically significant and positively related to bank interest margins. The ratio of liquid assets to total liabilities, a proxy for low liquidity risk, was inversely related to the bank interest margins.

Maudos and Guevara, (2003) investigated the factors that affects interest margin of European banking sector on the basis of a broad sample of banks in Germany, Spain, Italy, France and the United Kingdom in the period 1993-2000. The model shows that the ―pure" interest margin depends on the competitive conditions of the market, the interest rate risk, the credit risk, the average operating expenses and the risk aversion of banking firms, as well as on other variables not explicitly introduced into the model (opportunity cost of reserves, payment of implicit interest and quality of management).

Finally, Gunter et, al (2013) analyzed the determinants of the net interest margin in the Austrian banking sector. They considered various explanatory factors bank, industry and macroeconomic determinants of interest rate spreads and they concludes that the most significant variables that affect net interest margin are fee income, staff expenses and other operating expenses, balance sheet structure, leverage ratio, competition and GDP.

2.2.2 Determinants of interest rate spread in emerging countries

There are eight studies that have been reviewed from emerging economies. These are Barajas et al (1998), Afanassieff et al (2002), Khawaja and Din (2007), Norris and Floerkemeir (2007), Maudos and Solis (2009), Khan and Khan (2010), Afzal (2011) and Dumicic and Ridzak (2013) . The aforementioned researcher has conducted their study in Colombia, Brazil, Pakistan, Armenia, Mexico, Pakistan, Pakistan and Central and Eastern Europe (CEE) respectively.

Barajas et al (1998), examined the sources of high intermediation spreads observed in the Colombian banking sector over the pre liberalization period (1974- 1988) and the post liberalization period (1991-1996) and found mixed results. Liberalization increased banking sector competitiveness, lowered market power and reduced financial taxation

from its high 1970s level. The results also show bank spreads to be more responsive to non-financial costs (wages) and changes in loan quality.

Afanassieff et al (2000), using panel data techniques to find out the main determinants of bank spreads in Brazil, found that macroeconomic factors such as inflation rate, risk premium and economic activity are the most relevant factor in explaining the spreads.

Norris and Floerkemeir (2007) used bank level panel dataset for Armenia to examine the factors explaining interest rate spreads and margins from 2002 to 2006. They employed a variety of bank specific and macro variables including overhead costs, bank size, non interest income, capital adequacy, return on assets, liquidity, deposit market share, foreign bank participation, real GDP growth, inflation, money market rate and change in the nominal exchange rate. Using both pooled OLS and fixed effect regression they concluded that bank specific factors such as size, liquidity, return on asset, market concentration and market power explain a large proportion of banking spreads.

Khawaja and Din (2007) investigated the determinants of interest rate spreads in Pakistan using panel data of 29 banks from 1998 to 2005. They used industry variables like concentration and deposit inelasticity (measured as interest rate insensitive current and saving deposits) and firm variables of market share, liquidity, administrative costs, asset quality and macroeconomic variables of real output, inflation and real interest rates. They concluded that inelasticity of deposit supply was the major determinant of interest rate spread.

Maudos and Solis (2009) analyzed the determinants of net interest income in Mexican banking sector for the period between 1993 and 2005. Their sample constituted of 43 commercial banks with 289 annual observations of an unbalanced panel data. They observed high interest margins for Mexico. They considered various explanatory factors to explain the behavior of banking spreads. These included operating costs, volatility of interest rates, implicit interest payments, quality of management, non interest income, credit risk, degree of risk aversion, market risk, transaction size, liquidity, cost to gross income, GDP growth and inflation rate. The reported results reflected that except for liquidity all other variables were significantly related to interest rate spreads. They concluded that the high Mexican spreads are mainly a function of average operating costs and market power while non interest income, despite of increasing over the years, has low economic impact.

Khan and Khan (2010) examined the efficiency of financial intermediation in Pakistan using banking spreads and net interest margin for the period 1997 to 2006. They employed bank specific indicators of non interest income, provision to NPLs, administrative costs, foreign ownership and industry specific variable of concentration and macroeconomic indicator of real GDP growth and interest rate volatility. The review concluded that all of the variables were significant in explaining interest rate spreads with administrative costs and foreign ownership explaining a higher proportion in comparison with other determinants.

Afzal (2011) analyzed the determinants of interest rate spreads and margins in Pakistan‘s commercial banking sector in the post transition period from 2004 to 2009. They employed an exhaustive set of firm level and macro variables, and the findings reveals

bank size , operational efficiency, asset quality, liquidity, risk absorption capacity and GDP growth were important determinants of banking spreads but, the interest rate volatility and financial development indicator was not significant.

Finally, Dumicic and Ridzak (2013) investigated the main determinants of the net interest margin in eleven CEE countries: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia. The total sample consists of 12 periods (from 1999 to 2010) and 152 cross sections (banks), by considering bank specific, industry specific and macroeconomic factors. The finding reveals that low credit demand, higher capitalization and significantly increased share of non-performing loans affect interest rate margin significantly.

2.2.3 Determinants of interest rate spread in developing countries

There are seven studies that have been reviewed from developing countries, Ramful (2001), Chirwa and Mlachila (2002), Folawewol and Tennant (2008), Beck and Hesse (2009), Akinlo (2012), Ahokpossi (2013) and Were and Wambua (2013) The aforementioned researcher has conducted their study in Mauritius, Malawi, 33 Sub-Saharan African (SSA) countries, Uganda, Nigeria, Sub-Saharan African (SSA) countries and Kenya respectively.

Ramful (2001) examined the determinants of interest rate spread of Mauritian banking sector found that operating cost, required reserve and poor quality loan are the main factors that affect interest rate spread of Mauritian banking sector.

Chirwa and Mlachila (2002) used panel data techniques to investigate the causes of interest rate spreads in the commercial banking system of Malawi over the liberalized period of the 1990s. Their results show that high interest rate spreads were attributable to monopoly power, high reserve requirements, high central bank discount rate and high inflation.

Folawewo and Tennant (2008) examined the determinants of interest rate spread in 33 Sub-Saharan African (SSA) countries focusing on industry and macroeconomic variables. Their results show that interest rate spread is influenced by the extent of the crowding out effect of government borrowing, public sector deficits, discount rate, inflation, level of money supply, reserve requirement, level of economic development, financial development and population size.

Beck and Hesse (2009) analyzed factors explaining interest rate spreads in Uganda and compared with peer African countries for the period between 1999 and 2005. They used panel data set of 1390 banks from 86 countries. To explain the high variation in interest rate margins across countries, they used bank size, exchange rate depreciation, real T bill rate, liquidity ratio, concentration, inflation, GDP growth, institution development and overhead costs. They reported that that most of the bank specific as well as macroeconomic factor are relevant in explaining high banking margins in Uganda. However, the foreign banks and changes in market structure had no significant relation with interest rate spreads. They concluded that size, high T bill rates and institutional deficiencies explained large proportions of Ugandan interest margins.

Akinlo (2012) examined the determinants of interest rate spreads in Nigeria using a panel of 12 commercial banks for the period 1986-2007. The results suggest that cash reserve requirements, average loans to average total deposits, remuneration to total assets and GDP have positive effect on interest rate spreads. However, non-interest income to average total assets, treasury certificate and development stocks have negative relationship with interest rate spreads.

A more recent study on determinants of bank interest margins in SSA is by Ahokpossi (2013) using a sample of 456 banks in 41 SSA countries. The results show that bank-specific factors such as credit risk, liquidity risk and bank equity are important, determinants of interest margins, but such spreads are not sensitive to economic growth.

Finally, Were and Wambua (2013) investigated the determinants of interest rate spreads in Kenya‘s banking sector based on panel data analysis. The empirical results show that bank-specific factors play a significant role in the determination of interest rate spreads. These include bank size based on bank assets, credit risk as measured by non-performing loans to total loans ratio, liquidity risk, return on average assets and operating costs. The impact of macroeconomic factors such as real economic growth and inflation is not significant.

2.3 Conclusions on the literature review and knowledge gaps

As per the review of the literature, there are a number of empirical studies conducted on the determinants of interest rate margins and spreads in developed, emerging, developing and Sub-Saharan African countries focusing on different sets of factors (bank specific, industry-related and macroeconomic factors) and methodologies (time series and panel data methods) depending on the type of data, frequency and coverage (panel of banks, countries or country-specific analyses).

However, there is no universally accepted findings to the determinants of interest rate spread and net interest margin, since, countries differ each other by their economic, financial, regulatory and operating environments. For example Maudos and Solis (2009) found interest rate volatility as a significant factors that affect the interest rate spread of Mexican banking sector, it was inconsistent with Afzal (2011) which found interest rate volatility as insignificant factors for determining interest rate spread of Pakistan‘s banking sector, and also Beck and Hesse (2009) found inflation as the main determinants of interest rate spread of Ugandan banking sector, it was inconsistent with Were and Wambua (2013) which found inflation as insignificant variable for determining Kenyan banks interest rate spread, so further empirical evidence could provide additional insight about the determinants of interest rate spread.

Furthermore, the literature revealed that all of the prior researchers adopt a quantitative research approach only without considering a lot of limitations of it, so the researcher fill this gap by adopting mixed research approach which provides a better understanding about research problems than either approach alone and brings robustness to the research findings.

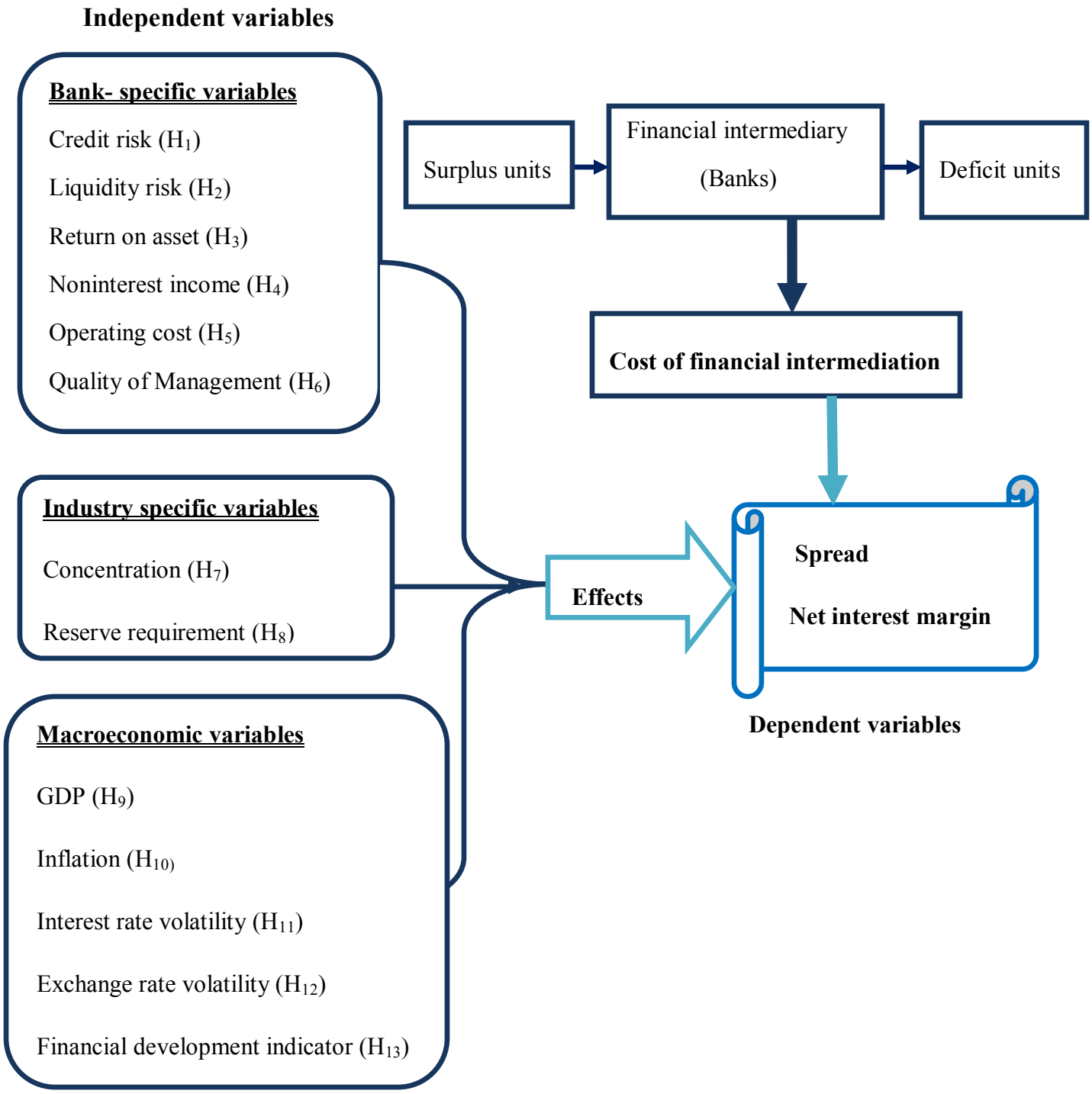
Moreover, the aforementioned researchers used spread or net interest margin as a dependent variable to measure intermediary efficiency of banks except Khan and Khan (2010) and Afzal (2011), this study use both measures of financial intermediary efficiency i.e. spread and NIM as a dependent variable.

Finally, in Ethiopia there is no any empirical study conducted in this area to the knowledge of the researcher, therefore this study is designed to fill this knowledge gaps by investigating Bank specific, industry specific and macroeconomic determinants of Banks' interest rate spread in Ethiopia.

2.4 Conceptual framework of the study

In this section a simplified conceptual framework that postulates the relationship between cost of financial intermediation, its indicator and various banks, industry and macroeconomic determinants that could possibly explain the variability two cost of financial intermediation measures. As shown in figure 2.2 banks role as financial intermediaries channeling funds from surplus sectors of the economy towards the deficit sectors. However this is achieved at some cost to both the depositors and borrowers. In practice, it is proxy by margins or banking spreads indicating gap between some sort of representative lending and deposit rates of financial intermediaries The most widely used indicators are the net interest margin gap between interest earned and interest paid normalized by average earning assets and the banking spread gap between lending and deposits rates. These indicators are affected by a host of factors such as bank, industry and macroeconomic specific factors.

