DETERMINANTS OF INTEREST RATE SPREAD IN COMMERCIAL BANKS: A CASE STUDY OF SELECTED LOCAL AND FOREIGN BANKS IN TANZANIA

DETERMINANTS OF INTEREST RATE SPREAD IN COMMERCIAL BANKS: A CASE STUDY OF SELECTED LOCAL AND FOREIGN BANKS IN TANZANIA

By

Kenedy Jeremiah Aikoh

A research Dissertation submitted in Partial Fulfillment of the Requirements for Award of the Degree of Master of Science (Accounting and Finance -MSc. A&F) of Mzumbe University

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Certification

We, the undersigned, certify that we have read and hereby recommend for acceptance by the **Mzumbe University**, a dissertation entitled**: The Determinants of Interest Rate Spreads in Commercial Banks: A case Study of Selected local and Foreign Banks in Tanzania,** in partial/fulfillment of the requirements for award of the degree of **Master of Science in Accounting and Finance** of Mzumbe University.

Signature

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I, ***Kenedy Jeremiah Aikoh***, certify and declare that this dissertation is a result of my own work and have not been accepted or submitted for any degree at Mzumbe University or other university elsewhere. I also declare that this work is a result of my own investigations except where otherwise identified by references and that I have not plagiarized another researchers' work.

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Date……

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Abbreviations and acronyms

BOT	Bank of Tanzania
CRDB	Formally Cooperative Rural Development Bank
DEGBOR	Degree of Government Borrowing From Commercial Banks
DISRATE	Deposit Rate
GDPrate	Gross Domestic Product Growth Rate
INFL	Inflation Rate
IRS	Interest Rate Spread.
LIQ	Liquidity Risk
NIE	Non- interest expenses
NII	Non-Interest Income
NMB	National Microfinance Bank
NPL	Non-performing loans
OC	Operating Cost
PLL	Provision for loan losses
ROA	Return on Asset
TBILLRATE	Treasury Bills Rate
RSA	Republic of South Africa

Abstract

The behaviour of interest rate spread in Tanzania for a very long period of time have been strong, high and persistently showing little signs of narrowing. When compared with other East African countries, interest rate spread in Tanzania seems to be the highest. It is this persistent and low narrowing trend of the interest rate spread which gave rise to the need of studying the factors which causes high interest rate spread in commercial banks in Tanzania. The overall objective of this study was to identify the Determinant of interest rate spread in commercial banks in Tanzania and comparing the interest rate spread between the selected banks.

The determinants were ascertained from review of previous literatures. Related parameters from the selected determinants were studied for the chosen banks for the period between 2006 and 2012, a period after adoption of market determined interest rate regime. The study based on the secondary data from 28 quarters of published quarterly reports of the selected commercial banks and Bank of Tanzania quarterly economic bulletin publications.

Multiple regressions were applied to establish relationship between the dependent variable, interest rate spread and the chosen independent variables which were non-interest income, provision for loan losses, non-performing loans, non-interest expenses, gross domestic product rate, treasury bills rate and inflation. The results from the study indicate that the key determinants of interest rate spread for the selected commercial banks are the treasury bills rate, **TBillrate**; Real GDP rate, Non-interest income, **NII;** Provision for loan losses, **PLL** and Non-performing loans, **NPL**. The results also show that the interest rate spread for the selected local commercial bank is higher than that of the selected foreign commercial bank.

The policy implication from the study is that the high responsiveness of commercial banks spread to the treasury bills and real GDP rate needs to be regulated.

This study can be extended by exploring the impact of financial sector development on interest rate spreads in commercial banking system.

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CHAPTER ONE:

INTRODUCTION

1.0 Introduction

This chapter deals with background to the problem, statement of the problem, research questions, objectives, scope, significance, limitations, and organization of the dissertation.

1.1Background information

Throughout the world, the governments both in developed and developing counties have been putting more emphasis on regulating financial sectors especially the banking industry. Financial institutions, including commercial banks, plays very vital role in the country's economic performance. For sustaining high economic growth, an important required condition of priority for policy is to ensure the required flow of savings into productive investments that depends on the development of appropriate financial institutions capable of generating adequate quantity and quality of investment resources.

In this context, an efficient financial system has two important roles: first, transfer of capital from savers to investors. That is, they facilitate the intermediation of flows of funds from the surplus spending units which are economic entities whose income is larger than their expenditure in a particular period (the savers/households) to deficit spending units which are economic entities whose expenditure is higher than income in a particular period of time (the users/individuals or institutions); and second, they direct loanable funds to productive and profitable investments, and enhance growth by pooling risks and facilitating transactions (Kessy J. Nicholaus, 2003). They are therefore considered to be the chief source of funds in modern market economies. It is therefore expected that the growth and development of the financial institutions is one of the key determinant/independent variables towards narrowing the interest rate spread due to

competition that results into cost leadership strategy and hence mobilizing both low income and high income individuals towards accessing capital for various economic activities at a minimized cost.

1.1.1 Historical background of banking industry and interest rate spread in Tanzania since 2006 to 2012.

The banking Industry in Tanzania has tremendously changed its dynamics for the last one decade. Many banks have joined the industry both local and foreign (Gabriel, E.O, (2003). On the other hand, the nonbank financial institutions have been developing rapidly by an alarming speed. As expected, the liberalization of the financial sector led to an increase in the number of local and foreign private banks and non-bank financial institutions (NBFIs) operating in the country. Between June 1991 and August 2011 the number of commercial banks increased from only 2 to about 30; and, while the number of regional unit banks rose from 0 to 7, the number of non-commercial banks increased from 3 to 5, insurance companies increased from 1 to 21 and 200 bureau de change became operational. The industry has various key players. These include; fully fledged banks (commercial and non-Commercial), Regional Unit Banks, Financial Institutions, Regional Financial Institutions, and Regional Unit Financial Institutions.

As of August, 2010, the banking supervision of the Bank of Tanzania has approved and registered the key players of the banking sector of Tanzania as follows: Fully Fledged banks (35) of which five (5) are registered financial institution and thirty (30) are registered commercial banks. There are also Regional Unit Banks which are seven (7), and Regional Unit Financial Institutions which are two (2). The industry also comprises of other players as insurance companies which are about twenty eight (28), and pension funds. For this very reason the increase in the number of players in the banking industry could be considered as an important determinant of the interest rate spread due to expected degree of competition among the commercial banks and other financial service providers. From industry historical point of view, it is seen that in mid 1960s the

industry had only one bank, National Bank of Commerce. It can therefore be said that in 1960s the industry had a monopolistic structure. In 1986, Cooperative and Rural Development Bank (CRDB) was established making the industry to experience a duopolistic market structure. In any industry, including the banking industry, the nature of competition is always a function of the market structure. The trend today is a perfect competition and the central bank has withdrawn from managing the market forces. Banks are now working on their own about what are relevant products and rates to be offered to the market (BOT answer to most frequently asked Questions book, Series No.1, 2006). This means, there are no specific country's policies on management of interest rates of the financial institutions except that market forces of demand and supply are the key determinants of the rates. It is therefore interest rate cost leadership strategy among other factors in the financial institutions which is expected to narrow the interest rate spreads.

1.1.2 Concept and role of Interest rate spread, IRS

According to Khawaja, M.I and Musleh-ud D, (2007) and professor Meyers (2003), interest rate is the difference between what a bank earns on its assets and what it pays out in its liabilities. Interest rate is the price paid for the use of loanable funds. It is also a payment from borrowers to lenders which compensates the lender for parting with funds for a period of time and at some risk. Furthermore, it is the price one pay for borrowing money- the rental price for purchasing power of money. To person borrowing money, interest is the penalty paid for consuming the income before it is earned. To a lender, interest is a reward for postponing current consumption until maturity of the loan.

There are, however, alternative ways of measuring interest rate spread in the literature, such as the difference between interest income received and interest paid on deposits and borrowings divided by total assets or difference between the ratio of interest received to all interest bearing assets and the ratio of interest paid to all interest earning liabilities. The other approach available is the difference between average borrowing interest and

lending rate. The fourth approach is to net interest income as a percentage of total assets. This study adopted the fourth approach.

A high interest rate spread acts as an impediment to the expansion of financial intermediation necessary for growth and development of an economy. It is often argued that the higher the interest rate spread, the higher would be the cost of credit to the borrowers for any given deposit rate. Alternatively, a high interest rate spread could mean unusually low deposit rates discouraging savings and limiting resources available to finance bank credit. In a country like Tanzania, a high interest rate spread raises the cost of credit restricting the access of potential borrowers to credit markets thus reducing investments and limiting growth potential of the economy. Moreover, problems become more critical for small businesses, household enterprises and rural industries which are vital to promoting equitable growth and reducing poverty in low income countries like Tanzania. From the perspective of the banks, interest rate spread shows the additional cost of borrowing.

Despite the rapid increase in the number of players in the industry, the interest rate spread still seems to remain unchanged. If compared to other African countries, the interest rate spread in Tanzania is have been high since 1995 except in the year 2007 and 2008 when it shown a decline below that of Rwanda, Kenya and Uganda. Table 1 below shows the interest rate spread in some of the East southern Africa countries.

Table 1-1: Interest Rate Spread in East Africa and the RSA (%).

Year	Tanzania	Rwanda	Uganda	Kenya	Republic of South Africa
1995	18.2	na	12.6	15.2	4.4
1996	20.4	7.4	9.7	16.2	4.6
1997	18.4	8.0	9.5	13.5	4.6
1998	15.1	9.4	9.5	11.1	5.3
1999	14.1	8.1	12.8	12.8	5.8
2000	14.2	6.9	13.1	14.2	5.3
2001	15.2	7.1	14.2	13.0	4.4
2002	13.1	7.4	13.5	13.0	5.0
2003	11.5	7.6	9.1	12.4	5.2
2004	9.9	7.1	12.9	10.1	4.7
2005	10.5	8.1	10.9	7.8	4.6
2006	8.9	7.8	9.6	8.5	4.0
2007	7.4	9.3	9.8	8.2	4.0
2008	6.9	na	na	8.7	3.5

Source: http://www.nationmaster.com/

As discussed above, it is seen that the banks take on to perform intermediation activities between borrowers and fund lenders. The interest rate spread is a premium for the risk that the banks undertake; it compensates for loan defaults and for risk related to cost of funding. As such, interest rate spread is a measure of bank efficiency and determinant of intermediation cost and profitability of the banks. Inefficiencies in intermediation may emerge from structural problems: lack of adequate competition, scale diseconomies due to small market size or high fixed operating costs, the existence of regulatory controls, perceived market risks and the unsoundness of banks.

Furthermore, the menu of financial instruments increase significantly to include diverse type of deposits with diverse maturities, treasury bills (**TBRate**), stocks, loans of diverse maturities and diverse type of payment instruments: paper, card, and electronic transfer based instruments. The Banks started working on their own about what are relevant products and rates to be offered to the market. This means there were no specific country's policies on management of interest rates of the financial institutions except that the increase in the menu of financial intermediaries and instruments may suggest development in the country of a fairly competitive financial system that, among others, would reduce interest rate spread due to interest rate cost leadership strategy. This was expected to reduce the lending rates and/or increase the interest rate on saving deposits. It is therefore the market forces which were expected to narrow the interest rate spreads. To the contrary, since the launch of financial sector reforms the nominal interest rate spread in Tanzania remained considerably large (Odhiambo, 2010; Epaphra, 2004; Tuni, (1997).

As per the NMB quarterly reports on the interest rates, it shows that until December 2008, deposit rates in NMB varied from 2.5% to 4% while lending rates varied from 14% to 24% depending on the deposit and lending period. This gives an interest rate spread of about 11.5% to 20% as a lending cost to lenders compared to overall Bank of Tanzania average interest rate spread of 12.6% during the same period. On the other hand, the interest rate spread for commercial banks in Tanzania shown a higher rate

compared to some East African countries during the period between 1995 and 2003 as shown in Table 1-1 above. The rate shown a narrow decrease from 2004 onwards but was still higher compared to that of the other countries. For example , as per the table shown above the spread in Tanzania is higher than that of Republic of South African, RSA in the year 2008.

The widespread between deposit and lending rate seems to be a possible reason as to why most Tanzanians are discouraged to seek the loans from commercial banks for investment purposes or why they are discouraged to open fixed deposit accounts with the commercial banks. In a least industrialized country like Tanzania, it is the mobilization of the entrepreneurship to small investors which can increase the national income through tax and increase employment to the nation. This is only achieved if the financial institutions which are the source of the capital are charging a reasonable cost in the loan accessibility, the common cost being the interest rate.

Several studies have been conducted on the determinants of the interest rate spread in commercial banks in various countries (Kari H.I, 2007; Khawaja Idrees, 2007, Jehovaness A *et all,* 2009*;* Balla and Mckenna (2009; Bouvatier and Lepetit, 2006; Bikker and Metzemakers, 2002; Odhiambo, 2010; Epaphra, 2004; Tuni, 1997) and others. The level of significance of the determinants of interest rate spread varies with studies. While some determinants are found to be significant in one country, it is not significant to some countries. Moreover, less has been done in Tanzania on the determinants of interest rate spread. Furthermore, few studies carried out in Tanzania based on the external determinants of interest rate spread and no such study has been done by comparing the local and foreign commercial banks in Tanzania. The study on the determinants of interest rate spread in commercial banks by comparing the local and foreign commercial banks is therefore set out to bridge this knowledge gap.

