International Journal of Management, IT & Engineering
Vol. 6 Issue 12, December 2016,
ISSN: 2249-0558 Impact Factor: 7.119
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gage as well as in Cabell's Directories of Publishing Opportunities, U.S.A

DETERMINANTS OF BANKS INTEREST RATE SPREAD: AN EMPIRICAL EVIDENCE FROM ETHIOPIAN COMMERCIAL BANKS

Aregu Asmare Hailu[1]

Abstract

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. The purpose of this study was 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 collected data was analyzed by using OLS linear regression model. 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 concludes 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: Efficient financial intermediation, Interest rate spread, economic growth, commercial banks.

[1] **Lecturer @ Department of Management, Mizan-Tepi University, Ethiopia**

1. INTRODUCTION

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 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).

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 researchers 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 , (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 in 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. Therefore this paper is designed to examine the main determinants of commercial banks interest rate spread by taking in to consideration bank, industry and macroeconomic factors that could possibly affects the variability of interest rate spread of Ethiopian commercial Banks.

The remaining part of this study was organized as follows: section two provides the literature review and past researchers of determinants of commercial banks' interest rate spread. This is followed by section three which encompasses the research methodology and section four, which embodies the analysis of the data and its findings. Lastly, section five deduces conclusions and recommendation of the study and recommendation for future research.

1 LITERATURE 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. In the following section the researcher reviewed previous researches which are conducted on determinants of banks interest rate spread.

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.

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.

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.

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).

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.

Folawewo and Tennant (2008) study 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.

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.

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.

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.

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.

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.

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 RESEARCH METHODOLOGY

To examine the determinants of banks' interest spread in Ethiopia the study employs pane data procedures since the sample contains data across banks and over time. 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 Baltagi (1995). 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.

Model Specification

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:

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

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

Operational Definition of Variables and Measurements

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

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.

$$\text{Spread}_{it} = \frac{R\,it}{\text{Average}\quad EA\,it} - \frac{C\,it}{\text{Average}\quad \text{IntLiab}\,it}$$

$$\text{NIM}_{it} = \frac{Rit - Cit}{EA\,it}$$

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.

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, positive or negative relation between return on asset and interest rate spread is expected.

H_3 There is a significant negative or positive 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 (HHI) to measure industry concentration similar to (Ahokpossi2013) among others. 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. This indicator is often used in the context of 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). 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 or negative relationship between GDP growth and interest rate spread is expected.

H_9 There is a significant positive or negative 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.

Test results for the classical linear regression model assumptions

In this study the 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:

Test for normality

The normality tests for this study as shown in Appendix A 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.

Test for Multicollinearity

Multicollinearity in the regression model suggests substantial correlations among independent variables. Correlation matrix between independent variables is presented in appendix B. 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.

Test for Heteroskedasticity

Appendix C 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.

Test for Autocorrelation

Appendix D 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.

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.

2 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.

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

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

The result obtained by the fixed effect model is reported in the following section for spread and NIM model respectively.

Table 4.1 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 the above table 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.

Based on the regression result, 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, 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 4.2 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%, 5% and 10% 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 the above table 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 indicates that, all bank-specific independent variables except 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. Finally, credit risks were significant at 10% significance level since their p-values were 0.0897.

Likewise, 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 11 of them were significant.

3 CONCLUSIONS AND RECOMMENDATIONS

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. This 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 and margin. 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. 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 is positive and statistically in significant 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 profitability.

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.

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 have 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 liquidity in general. 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 in order to enhance the economic growth in general and intermediary efficiency of the sector 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, as far as these factors are the main determinants for the health of the nation's economy in general and bank interest rate spread in particular.

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.

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).

Reference

- Afanasieff, T. S., Lhacer, P. M. V. and Nakane, M. I. (2002). The Determinants of Bank Interest Spreads in Brazil, Banco Central do Brazil Working Paper No. 46.
- Afzal A. (2011) 'Interest rate spreads, loan diversification and market discipline in Pakistan's commercial banking sector', PhD thesis, University of Pakistan.
- Ahokpossi, C. (2013). Determinants of Bank Interest Margins in Sub-Saharan Africa, IMF Working Paper WP/13/34.Washington D.C. International Monetary Fund.
- Akinlo A.(2012) The Determinants of Interest Rate Spreads in Nigeria: An Empirical Investigation. Modern Economy, 2012, 3, 837-845
- Anderson, D R, Sweeney, D J and Williams, T A (2008), Statistics for business and economics, 10th edn Thomson South-Western.
- Angbazo, L., (1997). "Commercial bank net interest margins, default risk, interest rate risk and off-balance sheet banking". Journal of Banking and Finance, , pp 55–87.
- Arshad N. (2011) Efficiency of financial intermediation: an analysis of banking spreads. State bank of Pakistan.
- Baltagi BH.(2005), Econometric Analysis of Panel Data, 3rd edn, John Wiley & Sons Ltd.
- Barajas, A., Steiner, R., & Salazar, N.(1999). Interest Spreads in Banking in Columbia, 1974- 96. IMF Staff Papers, 46 (2) International Monetary Fund.
- Beck, T. and Hesse, H., (2009). "Why are interests spreads so high in Uganda?" Journal of Development Economics, 88, pp 192 – 204.
- Benston, G. and C.W. Smith (1976) 'A transaction cost approach to the theory of financial intermediation', Journal of Finance, 31(2), pp.215–31.