Figure 2.2. Conceptual framework



Source: Researcher own design

CHAPTER THREE

RESEARCH METHODOLOGY

The preceding chapter presented the review of the existing evidence on factors affecting interest rate spread of banks and identified knowledge gaps. The results from a review of the literature are used to establish expectations for the relationship of the different determinants. The purpose of this chapter is to present the research methodology adopted in the study. The chapter is arranged as follows. Section 3.1 and 3.2 presents research approach and operational definition of variables. Then, section 3.3 and 3.4 presents sampling design and source and method of data collection respectively. Finally, section 3.5 and 3.6 presents method of data analysis and interpretation and model specifications.

3.1 Research Approach

Decision regarding the selection of research instrument, the nature of collected data and the analysis of collection are based on the research method used in a study. Selection of appropriate research methods is very important because it decides the quality of study findings. For the purpose of the present study, mixed approach which advocates the combination of both qualitative and quantitative has proved to be ideal for the study on determinants of interest rate spread in Ethiopian banks. Mixed method approach focuses on collecting, analyzing and mixing both quantitative and qualitative data in a single study or series of studies. The decisive argument here is that the use of both quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach achieves alone. Mixed method research involves both collecting and analyzing quantitative and qualitative data either sequentially or

concurrently (Creswell, 2003). Hence, the following sections present consecutively the quantitative and qualitative aspects of the research method.

3.1.1. Quantitative aspect of research method

The quantitative aspect of the research method intends to obtain data needed to generalize about the determinants of interest rate spread of banks in Ethiopia. Specifically, the current study collects the data through structured review of documents. The data related to a document analysis which is necessary to undertake this study were gathered from the audited financial statements of eight banks and NBE annual report for ten consecutive years (2004-2013).

3.1.2. Qualitative aspect of research method

Since the nature of this research requires in-depth understanding of the factors affecting interest rate spread of banks in Ethiopia, an interview was suitable gather such information. Easterby-Smith et al. (1991) commented that the interview method is the most fundamental of all qualitative methods and is claimed to be the best method for gathering information. The current study to gather the qualitative data needed for addressing the research questions stated in the preceding section, in- depth interviews with finance managers of some selected banks were conducted.

3.2. Operational Definition of Variables and Measurements

In this section the operational definitions of both dependent and independent variables will be presented as follows.

3.2.1. Dependent Variables

The literature on banking spreads proposes alternate definitions of intermediary efficiency. The most common of these include Spread and Net Interest Margin (NIM). These two are considered as superior measures to determine intermediary efficiency because both these definitions are related to core intermediary business of the commercial banks (Afzal, 2011). Based on this reality the researcher used both these definitions as dependent variables to proxy financial intermediation. These two variables will be measured as follows.

$$\text{Spread}_{it} = \frac{R_{it}}{\text{Average EA}_{it}} - \frac{C_{it}}{\text{Average IntLiab}_{it}}$$

$$\text{NIM}_{it} = \frac{R_{it} - C_{it}}{EA_{it}}$$

Where : NIM is Net Interest Margin, R represents interest revenue, C is interest expense, EA is total earning assets, IntLiab includes all interest bearing liabilities, while suffix $_{it}$ represents bank i at time t.

3.2.2 Independent variables

This subsection describes the independent variables that are used in the econometric model to estimate the dependent variables. Following prior researchers (Khawaja and Din, 2007; Maudos and Solis, 2009; Khan and Khan, 2010; Afzal, 2011 among others) towards the determinants of bank interest rate spread, the independent variables are

classified into bank-specific, industry-specific and macroeconomic variables. The bank-specific variables are internal factors and controllable for banks managers while the industry-specific and macroeconomic variables are uncontrollable and hence external.

Bank specific variables

The bank-specific variables are selected by using some key drivers of interest rate spread like earning, efficiency and risk. Hence, the following part of this particular section clearly presents the bank-specific variables that are used in this study.

Credit risk (CR)

Non-performing loans to total loans ratio is used as an indicator of credit risk or quality of loans. Credit risk belongs to the group of factors with the highest impact on banks' interest margins. An increase in provision for loan losses implies a higher cost of bad debt write offs. Given the risk-averse behavior, banks facing higher credit risk are likely to pass the risk premium to the borrowers, leading to higher spreads. Hence the higher the risk, the higher the pricing of loans and advances to compensate for likely loss (Maudos and de Guevara, 2004; Maudos and Solis, 2009; Khan and Khan 2010; Were and Wambua, 2013; Ahokpossi, 2013. Therefore, a positive relationship between credit risk and interest rate spread is expected.

H_1: There is a significant positive relationship between credit risk and banks interest rate spread.

Liquidity Risk (LR)

Liquidity risk is measured by the ratio of liquid assets to deposits and short-term funding. It is the risk of not having enough cash or borrowing capacity to meet deposit withdrawals or new loan demand. Liquidity risk is expected to affect bank margins positively

(Angbazo, 1997). Banks with high liquidity risk tend to borrow emergency funds at high cost and therefore charge a liquidity premium that is reflected in higher margins (Khawaja and Din, 2007; Ahokpossi, 2013; Were and Wambua, 2013). Therefore, a positive relationship between liquidity risk and interest rate spread is expected.

H_2: There is a significant positive relationship between liquidity risk and banks interest rate spread.

Return on Assets (ROA)

Return on asset is measured by net income to total asset explains the overall profitability of a bank emanating from the asset portfolio (both advances and investments). It is another effective measure for evaluating performance of a bank‘s management. A bank with higher profitability, otherwise, can afford to charge lower spreads. However, on the contrary, banks with higher ROA could result in higher spreads with better performance of interest sensitive assets (Norris and Floerkemeier, 2007; Afzal, 2011). Therefore, a negative relation between return on asset and interest rate spread is expected since the Ethiopian banking industry characterized as highly profitable (Zerayehu et.al, 2013).

H_3 There is a significant negative relationship between return on asset and banks interest rate spread.

Noninterest Income (NII)

Noninterest income is measured by the ratio of non interest income to total assets refers to the contribution of non core business towards profitability. The non interest income includes commission, fee and brokerage, capital gains, dividends and income from foreign exchange transactions. Banks with diversified and stable revenue sources are expected to influence the pricing of loan products and therefore may charge lower margins due to

cross subsidization of traditional banking activities (Norris and Floerkemeir ,2007; Maudos and Solis, 2009; Khan and Khan,2010; Afzal, 2011)**.** Therefore, a negative relationship between non interest income and interest rate spread is expected.

*H_4: There is a significant negative relationship between noninterest income and banks interest rate spread***.**

Operating Cost (OC)

Operating cost is measured by the ratio of overhead costs to total assets. Overhead costs include salaries and other administrative expense including wages, other staff costs, motor vehicles, premises, depreciation on fixed assets and other noninterest expenses. If a bank incurs high overhead costs in the process of providing services then it is likely to charge a higher spread to sustain its overall profitability (Brock and Suarez ,2000; Ramful, 2001; Maudos and Guevara, 2004; Khan and Khan,2010; Afzal, 2011; Were and Wambua, 2013). Therefore, a positive relationship between operating cost and interest rate spread is expected.

H_5: There is a significant positive relationship between operating cost and banks interest rate spread.

Management quality (MQ)

The quality or efficiency of management is measured by the cost to income ratio which is defined as the operating cost necessary to generate one unit of gross income. As mentioned earlier, high quality management translates into a profitable composition of assets and a low-cost composition of liabilities. An increase in this ratio implies a decrease in the efficiency or quality of management, which will translate into a high interest margin (Angbazo, 1997; Maudos and Guevara, 2004; Maudos and Solis, 2009;

Afzal, 2011). Therefore, a positive relationship between quality of management and interest rate spread is expected.

H_6 There is a significant positive relationship between management efficiency and banks interest rate spread.

Industry-specific variables

This subsection discusses two industry specific variables, market share and reserve requirement that could possibly explain the variability of banks interest rate spread.

Bank Concentration (HHI)

The primary industry specific variable that is vital to spreads is the bank concentration and competition structure. In this study the researcher uses the most popular measure of industry concentration level namely, Herfindahl–Hirschman index[2] (HHI) to measure industry concentration similar to (Ahokpossi2013) among others. This indicator is often used in the context of According to the Structure Conduct Performance (SCP) Hypothesis, concentration and bank margins are positively related. A higher Index is reflective of less competition and increasing market power for few banks this ultimately leads to high margin. A positive association between concentration and interest rate margins is an indication of greater market power and less competition in banking system. Banks in highly concentrated market tend to collude and as a result higher interest rates are charged on loans and lesser rate of return is paid to depositors (Afzal, 2011 and Ahokpossi, 2013).

[2] HHI is measured by adding up the squares of the market shares of all banks, and mathematically can be can be expressed as follows: HHI= $\sum_{i=1}^{N}(\mathrm{Zi}/\mathrm{Zt})^2$ Where: *Zi* is the deposit of bank *i* and *ZT* is the total deposit of the commercial banking sector. The criteria of concentration level by the US Department of Justice are as follows: HHI more than 0.18 is highly concentrated, HHI between 0.18 and 0.1 is moderately concentrated, and HHI less than 0.1 is un-concentrated.

Therefore, a positive relationship between concentration interest rate spread is expected. Furthermore some empirical evidence in Ethiopia indicates that banking industry is found to be concentrated (Zerayehu et.al, 2013).

H_7 There is a significant positive relationship between concentration and banks interest rate spread.

Reserve requirement (RES)

Prescribed reserve requirement is measured by the deposit reserve requirement ratio required by the National Bank of Ethiopia and it included as a market determinant of banking sector interest margin; as such reserves reflect a burden associated with operating in the banking sector. A positive correlation between such reserves and interest is expected, as high liquidity reserve requirements act as an implicit financial tax by keeping interest rates high. Chirwa and Mlachila (2002) explain by noting that, the opportunity cost of holding reserves at the central bank, where they earn no or little interest, increases the economic cost of funds above the recorded interest expenses that banks tend to shift to customers. They further argue that the large pool of resources created by high reserve requirements allow for the financing of high fiscal deficits, and thereby creates an environment of high inflation and persistently high intermediation margins (Folawewo and Tennant, 2008). Therefore, a positive relationship between reserve requirement and interest rate spread is expected.

H_8 There is a significant positive relationship between reserve requirement and banks interest rate spread.

Macroeconomic variables

The macroeconomic variables are external for banks managers and uncontrollable. The growth of real GDP, inflation, interest rate volatility, exchange rate volatility and financial development indicators are selected as possible macro-economic variables that can affect bank interest rate spread in this study.

GDP Growth (GDP)

Business cycle effects are measured by growth in GDP of an economy. Changes in business cycle impact the credit worthiness of borrowers in terms of repayment capacity. In order to compensate against expected default emanating from the changing business cycles, the banks are likely to impose higher lending rates. In case of an accelerating GDP growth, the banks tend to charge lower spreads reduction of defaults while in periods of stagnant or low growth the banks spreads are expected to increase (Beck and Hesse,2009; Maudos and Solis ,2009; Khan and Khan,2010; Afzal, 2011). Therefore, a positive relationship between GDP growth and interest rate spread is expected since, the growth of real GDP fluctuate over the year (NBE, 2012).

H_9 There is a significant positive relationship between GDP and banks interest rate spread.

Inflation (INFL)

Similar to most studies in this area, the inflation is calculated as the annual percentage change in the CPI. This variable is an indicator of the cost of doing business in an economy, and it is expected to be positively correlated with interest rate spread, particularly in developing countries where inflation is high and variable. (Chirwa and Mlachila, 2002) An increase in inflation deteriorates the net present value of future cash

flows and therefore erodes the real value of money reserves and ultimately increases the solvency risk of banks. In addition unstable inflation rate would reduce the debtor's ability to meet its obligations to the bank, both principal repayments and interest payments on the loan, thereby increasing non-performing loans to cover the losses, banks will raise bank interest rate spread (Khawaja and Din, 2007; Maudos and Solis, 2009). Therefore, a positive relationship between inflation and interest rate spread is expected.

H_{10} There is a significant positive relationship between Inflation and banks interest rate spread.

Interest Rate Volatility (IRV)

The interest rate volatility which is measured by standard deviation of annual money market interest rate is used as a macroeconomic factor that affects interest rate spread of banks. The volatility in money market interest rate creates reinvestment and refinancing risks arising from fluctuations in interest rates, due to the maturity mismatch between banks assets and liabilities accordingly, banks spreads are used as a risk hedging mechanism so, banks are inclined to charge higher spreads (Maudos and Solis, 2009; Khan and Khan, 2010; Afzal, 2011). Therefore, a positive relationship between interest rate volatility and interest rate spread is expected.

H_{11} There is a significant positive relationship between interest rate volatility and banks interest rate spread.

Exchange rate volatility (ERV)

Macroeconomic instability is measured by the variable exchange rate volatility. This variable reflects the changes in interest and inflation rates in countries with freely-floating exchange rates. Exchange rate volatility for each year is calculated as the standard deviation of the percentage change in the real exchange rate for the years. Because increased macroeconomic instability heightens the risk faced by commercial banks, exchange rate volatility is expected to be positively correlated with interest rate spread, as the banking sector increases its spreads to protect against the increased risk (Folawewo and Tennant, 2008). Therefore, a positive relationship between exchange rate volatility and interest rate spread is expected.

H_{12} There is a significant positive relationship between exchange rate volatility and banks interest rate spread.

Financial Development Indicator (FDI)

Financial development indicator which is measured by broad money to GDP (M2/GDP) captures the degree of monetization in the financial system of an economy. It measures the overall size of the financial intermediary sector and is correlated with growth in GDP. A lower monetization of the financial system may reflect lower level of efficiency in intermediation activity leading to higher spreads (Afzal, 2011). In Ethiopia the M2/GDP ratio shows an increasing trend therefore, a negative relationship between financial development indicator and interest rate spread is expected.

H_{13} There is a significant negative relationship between financial development indicator and banks interest rate spread.