This study is designed purposely to find out the determinants of interest rate spread in commercial banks and come up with the suggestions on how to narrow the margin between lending and deposit rates of the commercial banks in Tanzania. Further the

informal study showed that the spread is varying among different banks based on ownership and management.

1.1.3The concept of local and foreign commercial banks in Tanzania

A commercial bank is an institution authorized to receive money on current account subject to withdrawal by cheque. A commercial bank is said to be a local bank if: It originated from Tanzania; it is operating in Tanzania; and the ownership belongs to resident individual(s) in Tanzania. Examples of local commercial banks in Tanzania are; National Microfinance Bank (NMB) Plc, CRDB, Tanzanian Postal Bank (TPB) among others.

A commercial bank is said to be a foreign if: it is belonging to a non-resident individual, or it is a branch with a parent outside Tanzania. Examples of foreign banks are Kenya Commercial Bank (KCB), Barclays Bank Tanzania limited, Bank of India (BOI) and others. (BOT Act, 2006)

1.2 Statement of the problem

Despite the widespread implementation of costly financial sector reform programmes in the developing world including Tanzania, banking sector in many developing countries are still characterized by high interest rate spreads. Globalized economy has led to interlinked and integrated financial markets. It resulted in the liberization of the financial sector by the Government of the United Republic of Tanzania by 1991. Following the financial sector reforms in early 1995, Tanzania adopted market determined interest rate regime, where Treasury bills rates are used as reference point for the determination of interest rates in the banking sector. Commercial banks are allowed to determine deposits and lending rates, and the fees they charge on their services depending on the developments in the money markets, as well as competition in the industry.

Despite all the efforts, Tanzania has experienced a persistently increasing in interest rate spread for the past one decade (2001 to 2012). If compared with RSA, the interest rate spread in Tanzania seem to be high and have been little signs of narrowing over a long period of time despite a rapid growth of the banking industry in Tanzania.

Little have been done in studying on the interest rate spreads in commercial banks in Tanzania compared to other African countries. This provides a gap for further studies on the determinants of the interest rate spread in commercial banks in Tanzania thereby coming up with an academic contribution in banking industry on interest rate spreads in commercial banks.

The present study 'Determinants of Interest Rate spread in select Commercial banks in Tanzania' is an attempt to fill this gap. For the purpose two banks one from local banks and other from foreign banks operating in Tanzania as subsidiary are selected for this for the study. These selected banks include NMB and Barclays bank.

1.3 Motives/Reasons for Selecting NMB and Barclays Bank

The criteria used to select the NMB and Barclays Bank banks were based on the similarities between the two commercial banks in terms of the originality, years of operation, networking (number of branches and customers), types of services provided and customers they serve, and availability of the data for the selected identical parameters. These criteria are as described below:

(i). **Years of standing**

NMB was established in 1997 as a result of the breakup of the old National Bank of Commerce. It is therefore one of the oldest local commercial banks in Tanzania.

Barclays bank, a foreign commercial bank in Tanzania is a subsidiary of Barclays bank of the United Kingdom. It was established in Tanzania in 1925 before it was nationalized to National Bank of Commerce in 1967. Later in the year 1990, the bank re-opened its doors again in Tanzania. It officially stated to operate in Tanzania in 2000 as

foreign subsidiary commercial Bank. It is thus the oldest foreign commercial bank in Tanzania.

(ii). Networking

Networking here means the degree of penetration of the selected commercial banks terms of the number of branches, number of customers, total asset valuation, and coverage areas in the country.

National Microfinance Bank plc. (NMB) is one of the largest commercial banks in Tanzania, providing banking services to individuals, small to medium sized corporate clients, as well as large businesses. It is a local owned bank. According to the Bank of Tanzania reports of 2012, it is the largest local commercial bank when ranked by customer base and branch network. With over 139 branches, it is located in more than 80% of Tanzania's districts. This broad branch network distinguishes NMB from other financial institutions in Tanzania. According to NMB, the bank is committed to sustaining and enhancing their branch network in order to provide access of capital to citizens in all areas of Tanzania, including the most remote. As of December 2011, the total asset valuation of the bank is of about US$1.4 billion (TZS: 2.17 trillion). At that time, the bank's shareholders' equity was valued at approximately US$184million (TZS:284.4 billion). The stock of the bank is listed on the Dar-es-Salaam Stock Exchange, under the symbol: **NMB**.

Barclays Bank Tanzania now has 22 branches, 41 ATMs strategically located countrywide, with over 400 employees and over 110,000 customers.

Barclay Bank Tanzania Limited is the first largest foreign commercial bank in Tanzania in terms of the number of branches and customers as well as the number of years of operation in Tanzania.

1.4. Research Objective:

1.4.1 Main Objectives

The main objective of this study is to find out the determinants of the interest Rate Spread in select Commercial Banks in Tanzania.

1.4.2 Specific Objectives

Specific objectives for this study are:

1. To study and find out the internal and external determinants of interest rate spreads in National Microfinance Bank,(NMB), a selected local/indigenous bank in Tanzania.
2. To study and find out the internal and external determinants of interest rate spread in Barclays Bank Tanzania, a selected foreign based commercial banks in Tanzania
3. To compare the determinants of interest rate spread in the National Microfinance Bank and Barclays Bank Tanzania Limited

1.5 Research Questions

With the above research objectives, the study is set forward to answer the following main question: What are the determinants of interest rate spread in commercial banks in Tanzania? From this main question, the following specific questions have been developed:

1. What are the internal and external determinants of IRS in NMB?
2. What are the internal and external determinants of IRS in Barclays bank?
3. Is there a difference in the level of significance between the determinants of interest rate spread of selected domestic and foreign commercial banks in Tanzania?

1.6. Scope of the study

The study was made on the internal and external determinants of interest rate spreads in commercial banks in Tanzania. Basing on the reviewed literatures on the previous studies, the parameters for the internal and external determinants were selected. These parameters include: Non interest income, net worth of commercial banks, and provision for loan losses, non- performing loans, and non-interest expenses which were grouped into the internal determinants of interest rate spread. Other parameters included the gross domestic product growth rate, the treasury bills rate, the inflation rate, and commercial banks deposit rate. The study was based on the secondary data for the quarterly reports of the selected commercial banks and the bank of Tanzania for the period between 2006 and 2012. Twenty eight (28) quarters were covered. The study took nine months starting from September 2012 to June 2013. Two (2) commercial banks out of which one is a local (NMB) and the other is a foreign bank (Barclays) were studied. The area of data collection was Dar es Salaam because of the availability of headquarter of most commercial banks in Tanzania as well as the location of the Bank of Tanzania (BOT) and Tanzania Bureau of Statistics (TBS) where most secondary data for the external determinants of the interest rate spread were obtained..

1.7. Significance of the study.

The study is intended to determine the internal and external factors affecting the interest rate spread. The results of the study are expected to come up with contributions to various users as: First, the government, who need these results for making economic policies about the regulation of the banking industry and hence help to narrow the highly persisting interest rate spread. Second, is the commercial banks who need these information to set the reasonable lending rates and hence attracting many customers to access loan for their economic development and hence the economic development of the country as a whole. Third, are the higher learning students as a source of information for literature review on the study of interest rate spread in commercial banks in Tanzania.

Finally, the study is expected to contribute to the body of knowledge by providing the basis of references for the similar studies.

1.8. Limitations of the study

This section deals with the challenges and hurdle encountered during the study. The limitations of the study included the time limit and budgetary/financial constraints. Others were the difficulties in collecting data from the financial institutions due to weak cooperation or manipulation of data due to fear of exposing the internal weaknesses. In order to delimit these limitations, secondary data which are mostly available especially for the external determinants of interest rate spread were used. Most of these data were collected from the Bank of Tanzania and the National Bureau of Statistics offices' headquarters in Dar es Salaam as well as from publications available in the commercial banks websites.

1.9. Organization of the dissertation

The dissertation is organized in six chapters: Chapter one is introduction and problem setting, chapter two is about the literatures review, chapter three deals with research methodology, chapter four covers the presentation of finding, chapter five deals with the discussion of finding, and finally chapter six which is all about conclusion and recommendations. Chapter one deals introduction and problem setting and covers the following: Background information; statement of problem; objectives of study; research questions; scope of the study; significance of the study and limitation of study.

Chapter two deals with conceptual literature review on internal and external determinants of interest rate spread, empirical literature, conceptual framework and variable description and research model specifications

Chapter three deals with research methodology and it covers the following: Introduction; methodologies used in previous studies; methodologies used in this study;

research design; data type study, sources and collection methods used; sample size, sample selection and sampling procedures; data analysis and data analysis tools
Chapter four deals with presentation of finding and it covers the following: Introduction; findings on external and internal determinants of IRS; empirical results and econometric results of the study findings such as multiple regression results; correlation mix, mean and standard deviation.

The discussions of the study findings are dealt with in chapter five. The following are covered in chapter five: The impact of each parameter selected as the determinant of the interest rate spread on the dependent variable, the trend analysis of the parameters, and the comparison of the results between the two selected commercial banks.

Chapter Six deals with Conclusion and Recommendation, explaining the areas which need further research after identify the gap from discussion of finding. It provides the suggestions made from the study, the policy implication from the study findings and finally the conclusion made.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter deals with the discussion on the various sources of information about the research topic in question- the determinants of interest rate spread in commercial banks in Tanzania. It deals with examination of all available literature to get self-acquainted with the selected problem.

In the review, two types of literature—the conceptual literature concerning the concepts and theories, and the empirical literature consisting of studies made earlier which are similar to the one proposed will be made (Kothari, C.R, 2004). The purpose of the review was to get the knowledge as to what data and other materials were available for operational purposes which enabled the researcher to specify his own research problem in a meaningful context.

2.1. Theoretical Literature

The conceptual review deals with the concept of IRS, internal determinants of interest rate, and the external determinants of interest rate spread

2.1.1 Concepts of Interest Rate Spread in Commercial Banks

The interest rate is the difference between what a bank earns on its assets and what it pays out in its liabilities (Khawaja, M.I and Musleh-ud, D, (2007)). According to professor Meyers, interest rate is the price paid for the use of loanable funds. It is also a payment from borrowers to lenders which compensates the lender for parting with funds for a period of time and at some risk. Furthermore, it is the price one pay for borrowing money- the rental price for purchasing power of money. To person borrowing money, interest is the penalty paid for consuming the income before it is earned. To a lender, interest is a reward for postponing current consumption until maturity of the loan.

There are, however, alternative ways of measuring interest rate spread in the literature, such as the difference between interest income received and interest paid on deposits and borrowings divided by total assets or difference between the ratio of interest received to all interest bearing assets and the ratio of interest paid to all interest earning liabilities. The other approach available is the difference between average borrowing interest and lending rate. The fourth approach is to net interest income as a percentage of total assets.

2.2. Internal Determinants of Interest Rate Spread

The internal determinants of interest rate spread are also called the firm specific variables in which the firm in this study was the commercial bank- local and foreign bank in Tanzania. They are the factors which originate from within the commercial bank itself.

The selected internal factors in this study included non–interest income, provision for loan losses, net worth of the bank, net interest income, non-interest expenses, return on assets and non-performing loans.

2.2.1. Non-interest income

These are the income for the bank from sources other than interests imposed by the bank on the services it provides to its customers. Non-interest incomes in most cases are derived from fees and commissions imposed by the banks to the services provided to the customers. Examples of non-interest income include deposit and transaction fees, insufficient funds fees, annual fees, monthly account service charges; inactivity fees, check and deposit slip fees, and others.

Some sources of Non-interest income in commercial banks.

Commercial banks charge fees that provide non-interest income as a way of generating revenue and ensuring liquidity in the event of increased default rate.

The primary types of non-interest income in a bank are revenue from sundry services, fiduciary fees, and deposit service charges. Various sundry services include computer services, financial planning, brokerage, insurance, and others. Fiduciary services include trust and estate administration, securities safekeeping, corporate stock transfers, dividend payment services, legal and official depository and many more. Deposit service charges are levied on various business and individual checking and savings accounts. These types of revenue will grow at the community/customers growth rate.

Loan fees are important sources of non-interest income to most financial institutions. Such fees, however, are generally not accounted for as non-interest income but rather as part of interest income.

Deposit service charges. Even though "free" checking accounts are a popular marketing item, commercial banks collect a significant amount of checking account fees, included fees for account service, sales of checks and deposit slips, bank by mail supplies, charges for deposit and check transactions, etc. For BANK dynamics, service charges are collected for Commercial and Retail Checking Accounts when the customer's average balance falls below the agreed upon minimums. The higher the minimum balances, the more customers must pay. The Management Team has the flexibility of deciding whether to change the fees on now accounts. Fees on Regular Savings and Money Market Accounts will accrue in line with historical averages. All fees will grow or shrink with the balances in the deposit accounts; but some will be impacted by decisions of the Management Team.

Other sources of non-interest income include security gains and losses and fees from Off Balance Sheet Activities such as interest rate swap contracts. Both mentioned sources might appear on income statement, depending upon the Assumption of the Management Team.

The study was aiming at finding out the key sources of non-interest income and their impact on interest rate spread in the selected commercial banks.

Measuring non-interest income

There are a number of different ways to measure the incidence of non-interest income at commercial banks. Two of those ways are measuring non-interest income as a percentage of bank assets, and measuring of non-interest income as a percentage of bank operating income. In this study, non- interest income was measured as the percentage of bank operating income.