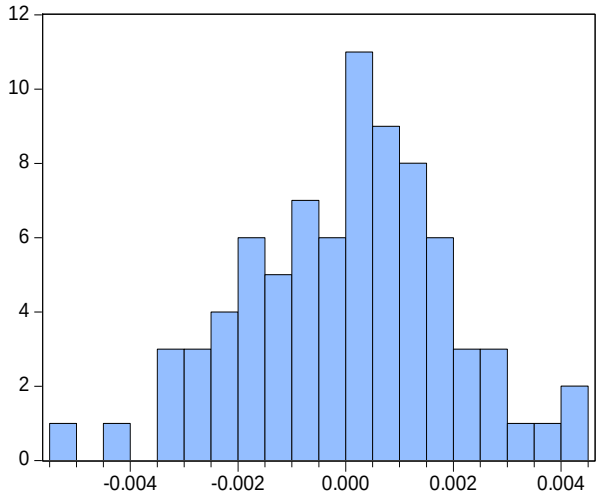
- Brock, P. and Suarez, R L. (2000) Understanding the Behavior of Bank Spreads in Latin America, Journal of Development Economics, 71(2), pp. 291-299.
- Brooks, C (2008), Introductory Econometrics for Finance, 2nd edn, Cambridge University Press, New York
- Chirwa, E. W. and Mlachila, M. (2004) Financial reforms and Interest Rate Spreads in the Commercial Banking System in Malawi. IMF Staff Papers, 51(1), 96—122
- Creswell, JW (2003), Research design: qualitative, quantitative and mixed methods approaches, 2nd edn, Sage Publications, California.
- Crowley, J. (2007) Interest Rate Spreads in English-Speaking African Countries. IMF Working Paper, WP/07/101.
- Diamond, Douglas W. (1984). Financial intermediation and delegated monitoring. Review of Economic Studies 51 (July): 383–414
- Diamond, Douglas W. and Dybvig, Philip H. (1983). Bank runs, deposit insurance, and liquidity. Journal of Political Economy 91 (June): 401–19.
- Dumicic M. and Ridzak T; (2013) determinants of banks' net interest margins in central and eastern Europe. Financial theory and practice 37 (1) 1-30 (2013).
- Easterby-smith, M, Thorpe, R and Lowe, A (1991), Management Research: An Introduction, London, Sage Publications Inc.
- Fama, E.F., (1980) "Agency Problems and the Theory of the Firm" The Journal of Political Economy, V.88, 2, pp. 288-307.
- Folawewo, A. O. and Tennant D. (2008). Determinants of Interest Rate Spread in Sub-Saharan African Countries: A Dynamic Panel Analysis. A paper prepared for the 13th Annual African Econometrics Society Conference, 9 – 11 July, 2008, Pretoria, Republic of South Africa
- Gelos, R. G. (2006) Banking Spreads in Latin America. IMF Working Paper, WP/06/44.
- Grenade H.K (2007) Determinants of Commercial Banks Interest Rate Spreads: Some Empirical evidence from the Eastern Caribbean Currency Union, ECCB staff research paper , WP/07/01
- Gujarati, D. (2004), Basic Econometrics 4th edn New York: McGraw-Hill.
- Gunter, U. Krenn, G and Sigmund, M (2013) Macroeconomic, Market and Bank-Specific Determinants of the Net Interest Margin in Austria. Financial stability report 25.
- Hanson, J. and R. Rocha. (1986). High Interest Rates, Spreads and the Costs of Intermediation:, World Bank, Washington, D.C.
- Ho, Thomas S. Y. and Anthony Saunders (1981), "The Determinants of Bank Interest Margins: Theory and Empirical Evidence," Journal of Financial and Quantitative Analysis, 16, 581-600.
- Holmstrom, B., and Tirole, J. (2001). "LAPM: A Liquidity-Based Asset Pricing Model." Journal of Finance, 56(5): 1837-1867.