Table 3.1 Variable definitions, measurements and expected sign

Classification	Variables	Measurements	Expected sign
Dependent variables	Spread	$\text{Spread}_{it} = \frac{R_{it}}{\text{Average } EA_{it}} - \frac{C_{it}}{\text{Average } IntLiab_{it}}$	NA
	Net Interest Margin	$NIM_{it} = \frac{R_{it} - C_{it}}{EA_{it}}$	NA
Independent variables			
Bank specific variables	Liquidity risk (LR)	Liquid asset/deposits and short-term funding	+
	Credit risk (CR)	NPL/ total loan	+
	Return on asset (ROA)	Net income/total asset	-
	Noninterest Income (NII)	Noninterest income/total asset	-
	Operating cost (OC)	Overhead cost/total assets	+
	Management quality (MQ)	Operating expense/ gross income	+
Industry specific variables	Industry concentration level	Herfindahl–Hirschman index	+
	Reserve requirement (RES)	Reserve Requirement Ratio	+
Macroeconomic variables	Inflation (INFL)	CPI growth	+
	GDP	Real GDP growth	+
	Interest rate volatility(IRV)	STDV of annual money market interest rates	+
	Exchange rate volatility (ERV)	STDV of the percentage change in the real exchange rate	+
	Financial development indicator (FDI)	M2/GDP	-

3.3 Sampling design

From the total population of eighteen commercial banks registered by NBE and under operation in the country currently both public and private that are engaged in the commercial banking activities, the sample of eight commercial banks were selected. Among those, two of them are state owned (Commercial bank of Ethiopia and Construction and Business bank) and six of them are private banks (Awash bank, Dashen bank, Bank of Abyssinia, Wegagen bank, United bank and Nib International Bank) were selected based on purposive sampling technique. The main reason for using purposive sampling technique is to include only those banks which have been operating for the last 10 years from 2004 up to 2013 in order to exploit ten years data for this study. Moreover the finance manager of eight banks were selected based on purposive sampling technique, the main reason for using this sampling technique is to include those individuals who have enough knowledge about the banks intermediation activity. The researcher believes that the sample size is sufficient to make sound conclusion about the population, moreover the inclusion of commercial bank of Ethiopia in the sample which takes the lions share in the country‘s banking sector makes the sample more representative and reasonable.

3.4 Source and method of data collection

The data used for this study were both primary and secondary data. Primary data was gathered through in-depth interview from finance manager of banks. Secondary data was collected through document analysis such as the bank specific variables of the study are driven from balance sheet and income statement of the selected banks over the study period. Regarding the industry and macroeconomic variables, the data was obtained from National Bank of Ethiopia (NBE), which regulates the banking sector of the country.

3.5 Method of data analysis and interpretation

The quantitative data collected through structured record reviews was analyzed by using both descriptive and inferential statistics. Descriptive statistics of the variables were used to analyze the general trends of the data over the sample period. In addition, Correlation matrix was used to examine the relationship between the explanatory and explained variables. A multiple linear regression model and t-static were used to determine the relative importance of each independent variable in influencing interest rate spread. The multiple linear regressions model were conducted and thus Ordinary Least Square (OLS) is applied by using Eviews 6 econometric software package, to test the casual relationship between the banks interest rate spread and their potential determinants and to verify the most significant and influential explanatory variables affecting the interest rate spread of Ethiopian banks. Moreover, the results of the interview were analyzed using triangulation with the findings of the structured record reviews. As a result, the response of the interviewees for the interview questions were used for supporting the result obtained from analysis of structured document reviews or as arguments.

As it is mentioned above, for this study OLS were used. Therefore, before the regression was run tests for fulfillment of the basic Classical Linear Regression Model (CLRM) assumptions were tested. As noted in Brooks (2008) there are basic assumptions required to show that the estimation technique, OLS, had a number of desirable properties, and also so that hypothesis tests regarding the coefficient estimates could validly be conducted. If these Classical Linear Regression Model (CLRM) assumptions hold, then the estimators determined by OLS have a number of desirable properties, and are known as Best Linear Unbiased Estimators. Therefore, for the purpose of this study, diagnostic

tests are performed to ensure whether the assumptions of the CLRM are violated or not in the model. Therefore, the basic CLRM assumptions tested in this study were hetroskedasity, autocorrelation, normality and multicollinearity.

3.6 Model specification

To examine the determinants of banks' interest spread in Ethiopia the study employs panel[3] data procedures since the sample contains data across banks and over time. As noted in Brook (2008) the general form of the panel data model can be specified as follows:

$$Y_{it} = \alpha + \beta x_{it} + \varepsilon_{i.t}$$

In this equation, y_{it} represents the dependent variable, and x_{it} contains the set of explanatory variables in the model. The subscripts i and t denote the cross-sectional and time-series dimension respectively. Also α is taken to be constant over time t and specific to the individual cross-sectional unit i.

Stylized facts and the review of the literature suggest that banking spreads are influenced by a host of factors, Bank, industry and macroeconomic specific determinants (Khawaja and Din, 2007; Maudos and Solis, 2009; Khan and Khan, 2010; Afzal, 2011 among others). The empirical model is specified as follows:

$$r_{it} = \alpha_i + X_{it}\beta + Z_t\gamma + \varepsilon_{it}$$

[3] As noted in Baltagi (1995) using panel data provide many advantages such as (i) controlling for individual heterogeneity, (ii) giving more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency, and (iii) eliminating biases resulting from aggregation over firms or individuals.

Where *rit* is the interest rate spread for bank *i* in period *t* computed as the difference between lending rate and deposit rate, *Xit* is a vector of bank specific variables, *αi* is bank-specific fixed effects capturing the impact of unobservable (omitted) effects, *Zt* is a vector of time-specific variables (industry and macroeconomic variables) and *εit* is the statistical disturbance term.

Based on the above models and on the base of selected variables the current study used econometric model as shown below. The dependent variable regressed with different independent variables based on multiple regression models as follows:

$$\text{Spread}_{it} = \alpha + \beta1(CR)_{it} + \beta2(LR)_{it} + \beta3(ROA)_{it} + \beta4(NII)_{it} + \beta5(OC)_{it} + \beta6(MQ)_{it} + \beta7(HHI)_t + \beta8(RES)_t + \beta9(GDP)_t + \beta10(INFL)_t + \beta11(IRV)_t + \beta12(ERV)_t + \beta13(FDI)_t + \varepsilon_{it}$$

The researcher further use an alternate definition of spreads for robustness and run the regression of same independent variables on net interest margin.

$$\text{NIM}_{it} = \alpha + \beta1(CR)_{it} + \beta2(LR)_{it} + \beta3(ROA)_{it} + \beta4(NII)_{it} + \beta5(OC)_{it} + \beta6(MQ)_{it} + \beta7(HHI)_t + \beta8(RES)_t + \beta9(GDP)_t + \beta10(INFL)_t + \beta11(IRV)_t + \beta12(ERV)_t + \beta13(FDI)_t + \varepsilon_{it}$$

Where: Spread_{it} and NIM_{it} denotes spread of bank i at time t and net interest margin of bank i at time t**,** respectively α is a constant term, $\beta1 - \beta13$ are coefficients for the respective explanatory variables, from this; $\beta1 - \beta6$ represent coefficient of bank specific variables, $\beta7$ & $\beta8$ represent coefficient of industry specific variable, $\beta9$ - $\beta13$ represent coefficient of macroeconomic variables.

- CR- Liquidity risk
- LR- Liquidity risk
- ROA- Return on asset
- NII- Non interest income
- OC- Operating cost
- MQ- Management quality
- RES- Reserve requirement
- HHI- Herfindahl–Hirschman index
- GDP- Gross domestic product
- INFL - Inflation
- IRV- Interest rate volatility
- ERV- Exchange rate volatility
- FDI- Financial development indicator

As stated above this study employs panel data procedures since the sample contains data across banks and over time. Once the type of data is recognized the challenge facing a researcher is: Which model is better, fixed effect model or random effect model? The answer to this question hinges around the assumption one makes about the likely correlation between the individual, or cross-section specific, error component εi and the X regressors. If it is assumed that εi and the X's are *uncorrelated*, random effect model may be appropriate, whereas if εi and the X's are *correlated,* fixed effect model may be appropriate (Gujarati, 2004).

In addition, as noted in Gujarati (2004) if T (the number of time series data) is large and N (the number of cross-sectional units) is small, there is likely to be little difference in the values of the parameters estimated by fixed effect model (FEM) and random effect model (REM). Hence the choice here is based on computational convenience. On this score, FEM may be preferable. Since the number of time series (i.e. 10 year) is greater than the number of cross-sectional units (i.e. 8 commercial banks), FEM is preferable in this case.

Furthermore according to Brooks (2008); Verbeek (2004) and Wooldridge (2004), it is often said that the REM is more appropriate when the entities in the sample can be thought of as having been randomly selected from the population, but a FEM is more plausible when the entities in the sample effectively constitute the entire population/sample frame. Hence, the sample for this study was not selected randomly and equals to the sample frame FEM is appropriate.

CHAPTER FOUR

RESULT PRESENTATION AND ANALYSIS

The preceding chapter presented the research methods adopted in the study. The purpose of this chapter is to present the results of the different methods used. The remaining part of the chapter is organized into three sections. The first section 4.1 discusses the results of the document analysis. Then, the results of in-depth interviews with finance managers of the selected banks were presented in the second section 4.2 and finally the result obtained through different methods are jointly analyzed in the analysis section presented in section 4.3.

4.1. Document analysis

The major purpose of this study is to identify bank, industry and macroeconomic specific factors affecting bank interest rate spread in Ethiopia. The main data sources to this end are the documents held by NBE, and banks audited financial statement. The following section presents the results of the document analysis as follows. Section 4.1.1 presents the result of descriptive statistics followed by correlation analysis among the dependent and independent variables in section 4.1.2. Section 4.1.3 presents the tests for the classical linear regression model assumptions. The outcomes of the panel data regression analysis are presented in section 4.1.4.

4.1.1 Descriptive statistics

Table 4.1 provides a summary of the descriptive statistics of dependent and independent variables for eight commercial banks for a period of ten years from year 2004-2013 with a total of 80 observations. The table includes the mean, median, standard deviation, number of observations, minimum and maximum values for the independent and dependent variables of the model.

Table 4.1: Descriptive Statistics of dependent and independent Variables

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Observation
Spread	0.065	0.054	0.080	0.035	0.012	80
NIM	0.045	0.041	0.065	0.031	0.010	80
CR	0.108	0.631	0.388	0.174	0.084	80
LR	0.243	0.208	0.634	0.20.3	0.034	80
ROA	0.027	0.028	0.042	0.003	0.006	80
NII	0.211	0.208	0.331	0.132	0.011	80
OC	0.241	0.198	0.592	0.112	0.014	80
MQ	0.426	0.415	0.661	0.112	0.025	80
HII	0.421	0.399	0.561	0.352	0.028	80
RES	0.10	0.10	0.15	0.05	0.012	80
GDP	0.128	0.114	0.281	0.088	0.052	80
INFL	0.206	0.194	0.373	0.068	0.098	80
IRV	0.166	0.147	0.368	0.022	0.102	80
ERV	0.034	0.030	0.068	0.015	0.015	80
FDI	0.329	0.325	0.416	0.251	0.059	80

Source: Financial statements of banks, NBE reports and own computation

According to table 4.1, all variables comprised 80 observations and the bank intermediary efficiency measure used in this study namely; spread and NIM indicates that the Ethiopian banks earn, on average 6.5% spread and 4.5% NIM from their earning assets , with a minimum of 3.5 and 3.1 and a maximum of 8% and 6.5% spread and NIM respectively. This means the most efficient banks earn 3.5% and 3.1% spread and NIM respectively and the most inefficient banks earn 8% and 6.5% spread and NIM. Standard

deviation of 1.2% and 1% for spread and NIM respectively indicates that the spread and NIM variation from its mean was very small.

Regarding the explanatory variables of the model there are some interesting statistics that have to be mentioned. Credit risk it was measured by the ratio of non-performing loans to total loans ratio. The average credit risk faced by the sampled banks was 10.8%. This indicates that, from the total loan invested on average, 10.8 % are non performing loan. The highest credit risk faced by the commercial banks was 38.8% this implies low asset quality, on the other hand the minimum credit risk faced by banks was 1.74%, the standard deviation was 8.4% which indicates high variation from the mean value.

The descriptive statistics for liquidity risk also indicated that the availability of cash and cash equivalent assets are averagely 24.3% percent per year to repay short term liabilities. This means most banks in the industry have around two birr liquid asset to repay one birr short term liabilities. The maximum and minimum values of liquidity risk are 63.4% and 20.3% respectively and also the standard deviation was 3.4 which indicate that there were high variations from the mean. This indicates that the Ethiopian commercial banks have, on average, a higher liquidity position which was somewhat higher than the statutory requirement of 20% for the last twelve years.

Regarding the return on asset, it was measured by the ratio of net income to total asset. The average profitability was 2.7%. This means, on the average, form each one birr investment in the asset there was 0.027 cent return. The maximum value of return on asset for the year was 4.2 where as the minimum value was 0.3 %. Also the standard deviation was 0.6% which indicates there was very low variation from the mean.

Another important variable is noninterest income which was measured by noninterest income to total asset ratio. The average noninterest income earned by banks was 21.1 percent, this indicate, most banks from the sample earn 0.211 cents as noninterest income from one birr investment on assets. The maximum value 33.1 % indicated some banks from the industry use noninterest income as the main source of income rather than interest income. This indicates, those banks have gradually transforming away from the traditional business of financial intermediation and towards provision of other financial services like money transfer. The minimum value 13.2 indicates the more traditional banks in the industry still use interest income as the main source of income. The standard deviation of 1.1% indicates there was low variation from the mean.

Furthermore, the mean of operating expense to total asset ratio is 24.1 percent. This implies most banks from the sample incurred 24.1 percent operating expenses to provide their financial services. In other words the bank incurred 0.241 cents as operating expenses provide their financial service. The most efficient banks incurred 11.2 percent operating expense and the inefficient banks incurred 59.2 percent operating expenses. This indicates the efficient banks have cost management advantage over the inefficient banks. The standard deviation of 1.4 % indicates there was low variation from the mean.