Interest Rate Spread and Non- Interest Income in Commercial Banks

It is expected that non-interest income is coexisting with, rather than replacing, interest income from the intermediation activities that remain banks' core financial services function. In most theories, banks exist because they mitigate a host of problems that otherwise prevent liquidity from flowing directly from agents with excess liquidity (depositors) to agents in need of liquidity (borrowers). These problems arise because of informational asymmetries, contracting costs, and scale mismatches between liquidity suppliers and liquidity demanders. Intermediation-based theories of financial institutions see banks as the solution to these problems, because: banks have a comparative advantage at gathering information on borrower creditworthiness; banks are better able than individual lenders to monitor borrowers; banks provide increased liquidity by pooling funds from many households and businesses and by issuing demandable deposits in exchange for these funds; and banks diversify away idiosyncratic credit risk by holding portfolios of multiple loans. Increases in non-interest income generally tend to be associated with higher profitability, higher variation in profits, and a worsened risk-return tradeoff for the average commercial bank.

It was therefore expected in the study that, non interest income is negatively correlated to interest rate spread and leads in decrease in interest rate spread due the fact that it reduces overreliance on interest income sources in commercial banks.

2.2.2. Provision for loan losses

A loan loss provision is a charge to commercial banks' profit and loss statements that creates a reserve on their balance sheets. It can be viewed as a cushioning mechanism which may ensure that banks do not unexpectedly lose their entire outstanding loan balances. Without this adjustment, the amount of loans and advances on the balance sheets of banks would include possible future losses. Furthermore, regulators, creditors and investors could be misled by overstated capital figures.

It is therefore an expense, or allowance, a lender sets aside to recognize that a borrower may be unable to repay a loan in part or in total. Credit specialists often use the terms "valuation reserve" or "valuation allowance" when referring to a provision for loan losses. Another term frequently used is "allowance for loan impairment." For a lender, the valuation reserve account is an expense account because the creditor anticipates that losses could result from debtors' financial woes.

To set a loan loss provision, a credit officer periodically reviews a bank's loan portfolio, heeding things like maturity, credit rating and geographical dispersion. For example, the officer may focus on loans that become due in the next 12 months or may pay attention to borrowers with less-than-stellar credit scores and shaky financial profiles. After selecting the group to review, the loan officer studies the payment patterns of all borrowers in the group, focusing on whether they pay on time, before the due date or way after. During this review, poring over borrowers' financial situations is helpful. Debtors who consistently miss payment dates or who are behind schedule -- say 60 or 90 days overdue -- implicitly are telling a lender that operating activities have embarked on a negative path with respect to revenue generation and solvency. The creditor may review a financially shaky corporate borrower to determine whether the business has restarted making money and if the tide of competitive battle is shifting in its favor. If not, the lender may record a loan loss provision.

Types of Loan Loss Provisioning

Balla and Mckenna (2009) highlight two broad categories of loan loss provisioning: the dynamic loan loss provisioning procedure and the traditional incurred loss method. Dynamic provisioning is a statistical method that utilizes the historical data of various asset classes. It determines the event driven provisioning periodically. It is a deliberate way to construct the loan loss reserve in good economic times. The built up reserve then eases pressures on earnings and capital by absorbing loan losses during an economic downturn. Conversely, the incurred loss method delays provisioning until the economy fails to grow; it may magnify the bust because most bad loans will only reveal themselves during recessions. In essence, the key difference between the two categories of loan loss provisioning is not the level of provisioning but its timing (Balla and Mckenna, 2009).

Bouvatier and Lepetit (2006) also distinguished between non-discretionary and discretionary loan loss provisioning. The non-discretionary component is designed to cover expected loan losses in the banks' loan portfolio. The authors state that this component drives the cyclicality of loan loss provisioning and it leads to a misevaluation of expected credit losses. The discretionary component is caused by management's use of loan loss provisioning for its own objectives. Bouvatier and Lepetit (2006), as well as (Bikker and Metzemakers, 2002), give at least three functions for which banks' management utilises loan loss provisioning. The first function is the practice of earnings management where banks reserve more in good years to cover for bad years. This effectively raises and lowers income, and by extension, profits and dividends, as desired. The second is the management of the capital ratio which is possible on account of loan loss provisions being a part of the regulatory capital depending on the stipulations of the territory. The third function is tax evasion and this is common because provisions are tax deductible in most countries.

Dermine and Calvalho (2006) who reviewed the methodologies in calculating loan loss provisions found evidence that loan loss provisions is a key credit risk input in calculating bank profitability, capital and solvency, and is an essential input in mark-to- market accounting. Dermine and Calvalho have developed two methodologies to calculate a fair level of loan loss provisioning schedules - at the time of default; and - after the default date, and the two methodologies are applied to a private real data set of non-performing loans using the data that was provided by the largest private bank in Portugal, Banco Commercial Portugal (BCP). The data consisted of 374 defaults cases of loans to small and medium size companies and the period covered from June, 1995 to December, 2000. Dermine and Calvalho (2006) highlighted that any empirical study on credit risk and loan loss provisions raises two measurement issues, namely – 1) which criterion should be used to define the time of default. This was due to the fact that the likelihood of being repaid diminishes as time lapses after the default date. Also, different classifications would lead to different results; and - 2) which method should be used to measure the recovery rate on a defaulted transaction.

The second methodological issues concerns on the measurement of recovery on defaulted loans, as provisions will be the amount that will not be recovered. Dermine and Calvalho (2006) quoted Schuermann (2005) that there are two approaches to the measurement of recovery on defaulted loans:

i. The price of the loan, defined as the market trading price one month after the default and the recovery is equal to the discounted value of future cash flows recovered over time after the default date.

As loan loss provisions represents the amount that will not be recovered, therefore, the measurement of recovery will be the basis in determining the adequacy and reasonability of the amount of loan loss provisions on non-performing loans.

Dermine and Calvalho (2006) quoted other authors all of whose studies have adopted the second methodology using the discounted value of future cash flows recovered over time after the default date as equal to the measurement of recovery on defaulted loans. Dermine and Calvalho identified them as Asarnow and Edwards (1995), Carty and Lieberman (1996), Araten et al. (2004) for the United States; Hurt and Felsovalyi (1998) for Latin America; Franks et al. (2004) for France, Germany and the United Kingdom; and Gruner and Weber (2005) for Germany. In another research in which perceived credit risks was found to be an important factor as a basis to make judgments was found in the studies of Choi and Smith (2002) in their analysis of the effect of uncertainties of lending of financial institutions in the United States, where banks defined loan loss provisions as an expected cost of default. Choi and Smith in their studies of real options of commercial banking lending applications had used data of top 100 largest bank holding companies (but only 77 of the top 100 bank holding companies had the necessary information for the entire sample period of 1987 to 1997). The real-options approach to investment under uncertainty has implications in that investment decisions can be optimally delayed when there is uncertainty due to an option value to wait. The authors had chosen the lending applications of commercial banks because of several reasons among others, the ease to identify uncertainties for the assets and liabilities of financial institutions – default risk and interest rate changes, and because commercial bank's loans may be subject to a high degree of irreversibility (e.g. substantial loss in default), thus it may be worthwhile to wait to make lending decisions. The authors' model assumed that

when a bank decides to accept loan applications, it was based on the net present value of the loans as measured by the discounted net interest revenue which is derived from interest income minus interest expense and loan losses.

Choi and Smith (2002) argued that loan loss provisions may reflect an aspect of management's attitude toward loans in that a more conservative bank may set a higher loan loss provisions for loans with the same risk. Also, their studies found empirical evidence that the greater the uncertainty is, the lower the loan activities are.

Despite its importance, loan loss provisioning is a process of evaluating credit losses in loan portfolio as analyzed by Podder and Al Mamun (2004), involves a great deal of judgments where bank managers are expected to evaluate credit losses in their loans on the basis of available information and the process involves various opposing incentives. Sometimes banks may be reluctant to account for the whole amount of incurred losses due to negative effects of provisions on profits and shareholders' equity. As such, the financial results of banks may not reflect the true economic reality of the underlying risk conditions.

2.2.3 Administrative/Operating Costs

These are the costs arising from day to day running activities of the bank. They include the costs such as costs for processing loans, costs for servicing deposits. Operating costs can be measured as the ratio of the total operating costs to the total earning assets or the ratio of bank's administrative expenses to bank's total assets.

In this study, the measurement to be used is the ratio of the banks administrative expenses to bank's total assets.

$$\mathbf{OC} = \frac{\text{Operating costs/Bank's administrative expenses}}{\text{Bank's Total Assets}}$$

Increase in operating costs widens the interest rate spread margin due to the fact much will be needed to cover these costs.

It is therefore expected in this study that the bank operating/ administrative costs is highly positively correlated with the interest rate spread. That is, increase in operating costs decreases the operation efficiency but increases the interest rate spread margin.

2.2.4. Net worth of the Bank

For a company, net worth is defined as total assets minus total liabilities. It is also called owner's equity or shareholders' equity, or net assets.

It is an important determinant of the value of a company, commercial banks in this study. It is considered to be composed primarily of all the money that has been invested since its inception, as well as the retained earnings for the duration of its operation. Net worth can be used to determine creditworthiness because it gives a snapshot of the company's investment history.

In this study, net worth will be measured as a percentage of the difference between the commercial bank's total assets and the total liabilities to commercial banks total assets.

It is expected to be negatively correlated with the interest rate spread. That is, increase in commercial bank's net worth leads to decrease in commercial banks interest rate spread.

2.2.5. Non-performing loans

Non-performing loans are loans on which borrowers are delinquent. Normally, lenders regard loan payments as late until borrowers' fall more than 90 days behind, at which time loans are classified as non-performing. Non-performing loans often end up being

charged off by lenders, which means the lender writes off the balance owed and sells the debt to a collection agency.

Non-performing loans in this study was measured as the percentage of non-performing loans to commercial banks gross loan

$$\text{That is, Non-performing loans (}\mathbf{NPL}\text{)} = \frac{\text{Non-performing loans, NPL}}{\text{Total Gross Loan}}$$

Non-performing loans increases the intermediate costs of the banks leading to increase in the interest rate spread. It was therefore expected in this study that non-performing loans is positively correlated with the interest rate spread.

2.2.6. Liquidity Risk

Liquidity in this study refers to the ability of converting liquid assets of the commercial banks into cash as fast as possible. In general terms, bank liquidity is defined as the ratio of the total operational costs to total assets. There is no specific formula in computing liquidity; however, liquidity is often calculated by using liquidity ratios (Marcio I.Nakane, 2010). In this study, liquidity ratio is measured as the ratio of the liquid assets to total assets due to the possibility of obtaining the data for the variable. Thus,

$$\mathbf{LIQ} = \frac{\text{Liquid Assets}}{\text{Total Assets}}$$

It was expected in this study that liquidity of commercial banks is negatively (inversely) related to the interest rate spread. That is, an increase in liquidity of the commercial banks reduces the bank liquidity, which reduces the interest rate spread due to a lower liquidity premium charged on loans

2.3. External Determinants of Interest Rate Spread.

These are the interest rate determinants which are out of the commercial banks' ability. They are externally driving factors which are sometimes classified into macro variables OR macro-economic determinants of interest rate. In some studies, the external determinants of interest rate spread are classified as market determinants of interest rate spread. In this study, they are termed as the external determinants of interest rate spread (**IRS**). The external variables of interest in this study included the Inflation rate; Deposit rate; Treasury bill rate; and Gross domestic product (GDP) growth rate;

2.3.1. Inflation Rate

Inflation is a substantial sustained increase in the general level of price in a given period of time. It refers to a tendency of persistent rise in prices over a period of time. **Inflation rate** is a measure of the speed at which average prices increases. The banking business revolves around taking deposits from the public and lending the same in order to make profit. The concept of time value for money is critical in banking. Inflation therefore is among the core and most fundamental drivers of high interest rate. This is mainly so in an inflation-ridden economy like that of Tanzania. This republic has seen a double digit inflation rates and tough struggle is to tame it below the double digits.

In order to protect the value of the money they lend, the lending institutions including commercial banks have to charge inflation adjusted rates. Therefore, the higher the inflation rate (actual or potential) the higher the interest rates provided that other things are constant. Real interest rate is always adjusted for expected rate of inflation over a given period of time. Generally, inflation reduces the purchasing power of the interest income, so lenders demand higher payments to compensate for lower values. As a result, increase in inflation rates leads increase in interest rates.

1. Real interest rate can be determined as:

$$\textbf{Real Interest Rate} = \{\underline{\textbf{Interest Rate + inflation}}\} \quad \textbf{x 100\%.]}$$
$$\textbf{\{1 + Inflation Rate\}}$$

2. **Inflation Rate =** $\dfrac{\text{CPI in current year – CPI in previous year x 100\%}}{\text{CPI in previous year}}$

The inflation rate of interest in this study is the consumer price index (CPI).

Inflation and Interest Rate Spread in Commercial Banks

The interest rate is an important price in the commercial banks profitability. It is an income the commercial banks receive on their nest eggs and the cost consumers and business borrowers pay for funds they spend and invest. Inflation reduces the purchasing power of interest income, so lenders demand higher payments to compensate for lower real values. Inflation therefore tends to drive up money or nominal interest rates.

It is therefore expected in this study that, inflation rate is positively correlated to interest rate spread.