- International Monetary Fund (2012), International Financial Statistics and data files. World Development Indicators
- Kalluci I. (2007) Determinants of Net Interest Margin in the Albanian Banking System. Bank of Albania
- Khan H. and Khan B, (2010), What Drives Interest Rate Spreads of Commercial Banks in
    - Pakistan? Empirical Evidence based on Panel Data. SBP Research Bulletin Volume 6, Number 2, 2010
- Khawaja, I. and Din, M., (2007). "Determinants of interest spread in Pakistan". PIDE Working Papers, 22, pp 1- 16.
- Leedy PD & Ormrod JE. (2005). Practical research: planning and design. 8th edition. Upper Saddle River, NJ: Pearson
- Leland, H. and Pyle, H (1977) "Informational Asymmetries, Financial Structure, and Financial Intermediation," Journal of Finance, Vol. 32, No.2, 1977):371- 387.
- Levine, R (1996), Financial development and economic growth, Policy Research Paper
    - 1678, the World Bank Journal of Economic Literature.
- Matthews K. and Thompson J. (2005) The economics of banking 1st edn. John Wiley and Sons Ltd,
- Maudos, J. and Solis, L., (2009). "The determinants of net interest income in the Mexican banking system: An integrated model". Journal of Banking and Finance
- Maudos, J. and Guevara, J., (2004). Factors explaining the interest margin in the banking sectors of the European Union. Journal of Banking & Finance 28, 2259-2281.
- Merton, Robert C., (1995). "Financial innovation and the management and regulation of financial institutions," Journal of Banking & Finance, Elsevier, vol. 19National Bank of Ethiopia (2012) annual report.
- Meyers, LS, Gamut, G and Guarino, AJ (2006) "Applied Multivariate Research: Design and Interpretation", SAGE publications, Thousands oaks London, New Delhi.
- Mudzamiri K. (2012) Determination of net interest margin drivers for selected financial
- institutions in South Africa: A comparison with other capital markets, Master' Thesis, University of Johannesburg.
- Ndung'u, N. and Ngugi, R.W. (2000) Banking Sector Interest Rate Spreads in Kenya, Kenya Institute for Public Policy Research and Analysis Discussion Paper, No. 5
- Ngugi R W. (2001). An empirical analysis of interest rate spread in Kenya. Research Paper 106 African Economic Research Consortiums, Nairobi May 2001
- Norris, D. and Floerkemeir, H., (2007). "Bank Efficiency and market structure: What Determines Banking Spreads in Armenia?" IMF Working Paper, 134
- Quaden, G. (2004). Efficiency and stability in an evolving financial system,
- Ramful, P. (2001). The Determinants of Interest Rate Spread: Empirical Evidence on the Mauritian Banking Sector. Research Department, Bank of Mauritius

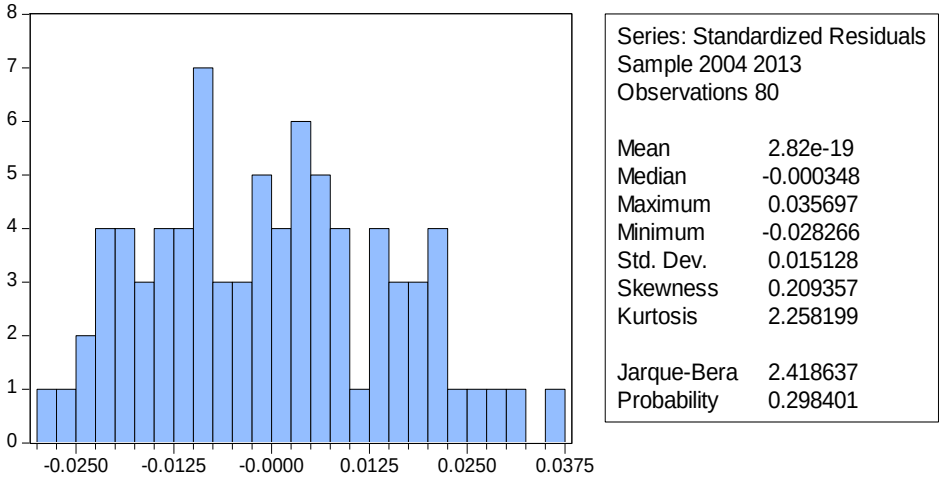
- Randall, R. (1998) Interest Rate Spreads in the Eastern Caribbean. IMF Working paper
- Tobin, James (1963), "Commercial Banks as Creators of Money", in Dean Carson ed. Banking and Monetary Studies, pp. 408-19, Homewood, Ill.: Richard D. Irwin.
- Valverde, S. C., Del Paso, R.L. and Fernandez, F.R. (2004) Banks, Financial Innovations and Regional Growth
- Verbeek, JM (2004), A guide to modern econometrics, 2nd edn., John Wiley & Sons Ltd, Erasmus University Rotterdam.
- Were M. and Wambua J. (2013) Assessing the determinants of interest rate spreads of commercial banks in Kenya.KBA centre for research on financial market and policy working paper series.
- Wooldridge, JM (2004), Introductory Econometric: A Modern Approach. International Student edition, 3 rd edn., Canada: Thomson South–Western.
- Zerayehu S, Kagnew W, and Ketama A. (2013) Competition in Ethiopian Banking Industry, African Journal of Economics vol. 1 (5), pp. 176-190

Appendix

Appendix A normality test for residuals



Series: Standardized Residuals	
Sample 2004 2013	
Observations 80	
Mean	0.000000
Median	0.000106
Maximum	0.004447
Minimum	-0.005364
Std. Dev.	0.001903
Skewness	-0.202656
Kurtosis	3.118068
Jarque-Bera	0.594061
Probability	0.743021



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

Appendix B Test for Multicollinearity test

Appendix I Correlation matrix of dependent and independent variables: Spread

	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 C Test for Heteroskedasticity

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

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.

Appendix E: Test for Autocorrelation

Autocorrelation Test: Durbin Watson

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

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.

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.