On the other hand, the mean of management quality which is measured by cost to gross income ratio was 42.6 this implies that most banks incur 42.6 percent operating cost necessary to generate one unit of gross income. The most inefficient and efficient bank earn 66.1% and 11.2% operating expense to generate one percent gross income, the standard deviation of 2.5 percent, indicate the relatively higher variation which implies

that the most efficient bank has a quite substantial cost advantage compared to inefficient the least efficient banks.

Furthermore, bank concentration which was measured by Herfindahl - Hirschman index indicate that average industry concentration was 0.421, meaning that the industrial concentration level of the Ethiopian banking sector during the analyzed period 2004-2013 was highly concentrated, the most concentrated bank in the sector has the maximum value of 0.561 share and the least concentrated bank in the sector has the minimum value of 35.2% percent share. The statistical result also shows high deviation of 2.8% implies high variation from the mean.

Besides the average of the reserve requirement which was measured by cash reserve requirement ratio for the last ten years was 10%, the maximum and minimum reserve requirement was of 15% and 5% respectively. The statistical result also shows small deviation of 1.2% implies low variation from the mean.

Regarding the macroeconomic variable also shows that the mean real GDP growth in Ethiopia for the last ten years was 12.8%, with a maximum of 28.1% and a minimum of 8.8 %. Also the standard deviation was 5.2% this implies that economic growth in Ethiopia during the period of 2004 to 2013 remains reasonable stable and the result was more or less in agreement with the governments report regarding economic growth.

The other macro-economic variable employed in this study was inflation; it had the mean CPI growth in Ethiopia for the last ten years was 20.6, with a maximum of 37.3% and a minimum of 6.8 %. Also the standard deviation was indicates somewhat a higher standard deviation 9.8% compared to GDP; this implies that inflation rate in Ethiopia during the study period remains somewhat unstable.

On the other hand, the mean of interest rate volatility which measures the variability of market interest rate was 16 % with a maximum of 36.8% and a minimum of 2.2%. Also the standard deviation is 10.2% this implies that the market interest rate during the study periods remains volatile as compared to GDP and inflation.

Furthermore, the mean of exchange rate volatility was 3.4 % with a maximum of 6.8%, a minimum of 1.5% and a standard deviation of 1.5 this indicates that the exchange rate is stable as compared to GDP and inflation.

Finally, the mean of financial development indicator was 32.9% this implies that broad money contributes 32.9% for the GDP. The maximum ratio was 41.6 and the minimum ratio was 25.1. On the other hand, the standard deviation of 5.9 indicates that the growth of financial development during the study period was less volatile as compared to GDP, inflation and interest rate volatility.

4.1.2. Correlation analysis among variables

As it could be seen in table appendix I and II, credit risk, liquidity risk, operating cost, reserve requirement, GDP, inflation, and exchange rate volatility and interest rate volatility was the most positively correlated variable with spread and NIM. This correlation clearly shows that, as those variables increases, spread and NIM also moves to the same direction. On the other hand, return on asset, noninterest income and financial development indicator seems to be negatively correlated with the interest rate spread measures, indicating that, when the aforementioned variables increase, interest rate spread moves to the opposite direction. Unexpectedly, management quality was negatively correlated with spread and NIM, this implies that as the operating cost

incurred to generate gross income decrease the management quality becomes improved so it affects spread and NIM negatively.

As a sample size approaches to 100, the correlation coefficient of about or above 0.20 is significant at 5% level of significance (Meyers et al. 2006). The sample size of the study was 8*10 matrixes of 80 observations which was little bit approaches to 100 hence the study used the above justification for significance of the correlation coefficient. As per appendix I result, credit risk, liquidity risk, return on asset, operating cost, HHI reserve requirement, GDP, interest rate volatility and exchange rate volatility are positive and significant correlation with spread. On the other hand, return on asset, noninterest income and financial development indicator were negative and significant correlation with spread, while inflation and management quality has insignificant correlation with spread.

As per appendix II result, credit risk, liquidity risk, operating cost, HHI, interest rate volatility and exchange rate volatility are positive and significant correlation with NIM. On the other hand return on asset, noninterest income and financial development indicator were negative and significant correlation with NIM, while the rest of other variables have insignificant correlation with NIM.

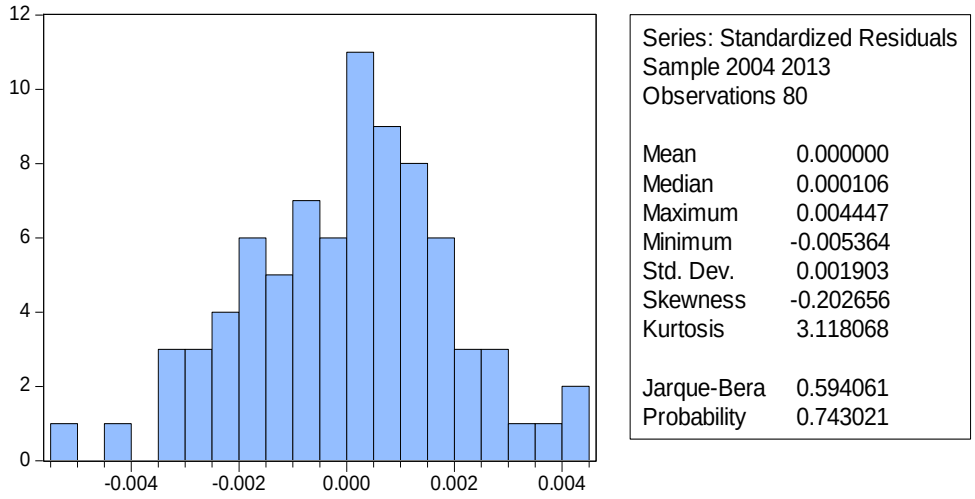
4.1.3. Test results for the classical linear regression model assumptions

In this study as mentioned in chapter three diagnostic tests were carried out to ensure that the data fits the basic assumptions of classical linear regression model or not. Consequently, the results for model misspecification tests are presented as follows:

4.1.3.1 Test for normality

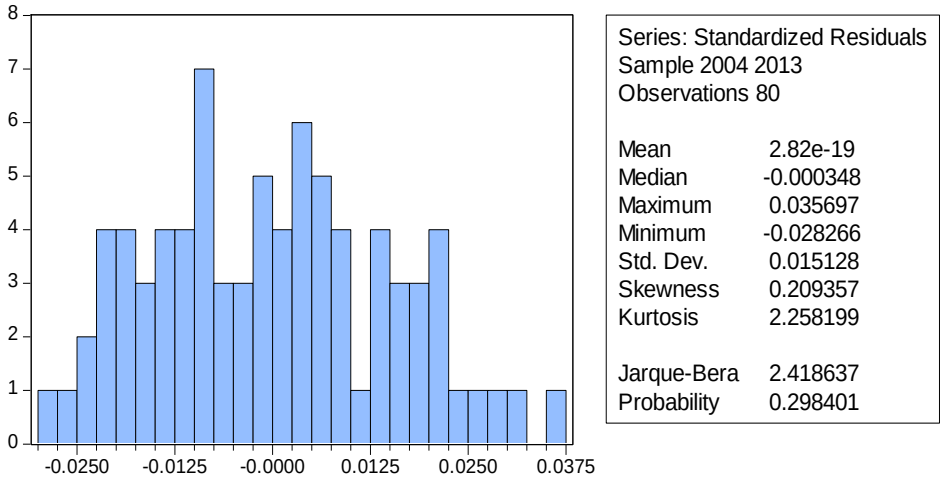
The normality tests for this study as shown in figure 4.1 and 4.2, the coefficient of kurtosis for both spread and NIM was close to 3, and the Bera-Jarque statistic had a P-value of 0.743 and 0.298 for spread and NIM respectively, which implies that the data were consistent with a normal distribution assumption.

Figure 4.1 Normality test for residuals: Dependent variable Spread



Source: Financial statements of banks, NBE reports and own computation.

Figure 4.2 Normality test for residuals: Dependent variable NIM



Source: Financial statements of banks, NBE reports and own computation.

4.1.3.2 Test for Multicollinearity

Multicollinearity in the regression model suggests substantial correlations among independent variables. Correlation matrix between independent variables is presented in appendix III. As shown in the table there was fairly low data correlations among the independent variables. These low correlation coefficients indicate that, there is no problem of Multicollinearity in this study. Moreover, Anderson (2008) stated that Multicollinearity problem exists when the correlation coefficient among the variables are greater than 0.70, but in this study there is no correlation coefficient that exceeds or even close to 0.70. Consequently, in this study there is no problem of Multicollinearity which enhanced the reliability for regression analysis.

4.1.3.3 Test for Heteroskedasticity

The result in table 4.2 and 4.3 shows, both the F-statistic and Chi-Square versions of the test statistic gave the same conclusion that there is no evidence for the presence of heteroscedasticity, since the p-values were in excess of 0.05. The third version of the test statistic, Scaled explained SS, which as the name suggests is based on a normalized version of the explained sum of squares from the auxiliary regression, also gave the same conclusion that there is no evidence for the presence of heteroscedasticity problem, since the p-value was considerably in excess of 0.05 for both spread and NIM.

Table 4.2 Heteroskedasticity Test: White, Dependent variable Spread

F-statistic	4.438629	Prob. F(72,7)	0.2219
Obs*R-squared	78.28527	Prob. Chi-Square(72)	0.2862
Scaled explained SS	44.17693	Prob. Chi-Square(72)	0.9960

Source: Financial statements of banks, NBE reports and own computation.

Table 4.3: Heteroskedasticity test: White, Dependent variable NIM

F-statistic	28.13279	Prob. F(72,7)	0.2101
Obs*R-squared	79.72449	Prob. Chi-Square(72)	0.2492
Scaled explained SS	49.61851	Prob. Chi-Square(72)	0.9796

Source: Financial statements of banks, NBE reports and own computation.

4.1.3.4 Test for Autocorrelation

The Durbin-Watson test statistic value in the multivariate regression result was 2.239 for spread and 2.202 for NIM. There are 80 observations in the regression. According to DW stat table, the relevant critical values for the test were dL =1.36, dU = 1.62, so 4 – 1.62 = 2.38 and 4 – 1.36 = 2.64. The Durbin-Watson test statistic result for both spread and NIM was clearly between the upper limit (dU) which is 1.62 and the critical value of 4-dU i.e.2.38 and thus the null hypothesis of no autocorrelation is within the non- rejection region of the number line and thus there is no evidence for the presence of autocorrelation. In addition, a more general test for autocorrelation up to the r^{th} order Breusch--Godfrey test also provide consistent result with Durbin Watson test, as indicated in table 4.5 and 4.6 the conclusion from both (F and $\chi 2$) version of the test confirms that the null hypothesis of no autocorrelation should not be rejected and thus there is no evidence for the presence of autocorrelation.

Table 4.4 Autocorrelation Test: Durbin Watson

Variables	Dependent variables	DW test static result
All bank, industry, and macroeconomic specific factors	Spread	2.287
	NIM	2.360

Source: Financial statements of banks, NBE reports and own computation.

Table 4.5 Autocorrelation: Breusch-Godfrey Serial Correlation LM Test: Spread

F-statistic	1.472546	Prob. F(10,56)	0.4742
Obs*R-squared	16.65647	Prob. Chi-Square(10)	0.5823

Source: Financial statements of banks, NBE reports and own computation.

Table 4.6 Autocorrelation: Breusch-Godfrey Serial Correlation LM Test: NIM

F-statistic	0.708624	Prob. F(10,56)	0.7125
Obs*R-squared	8.986095	Prob. Chi-Square(10)	0.5334

Source: Financial statements of banks, NBE reports and own computation.

In general, all tests illustrated above satisfy the basic assumptions of CLRM. Hence, the employed model was not sensitive to the problems of violation of the CLRM assumption.

4.1.4. Results of regression analysis

Empirical model: As presented in the third chapter the empirical model used in the study in order to identify the factors that can affect Ethiopian banks interest rate spread was provided as follows.

$$Spread_{it} = \alpha + \beta1(LR)it + \beta2(CR)it + \beta3(ROA)it + \beta4(NII)it + \beta5(OC)it + \beta6(QM)it + \beta7(RES)it + \beta8(BCON)it + \beta9(GDP)it + \beta10(INFL)it + \beta11(IRV)it + \beta12(ERV)it + \beta13(M2/GDP)it + \varepsilon it \quad \ldots\ldots\ldots\ldots(1)$$

$$NIM_{it} = \alpha + \beta1(LR)it + \beta2(CR)it + \beta3(ROA)it + \beta4(NII)it + \beta5(OC)it + \beta6(QM)it + \beta7(RES)it + \beta8(BCON)it + \beta9(GDP)it + \beta10(INFL)it + \beta11(IRV)it + \beta12(ERV)it + \beta13(M2/GDP)it + \varepsilon it \quad \ldots\ldots\ldots\ldots,(2)$$

The result obtained by the fixed effect model is reported in Table 4.7 and 4.8 for spread and NIM model respectively.