2.3.2 Deposit Rate/ Bank Rate

Deposit rate (***DISRATE***) or bank rate is defined as the cost faced by commercial banks when borrowing from the central bank, the lender of financial institutions. It is the rate at which the central bank of a country is providing loans to the commercial banks. For example, the rate charged by Bank of Tanzania (BOT) in providing loan to commercial banks such as NMB, BARCLAYS and other commercial banks as well as other financial institutions. Bank rate is also called the discount rate because in the earlier days, the central bank used to provide finance to the commercial banks by rediscounting their bills of exchange.

Deposit/Bank Rate and Interest rate Spread

Through change in the bank rate, the Central Bank can influence the creation of credit by the commercial banks. When Central Banks raises the cost of borrowing, the bank rate would rise. When bank rate is raised, the commercial banks also raise their lending rates. When the rates of interest charged by commercial banks are high, borrowers are discouraged to borrow more. This would tend to contract bank credit and hence would result in reduced aggregate demand for money. The possible effect of change in deposit rate is that, rise in deposit rate leads to increase in interest rate spread.

It is therefore expected in this study that, deposit rate (**DISRATE**) is positively correlated to interest rate spread (**IRS**) and hence one of the determinants of interest spread in commercial banks.

2.3.3. Treasury Bill Rate

Investors consider Treasury bills (T-bills) to be the safest short-term financial instrument because these debt obligations are perceived to have no default risk. Moreover, because T-bills mature in less than one year-most mature in several months-they do not have a large interest rate risk component. Many factors may affect Treasury bill interest rates in general, as well as rates for specific issues of Treasury securities, in particular. Here are several factors you might want to consider**:**

- **Demand** for risk-free fixed-income securities in general—For example, a "flight to safety" caused by concerns about default or liquidity risk in other financial markets may cause investors to shift to T-bills to avoid risk.
- **Economic conditions** may influence rates--for example, Rose (1994) notes that T-bill rates typically rise during periods of business expansion and fall during recessions.
- **Monetary policy** actions by the government--Fed actions that affect the government funds rate likely will influence interest rates for other close substitutes, including short-term T-bills.

- **Inflation** and inflation expectations also are factors in determining interest rates--for example, periods of relatively high (low) rates of inflation usually are associated with relatively high (low) interest rates on T-bills.

The variable, Treasury bill rate (**TBRATE**) is therefore also expected to be positively correlated with the interest rate spread (**IRS**), because lower Treasury Bill rates would lead to lower interest rate spreads and higher Treasury Bill rates would lead to higher interest rate spread.

2.3.4. Exchange Rate Volatility

An exchange rate is the rate at which one currency is traded against the other currency in the foreign exchange markets. It is the price of one currency against the other currency in the foreign exchange markets such as the commercial banks, bureau de changes, and other agencies.

Exchange rate volatility (**EXRATEVOL)** implies to the exchange rate movement of one currency against the other over a given time period. The selected currencies whose exchange rate movement trend is to be taken into account in this study is the Tanzanian shillings (TZS) and the US Dollar ($). The reason for selection of the US Dollar is due to its powerful influence in most of the financial markets as a base for the determination of the cross exchange rate of the other currencies traded in the foreign exchange markets. An exchange rate for the Tanzanian shillings (TZS) against the US Dollar for period between 2000 and 2011 will be used in this study.

Exchange rate is one of the most determinant of inflation rate and hence interest rate. A free float exchange rate regime is an exchange rate system in which the market forces of demand and supply determines the exchange rate. No government intervention.

Exchange rate volatility for each year is determined as the standard deviation of the percentage change in the real US Dollar exchange rate for the three preceding years. Instability of the exchange rate increases the risk faced by the commercial banks due to

depreciation of the local currency, the Tanzanian Shillings in this study. Being the case, it is expected in this study that exchange rate volatility (**EXRATEVOL**) is positively correlated with interest rate spread, IRS, and unfavorable movement of exchange rate for the Tanzanian Shillings leads to increase in interest rate volatility and hence interest rate spread, IRS.

2.3.5. Degree of government borrowing from commercial banks

The degree of government borrowing (**DEGBOR**) from commercial banks in this study are regarded as the coefficient of net government borrowing which is determined by taking into account the amount borrowed by the government from commercial banks in funding its deficit budget. It measures for the entire banking sector, public sector borrowing as a percentage of total loans. Robins (2002:18) notes that 'the level of government borrowing and its influence on money and credit market is an element of external determinant of IRS that imposes the flexibility on interest rates.

It is therefore expected in this study that the degree of government borrowing (**DEGBOR**) from commercial banks is positively correlated with the interest rate spread (IRS), as governments' heavy reliance on domestic banking sectors for deficit financing increases competition for funds and causes interest rates to rise.

2.4. Empirical Literature

This is a review on the research findings of the previous studies on the determinants of interest rate spread or related topics.

Various studies have been done on the determinants of interest rate spread in various countries.

Demirguc-Kunt and Huizinga (1998:3), Moore and Craigwell (2000) and Sologoub (2006) noted that the specific characteristics of commercial banks that are usually theorized to have an impact on their spreads include the size of the bank, ownership

pattern, the quality of the loan portfolio, capital adequacy, overhead costs, operating expenses, and shares of liquid and fixed assets.

Robinson (2002) further notes that the incidence of fraud, the ease with which bad credit risks survive due diligence and the state of corporate governance within banks operate all lead to higher operating costs, asset deterioration and ultimately wider interest rate spreads. These studies all show that such bank-specific factors impact significantly on commercial banks' net interest margins. Notwithstanding this, Brock and Franken (2002) note that the results of many other studies suggest that individual bank characteristics are often not tightly correlated with interest rate spreads. It is asserted that this may be because spreads are largely determined at the industry level, thus making individual bank characteristics more relevant to other variables, such as bank profitability.

A similar argument, made to explain the failure of spreads in developing countries to converge to international levels even after financial liberalization, suggests that high interest rate spreads in developing countries will persist if financial sector reforms "do not significantly alter the structure within which banks operate" (Chirwa and Mlachila 2004). This structure refers to the market/industry and macroeconomic environment in developing countries. The market specific determinants of commercial bank interest rate spreads highlighted in the literature typically include lack of adequate competition in the banking sector and consequent market power of commercial banks, the degree of development of the banking sector, and explicit and implicit taxation - such as profit taxes and reserve requirements. Cross-country studies have also established that banking spreads tend to fall as institutional factors improve. Such factors include the efficiency of the legal system, contract enforcement, and decreased levels of corruption, which are all critical elements of the basic infrastructure needed to support efficient banking.

Macroeconomic factors have also been shown to explain significant variation in commercial bank interest rate spreads. Brock and Franken (2003) quote from a Moody's report which argues that, "macroeconomic factors are certainly among the most

influential sources for variations in credit spreads." Chirwa and Mlachila (2004) agree and assert that macroeconomic instability and the policy environment have important impacts on the pricing behavior of commercial banks. They note that the macroeconomic variables typically thought to be determinants of interest rate spreads include inflation, growth of output, and money market as well as other market determinants.

The macroeconomic variables which have been empirically shown to increase interest rate spreads include:

- High and variable inflation and real interest rates (Demirguc-Kunt and Huizinga 1998);
    - Interest rate uncertainty - proxied by inter-bank interest rate volatility (Brock and Franken 2002:17); and
    - A high share of commercial bank public sector loans (Randall 1998)

The prevailing results in most of the previous results relied more on the external determinants of the interest rate spread. Less has been done on the internal determinants of interest rate spread. Furthermore, few studies have been carried out in the banking sector in Tanzania.

The study by David Tennant and Abiodun Folawewo (2008) depicted the inflation rate (**INFL**), Discount Rate (**DISRATE**), and government dependence on domestic banking sector (**DEGBOR**) as the most significant determinants of interest rate spread in commercial banks.

Jehovaness Aikaeli et al (2010) findings on the determinants of interest rate spread in developing countries revealed that interest rate spread in Tanzania were strongly influenced by net government borrowing from commercial banks, development of banking sector, statutory minimum reserve requirement and the discount rate. None of the internal determinants of the interest rate spread were dealt with. The studies done by various researchers show that the major causes of the existence of wide and persistent

interest rate spreads in the country since interest rate liberalization policy became effective is yet to be exactly established, at least empirically. On this account, the main objective in this study is to examine the behavior and the determinants of interest rate spread in the selected commercial banks Tanzania.

The study is considered more significant and important for various reasons: One is theoretical importance of interest rate in monetary policy. Second, is the argument in some academic and policy makers that Government should reduce the lending rates because they are prohibitively high and economically distortionary? Third, is availability of the room of empirical studies on interest rate spread in Tanzania? This is because, few research works seems to be done in Tanzania on the determinants of the interest rates giving a wider room for the research work.

The summary of the review of literature is presented below

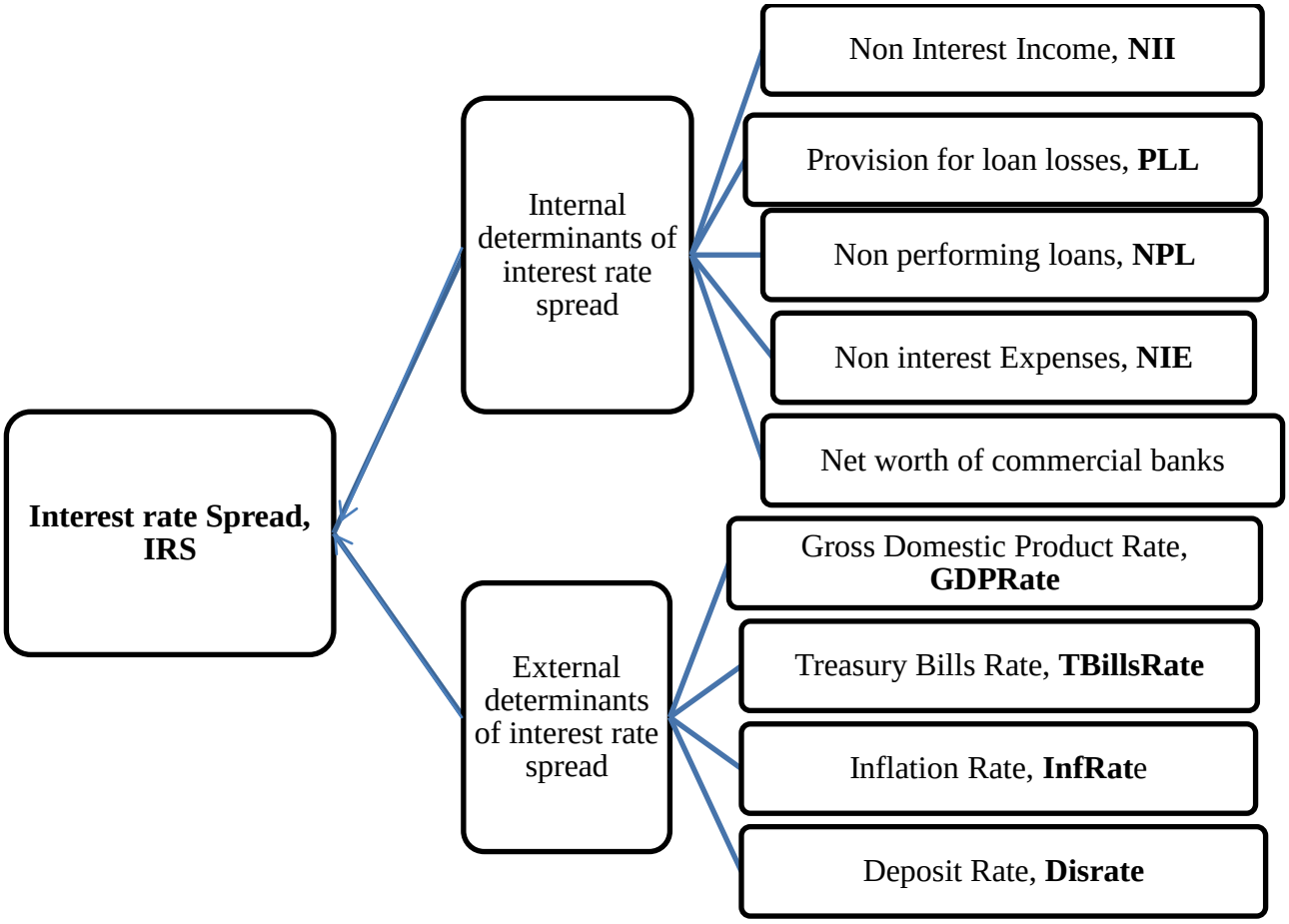
Table 2-1: Summary of Reviewed Literatures on IRS

S/No.	Author(s)	Country	Year of Study	Determinants Identified
1	Demirguc- Kunt, A and H. Huizinga	Some international evidence	1999	Size of the bank, ownership pattern, overhead costs, operating expenses
2	David Tennant and Abiodun Folawewo	Sub sahara Africa countries	2008	Public sector domestic borrowing, discount rate, treasury bills rate
3	Bajas , A et all	Colombia	1998	Non-financial costs, changes in loan quality
4	Randall,R	East Carrebian	1998	Exchange rate volatility, Treasury bills rate
5	Ramful	Mauritania	2001	Cost of operating expenses
6	Kari H.I Grenade	ECCU	2008	Non-performing loans, high operating costs, high level of market concentration
7	Epaphra, M	Tanzania	2004	Economic growth, statutory researves, exchange rate volatility, discount rate, development of financial sector
8	Mlachila, M and E.W.Chirwa	Malawi	2004	Monopoly power, High reserve requirement, High central bank discount rate, High inflation rate
9	Jehovanes A et all	Tanzania	2010	Net government borrowing from commercial banks, discount rate, development of the banking sector. The findings gave a positive effect of the findings on the interest rate spread.
10	Brock and Franken		2003	Exchange rate volatility, discount rate
11	Odhiambo, 2010	Tanzania	2006	Economic growth, statutory reserves, exchange rate volatility, discount rate, development of financial sector

2.5. Conceptual Framework and Research Model

Conceptual frameworks, according to educational researcher Smyth (2004), are structured from a set of broad ideas and theories that help a researcher to properly identify the problem they are looking at, frame their questions and find suitable literature. It is the researcher's own position on the problem and gives direction to the study. Most academic research uses a conceptual framework at the outset because it helps the researcher to clarify his research question and aims. The aim of this task is to write the conceptual framework on the determinants of the interest rate spread in the selected local and foreign commercial banks in Tanzania. Being the case, we developed a conceptual framework on the determinants of interest rate spread in commercial banks in Tanzania in which two commercial banks: National Microfinance Bank (Indigenous Bank) and Barclays Bank (Foreign Bank) are to be studied with an aim of making a comparison between the interest rate spread in local/indigenous bank and those in the foreign banks operating in Tanzania. The key independent variable used in this study are interest rate spread (**IRS**) in which the effects of various dependent variables will be used in arriving at the findings and the conclusions for the study. Figure 2 below provides a conceptual framework

Figure 1. Conceptual Framework on interest Rate spread



Source: Researchers' work

2.5.1. Dependent variable

Based on the data to be used in this study most of which are available in the Bank of Tanzania publications and the selected commercial banks reports, we adopt and used the ex-ante approach as depicted by David Tennant and Abiodun Folawewo (**undated**). Under this approach, interest rate spread is calculated "using the rates quoted on loans and deposits and draws inferences from the differences between them". Our dependent variable (**Y**), in this study is the bank interest rate spread

2.5.1.1 Interest Rate spread, IRS

For the purpose of this study the IRS is taken as the ratio of net interest income to the total assets of the banks under the study. Net interest income is taken as the difference between total interest income and total interest expenses. In this study net interest income which represents the IRS for the commercial banks, was measured as the percentage of net interest income to average earning assets.

$$\text{Net Interest Income, } \mathbf{IRS} = \frac{\text{Net interest income}}{\text{Average earning assets}}$$

The most of the previous studies measured the interest rate spread as the difference between average borrowing interest and lending rate.

2.5.2. Independent Variables

Independent variables which are also called the explanatory variable or predictor variable or regressor variable are the variable that explains the dependent variables in a simple or multiple regression equation. In this study, the independent variables are grouped into two:

1. **External variables:**
    - Inflation Rate abbreviated as **INFL,**
    - Discount Rate abbreviated as **DISRATE,**
    - Exchange Rate Volatility, abbreviated as **EXRATEVOL,**
    - Treasury Bills Rate abbreviated as **TBRATE, and**
    - Gross Domestic Product, abbreviated as **GDP pc**
2. **Internal variables:**
    - Non- interest income in commercial banks;
    - Provision for loan losses;
    - Net worth of the bank;
    - Non- performing loans;
    - Net interest expenses

The explanation of variables along with their measurement and impact on IRS is given in the following table

Table 2-2. Variable description, measurement and their expected impact on IRS

S/No.	***Variable standard name***	***Variable name as used in study***	***Variable definition in relation to this study***	***Variable measurement***	***Expected effects on IRS***
01	Inflation Rate	INFL	Refers to the tendency of persistent changes in prices over a period of time	**INF** =CPI in Current Yr-CPI in Pry / CPI in previous yr.	**Positive**
02	Exchange Rate Volatility	EXRATEVOL	An exchange rate is the rate at which one currency is traded against the other currency in the foreign exchange markets	**EXTRAVOLT**: Exchange rate is the rate of change in exchange rate over time	**Positive**
04	Treasury Bills Rate	TBRATE	Economic indicator of the interest rate policy being pursued by the government, and the bench mark for the rates charged by the commercial banks.	T**BRATE**: TB movement over time from BOT data	**Positive**
05	Net- interest income	NII	Income for the bank from sources other than interests imposed by the bank on the services it provides to its customers	**NII**= Net-interest income / Gross income	**Negative**
06	Provision For loan losses	PLL	Charge to commercial banks' profit and loss statements that creates a reserve on their balance sheets	**PLL**= Provision for loan losses / Total Assets	**Positive**
07	Net worth of Commercial Banks	NWB	Is defined as the Total assets minus total liabilities. It is also known as the shareholders/owners' equity	NWB= Total Assets minus Total liabilities as percentage of total assets	**Negative**
08	Non- Performing Loans	NPL	Non-performing loans are loans on which borrowers are delinquent	NPL= Non performing loans / Total loans	**Positive**

2.6. Model specifications

Panel data models are usually estimated using either pooled ordinary least square (OLS), fixed effects, fe or random effects, re. The random effects estimator is used if the

specific component is assumed to be random with respect to explanatory variable (Green 2000). Fixed effects and random effects models are usually used to control the effects of the omitted variables bias. As cited in Ramful (2001), the two models have been developed to handle the systematic tendency of individual specific components to be different for some units. Hausman test was carried to distinguish fixed effect from random effects models from which OLS was used to make conclusion of the econometric results.

The relationship between the selected commercial banks interest rate and the selected external and internal determinants was specified based on the OLS. The models of specification based external determinants, internal determinants and overall for individual selected commercial banks as well as the external determinants, internal determinants and overall for all the two selected commercial banks.

Five OLS models of specifications were therefore developed in this study as follows:

- The mode of specification for internal determinants of interest rate spread for NMB commercial bank is:

  IRS $= \beta 0 + \beta_1 NII_t + \beta_2 PLL_t + \beta_3 NIE_t + \beta_4 NPL_t + \beta_5 Networth + e$……..*(1)*

- The model of specification for the external determinants of the interest rate spread for NMB bank:

  IRS $= \beta 0 + \beta_1 INFL_t + \beta_2 DISRATE_t + \beta_3 GDPrate + \beta_4 TBRATE_t + e$…….*(2)*

  Where t represents the time and β represents a coefficient.

  - The model specification for a combination of the internal and external determinants of interest rate spread for NMB banks is:

  $IRS = \beta_0 + \beta_1 inflrate + \beta_2 lnrealGDPrate + \beta_3 lndepositrate + \beta_4 lnTbillrate + \beta_5 lnnetworth + \beta_6 lnnii + \beta_7 lnpll + \beta_8 npl + \beta_9 nie + e$…… *(3)*

  - The model of specification for internal determinants of interest rate spread in commercial banks for Barclays bank is:

  IRS $= \beta 0 + \beta_1 NII_t + \beta_2 PLL_t + \beta_3 NIE_t + \beta_4 NPL_t + \beta_5 Networth + e$……..*(4)*

- The model of specification for the external determinants of the interest rate spread for Barclays bank:

IRS $=\beta 0 + \beta_1 INFL_t + \beta_2 DISRATE_t + \beta_3 GDPrate + \beta_4 TBRATE_t + e \ldots\ldots\ldots\ldots (5)$

Where t represents the time and β represents a coefficient.

- The model specification for a combination of the internal and external determinants of interest rate spread for Barclays banks is:

$IRS = \beta_0 + \beta_1 inflrate + \beta_2 lnrealGDPrate + \beta_3 lndepositrate + \beta_4 lnTbillrate + \beta_5 lnnetworth + \beta_6 lnnii + \beta_7 lnpll + \beta_8 npl + \beta_9 nie + e \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$

Where:

IRS= Interest rate spread which is measured a percentage of net interest income to the total earning assets.

NII=Non-interest income

PLL= Provision for loan losses

NPL = Non performing loan

TBillrate = Treasury bills rate

NIE = Net interest expense

Infrate = Inflation rat

CHAPTER THREE

RESEARCH METHODOLOGY

3.0. Introduction

This chapter presents research methodologies and design of the study. The research design is the framework or plan for a study used to collect and analyse data (Churchill and Iacobucci, 2005). The chapter deals with the procedures used in conducting the study. It includes type of the study, study area, study population, units of analysis, variables and their measurements, sample size and sampling techniques, types and sources of data, data collection methods, validity issues, and data analysis methods.

The chapter starts by presenting a brief review of various research methodologies used in previous studies, followed by description of methodologies as well as research design used in this study.

3.1. Methodologies used in previous studies

Several empirical studies have attempted to assess the determinants of interest rate spread in commercial banks. In most reviewed literatures, quantitative data analysis approach to determine the determinants of interest rate spread have been used. For example Kari H I Grenade (2007) conducted a study on the determinants of commercial banks interest rate spread using pooled annual commercial data for the eastern Caribbean currency union. In this study, the analysis of the data employed the panel data technique to measure the relevance of micro and macro factors in determining commercial banks' interest rate spreads over periods. The study used financial ratio analysis and a series of bivariate correlation between interest rate spread and seven selected determinants of interest rate spread of the selected sample institutions. The methodological weakness of the study is that, simple correlation just indicates whether or not two variables move together in the same or opposite direction. It does not necessarily mean that one should be causing the other (Dietman, 1991). Two variables

may be positively correlated just because the third variable causes them to behave that way. Estimations were done using the two-stage-least –square –method. The study did not show the statistical data analysis method used.

Jehovaness Aikaeli et al (2010) made a study on the determinants of interest in developing countries: Evidence on Tanzania, 1991-2009. The study based on secondary data for the period 1991 to 2009, a period that was characterized by financial sector reform which started in Tanzania since 1991.The study used a simple regression basing on one dependent variable. The study did not specify the comparability of the determinants of the interest rate spread in local and indigenous commercial banks in Tanzania therefore providing the research gaps for studying the same topic on the basis of comparing the local and foreign banks in Tanzania.

Khawaja, M.I and Musleh-ud Din (2007), studied on the determinants of interest rate spread in Pakistan. The study employed a variant model used by Peria and Mody (2004) in which the least square method was selected dropping the fixed effect model. As it is for the other previous studies, quantitative research approach was applied in the study.

Mustafa K. M and Younus S (2009) carried out a study on analysis of interest rate spread in the banking sector in Bangladesh. The study was carried out using a sample of 48 banks in Bangladesh. Furthermore, the study was carried out using a simple regression model in which SAS package was used to analyze the data. Quantitative research analysis approach as it is for most research on the interest rate spread was used.

Ndung'u S.N and Rose W.Ngugi (2000) studied on the banking sector interest rate spread in Kenya. The study applied the OLS multiple regression model.

Mlachila M and Ephraim W. Chirwa (2002) studied on the financial reforms and interest rate spreads in the commercial banking system in Malawi. In analyzing the data, panel data regression estimates of determinants of interest rate spreads were used. The study also employed the quantitative research techniques as it is for the most previous research papers on the interest rate spread.

Demirguc-Kunt et al (1998) studied on the determinants of the commercial banks interest margins and profitability. The study applied quantitative research from which most of the previous research papers on the interest rate spread adopted their research methodology. The study used panel data analysis basing on the secondary data obtained from World Bank and International Monetary Fund reports.

3.2. Methodologies used in this study

The study based on the quantitative research approach. The reason behind the use of quantitative research approach was that, the quantitative research approach is useful where quantitative data are generated from large samples to test applicability of the existing theory using statistical analysis (Collins and Hussey, 2003). The study used secondary data from the Commercial Banks quarterly financial statements and Bank of Tanzania quarterly economic review bulletins/publications the quarterly financial statements used were extracted from the quarterly financial reports for the period between 2001 and 2011. Bank of Tanzania quarterly economic bulletin reports and Tanzania Bureau of Statistics provided the data for selected external determinants of interest spread. Such data includes inflation rate, exchange rate volatility, treasury bills, gross domestic product growth rate and commercial banks savings deposit rates as well as lending rates from which interest rate spreads were calculated as per BOT requirements. The internal determinants of interest rate such as non–interest income, provision for loan losses, return on assets, net worth of the bank, non-performing loans and liquidity of the commercial banks were obtained from quarterly financial statements reports of the selected banks (NMB and Barclays Bank Tanzania).

The study adopted the methodologies used by David Tennant and Abiodun Folawewo (2007), Mlachila, M and Chirwa E,W (2002); Kari H I Grenade (2007); and the current study by Jehovaness A, et al (2010) which used multiple regression to study the determinants of interest rate spread. An approach used in much of the literature is to classify the determinants of the interest rate spread according to whether they are

internal or external determinants in nature. In the study, the interest rate spread was calculated as the ratio of net interest income to the total earning assets of the selected commercial banks.

That is,

$$IRS = \frac{\text{Total Interest Income of the bank - Total interest expense of the bank}}{\text{Total earning assets of the bank}}$$

The dependent variable in this case is the interest rate spread (IRS) while the independent variables are the selected internal and external determinants of the interest rate spread described above.

3.3. Research Design

This study aimed at finding out the determinants of interest rate spread in commercial banks by comparing the local and foreign commercial banks in Tanzania.

The study was designed to establish whether the selected determinants of interest rate spread are significantly affecting the interest rate spread in commercial banks as well as identifying if their effects differ between the local and foreign commercial banks operating in Tanzania.

Quantitative data analysis approach was used to establish the cause –effect relationships based on the determinants reported in previous studies.

In carrying out the research work, both longitudinal and case study design were taken into consideration. Longitudinal is a research design in which data are collected on a sample of people, documents, etc. on at least two occasions and Case Study Design is a research design that entails the detailed and intensive analysis of a single or more cases (2010) Alan Bryman and Emma Bell). In designing the research, comparison between the interest rate spreads from various documents on the past seven year's interest rate spread of the commercial banks in Tanzania was done.