Table 4.7 Regression Results for factors affecting banks intermediary efficiency (spread)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.063627	0.015489	-4.107922	0.0001
CR	0.134311	0.039221	3.424494	0.0011***
LR	0.133554	0.057597	2.318755	0.0239**
ROA	-0.146542	0.031032	-4.722288	0.0000***
NII	-0.004896	0.001785	-2.742152	0.0081***
OC	0.963408	0.037505	25.68728	0.0000***
MQ	-0.001400	0.001339	-1.045410	0.3001
HHI	0.015619	0.011088	1.408664	0.1642
RES	0.165590	0.039158	4.228749	0.0001***
GDP	0.112509	0.015932	7.061697	0.0000***
INFL	0.002337	0.002007	1.164230	0.2490
IRV	0.094968	0.029313	3.239803	0.0020***
ERV	0.134639	0.049475	2.721357	0.0085***
FDI	-0.006540	0.002389	-2.737401	0.0082***
R-squared	0.977348	Durbin-Watson stat		2.287876
Adjusted R-squared	0.969670			
F-statistic	127.2833			
Prob(F-statistic)	0.000000			

**** and **, denote significant at 1% and 5% significance levels respectively*

Source: Financial statements of banks, NBE reports and own computation

The estimation result of fixed effect panel regression model is presented in table 4.7 indicates that R-squared and the adjusted-R squared statistics of the model was 97.7% and 96.9% respectively, the result indicates that the changes in the independent variables explain 96.9% of the changes in dependent variables. That is credit risk, liquidity risk, return on asset, non interest income, operating cost, management quality,

HHI, reserve requirement, GDP, inflation, interest rate volatility, exchange rate volatility, and financial development indicator collectively 96.9% of the changes in spread. The remaining 3.1% of changes of spread was explained by other factors which are not included in the model. Thus, these variables collectively are good explanatory variables of the interest rate spread of commercial banks in Ethiopia. The regression F-statistic and the p-value of zero attached to the test statistic reveal that the null hypothesis that all of the coefficients are jointly zero should be rejected. Thus, it implies that the independent variables in the model were able to explain variations in the dependent variable.

The regression result in table 4.7 shows that, all bank-specific independent variables except management quality had statistically significant impact on spread. On the other hand, among the two industry specific variables reserve requirement is significant and HHI is insignificant. Regarding the macroeconomic determinants GDP, interest rate volatility and exchange rate volatility and financial development indicators are significant, whereas inflation was insignificant. Among the significant variables, credit risk, return on asset, noninterest income, operating cost, reserve requirement, GDP, interest rate volatility , exchange rate volatility and financial development indicator were significant at 1% significance level since the p-value was 0.0011, 0.0000, 0.0081, 0.0000, 0.0001, 0.0000, 0.0020, 0.0085 and 0.0082 respectively. Whereas liquidity risk was significant at 5% significance level since the p-value was 0.0239.

Furthermore, table 4.7 also shows that there were inverse relationships between return on asset, noninterest incomes and financial development indicator against spread as far as the coefficients for those variables are negative. Thus the increase of those variables will lead to a decrease in spread while the rest explanatory variables have a direct relationship

with spread to the extent that their coefficient is positive. In general as per the regression results provided in table 4.7 among the 13 regressors used in this study 10 of them were significant.

Table 4.8 Regression Results for factors affecting banks intermediary efficiency (NIM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.172174	0.034107	-5.048013	0.0000
CR	0.134764	0.078119	1.725105	0.0897
LR	0.695396	0.069989	9.935854	0.0000***
ROA	-0.716134	0.097134	-7.372620	0.0000***
NII	-0.010542	0.003826	-2.755282	0.0078***
OC	0.005535	0.002648	2.090482	0.0409**
MQ	-0.000306	0.004845	-0.063203	0.9498
HHI	0.094351	0.025687	3.673138	0.0005***
RES	0.375060	0.085087	4.407943	0.0000***
GDP	0.333263	0.036982	9.011467	0.0000***
INFL	0.002404	0.003785	0.635034	0.5279
IRV	0.211699	0.062267	3.399858	0.0012***
ERV	0.370896	0.103325	3.589596	0.0007***
FDI	-0.015223	0.005091	-2.990301	0.0041***
R-squared	0.851643	Durbin-Watson stat		2.360672
Adjusted R-squared	0.801352			
F-statistic	16.93445	Prob(F-statistic)		0.000000

**** and ** denote significant at 1%, and 5% significance levels respectively.*

Source: Financial statements of banks, NBE reports and own computation

The estimation result of fixed effect panel regression model is presented in table 4.8 indicates that R-squared statistics and the adjusted-R squared statistics of the model was 85.2% and 80.1% respectively, the result indicates that the changes in the independent variables explain 80.1% of the changes in dependent variables. That is credit risk, liquidity risk, return on asset, non interest income, operating cost, management quality, HHI, reserve requirement, GDP, inflation, interest rate volatility, exchange rate volatility,

and financial development indicator collectively explain 80.1% of the changes in NIM. The remaining 19.9% of changes of NIM was explained by other factors which are not included in the model. Thus, these variables collectively are good explanatory variables of the interest rate spread of commercial banks in Ethiopia. The regression F-statistic and the p-value of zero attached to the test statistic reveal that the null hypothesis that all of the coefficients are jointly zero should be rejected. Thus, it implies that the independent variables in the model were able to explain variations in the dependent variable.

Moreover, the regression result in table 4.8 shows that, all bank-specific independent variables except credit risk and management quality had statistically significant impact on NIM. In contrast, both industry specific variables had statistically significant impact on NIM. Regarding the macroeconomic variables GDP, interest rate volatility and exchange rate volatility and financial development indicator are statistically significant, where as inflation was statistically insignificant. Among the significant variables liquidity risk, return on asset, noninterest income, HHI, reserve requirement, GDP, interest rate volatility, exchange rate volatility and financial development indicator were significant at 1% significance level since the p-value was 0.0000, 0.0000, 0.0078, 0.0005, 0.0000, 0.0000, 0.0012, 0.0007 and 0.0041 respectively. Whereas, operating cost was significant at 5% significance level since there p-values were 0.0409.

Likewise, table 4.8 also shows that there were inverse relationship between NIM and return on asset, noninterest income and financial development indicator as far as the coefficients for those variables are negative. Thus, an increase of those variables will lead to a decrease in NIM while the rest of explanatory variables have a direct relationship with NIM given that their coefficients are positive. In general as per the regression results

provided in table 4.8 among the 13 regressors used in this study 10 of them were significant.

4.2. In-depth interview results

In depth interviews were conducted from eight Ethiopian commercial banks finance managers. The eight finance managers interviewed were from CBE, CBB, AIB, UB, WB NIB BOA and DB .The eight finance managers were interviewed independently at different times. The interview questions were fully unstructured and focused on the identification of factors affecting Ethiopian banks interest rate spread in general. More specifically, the interview questions were also tried to identify how those factors can influence interest rate spreads and the major factors among the influential factors.

According to an interview with the aforementioned finance managers, the factors that can affect Ethiopian banks interest rate spread can be grouped generally into two major categories. The first category includes the internal determinants originate from bank accounts (balance sheets and/or profit and loss accounts) and therefore could be termed micro or bank-specific determinants of interest rate spread. The group of the bank-specific determinants of interest rate spread includes variables such as credit risk affect the banks spread positively this direct relationship indicates that an increase in provision for loan losses the bank will need to cover the losses, by passing on the additional costs to its customers, in the form of higher loan rates or lower deposit rates, or a combination of both of them. Here one interesting result generated from interview was despite the high liquidity ratio recorded earlier based on the output of the descriptive statistics, as per the interview conducted with the finance managers Ethiopian banks are currently characterized by low level of liquidity. The reason for the existence of high liquidity as

per the result of descriptive statistics was the classification of some accounts like reserve with NBE and treasury bill as a liquid asset on which banks have no right for lending or other purposes. While return on assets could be interpreted as an indication of profit-maximizing behavior in order to improve profitability, the bank will seek to increase net interest income by increasing interest margin but in the long run as the return on asset improved and the level of competition increased the bank will charge low lending rate this ultimately reduce spread.

On the other hand, noninterest income affects the banks spread negatively this means that banks with well-developed non-interest income sources may have lower interest margins due to cross-subsidization of bank activities. The other bank specific factor operating cost affect the banks spread positively this result implies that banks operating with high costs must operate with high margin to cover those costs. Finally management quality which is measured by cost to income ratio which is defined as the operating cost necessary to generate one unit of gross income. The ratio is increasing year to year; an increase in this ratio implies a decrease in the efficiency or quality of management, which will translate into a high interest margin.

In light of the above, the second category of factors that can affect Ethiopian banks interest rate spread as per the interview conducted includes external factors. The external determinants are variables that are not related to bank management but reflect the economic and legal environment that affects the intermediation cost of financial institutions, this factors are either direct or indirect effects on Ethiopian banks interest rate spread. This means the increase in some external or uncontrollable factors result in an increase in banks interest rate spread and the others act in a reverse way. The

determinant classified under this category includes industry and macroeconomic variables.

As per the interview result industry specific variables includes concentration, reserve requirement and involuntary bill purchase. Concentration affects the bank spread positively since the Ethiopian banking sector is more concentrated and uncompetitive the dominant bank (Commercial Bank of Ethiopia) still seizes quasi-monopoly power.

Moreover, some NBE‘s directives like reserve requirement (any bank operating in Ethiopia should required to maintain 5% of all birr and foreign currency deposit liabilities held in the form of demand or current deposit, saving deposit and time deposits) affect the banks interest rate spread positively and this reveals that unremunerated reserves act as implicit tax on banks so the opportunity cost of keeping reserves is compensated by setting higher interest rate spread.

The other regulations which were solely imposed on private banks like the credit cap latter replaced by an involuntary bill purchases which forces private banks solely to invest 27% of loanable funds in government treasury bonds maturing in 5 years, a relatively minimum interest rate (3%) which was even below the 5% interest rate paid by most of the privately owned banks for their depositors also considered as a factor that affects Ethiopian private banks interest rate spreads positively, since this requirement has the potential of creating maturity mismatches as private banks collect savings at two to three-year maturity and even shorter in some cases, but have to freeze these resources for five years at rates lower than cost of funds. In addition, it reduces profitability of private banks on account of less intermediation activities.

Regarding the macroeconomic factors that affects interest rate spread of banks the interview result reveals that variables which includes GDP, inflation, interest rate volatility and exchange rate volatility affects the banks spread positively by enhancing the likelihood of default of debtors. Whereas the other macroeconomic variable financial development indicators affect the banks spread negatively, this suggest the improvement of this ratio reflects increased deposit mobilization by commercial this ultimately narrow spread.

As per the interview conducted with Ethiopian banks finance managers almost all the aforementioned internal and external variables affect banks interest rate spread highly either by having a direct or indirect impact on it.

4.3. Analysis

This section of the chapter discusses some of the main implications of the results. The analysis is based on the regression result which indicate the relationship between dependent and independent variables presented in table 4.7 and 4.8 and in-depth interview result. The results obtained under these different methods are jointly analyzed**.**

Credit risk

H_1 predicts significant positive relationship between credit risk and interest rate spread of banks, as expected the coefficient of credit risk which was measured by the non performing loan to total loan ratio was positive and statistically significant at 1% significance level (p-value = 0.0011) for spread, but it was statistically insignificant for NIM since (p-value=0.0897). The coefficient of credit risk implies that if credit risk increased by 1% spread increased by 13.43%. The positive coefficient indicates that an increase in provision for loan losses implies a higher cost of bad debt write offs. Given

the risk-averse behavior, banks facing higher credit risk are likely to pass the risk premium to the borrowers, leading to higher spreads and margin. Hence, the higher the risk, the higher the pricing of loans and advances to compensate for likely loss. So, from the findings we can conclude that credit risk was one of the main determinants of interest rate spread of banks in Ethiopia. Further, the finding is also consistent with previous studies of Maudos and de Guevara (2004), Maudos and Solis, (2009), Khan and Khan (2010), Were and Wambua (2013) and Ahokpossi (2013).

Correspondingly, the result obtained from interview reveals the existence of similar fact or the result clearly supports the regression output. As per the interview conducted with the finance managers of the selected banks, credit risk is one of the major factors that can affect Ethiopian banks interest rate spread positively. That means an increase in credit risk will lead to an increase in interest rate spread by increasing uncertainty, so the bank will charge interest rate spread to compensate the risk premium.

Liquidity risk

H_2 predicts significant positive relationship between liquidity risk and interest rate spread of banks, as expected the coefficient of liquidity risk which was measured by the ratio of liquid assets to deposits and short-term funding was positive and statistically significant at 5% significance level (p-value=0.0239) and 1% significance level (p-value=0.0000) for both spread and NIM respectively. The coefficient of liquidity risk implies that if liquidity risk increased by 1% spread and NIM increased by 13.39% and 69.53% respectively. The positive coefficient indicates that the banks with high liquidity risk tend to borrow emergency funds at high cost and therefore charge a liquidity premium that is reflected in higher margins. This reveals that the bank with high liquidity risk charges

high spread in order to compensate the risk premium. The finding of this study is consistent with Khawaja and Din (2007), Ahokpossi (2013) and Were and Wambua (2013).

Accordingly, the result drawn from interview also supports the above fact. Therefore, liquidity risk exists as one of the major determinant factor that can influence Ethiopian banks interest rate spread positively. This implies that the bank with high liquidity risk charges high spread in order to compensate the risk premium.

Return on asset

H_3 predicts significant negative relationship between return on asset and interest rate spread of banks, as expected the coefficient of return on asset which was measured by the ratio of net income to total asset was negative and statistically significant at 1% significance level (p-value=0) for both spread and NIM. The coefficient of return on asset entails that if return on asset increased by 1% spread and NIM decreased by 14.64% and 71.61% respectively. The negative relationships suggest that a bank with higher profitability can afford to charge lower spreads. The result confirms a well known assertion that banks who have adequate return on asset has less sensitive towards interest income (profit maximization) thus, it has likely to charge low lending and low deposit rate in order to attract new customers and take competitive advantage. The finding is consistent with Norris and Floerkemeier, (2007).

Likewise, the result drawn from interview also strongly indicates as the return on asset was one of the major determinants of Ethiopian banks interest rate spread. This could be interpreted as an indication of profit-maximizing behavior in order to improve profitability, the bank will seek to increase net interest income by increasing interest

margin but in the long run as the return on asset improved and the level of competition increased the bank will charge low lending rate this ultimately reduce spread.

Noninterest income

H_4 predicts significant negative relationship between noninterest income and interest rate spread of banks, as expected the coefficient of non interest incomes which was measured by the ratio of noninterest income to total asset is negative and significant at 1% significance level (p-value = 0.0081 and 0.0078) for both spread and NIM respectively. The coefficient of noninterest income entails that if noninterest income increased by 1% spread and NIM decreased by 0.48% and 1.05% respectively. The negative relationship suggests that the banks with diversified and stable revenue sources are expected to influence the pricing of loan products and therefore may charge lower margins rates because they consider the two sources of income as substitutes of each-other. This result suggests that the Ethiopian commercial banks with a higher share of non-interest income in their gross revenues charged lower margins for loans granted and collected additional revenue through various charges connected to credit activity. The finding of the study is consistent with Norris and Floerkemeir (2007), Maudos and Solis (2009), Khan and Khan (2010) and Afzal (2011)**.** Accordingly, the result generated through interview also supports the above reality. The banks tend to lower the margins if they compensate the interest incomes by higher commission or non-interest incomes. Therefore, noninterest income exists as one of the major factor that can influence Ethiopian banks interest rate spread.

Operating cost

H_5 predicts significant positive relationship between operating cost and interest rate spread of banks, as expected the coefficient of operating cost which was measured by the ratio of overhead costs to total assets was positive and statistically significant at 1% significance level (p-value=0.0000) and 5% significance level (p-value=0.0409). The coefficient of operating cost implies that if operating cost increased by 1% spread and NIM increased by 96.34% and 0.55% respectively. The highest positive coefficient that existed between operating cost and spread compared to other variables clearly indicates as the Ethiopian banks interest rate spread is highly determined by this variable. The positive sign indicating that the Ethiopian‘s banks transfer a large portion of their operating costs to their borrowers and depositors. In a general word, the result confirms the well known assertion that banks operating with high costs due to diseconomies of scale must operate with high margin to cover those costs and maintain overall profitability. This result is consistent with Brock and Suarez (2000), Ramful (2001), Maudos and Guevara (2004), Khan and Khan (2010), Afzal (2011) and Were and Wambua (2013). Correspondingly, the result obtained from the interview also supports the output of the regression analysis fully. That is Ethiopian banks interest rate spread increases as the operating cost of the banks increase in order to cover the costs.

Management quality

H_6 predicts significant positive relationship between management quality and interest rate spread of banks, on the contrary the coefficient of management quality which is measured by the ratio of operating expense to gross income was negative and statistically insignificant (p-value= 0.3001 and 0.9498) for both spread and NIM respectively

insinuating that its influence is negligible. Moreover, the insignificant parameter indicates that the management quality does not affect Ethiopian banks interest rate spread. Thus, the hypothesis that states there is a significant positive relationship between management quality and interest rate spread may be rejected or data did not support the hypothesis. The finding is consistent with Mudzamiri, (2012). Regardless of the findings of the regression analysis, the result of the interview reveals that management quality is one of the major determinants of Ethiopian banks interest rate spread. The result of interview and regression output was inconsistent therefore, conclusion about the impact of management quality on interest rate spread of Ethiopian banking industry remains ambiguous and further research is required.

Industry concentration

H_7 predicts significant positive relationship between industry concentration and interest rate spread of banks, as expected the coefficient of industry concentration which was measured by HHI was positive and statistically significant at 1% significance level (p-value = 0.0005) for NIM model but it was statistically insignificant (p-value = 0.1642) for spread. The coefficient of concentration implies that the level of concentration increased by 1% NIM increased by 9.4%. This suggests that the study has enough evidence to support the Structure Conduct Performance (SCP) Hypothesis, concentration and bank margins are positively related hypothesis. A positive association between concentration and interest rate margins is an indication of greater market power and less competition in banking system. Banks operate in highly concentrated market tend to charged higher interest rates on loans and lesser rate of return is paid to depositors, it ultimately leads to high interest rate spread. The result is compatible with that obtained by Khawaja and Din

(2007), Beck and Hesse (2009), Ahokpossi (2013). Accordingly, the result generated through interview also supports the above fact. Therefore, industry concentration exists as one of the major factor that influence Ethiopian banks interest rate spread.

Reserve requirement

H_8 predicts significant positive relationship between reserve requirement and interest rate spread of banks, as expected the coefficient of reserve requirement which was measured by the deposit reserve requirement ratio was positive and statistically significant at 1% significance level (p-value= 0.0001 and 0) for both spread and NIM respectively. The coefficient of reserve requirement implies that if reserve requirement increased by 1% spread and NIM increased by 16.55% and 37.5% respectively. This implies that the opportunity cost of holding reserves at the national bank, where they earn no interest increases the economic cost of funds above the recorded interest expenses , the banks tend to shift this cost to customers so, the banks likely to increase the margins for compensating the missing incomes from investing in obligatory reserves. This finding is consistent with Chirwa and Mlachila (2002) and Folawewo and Tennant (2008). Correspondingly, the result generated from interview also strongly indicates that reserve requirement was one of the major determinants of Ethiopian banks interest rate spread which positively affect it, since reserve requirements act as an implicit financial tax, it leads to high interest rates spread.

GDP

H_9 predicts significant positive relationship between GDP and interest rate spread of banks, as expected the coefficient of GDP which was measured by annual real GDP growth was positive and statistically significant at 1% significance level (p-value = 0) for both spread and NIM. The coefficient of GDP implies that if GDP decreased by 1% spread and NIM increased by 11.25% and 33.32 % respectively. This result suggests that as national income reduced it affect firms and households ability to meet obligations, increase the demand for loans and reduce the supply of deposit. Consequently, in order to compensate against expected default emanating from the changing business cycles, the banks are likely to impose higher lending rate. The result is comparable with Beck and Hesse (2009), Maudos and Solis (2009) Khan and Khan (2010) and Afzal (2011). The interview result also supports the existence of the above reality in relative to the relationship of banks interest rate spread and GDP. According to the results of the interview the national income remain as a major factor that affects their interest rate spreads.

Inflation

H_{10} predicts significant positive relationship between inflation and interest rate spread of banks, however, even if the coefficient of inflation which is measured by annual percentage change in the CPI was positive as expected, it was statistically insignificant (p-value= 0.2490 and 0.5279) for both spread and NIM respectively, this suggests that its influence is negligible. Moreover, the insignificant parameter indicates that the inflation does not affect Ethiopian banks interest rate spread. Thus, the hypothesis that states there is a significant relationship between inflation and interest rate spread may be rejected or

data did not support the hypothesis. The finding is consistent with Were and Wambua (2013).

Apart from of the findings of the regression analysis, the result of the interview reveals that inflation is one of the major determinants of Ethiopian banks interest rate spread. But, the output of the regression analysis and the interview are in agreement in relation to the direction of the effect of inflation as far as both of them proves the existence of positive or direct relationship between inflation and interest rate spread of Ethiopian banks. Therefore, conclusion about the impact of inflation on interest rate spread of Ethiopian banking industry remains ambiguous and further research is required.

Interest rate volatility

H_{11} predicts significant positive relationship between interest rate volatility and interest rate spread of banks, as expected the coefficient of interest rate volatility which is measured by standard deviation of annual money market interest rate was positive and statistically significant at 1% significance level (p-value=0.0020 and 0.0012) for spread and NIM respectively. The coefficient of interest rate volatility implies that if interest rate volatility increased by 1% spread and NIM increased by 9.49% and 21.16% respectively. The positive relationships between interest rate volatility and two dependent variables suggest the volatility in money market interest rate creates reinvestment and refinancing risks arising from fluctuations in interest rates, due to the maturity mismatch between banks assets and liabilities accordingly, banks spreads are used as a risk hedging mechanism so, banks are inclined to charge higher spreads. This finding is consistent with Maudos and Solis (2009), Khan and Khan, (2010).

Likewise, the result obtained from interview reveals the existence of similar fact that interest rate volatility is one of the major factors that can affect Ethiopian banks interest rate spread certainly. This means an increase in interest rate volatility will lead to an increase in interest rate spread by increasing uncertainty, so the bank will charge interest rate spread to compensate the risk premium.

Exchange rate volatility

H_{12} predicts significant positive relationship between exchange rate volatility and interest rate spread of banks, as expected the coefficient of exchange rate volatility which was measured by the standard deviation of the percentage change in the real exchange rate was positive and statistically significant at 1% significance level (p-value=0.0085 and 0.0007) for both spread and NIM respectively. The coefficient of exchange rate volatility implies that if exchange rate volatility increased by 1% spread and NIM increased by 13.46% and 37.08% respectively. The positive relationship between exchange rate volatility and interest rate spread implies that an increased in macroeconomic instability heightens the risk faced by commercial banks, as a result the banking sector increases its spreads to protect against the increased risk. The finding is consistent with Folawewo and Tennant (2008). Correspondingly, the result of the interview also supports the existence of the above reality in relative to the relationship of banks interest rate spread and exchange rate volatility. According to the results of the interview the exchange rate volatility as a major determinant factor that affects their interest rate spread positively.

Financial development indicator

H_{13} predicts significant negative relationship between financial development indicator and interest rate spread of banks, as expected the coefficient of financial development indicator which is measured by M2/GDP was negative and statistically significant at 1% significance level (p-value= 0.0082 and 0.0041) for both spread and NIM respectively. The coefficient of financial development indicator implies that if financial development indicator increased by 1% spread and NIM decreased by 0.65% and 1.52% respectively. This suggests that the development of this ratio reflects the growth of deposit mobilization by commercial banks this ultimately reduce the lending rate. The finding is consistent with Folawewo and Tennant (2008). Accordingly, the result of interview support the above facts financial development indicators affect the banks spread negatively, this suggest the improvement of this ratio reflects increased deposit mobilization by commercial this ultimately narrow interest rate spread of banks.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

The previous chapter offered the result presentation and analysis of the findings, while this chapter deals with the conclusions and recommendations provided based on the findings of the study. Accordingly, this chapter is organized into three subsections. The first section 5.1 presents the conclusions where as the second section 5.2 present the recommendations and finally recommendation for future research presented in section 5.3.

5.1 Conclusions

Efficient financial intermediation is an important factor in economic development process as it has implication for effective mobilization of investible resources, interest rate spreads is a major indicator of banking sector efficiency. To this end, this study aimed at examining possible factors that could influence the interest rate spreads of commercial banks in Ethiopia. In order to achieve this objective, one research questions and thirteen hypotheses have been developed. To address the research questions, test hypotheses and achieve the broad research objective, the study used mixed research approach. More specifically, the analyses were performed using data derived from the financial statements of commercial banks in Ethiopia and NBE annual report during ten-year period from 2004-2013 and in-depth interview with finance manager of banks. Eight commercial banks were selected as a sample from eighteen commercial banks currently operating in Ethiopia. Fixed effect model was used to estimate the regression equation. In the study credit risk, liquidity risk, return on asset, noninterest income, operating cost, management quality, market share, reserve requirement, GDP, inflation, interest rate

volatility, exchange rate volatility and financial development were considered as independent variables while spread and NIM was considered as dependent variables.

The empirical findings on the determinants of banks interest rate spread in Ethiopia draw the following conclusions.

Regarding the bank specific factors, the following conclusions were drawn:

First, as expected, the result showed a positive and statistically significant relationship between credit risk and banks interest rate spread, but it was statistically insignificant for NIM. The significant relationship between credit risk and spread suggests that an increase in provision for loan losses implies a higher cost of bad debt write offs. Given the risk-averse behavior, banks facing higher credit risk are likely to pass the risk premium to the borrowers, leading to higher spreads. This is in line with the expectation as the banks facing higher credit risk are likely to pass the risk premium to the borrowers, leading to higher spreads.

Second, again as expected, the result showed a positive statistically significant and relationship between liquidity risk and interest rate spread. This implies that the bank with high liquidity risk tend to borrow emergency funds at high cost and therefore charge a liquidity premium that is reflected in higher margins.

Third, the result showed a negative relationship between return on asset and interest rate spread with strong statistical significance which is in line with a prior expectation. This entails that a bank with higher profitability can afford to charge lower spreads. The result confirms a well known assertion that banks with adequate return on asset has less

sensitive towards interest income thus; it has likely to charge low lending and high deposit rate in order to attract new customers and take competitive advantage.

Fourth, as the result reveals, the coefficient of noninterest income was negative and strongly statistically significant which is in line with a prior expectation and makes the variable an important determinant of Ethiopian banks interest rate spread. This implies that banks with diversified and stable revenue sources are expected to influence the pricing of loan products and therefore may charge lower margins due to cross subsidization of traditional banking activities.

Fifth, the coefficient of operating cost has positive and statistically significant. The positive relationship between operating cost and banks interest rate spread entails that, banks operating with high costs due to diseconomies of scale must operate with high margin to cover those costs and maintain overall profitability.

Sixth, the coefficient of management quality was negative and statistically insignificant for both spread and NIM model. The insignificance of this variable suggests that it has less impact on interest rate spreads than a lot perceived in the literature.

Concerning the industry specific variables the following conclusions were drawn:

The coefficient of concentration was positive even though it is statistically insignificant as the regression result of spread shows. However, statistical result for NIM shows, there is a positive relationship between concentration and Ethiopian commercial banks interest rate spread which is strongly statistically significant at 1% significance level. A positive association between concentration and interest rate margins is an indication of greater market power and less competition in banking system. Banks operate in highly

concentrated market tend to charged higher interest rates on loans and lesser rate of return is paid to depositors, it ultimately leads to high interest rate spread.

The empirical finding showed that the coefficient of reserve requirement has a positive and statistically significant impact on interest rate spread of banks as expected. This implies that the opportunity cost of holding reserves at the national bank, where they earn no interest increases the economic cost of funds so the banks tend to shift this cost to customers in order to compensate the missing incomes from investing in obligatory reserves.

Furthermore, the discussions with the interviewees suggested that regulations which were solely imposed on private banks like the credit cap latter replaced by an involuntary bill purchases which forces private banks solely to invest 27% of loanable funds in government treasury bonds maturing in 5 years, a relatively minimum interest rate (3%) which was even below the 5% interest rate paid by most of the privately owned banks for their depositors also considered as main factor that affects Ethiopian private banks interest rate spreads positively, because this requirement has the potential of creating maturity mismatches and reduce profitability of private banks. Consequently, the bank charge high interest rate spread in order to compensate the risk and maximize their profit.

Pertaining to the macroeconomic variables the following conclusions were drawn:

First, the coefficient of GDP was positive and statistically significant impact on interest rate spread of banks in line with prior expectations. This entails that, changes in business cycle impact the credit worthiness of borrowers in terms of repayment capacity. In order to compensate against expected default emanating from the changing business cycles, the banks are likely to impose higher lending rates.