3.4. Data types, Sources and Collection Methods Used

Secondary data were the mostly needed and used data except in some cases where the need for primary data was seen to be of importance. The reason for the need and use of the secondary data was due to the data analysis methods applied by the researcher in the study.

The analysis of secondary data based on secondary quarterly time series data for the period ranging between 2006 and 2012, a period after financial sector reforms which started in Tanzania since 1991. The data for interest rate spread (IRS), the discount rate (**DISRATE**) and other selected external determinants of interest rate spread were obtained from the reports and publications of the Bank of Tanzania. The BoT reports also provided the source of data for the net government debt, deposits and assets of the commercial banks. The data for internal determinants of interest rate were obtained from the selected commercial bank's head offices in Dar es Salaam as well as the published financial statements of these banks.

The data for the growth of the financial institutions such as the number of financial institutions were also obtained from the reports and publications of the Bank of Tanzania since the start of the financial sector reform in 1991 to 2012. The other sources for secondary data were the previous research reports on the related topic.

Primary data were in few cases needed in order get the concern of various groups of interest rate spread stakeholders. These include the bankers, government officers responsible for policy making, and various groups of investors and other stakeholders.
These data were collected through various methods such as interviews, use of questionnaire and mostly through online search in websites of the respective sources.

3.5. Sample Size, Sample selection and Sampling Procedure.

The study was basically to determine the interest rate spread in commercial banks by making a comparison between local and foreign banks in Tanzania. In this study, the

researcher decided to select local and a foreign commercial banks in Tanzania on the basis of the coverage of the selected bank and the type of the customers the selected commercial banks seems to be serving more.

National microfinance bank (NMB), a local leading bank in terms of the number of branches and Barclays Bank, a foreign leading bank in terms of the number of branches as well as provision of the services to low income people were selected.

According to the Bank of Tanzania reports dated 2010 there were about 32 registered commercial banks in Tanzania with a total network of 395 branches countrywide, the local leading bank being NMB with about 135 branches up to 2010 and foreign leading bank being Barclays Bank with about 30 branches up to 2010.

Selecting NMB as a local commercial bank and Barclays as foreign registered commercial banks represents a total sample size of about 165 out of 395 population in which the population is represented by the number of branches of all registered commercial banks countrywide.

The study therefore expects to use a sample 165 branches of commercial banks from sample frame of 395 branches of commercial banks (BOT, 2010). The 165 branches were made up of 135 local commercial bank branches and 30 foreign commercial banks' branches. Selection criteria for NMB and Barclays Bank also based on the type and number of customers served by these commercial banks as well as the period lapse since they started operating in Tanzania. The sampling procedure to be used is probability sampling in which systematic random sampling procedure will be the common sampling method.

3.6. Data Analysis

Both qualitative and quantitative data analysis methods will be used in analyzing the obtained data. Quarterly reports of the two commercial banks for the sample period 2006-2012 have been used to estimate the model using pooled OLS and fixed effect

model with panel data. Due to availability of the quarterly data for commercial banks' lending rate and savings deposit rate for the period in question, IRS was measured as the difference between average commercial banks' lending rates and average commercial banks deposit rates. In the analysis, the STATA software package was used due to the researcher's knowledge in using the software.

In practice, panel data models are estimated using pooled OLS, fixed effects or random effects techniques. The random effects estimator is used if the specific component is assumed to be random with respect to explanatory variable (Green 2000). Hausman test was carried to distinguish fixed effect from random effects models in from which OLS was used to make conclusion of the econometric results.

The tool used to analyse the data was multiple regression equation as shown in equation 1, 2 and 3, 4, 5 and 6 below.

- The mode of specification for internal determinants of interest rate spread for NMB commercial bank is:

  IRS $= \beta 0 + \beta_1 NII_t + \beta_2 PLL_t + \beta_3 NIE_t + \beta_4 NPL_t + \beta_5 Networth + e \ldots\ldots\ldots\ldots\ldots (1)$

- The model of specification for the external determinants of the interest rate spread for NMB bank:

  IRS $= \beta 0 + \beta_1 INFL_t + \beta_2 DISRATE_t + \beta_3 GDPrate + \beta_4 TBRATE_t + e \ldots\ldots (2)$

  Where t represents the time and β represents a coefficient.

  - The model specification for a combination of the internal and external determinants of interest rate spread for NMB banks is:

  $IRS = \beta_0 + \beta_1 inflrate + \beta_2 lnrealGDPrate + \beta_3 lndepositrate + \beta_4 lnTbillrate + \beta_5 lnnetworth + \beta_6 lnnii + \beta_7 lnpll + \beta_8 npl + \beta_9 nie + e \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$

  - The model of specification for internal determinants of interest rate spread in commercial banks for Barclays bank is:

  IRS $= \beta 0 + \beta_1 NII_t + \beta_2 PLL_t + \beta_3 NIE_t + \beta_4 NPL_t + \beta_5 Networth + e \ldots\ldots\ldots\ldots\ldots (4)$

  - The model of specification for the external determinants of the interest rate spread for Barclays bank:

IRS $= \beta 0 + \beta_1 INFL_t + \beta_2 DISRATE_t + \beta_3 GDPrate + \beta_4 TBRATE_t + e \ldots\ldots\ldots\ldots (5)$

Where t represents the time and β represents a coefficient.

- The model specification for a combination of the internal and external determinants of interest rate spread for Barclays banks is:

$$IRS = \beta_0 + \beta_1 inflrate + \beta_2 lnrealGDPrate + \beta_3 lndepositrate + \beta_4 lnTbillrate + \beta_5 lnnetworth + \beta_6 lnnii + \beta_7 lnpll + \beta_8 npl + \beta_9 nie + e \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

CHAPTER FOUR

PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.0. Introduction

This chapter deals with the analysis of the data and presentation of the research findings objective wise from the study. The chapter includes presentation, analysis and discussion of the findings basing on the selected internal and external determinants of interest rate spreads in the selected commercial banks.

4.1. NMB

This part deals with the presentation, analysis and discussion of the findings of the study of the selected local commercial bank, the NMB. It covers the descriptive, correlation and regression results for the selected internal and external determinants of IRS and a combination of the internal and external determinants of IRS in NMB.

4.1.1. Descriptive Statistics

The descriptive statistics dealt with in this part are the mean and standard deviation for the determinants of interest rate spread in the selected commercial banks.

Testing for the normality

In testing for the normality of the selected variables by the use of stata econometric model, multiple regression equation was run on a normal basis after which kennel density test was carried to test for the normality. Only treasury bills and inflation rate gave abnormal results as shown in **appendix 4**. These parameters were made normal by introducing log as indicated in **Table 4-2.** Other parameters were all normal.

Testing for autocorrelation and multicollinearity

The multicollinearity was tested using variance inflation factor (VIF) and the results shown that there were no multicollinearity problem as the VIF value was less than 10 as shown in below.

```
. vif

    Variable |       VIF       1/VIF
-------------+----------------------
       lnnii |      7.47    0.133879
       lnpll |      6.28    0.159246
         npl |      4.39    0.228010
lndepositr~e |      1.43    0.699460
  lnnetworth |      1.38    0.727185
         nie |      1.36    0.734375
 lntbillrate |      1.24    0.805153
lnrealgdpr~e |      1.11    0.897563
-------------+----------------------
    Mean VIF |      3.08
```

Test for heteroskedasticity was done using Breusch-Pagan test. Chi square value of 0.51 implying that there is no heteroskedasticity problem. The null hypothesis is that residuals are not homoscedastic and hence we to rejected the null at 95% and concluded that residuals are not homogeneous

```
. hettest

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

         chi2(1)      =     0.51
         Prob > chi2  =   0.4735
```

Unit Root Tests

Estimation of an error correction model (ECM) was assumed to rejects the null hypothesis that all variables were first difference stationary at the conventional test levels.

Mean and standard deviation for the determinants of interest rate spread in NMB

Table 4-1 below provides the mean and standard deviation for the determinants of interest rate spread in NMB.

Table 4-1. Mean and Standard Deviation the determinants of IRS in NMB

Variable	Obs	Mean	Std. Dev.	Min	Max
nii	28	11.985	2.011417	9.03	16.92
npl	28	3.740357	1.298958	1.38	7
nie	28	51.5	5.130765	39.13	62.92
pll	28	.7885714	.2289867	.26	1.32
roa	28	3.698214	.6869744	2.62	4.86

.

In summary, table 4-1 above revealed the following observations:

- **NII** mean is **11.985**, standard deviation is **2.011417** and the range is **9.03** and **16.92.**
- The mean for **NPL** is **3.74**, standard deviation is **1.298958** and the range is between **1.38** and **7.**
- The mean for **NIE** is **51.57**, standard deviation is **5.1307** and the range is **39.13** and **62.92**.
- The mean for PLL is **0.7885**, standard deviation is **0.2289** and the range is between **0.26** and 1.32.

4.1.2. Correlation Matrix of the variables for NMB

Table 4-2 below shows the correlation matrix of the variables for the NMB determinants of IRS

Table 4-2. Correlation Matrix of the variables for NMB

	irs	inflrate	realgd~e	deposi~e	tbillr~e	networth	roa	npl	nie
irs	1.0000								
inflrate	-0.2240	1.0000							
realgdprate	-0.2886	-0.0513	1.0000						
depositrate	-0.0372	0.4755	-0.0435	1.0000					
tbillrate	0.5685	0.2059	-0.0502	0.2634	1.0000				
networth	-0.1338	0.6929	-0.1566	0.4283	0.2995	1.0000			
roa	0.6988	0.1465	-0.0722	0.2644	0.8080	0.3294	1.0000		
npl	0.5274	-0.1386	-0.1186	0.1958	0.1204	-0.3872	0.1997	1.0000	
nie	-0.3708	-0.1490	-0.1303	-0.1717	-0.4677	-0.1302	-0.5693	-0.3699	1.0000
pll	-0.1709	0.4011	-0.2159	0.6946	0.0805	0.3307	0.0482	0.0250	0.1353
nii	0.5584	0.4212	-0.1596	0.4229	0.6750	0.5102	0.7395	0.1383	-0.3086
lntbillrate	0.5575	0.2049	0.0194	0.2245	0.9805	0.2795	0.7825	0.1573	-0.4693
lnnetworth	-0.1380	0.6658	-0.1651	0.4083	0.2707	0.9982	0.3156	-0.3825	-0.1166

Source: Data base used

From table 4-2 above, the selected external determinants of IRS as inflation rate, real GDP rate, and deposit rate are weak and negatively correlated to IRS. Treasury bill is the highly positive correlated parameter of all these external determinants to the IRS. The correlation coefficient, **r** of **0.5685** between the treasury bills rate and the IRS is an evident of this relationship. This implies that, treasury bills rate is highly affecting the IRS in NMB and hence as the treasury bills rate increases by **0.5685**, the IRS increases by **1**. Inflation rate, real GDP rate and deposit rates are weaker in determining interest rate spread as they give negative correlation of 22.4%, 28.86% and 3.72% respectively.

On the other hand, the internal determinants as net worth, non-interest expenses, **NIE**; and provision for loan losses, **PLL** are highly negative correlated to the IRS as evidenced by the correlation coefficient of **-0.1338, -0.3708** and **-0.1709** respectively. This implies that, as these parameters decreases by respective values, the IRS increases by 1.

Basing on the results above, the key determinants of interest rate spread for NMB are treasury bills rate, non-performing loans, non-interest income at a significant level of 56.85%, 52.74% and 55.84% respectively.

4.1.3. Regression Results

This part deals with the presentation, analysis and discussion of the regression results for the internal determinants of IRS, external determinants of IRS the combination of the internal and external determinants of IRS for NMB.

(i) Regression Results for the internal determinants of IRS of NMB

The regression results for the internal determinants of interest rate spread for the NMB are based on equation (1).

The coefficient for estimates for the internal determinants of IRS for the NMB is given by table 4-3 below.

Table 4-3: Coefficient estimate for the internal determinants of NMB on IRS

Source	SS	df	MS	Number of obs =	28
				F(5, 22) =	9.45
Model	18.3147844	5	3.66295688	Prob > F =	0.0001
Residual	8.52374538	22	.387442972	R-squared =	0.6824
				Adj R-squared =	0.6102
Total	26.8385298	27	.994019622	Root MSE =	.62245

irs	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
networth	-.3145178	.1831112	-1.72	0.100	-.6942671	.0652316
npl	.2324951	.1237226	1.88	0.074	-.0240898	.4890801
nie	-.0048934	.0282115	-0.17	0.864	-.0634005	.0536137
pll	-1.305996	.5982027	-2.18	0.040	-2.546592	-.0653991
nii	.3738991	.0776709	4.81	0.000	.2128195	.5349787
_cons	11.67337	2.834695	4.12	0.000	5.794568	17.55216

From **table 4-3** above, the econometric results shows that non-interest income, NII and non-performing loans, PLL are positive and statistically significant in determining the interest rate spread. This is evidenced by the p- values of **0.000 and 0.040** for net interest income and provision for loan losses implying that net interest income and

provision for loan losses are significant variables at 4% and 1% respectively. Coefficient of 0.3738991 and -1.305996 for net interest income and non-performing loan respectively gives a weak positive and negative effect of the two determinants on IRS respectively. Furthermore, the independent variables explain the dependent variable by **68.24%** as evidenced by the value of R-Squared value of **0.6824.** This implies that the independent variables are good predictors of the dependent variable. The findings also depicts that net worth, non-interest expense, **NIE**; and provision for loan losses, **PLL** are insignificant at 10%, 86.4% and 7.4% respectively. These parameters have the inverse relationship with the interest rate spread as the coefficients of **-0.3145178,- 0.0048934** and **-1.305996** respectively are negative implying that as IRS by 1 increases, the three parameters decreases respective coefficient. On the other hand, non-performing loans, **NPL** are net interest income, **NII** with the coefficients **0.2324951** and **0.3738991** have positive coefficients implying that as the parameters increases by the respective coefficients, IRS increases by 1.