Second, the coefficient of inflation which is an indicator of the cost of doing business in an economy was positive and statistically insignificant. The insignificance of this variable suggests that it has less impact on interest rate spreads than a lot perceived in the literature.

Third, the coefficient of interest rate volatility is positive and statistically significant. This suggests that the volatility in money market interest rate creates reinvestment and refinancing risks arising from fluctuations in interest rates, due to the maturity mismatch between banks assets and liabilities accordingly, banks spreads are used as a risk hedging mechanism so, banks are inclined to charge higher spreads.

Fourth, the coefficient of exchange rate volatility was positive and statistically significant. This implies that an increased in macroeconomic instability heightens the risk faced by commercial banks, as a result the banking sector increases its spreads to protect against the increased risk.

Fifth, the coefficient of financial development indicator which measures the degree of monetization of the economy relative to GDP was statistically significant. This suggests that the development of this ratio reflects the growth of deposit mobilization by commercial banks this ultimately reduce the lending rate.

5.2 Recommendations

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

Credit risk, liquidity risk, return on asset, non-interest income, operating cost industry concentration, reserve requirement, real GDP growth rate, interest rate volatility, exchange rate volatility and financial development indicators are significant key drivers of interest rate spread of commercials banks in Ethiopia indeed focusing and reengineering the institutions alongside these indicators could enhance the intermediary efficiency of Ethiopian banks in particular and economic growth in general.

The empirical finding suggests that the variability of interest rate spread is explained by different bank specific, industry specific and macroeconomic factors. Thus, banks in Ethiopia should not only be concerned about internal structures and policies, but they must consider both the internal, industry and the macroeconomic environment together in fashioning out strategies to improve their intermediary efficiency

To control the impact of credit risk, Ethiopian commercial banks should strive to improve their inspection techniques and loan application methodologies in screening potential borrowers.

Liquidity risk has positive and statistically significant effect on commercial banking industry interest rate spread in general and private banks in particular. This implies the presence of less liquid assets. So, banks those have less liquid asset should implement effective and efficient liquidity management system such as making more short term investments.

Noninterest income has negative and strongly statistically significant impact on commercial banking industry interest rate spread, so the Ethiopian commercial banks should make a diversified investment portfolio in order to maximize the revenue earned from non core business activities.

The commercial banks should give more attention in reduction of operating expenses, to improve its efficiency of financial intermediation, by using advanced technologies extensively.

Reserve requirement regulation which forced banks to preserve about 5% of the total deposit which earns no interest is currently affecting the Ethiopian commercial banks interest rate spread positively. So the government needs to revisit its policy or it should take some corrective actions like paying at least equivalent interest with that of the deposit rate paid for commercial bank‘s customers.

Government regulation which forced private banks solely to make investment on bonds that amounts about 27% of the total loans provided by the bank to customers is currently affecting the Ethiopian private banks interest rate spread positively. So the government needs to revisit its policy or it should take some corrective actions like paying at least equivalent interest with that of the deposit rate paid for private commercial bank‘s customers in order to enhance the economic growth of the country in general and intermediary efficiency of banks in particular.

Policies aimed at controlling GDP growth, interest rate volatility and exchange rate volatility should be given priority in fostering Ethiopian commercial banking sector intermediary efficiency.

To achieve financial deepening the Ethiopian commercial banks should provide excellent service for their customers to mobilize more deposits. Incentives such as coupon prizes are also effective for deposit growth. Furthermore deposit rate has positive effect on commercial bank deposit mobilization, so the banks should increase their deposit rate in order to attract more deposit.

5.3 Recommendation for Future Research

This study sought to investigate the factors that influence interest rate spread of commercial banks in Ethiopia. However, the variables used in the statistical analysis did not include all factors that could possibly affect the dynamics of Ethiopian banks interest rate spread. Thus, future research could incorporate other bank specific factors like bank size and leverage and macro policy environment factors such as extent of government dependence on the domestic banking sector for the financing of its fiscal deficit (CROWD) discount rate (DISRATE) Treasury Bill rate (TBILL).

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Appendices

Appendix I Correlation matrix of dependent and independent variables: Spread

	SPREAD	CR	LR	ROA	NII	OC	MQ	HHI	RES	GDP	INFL	IRV	ERV	FDI
SPREAD	1													
CR	0.369	1												
LR	0.569	-0.095	1											
ROA	-0.494	-0.127	0.016	1										
NII	-0.461	0.262	0.058	0.318	1									
OC	0.921	-0.166	-0.09	-0.419	-0.169	1								
MQ	-0.104	0.112	-0.016	0.063	0.253	-0.004	1							
HHI	0.669	-0.054	-0.13	-0.505	-0.219	0.471	-0.096	1						
RES	0.231	-0.018	0.012	0.311	0.182	-0.505	-0.051	-0.641	1					
GDP	0.305	0.036	0.092	0.034	0.002	-0.041	0.132	-0.193	-0.451	1				
INFL	0.081	0.083	0.212	0.423	0.114	-0.588	0.121	-0.618	0.301	0.404	1			
IRV	0.413	-0.051	-0.059	0.221	0.153	-0.429	0.031	-0.489	0.612	-0.105	0.169	1		
ERV	0.527	0.106	0.152	0.193	0.001	-0.211	0.132	-0.231	-0.385	0.487	0.554	-0.011	1	
FDI	-0.395	0.015	-0.071	-0.373	-0.198	0.596	-0.013	0.615	-0.601	0.172	-0.581	-0.632	0.155	1

Appendix II Correlation matrix of dependent and independent variables: NIM

	NIM	CR	LR	ROA	NII	OC	MQ	HHI	RES	GDP	INFL	IRV	ERV	FDI
NIM	1													
CR	0.352	1												
LR	0.527	-0.095	1											
ROA	-0.676	-0.127	0.016	1										
NII	-0.232	0.262	0.058	0.318	1									
OC	0.222	-0.166	-0.09	-0.419	-0.169	1								
MQ	-0.113	0.112	-0.016	0.063	0.253	-0.004	1							
HHI	0.267	-0.054	-0.13	-0.505	-0.219	0.471	-0.096	1						
RES	0.026	-0.018	0.012	0.311	0.182	-0.505	-0.051	-0.641	1					
GDP	0.003	0.036	0.092	0.034	0.002	-0.041	0.132	-0.193	-0.451	1				
INFL	0.005	0.083	0.212	0.423	0.114	-0.588	0.121	-0.618	0.301	0.404	1			
IRV	0.211	-0.051	-0.059	0.221	0.153	-0.429	0.031	-0.489	0.612	-0.105	0.169	1		
ERV	0.301	0.106	0.152	0.193	0.001	-0.211	0.132	-0.231	-0.385	0.487	0.554	-0.011	1	
FDI	-0.231	0.015	-0.071	-0.373	-0.198	0.596	-0.013	0.615	-0.601	0.172	-0.581	-0.632	0.155	1

Appendix III Correlation matrix independent variables

	CR	LR	ROA	NII	OC	MQ	HHI	RES	GDP	INFL	IRV	ERV	FDI
CR	1												
LR	-0.095	1											
ROA	-0.127	0.016	1										
NII	0.262	0.058	0.318	1									
OC	-0.166	-0.09	-0.419	-0.169	1								
MQ	0.112	-0.016	0.063	0.253	-0.004	1							
HHI	-0.054	-0.13	-0.505	-0.219	0.471	-0.096	1						
RES	-0.018	0.012	0.311	0.182	-0.505	-0.051	-0.641	1					
GDP	0.036	0.092	0.034	0.002	-0.041	0.132	-0.193	-0.451	1				
INFL	0.083	0.212	0.423	0.114	-0.588	0.121	-0.618	0.301	0.404	1			
IRV	-0.051	-0.059	0.221	0.153	-0.429	0.031	-0.489	0.612	-0.105	0.169	1		
ERV	0.106	0.152	0.193	0.001	-0.211	0.132	-0.231	-0.385	0.487	0.554	-0.011	1	
FDI	0.015	-0.071	-0.373	-0.198	0.596	-0.013	0.615	-0.601	0.172	-0.581	-0.632	0.155	1

Appendix –IV: Tests for Heteroskedasticity, both Spread and NIM respectively:

Heteroskedasticity Test: White :Spread

F-statistic	4.438629	Prob. F(72,7)	0.2219
Obs*R-squared	78.28527	Prob. Chi-Square(72)	0.2862
Scaled explained SS	44.17693	Prob. Chi-Square(72)	0.9960

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 04/13/14 Time: 03:22
Sample: 2004 2013
Included observations: 80
Collinear test regressors dropped from specification

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.160490	0.425467	0.377210	0.7172
LR^2	2.391688	2.805641	0.852457	0.4222
LR*ROA	-0.237101	3.095631	-0.076592	0.9411
LR*NII	0.173591	0.161614	1.074107	0.3184
LR*OC	-5.283279	3.258483	-1.621393	0.1490
LR*MQ	-0.041880	0.086559	-0.483834	0.6433
LR*HHI	-1.386145	1.093646	-1.267454	0.2455
LR*RES	0.663293	1.470922	0.450937	0.6657
LR*GDP	0.371627	3.388487	0.109674	0.9157
LR*INFL	-0.590878	0.328592	-1.798211	0.1152
LR*IRV	2.020833	1.266528	1.595570	0.1546
LR*ERV	-1.431103	2.952383	-0.484728	0.6427
LR*FDI	0.692928	0.501234	1.382444	0.2093
ROA^2	0.942557	2.861474	0.329396	0.7515
ROA*NII	-0.265118	0.237558	-1.116016	0.3013
ROA*OC	0.419136	2.886688	0.145196	0.8886
ROA*MQ	0.024494	0.036276	0.675213	0.5212
ROA*HHI	0.387783	2.312214	0.167711	0.8716
ROA*RES	1.300943	1.136992	1.144197	0.2902
ROA*GDP	1.252244	2.682092	0.466891	0.6548
ROA*INFL	-0.139168	0.137063	-1.015358	0.3437
ROA*IRV	-1.248679	1.895283	-0.658835	0.5311
ROA*ERV	4.027957	3.997870	1.007526	0.3472
ROA*FDI	-1.220610	0.563565	-2.165873	0.0670
NII^2	0.000725	0.001942	0.373237	0.7200
NII*OC	0.209371	0.339481	0.616739	0.5569
NII*MQ	0.000785	0.002515	0.312381	0.7639
NII*HHI	-0.347008	0.226390	-1.532791	0.1692
NII*RES	0.274802	0.136875	2.007678	0.0847

NII*GDP	-0.013158	0.090238	-0.145820	0.8882
NII*INFL	-0.014086	0.029895	-0.471197	0.6518
NII*IRV	0.385698	0.253141	1.523646	0.1714
NII*ERV	-0.514364	0.508034	-1.012458	0.3450
NII*FDI	0.031592	0.022057	1.432272	0.1952
OC^2	-0.630773	1.098718	-0.574099	0.5839
OC*MQ	-0.029201	0.086601	-0.337187	0.7459
OC*HHI	-0.515512	1.033883	-0.498618	0.6333
OC*RES	0.728458	1.543162	0.472055	0.6512
OC*GDP	-0.663990	2.104361	-0.315530	0.7616
OC*INFL	-0.169597	0.182689	-0.928335	0.3841
OC*IRV	1.114752	1.445424	0.771228	0.4658
OC*ERV	0.563381	5.793733	0.097240	0.9253
OC*FDI	0.271476	0.484834	0.559935	0.5930
MQ^2	0.000482	0.001284	0.375279	0.7186
MQ*HHI	-0.003442	0.055212	-0.062348	0.9520
MQ*RES	-0.011517	0.020250	-0.568739	0.5873
MQ*GDP	0.013241	0.048103	0.275273	0.7911
MQ*INFL	0.005611	0.006144	0.913187	0.3915
MQ*IRV	0.002523	0.051704	0.048788	0.9625
MQ*ERV	-0.022503	0.053791	-0.418344	0.6882
MQ*FDI	0.006409	0.012639	0.507082	0.6277
HHI^2	0.362752	0.440910	0.822734	0.4378
HHI*RES	3.959906	16.82187	0.235402	0.8206
HHI*GDP	-4.528014	15.35939	-0.294804	0.7767
HHI*INFL	-0.339457	0.636532	-0.533292	0.6103
HHI*IRV	0.759909	4.365855	0.174057	0.8667
HHI*ERV	-10.37877	49.51201	-0.209621	0.8399
HHI*FDI	-1.687552	4.945284	-0.341245	0.7429
RES^2	-7.713062	26.51620	-0.290881	0.7796
RES*GDP	17.89946	9.794340	1.827531	0.1103
RES*INFL	-0.379982	0.648634	-0.585818	0.5764
RES*IRV	-10.34103	16.36764	-0.631797	0.5476
RES*ERV	25.20361	125.4229	0.200949	0.8465
RES*FDI	-0.752772	3.877938	-0.194117	0.8516
GDP*INFL	-0.712630	1.713781	-0.415823	0.6900
GDP*FDI	1.658215	17.05911	0.097204	0.9253
INFL^2	-0.099855	0.053064	-1.881787	0.1019
INFL*IRV	0.894218	1.168087	0.765540	0.4690
INFL*ERV	-0.005113	2.603321	-0.001964	0.9985
INFL*FDI	0.283599	0.586981	0.483148	0.6437
IRV*FDI	1.335114	0.935210	1.427609	0.1965
ERV*FDI	2.223145	5.539157	0.401351	0.7001
FDI^2	0.083788	0.036407	2.301439	0.0549

R-squared	0.978566	Mean dependent var	0.000297
Adjusted R-squared	0.758100	S.D. dependent var	0.000379

S.E. of regression	0.000187	Akaike info criterion	-14.94667
Sum squared resid	2.44E-07	Schwarz criterion	-12.77307
Log likelihood	670.8668	Hannan-Quinn criter.	-14.07521
F-statistic	4.438629	Durbin-Watson stat	2.162439
Prob(F-statistic)	0.021884		