(ii) Regression Results for the external determinants of IRS of NMB

The regression results for the external determinants of interest rate spread for the NMB are based on the equation 2

The coefficient for estimates for the external determinants of IRS for the NMB is given by table 4-4 below.

Table 4-4 Coefficient estimate for external determinants of NMB on IRS

Source	SS	df	MS	Number of obs =	28
				F(4, 23) =	8.21
Model	64.257567	4	16.0643917	Prob > F =	0.0003
Residual	44.9789367	23	1.95560594	R-squared =	0.5882
				Adj R-squared =	0.5166
Total	109.236504	27	4.04579643	Root MSE =	1.3984

nii	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
inflrate	.1015958	.07664	1.33	0.198	-.0569462	.2601378
realgdprate	-.1927714	.1693831	-1.14	0.267	-.5431671	.1576243
depositrate	2.537523	2.092195	1.21	0.237	-1.790514	6.865559
lntbillrate	2.339446	.5455936	4.29	0.000	1.210799	3.468092
_cons	.2277677	5.380156	0.04	0.967	-10.90193	11.35747

From **table 4-4** above, the econometric results shows that the treasury bills rate, **TBillrate** is positive and statistically significant in determining the interest rate spread. This is evidenced by the p- values of **0.000** implying that its level of significance is **0**. The results also show that inflation rate, deposit rate and treasury bills rate are insignificant determinants of interest rate at 19.8%, 26.6% and 23.7% respectively despite the fact that they affects the IRS in a positive way. That is, increase of the inflation rate by **0.1015958**, deposit rate by **2.537523** and treasury bills rate by **2.339446** respectively leads to an increase of the IRS by 1. Real GDP growth rate is inversely related to the IRS as it gives negative coefficient of **-0.1927714** implying that as IRS increases by 1, the real GDP rate decreases by **-0.1927714**. Furthermore, at a confidence level of 95%, the independent variables explain the dependent variable by **58.82%** as evidenced by the value of R-Squared.

(iii) Regression Results for the combination of the internal and external determinants of IRS of NMB

The econometric results for the internal and external determinants of interest rate spread for NMB are based on the equation 3 using the internal determinants of NMB and external determinants only. The results are shown in table 4-5 below.

Table 4-5: Econometric results for the internal and external determinants of interest rate spread for NMB commercial banks.

Source	SS	df	MS
Model	21.9811481	9	2.44234979
Residual	4.85738172	18	.26985454
Total	26.8385298	27	.994019622

Number of obs	= 28
F(9, 18)	= 9.05
Prob > F	= 0.0000
R-squared	= 0.8190
Adj R-squared	= 0.7285
Root MSE	= .51948

irs	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
inflrate	-.074051	.0356431	-2.08	0.052	-.1489343	.0008324
realgdprate	-.1559701	.0709531	-2.20	0.041	-.3050371	-.0069032
depositrate	-.6585647	1.137808	-0.58	0.570	-3.049011	1.731881
npl	.222528	.1117874	1.99	0.062	-.0123286	.4573846
nie	-.0134172	.0255617	-0.52	0.606	-.0671203	.0402858
pll	-.7923374	.6856719	-1.16	0.263	-2.232881	.6482059
nii	.304647	.0820448	3.71	0.002	.1322773	.4770166
lntbillrate	.3713759	.294301	1.26	0.223	-.2469277	.9896794
lnnetworth	-1.520382	2.081653	-0.73	0.475	-5.893774	2.853009
_cons	15.46147	5.425462	2.85	0.011	4.063	26.85994

The result shows that the independent variables explain the dependent variable by **81.90%** as evidenced by **R-Squared value.** The interest rate spread is positively and significantly determined by net interest income with p-value of **0.002**, and real GDP growth rate with p-value of **0.041** giving of significance of 0.2% and 4.1% respectively. Treasury bills rate**, Tbillrate;** non-performing loans, **NPL;** and net interest income with the P-Values of **0.3713759, 0.222528** and **0.304647** positively affects the IRS but are statistically insignificant at the 22.3%, 6.2%, 6.06% respectively. Inflation rate, real GDP rate, deposit rate, non-interest expenses, provision for loan losses, net worth with the coefficient -0.074051, -0.1559701, -0.6585647, -0.0134172, -0.7923374 and -1.520382 respectively shows a negative effect on IRS but are statistically insignificant.

The key determinants of the IRS as shown above are real GDP rate, and net interest income.

4.2. Barclays Bank

This part deals with the presentation, analysis and discussion of the findings of the study of the selected foreign commercial bank, Barclays Bank Tanzania Limited.

It covers the descriptive, correlation and regression results for the selected internal and external determinants of IRS and a combination of the internal and external determinants of IRS in Barclays Bank Tanzania Limited.

4.2.1. Descriptive Statistics

Table 4-6 below provides the mean and standard deviation for the determinants of interest rate spread in Barclays Bank.

Table 4-6. Mean and Standard Deviation the determinants of IRS in Barclays Bank

Variable	Obs	Mean	Std. Dev.	Min	Max
networth	28	10.35286	1.981139	6.87	13.43
nii	28	6.077857	.7423305	4.2	7.24
npl	28	10.47214	2.3154	6.86	14
nie	28	50.42929	6.211781	39.6	62
pll	28	4.813214	1.295145	2.7	8.03

In summary, table 4-6 above revealed the following observations:

- **NII** mean is **6.077**, standard deviation is **0.74233** and the range is **4.2** and **7.24.**
- The mean for **NPL** is **10.47**, standard deviation is **2.315** and the range is between **6.86** and **14.**
- The mean for **NIE** is **50.43**, standard deviation is **6.21** and the range is **39.6** and **62.**
- The mean for PLL is **4.81**, standard deviation is **1.2951** and the range is between **2.7** and **8.03.**
- **Networth** mean is **10.35**, standard deviation is 1.98 and the range is between 6.87 and **13.43**

4.2.2. Correlation Matrix of the variables for Barclays Bank

Table 4-7 below shows the correlation matrix of the variables for the Barclays bank determinants of IRS

Table 4-7. Correlation Matrix of the variables for Barclays bank

```
. cor
(obs=28)
```

	irs	inflrate	realgd~e	deposi~e	tbillr~e	networth	npl	nie	pll
irs	1.0000								
inflrate	-0.2240	1.0000							
realgdprate	-0.2886	-0.0513	1.0000						
depositrate	-0.0372	0.4755	-0.0435	1.0000					
tbillrate	0.5685	0.2059	-0.0502	0.2634	1.0000				
networth	-0.2726	0.0634	-0.2189	0.2133	-0.2804	1.0000			
npl	-0.0549	-0.4628	-0.1954	-0.1286	-0.5229	0.1185	1.0000		
nie	0.0144	0.2658	-0.1790	0.4301	0.2979	0.4206	-0.3559	1.0000	
pll	-0.3257	0.7537	-0.1651	0.2278	-0.1431	0.0742	-0.3133	0.0335	1.0000
nii	-0.1132	-0.0485	0.0239	0.1041	0.1979	-0.0758	-0.3014	0.1713	-0.2998
lntbillrate	0.5575	0.2049	0.0194	0.2245	0.9805	-0.3680	-0.5200	0.2012	-0.1365
lnnetworth	-0.2598	0.0815	-0.2209	0.2056	-0.2552	0.9967	0.0752	0.4258	0.1045

Source: Date base used

From table 4-7 above, the selected external determinants of IRS as inflation rate, real GDP rate, and deposit rate are weak and negatively correlated to IRS. Treasury bill is the highly positive correlated parameter of all these external determinants to the IRS. The correlation coefficient, **r** of **0.5685** between the treasury bills rate and the IRS is an evident of this relationship. This implies that, treasury bills rate is highly affecting the IRS in NMB and hence as the treasury bills rate increases by **0.5685**, the IRS increases by **1**. On the other hand, the internal determinants as net worth; non-performing loans, **NPL** provision for loan losses, **PLL** are highly negative correlated to the IRS as evidenced by the correlation coefficient of **-0.2726, -0.0549** and **-0.3257** respectively. This implies that, as these parameters decreases by respective values, the IRS increases by 1. Net interest expense, **NIE** with a correlation coefficient of 0.0144 is weak

positively correlated to IRS implying that as it increases in value by 0.0144, the IRS increases by 1.

4.2.3. Regression Results

This part deals with the presentation, analysis and discussion of the regression results for the internal determinants of IRS, external determinants of IRS the combination of the internal and external determinants of IRS for Barclays bank.

(i) Regression Results for the internal determinants of IRS of Barclays

The regression results for the internal determinants of interest rate spread for the Barclays are based on the equation 1.

The coefficient for estimates for the internal determinants of IRS for the Barclays is given by table 4-8 below.

Table4-8: Coefficient estimate for the internal determinants of Barclays on IRS

Source	SS	df	MS	Number of obs =	28
Model	18.250641	5	3.6501282	F(5, 22) =	9.35
Residual	8.58788877	22	.390358581	Prob > F =	0.0001
				R-squared =	0.6800
Total	26.8385298	27	.994019622	Adj R-squared =	0.6073
				Root MSE =	.62479

irs	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
npl	.2435866	.1215639	2.00	0.058	-.0085215	.4956947
nie	-.0030627	.0280892	-0.11	0.914	-.0613162	.0551908
pll	-1.348264	.594511	-2.27	0.034	-2.581205	-.115324
nii	.3679381	.0767669	4.79	0.000	.2087332	.527143
lnnetworth	-3.3394	2.008661	-1.66	0.111	-7.505108	.8263088
_cons	16.17364	5.255994	3.08	0.006	5.273377	27.07391

From **table 4-8** above, the econometric results shows that non- interest income, NII and non-performing loans, PLL are positive and statistically significant in determining the

interest rate spread. This is evidenced by the p- values of **0.000 and 0.0340** for net interest income and provision for loan losses respectively implying that the two determinants are significant at confidence interval of 5%. Coefficient of 0.3679381 and -1.348264 for net interest income and provision for loan losses respectively gives a weak positive and negative effect of the two determinants on IRS respectively. Furthermore, the independent variables explain the dependent variable by **68.00%** as evidenced by the value of R-Squared. The findings also depicts that net worth, non-interest expenses, **NIE**; and provision for loan losses, **PLL** have the inverse relationship with the interest rate spread as the coefficients of **-3.3394,- 0.0030627** and **-1.348264** respectively are negative implying that as IRS by 1 increases, the three parameters decreases respective coefficient. On the other hand, non-performing loans, **NPL** are non- interest income, **NII** with the coefficients **0.2435866** and **0.3679381** have positive coefficients implying that as the parameters increases by the respective coefficients, IRS increases by 1.

(ii) Regression Results for the external determinants of IRS of Barclays

The regression results for the external determinants of interest rate spread for the Barclays are based on the equation 2 for Barclays bank.

The coefficient for estimates for the external determinants of IRS for the Barclays is given by table 4-9 below.

Table 4-9 Coefficient estimate for the external determinants of Barclays on IRS

Source	SS	df	MS
Model	171.58128	4	42.89532
Residual	539.186825	23	23.4429054
Total	710.768105	27	26.3247446

Number of obs	= 28
F(4, 23)	= 1.83
Prob > F	= 0.1575
R-squared	= 0.2414
Adj R-squared	= 0.1095
Root MSE	= 4.8418

nie	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
inflrate	-.045195	.265351	-0.17	0.866	-.5941153	.5037253
realgdprate	-.4061273	.5864557	-0.69	0.496	-1.619303	.8070488
depositrate	-2.088913	7.243814	-0.29	0.776	-17.07388	12.89606
lntbillrate	-4.489262	1.88901	-2.38	0.026	-8.396977	-.5815464
_cons	70.22539	18.62773	3.77	0.001	31.691	108.7598

From **table 4-9** above, the econometric results shows that the treasury bills rate, **TBillrate** is negatively and statistically significant in determining the interest rate spread. This is evidenced by the p- values of **0.000**. The results also show that inflation rate, deposit rate and treasury bills rate affects the IRS in a negative way. That is, increase of the inflation rate by -0.045195, deposit rate by -2.088913 and real GDP rate by -0.4061273 respectively leads to a decrease of the IRS by 1. Furthermore, the independent variables explain the dependent variable by **24.14%** as evidenced by the value of coefficient of determination, R-Squared.

iii) Regression Results for the combination of the internal and external determinants of IRS of Barclays

The econometric results for the internal and external determinants of interest rate spread for Barclays bank are based on the equation 3 for the Barclays bank using the internal determinants and external determinants given below.

The results are shown in table 4-10 below.