Heteroskedasticity Test: White: NIM

F-statistic	28.13279	Prob. F(72,7)	0.2101
Obs*R-squared	79.72449	Prob. Chi-Square(72)	0.2492
Scaled explained SS	49.61851	Prob. Chi-Square(72)	0.9796

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 04/13/14 Time: 01:38
Sample: 2004 2013
Included observations: 80
Collinear test regressors dropped from specification

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.272097	0.369276	-0.736839	0.4852
LR^2	2.276336	2.685296	0.847704	0.4246
LR*ROA	-3.056537	7.823747	-0.390674	0.7077
LR*NII	0.011152	0.118871	0.093818	0.9279
LR*OC	0.004546	0.029526	0.153981	0.8820
LR*MQ	0.068204	0.153194	0.445212	0.6696
LR*HHI	-1.302002	1.740352	-0.748126	0.4788
LR*RES	0.690593	2.359696	0.292662	0.7783
LR*GDP	-0.513172	0.786972	-0.652084	0.5352
LR*INFL	0.047583	0.102583	0.463850	0.6568
LR*IRV	1.261024	1.859788	0.678047	0.5195
LR*ERV	-2.460743	3.207301	-0.767232	0.4680
LR*FDI	0.608559	0.895481	0.679588	0.5186
ROA^2	130.2574	157.5711	0.826658	0.4357
ROA*NII	-0.278907	0.211917	-1.316115	0.2296
ROA*OC	-0.055116	0.051239	-1.075669	0.3177
ROA*MQ	-2.905882	4.618631	-0.629165	0.5492
ROA*HHI	83.80299	106.9216	0.783780	0.4589
ROA*RES	-90.79353	123.1089	-0.737506	0.4848
ROA*GDP	16.43034	63.73317	0.257799	0.8040
ROA*INFL	-0.063759	0.122318	-0.521258	0.6183
ROA*IRV	-108.1011	147.7193	-0.731800	0.4881

ROA*ERV	6.772852	8.068792	0.839389	0.4290
ROA*FDI	0.876770	3.731687	0.234953	0.8210
NII^2	-0.002866	0.008250	-0.347410	0.7385
NII*OC	0.014848	0.011704	1.268614	0.2451
NII*MQ	0.017340	0.019191	0.903543	0.3963
NII*HHI	0.013347	0.032834	0.406507	0.6965
NII*RES	-0.113527	0.068149	-1.665851	0.1397
NII*GDP	-0.011130	0.064511	-0.172530	0.8679
NII*INFL	-0.004265	0.010932	-0.390132	0.7080
NII*IRV	0.015232	0.055807	0.272947	0.7928
NII*ERV	0.259197	0.142919	1.813589	0.1126
NII*FDI	0.001366	0.017770	0.076871	0.9409
OC^2	-0.000154	0.001063	-0.144563	0.8891
OC*MQ	-0.001356	0.001883	-0.720058	0.4948
OC*HHI	0.026450	0.024676	1.071897	0.3193
OC*RES	-0.007186	0.024937	-0.288153	0.7816
OC*GDP	0.009504	0.011198	0.848717	0.4241
OC*INFL	-0.003526	0.006808	-0.517969	0.6204
OC*IRV	-0.029386	0.027553	-1.066502	0.3216
OC*ERV	0.000145	0.031553	0.004584	0.9965
OC*FDI	-0.001229	0.004391	-0.279998	0.7876
MQ^2	0.049736	0.102522	0.485124	0.6424
MQ*HHI	-0.897847	1.248668	-0.719044	0.4954
MQ*RES	0.382586	0.449939	0.850307	0.4233
MQ*GDP	0.023019	0.308291	0.074665	0.9426
MQ*INFL	0.005744	0.007394	0.776799	0.4627
MQ*IRV	1.252806	1.923671	0.651258	0.5357
MQ*ERV	-0.147192	0.170439	-0.863603	0.4164
MQ*FDI	0.114025	0.172039	0.662784	0.5287
HHI^2	-4.744349	6.205418	-0.764549	0.4695
HHI*RES	9.386147	12.96111	0.724178	0.4924
HHI*GDP	-6.366933	10.56410	-0.602695	0.5657
HHI*INFL	-0.012100	0.048461	-0.249691	0.8100
HHI*IRV	8.067025	11.12965	0.724823	0.4921
HHI*ERV	-0.406137	1.880072	-0.216022	0.8351
HHI*FDI	-0.915902	1.283024	-0.713862	0.4984
RES*INFL	-0.004479	0.048932	-0.091534	0.9296
RES*ERV	0.128586	2.439058	0.052720	0.9594
RES*FDI	-0.612496	0.444694	-1.377342	0.2108
GDP*INFL	0.004720	0.033598	0.140479	0.8922
GDP*ERV	-1.417829	1.147491	-1.235591	0.2565
GDP*FDI	3.047508	2.690993	1.132484	0.2947
INFL^2	-0.001579	0.006706	-0.235439	0.8206
INFL*IRV	0.025658	0.052339	0.490233	0.6390
INFL*ERV	-0.107752	0.111670	-0.964915	0.3667
INFL*FDI	0.006796	0.013461	0.504879	0.6291

IRV*ERV	0.917019	1.978405	0.463514	0.6571
IRV*FDI	0.193746	1.568007	0.123562	0.9051
ERV^2	1.269470	1.251505	1.014355	0.3442
ERV*FDI	-0.773355	0.746845	-1.035495	0.3349
FDI^2	-0.006870	0.126707	-0.054220	0.9583

R-squared	0.996556	Mean dependent var	0.000262
Adjusted R-squared	0.961133	S.D. dependent var	0.000351
S.E. of regression	6.91E-05	Akaike info criterion	-16.93181
Sum squared resid	3.35E-08	Schwarz criterion	-14.75821
Log likelihood	750.2725	Hannan-Quinn criter.	-16.06035
F-statistic	28.13279	Durbin-Watson stat	1.619076
Prob(F-statistic)	0.000059		

Appendix V Autocorrelation test: For both Spread and NIM model respectively.

Breusch-Godfrey Serial Correlation LM Test: Dependent Variable Spread

F-statistic	1.472546	Prob. F(10,56)	0.1742
Obs*R-squared	16.65647	Prob. Chi-Square(10)	0.0823

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/19/14 Time: 23:40
Sample: 2004 2013
Included observations: 80
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.007247	0.017778	0.407619	0.6851
CR	-0.018892	0.035182	-0.536993	0.5934
LR	0.009075	0.050510	0.179664	0.8581
ROA	0.008881	0.032573	0.272644	0.7861
NII	3.30E-06	0.001811	0.001824	0.9986
OC	0.003719	0.037822	0.098326	0.9220
MQ	-0.000996	0.001230	-0.809951	0.4214
HHI	-0.006604	0.011419	-0.578341	0.5654
RES	-0.019200	0.047278	-0.406103	0.6862
GDP	-0.007033	0.018938	-0.371377	0.7118
INFL	0.000728	0.002031	0.358394	0.7214
IRV	-0.003262	0.034285	-0.095154	0.9245

ERV	-0.017304	0.047904	-0.361214	0.7193
FDI	0.002015	0.002481	0.812069	0.4202
RESID(-1)	-0.025525	0.137727	-0.185332	0.8536
RESID(-2)	0.146310	0.145421	1.006114	0.3187
RESID(-3)	-0.142330	0.161262	-0.882599	0.3812
RESID(-4)	0.087344	0.157261	0.555408	0.5808
RESID(-5)	0.142886	0.145370	0.982909	0.3299
RESID(-6)	-0.187113	0.150624	-1.242255	0.2193
RESID(-7)	0.042119	0.150919	0.279085	0.7812
RESID(-8)	0.216785	0.149707	1.448068	0.1532
RESID(-9)	-0.101344	0.171145	-0.592149	0.5561
RESID(-10)	0.383866	0.169083	2.270285	0.0271

R-squared	0.208206	Mean dependent var	-4.84E-18
Adjusted R-squared	-0.116995	S.D. dependent var	0.002069
S.E. of regression	0.002186	Akaike info criterion	-9.169883
Sum squared resid	0.000268	Schwarz criterion	-8.455276
Log likelihood	390.7953	Hannan-Quinn criter.	-8.883377
F-statistic	0.640237	Durbin-Watson stat	2.057801
Prob(F-statistic)	0.879738		

Breusch-Godfrey Serial Correlation LM Test: Dependent Variable NIM

F-statistic	0.708624	Prob. F(10,56)	0.7125
Obs*R-squared	8.986095	Prob. Chi-Square(10)	0.5334

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/19/14 Time: 23:26
Sample: 2004 2013
Included observations: 80
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.003550	0.036752	-0.096602	0.9234
CR	-0.047201	0.091313	-0.516918	0.6072
LR	-0.006666	0.076891	-0.086698	0.9312
ROA	0.038704	0.106531	0.363312	0.7177
NII	0.003576	0.004121	0.867604	0.3893

OC	-0.000555	0.002192	-0.253128	0.8011
MQ	0.001115	0.004980	0.223834	0.8237
HHI	-0.002510	0.026300	-0.095422	0.9243
RES	0.016544	0.095121	0.173929	0.8625
GDP	-0.009172	0.040214	-0.228086	0.8204
INFL	-0.001363	0.003639	-0.374560	0.7094
IRV	0.012988	0.068086	0.190755	0.8494
ERV	0.000774	0.098875	0.007832	0.9938
FDI	0.003945	0.005435	0.725792	0.4710
RESID(-1)	-0.024443	0.151364	-0.161487	0.8723
RESID(-2)	0.152948	0.150258	1.017898	0.3131
RESID(-3)	-0.070458	0.167052	-0.421770	0.6748
RESID(-4)	-0.014047	0.154563	-0.090883	0.9279
RESID(-5)	-0.067340	0.164862	-0.408464	0.6845
RESID(-6)	0.071725	0.162537	0.441285	0.6607
RESID(-7)	-0.143827	0.158895	-0.905172	0.3693
RESID(-8)	-0.133814	0.164264	-0.814627	0.4187
RESID(-9)	0.066951	0.169076	0.395984	0.6936
RESID(-10)	0.296724	0.167480	1.771692	0.0819

R-squared	0.112326	Mean dependent var	1.11E-17
Adjusted R-squared	-0.252254	S.D. dependent var	0.004111
S.E. of regression	0.004600	Akaike info criterion	-7.682067
Sum squared resid	0.001185	Schwarz criterion	-6.967459
Log likelihood	331.2827	Hannan-Quinn criter.	-7.395560
F-statistic	0.308097	Durbin-Watson stat	1.968334
Prob(F-statistic)	0.998569		

Appendix-VI: Regression Results For Factors affecting Bank intermediary efficiency, both Spread and NIM respectively

Dependent Variable: SPREAD
Method: Panel Least Squares
Date: 04/15/14 Time: 03:18
Sample: 2004 2013
Periods included: 10
Cross-sections included: 8
Total panel (balanced) observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.063627	0.015489	-4.107922	0.0001
CR	0.134311	0.039221	3.424494	0.0011
LR	0.133554	0.057597	2.318755	0.0239
ROA	-0.146542	0.031032	-4.722288	0.0000
NII	-0.004896	0.001785	-2.742152	0.0081
OC	0.963408	0.037505	25.68728	0.0000
MQ	-0.001400	0.001339	-1.045410	0.3001
HHI	0.015619	0.011088	1.408664	0.1642
RES	0.165590	0.039158	4.228749	0.0001
GDP	0.112509	0.015932	7.061697	0.0000
INFL	0.002337	0.002007	1.164230	0.2490
IRV	0.094968	0.029313	3.239803	0.0020
ERV	0.134639	0.049475	2.721357	0.0085
FDI	-0.006540	0.002389	-2.737401	0.0082

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.977348	Mean dependent var	0.053608
Adjusted R-squared	0.969670	S.D. dependent var	0.012645
S.E. of regression	0.002202	Akaike info criterion	-9.178175
Sum squared resid	0.000286	Schwarz criterion	-8.552893
Log likelihood	388.1270	Hannan-Quinn criter.	-8.927482
F-statistic	127.2833	Durbin Watson stat	2.287876
Prob(F-statistic)	0.000000		

Dependent Variable: NIM
Method: Panel Least Squares
Date: 04/15/14 Time: 23:35
Sample: 2004 2013
Periods included: 10
Cross-sections included: 8
Total panel (balanced) observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.172174	0.034107	-5.048013	0.0000
CR	0.134764	0.078119	1.725105	0.0897
LR	0.695396	0.069989	9.935854	0.0000
ROA	-0.716134	0.097134	-7.372620	0.0000
NII	-0.010542	0.003826	-2.755282	0.0078
OC	0.005535	0.002648	2.090482	0.0409
MQ	-0.000306	0.004845	-0.063203	0.9498
HHI	0.094351	0.025687	3.673138	0.0005
RES	0.375060	0.085087	4.407943	0.0000
GDP	0.333263	0.036982	9.011467	0.0000
INFL	0.002404	0.003785	0.635034	0.5279
IRV	0.211699	0.062267	3.399858	0.0012
ERV	0.370896	0.103325	3.589596	0.0007
FDI	-0.015223	0.005091	-2.990301	0.0041

Effects Specification
Cross-section fixed (dummy variables)

R-squared	0.851643	Mean dependent var	0.037634
Adjusted R-squared	0.801352	S.D. dependent var	0.010290
S.E. of regression	0.004586	Akaike info criterion	-7.710910
Sum squared resid	0.001241	Schwarz criterion	-7.085628
Log likelihood	329.4364	Hannan-Quinn criter.	-7.460216
F-statistic	16.93445	Durbin-Watson stat	2.360672
Prob(F-statistic)	0.000000		

Appendix-VII: Semi structured Interview Instrument

Addis Ababa University

College of Business and Economics

MBA program

Interview questions for the Finance Managers of Ethiopian Commercial Banks

1. What are the overall factors that can affect your banks interest rate spread?
2. How do those identified factors affect/influence your banks interest rate spread in general?
3. Among the identified factors that can influence your banks interest rate spread, which of them are the major determinants of your bank interest rate spread?