Table 4-10. Coefficient estimate for the internal and external determinants of Barclays bank on IRS

Source	SS	df	MS
Model	17.1100224	9	1.90111361
Residual	9.72850734	18	.54047263
Total	26.8385298	27	.994019622

Number of obs	= 28
F(9, 18)	= 3.52
Prob > F	= 0.0111
R-squared	= 0.6375
Adj R-squared	= 0.4563
Root MSE	= .73517

irs	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
inflrate	-.0389503	.070544	-0.55	0.588	-.1871578	.1092571
realgdprate	-.2973142	.112206	-2.65	0.016	-.5330503	-.0615782
depositrate	.7719768	1.313175	0.59	0.564	-1.986901	3.530854
npl	-.1243643	.1181294	-1.05	0.306	-.372545	.1238165
nie	-.0174463	.0328981	-0.53	0.602	-.0865626	.0516699
pll	-.3459787	.2545001	-1.36	0.191	-.8806636	.1887061
nii	-.5450701	.2530971	-2.15	0.045	-1.076807	-.0133327
lntbillrate	.7775312	.4833514	1.61	0.125	-.2379525	1.793015
lnnetworth	-.7621129	.8996978	-0.85	0.408	-2.652308	1.128082
_cons	19.71498	5.098013	3.87	0.001	9.004451	30.42551

From table 4-10 above, the independent variables defines the dependent variable by **63.75%** as evidenced by the R-Squared value. **Real GDP rate** is the significant determinant of interest rate spread for the Barclays bank as it gives a negative and significant value of p = 0.016 which is less than the benchmark level of 0.05. Net interest income is also another significant determinant of interest rate spread since its p-value is 0.045. Only treasury bills rate is positively correlated to the IRS of Barclays bank. The degree of correlation between the IRS and treasury bills rate is highly positive as signified by the coefficient of **0.7775312**. All other determinants as inflation rate, real GDP rate, deposit rate, non-performing loans, non-interest income, provision for loan losses, net interest income and net worth affects the IRS of Barclays bank in a negative way as depicted by the coefficients in table 1-13 above.

4.3. Comparison of the results between the NMB and Barclays Bank

This part gives the comparison between the results from NMB and Barclays bank on the bases of the regression results and descriptive results above.

The comparison for these results is shown in table 4-11 below.

Table 4-11 Comparison of the results between NMB and Barclays

Parameter	**NMB**	**Barclays**	**Remarks**
Internal Determinants of IRS	Non-performing loan, NPL; and Net interest income, NII	Non-performing loan, NPL; and Net interest income, NII	The internal determinants are the same for the two banks but differ in coefficients
External Determinants of IRS	Treasury bills rate and real GDP rate	Treasury bills rate and real GDP rate	Treasury bills rate affects IRS in both the two commercial banks but in opposite direction
Mean IRS	11.985	6.077	IRS is higher for NMB than Barclays Bank
Standard Deviation of IRS	2.011	0.74	Standard Deviation is also higher for NMB than Barclays as it is 2.011 compared to 0.74

Source: Developed from econometric results.

The econometric results from this study shows that the internal determinants of the interest rate spread in the selected commercial banks are non-performing loans and net-interest income while external determinants are Treasury bills rate and real GDP rate.

The different observed is that the interest rate spread differ among the two selected commercial banks with the NMB representing locally originated commercial banks having higher interest rate spread than Barclays bank representing the foreign originated commercial banks in Tanzania. This depicts that foreign originated commercial banks have lower interest rate spread and hence lower borrowing costs compared to locally originated commercial banks.

Furthermore, the findings reveal that the findings in this study are not similar to most of the findings in the previous studies carried in other countries. This shows that most of the variables believed to be the determinants of the interest rate spread in other countries may give negative results in other countries possibly due to financial regulations and banking industry development in the respective country.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND POLICY IMPLICATIONS

This chapter deals with giving the brief summary of the study, presents conclusion emerging from the study, objectives, some suggestions for improvement and the policy implications.

5.1. Summary of the study.

The overall objective of this study was to identify the Determinant of interest rate spread in commercial banks in Tanzania. The specific objectives include: First, to study and find out the internal and external determinants of interest rate spreads in NMB, a local bank and Barclays bank, a foreign bank in Tanzania: Second to compare the interest rate spread margin of NMB, a local commercial banks and Barclays bank a foreign commercial bank in Tanzania.

For the purpose of the study, two commercial banks with similar characteristics, one being a local owned bank and the other being a foreign owned bank operating in Tanzania were studied. The determinants were ascertained from review of literatures. Related parameters from the selected determinants were studied for chosen banks for the period between 2006 and 2012 basing on the secondary data from 28 quarters of published quarterly reports of the selected commercial banks and Bank of Tanzania quarterly economic bulletin publications.

The study employed panel data techniques to measure the relevance of internal and external determinants of interest rate spreads in the selected commercial banks over the period. Multiple regressions were applied to establish relationship between the dependent variable (**IRS**) and the chosen independent variables.

5.2. Conclusion of the Study

The econometric results clearly indicates that many of the factors commonly believed to be critically determinants of interest rate spreads may not be in fact relevant to all countries. Inflation rate, a commonly used factor that contributes to the interest rate spread gave statistical insignificant results. Similarities of the results from the previous studies were shown by the treasury bills rate which in most studies gave a positive result.

The study shows that the internal determinants of IRS in the selected local and foreign commercial banks in Tanzania are the non-performing loans, and net interest income.

On the other hand, the external determinants of interest rate spread in selected commercial banks in Tanzania are the treasury bills rate and real GDP rate. The degree of the impact of the study determinants of interest rate spread differ among the two selected commercial banks.

Furthermore, the interest rate spread in local banks as represented by NMB in this study shows a higher rate than it is for foreign banks represented by Barclays bank in this study.

5.3. Suggestions, policy implications and recommendations from the study

This study contributes to the literature on the determinants of interest rate spreads using the ratio of the net interest income to the income generating assets of the selected commercial banks. The paper grouped the selected variables into internal and external variables. A number of variables both for internal and external determinants of interest rate spread most of which were chosen from academic literatures and previous research papers were tested. The internal variables selected included the provision for loan losses, non-performing loans, net interest income, non- interest expenses and net worth of commercial banks. External variables selected included the treasury bills rate, inflation

rate, real GDP rate, deposit rate and exchange rate volatility. Panel data econometric techniques were used to test for such data.

The study evidenced that treasury bills rate and real GDP rate are the most significant determinant of interest rate spread in commercial banks in Tanzania. For example, the gap between lending rates and the return on government securities has been narrowing from 2004/05 to 2007/08 and thereafter, Government securities rates showed a declining trend while commercial banks' lending rates remained constant. This is an inverse trend from the expectation of the relationship between the rates, whereby it was expected that a decline in Government security rates would pull down the lending rates.

The government through the Bank of Tanzania should therefore make sure that they regulate the treasury bills rate in order to help commercial banks regulate their high lending rates which highly impact the interest rate spread.

Net interest income, provision for loan losses and non-performing loans also shown an impact on the interest rate spread on the bases coefficient of estimation and p-value for the econometric results of the each individual bank of. All other selected variables, both internal and external variables gave an insignificant impact on the interest rate spread.

The policy implication from the study is that the high responsiveness of commercial banks spread to the treasury bills and real GDP rate needs to be regulated. Secondly, if there is to be any success in reducing commercial banks interest rate spreads to support long term economic growth, the competitive environment in banking sector must be enhanced.

This study can be extended by exploring the impact of financial sector development on interest rate spreads in commercial banking system.

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APPENDICES:

APPENDIX 1. Quarterly report data for NMB and BOT for six years (2006-2012)

Year	Date	**IRS**	InflRate	RealGDPRate	DepositRate	TBillRate	Networth	NII	NPL	NIE	PLL
2006	1	12.10	7.70	9.20	2.60	13.40	10.21	12.00	4.20	48.53	0.65
2006	2	13.00	9.20	8.80	2.50	8.20	10.97	12.90	4.32	50.33	0.35
2006	3	13.60	5.90	5.70	2.60	12.00	11.18	14.10	3.89	51.23	0.26
2006	4	13.67	6.30	3.00	2.60	15.00	11.35	13.80	4.01	51.53	0.71
2007	5	12.00	7.20	4.50	2.60	16.00	11.31	13.80	3.99	53.21	0.71
2007	6	12.70	5.70	5.90	2.60	17.10	11.20	13.10	4.43	44.26	0.86
2007	7	11.56	8.40	7.20	2.60	15.60	9.13	13.30	4.08	45.90	0.78
2007	8	11.31	6.90	11.20	2.80	11.40	10.53	12.50	4.20	51.90	0.88
2008	9	12.21	8.90	7.10	2.67	10.17	10.37	11.63	4.49	58.00	0.74
2008	10	10.92	9.40	7.30	2.69	10.13	10.30	12.13	4.55	58.76	0.73
2008	11	11.28	10.30	9.10	2.67	10.99	11.73	12.24	5.09	39.13	0.56
2008	12	12.76	12.50	5.70	2.71	13.33	11.54	13.34	5.57	46.75	0.69
2009	13	11.45	13.10	5.60	2.72	6.97	10.39	12.40	7.00	45.40	0.79
2009	14	11.29	11.20	5.20	2.69	4.52	11.30	12.79	5.68	51.57	0.92
2009	15	11.67	11.70	5.30	2.66	4.48	10.38	12.24	3.75	52.00	0.93
2009	16	10.05	12.50	5.40	2.72	6.14	11.52	10.66	3.75	56.15	0.99
2010	17	9.88	9.80	6.50	2.87	5.89	11.11	10.86	4.16	53.11	1.00
2010	18	9.33	8.20	6.60	2.82	2.90	10.74	11.15	2.92	56.99	0.83
2010	19	9.15	5.80	6.40	2.61	4.27	11.23	11.27	2.71	55.09	0.90

2010		9.03		6.50	2.50	5.95	10.94		2.29	62.92	0.81
	20		6.80					11.07			
2011		9.66		7.40	2.61	6.39	11.45		1.59	47.47	0.47
	21		7.30					10.90			
2011		11.11		7.60	2.40	4.70	11.25		1.86	58.55	0.64
	22		9.70					11.14			
2011		11.32		7.20	2.39	7.18	12.05		1.38	53.67	0.64
	23		14.60					11.50			
2011		11.63		7.40	2.79	14.98	13.10		1.59	47.27	0.72
	24		19.00					10.67			
2012		14.24		6.40	2.86	16.48	13.18		3.07	49.55	0.93
	25		19.80					12.01			
2012		15.66		6.20	2.88	14.31	12.93		3.17	53.74	1.11
	26		18.70					12.43			
2012		16.08		6.40	3.02	14.13	12.98		3.42	50.63	1.32
	27		14.70					12.53			
2012	28	16.92		6.40	2.88	13.98	12.54		3.57	48.36	1.16
			12.40					12.65			

Source: Calculated from NMB quarterly financial statement data

APPENDIX 2. Quarterly report data for Barclays and BOT for six years (2006-2012)

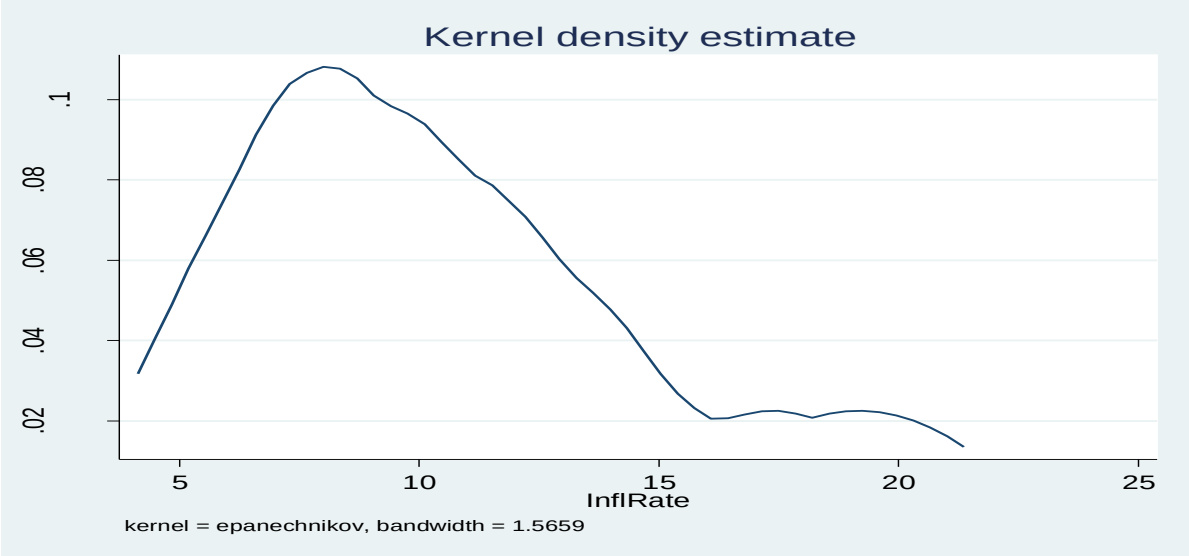
Year	Date	IRS	InflRate	RealGDPRate	DepositRate	TBillRate	Networth	NII	NPL	NIE	PLL
2006	1	5.20	7.70	9.20	2.60	13.40	7.98	3.86	12.10	43.50	4.54
2006	2	4.80	9.20	8.80	2.50	8.20	7.94	3.73	11.80	42.00	4.53
2006	3	6.00	5.90	5.70	2.60	12.00	8.30	4.10	10.60	39.60	4.53
2006	4	5.60	6.30	3.00	2.60	15.00	8.53	4.66	12.00	42.00	4.44
2007	5	6.90	7.20	4.50	2.60	16.00	11.44	4.11	9.80	60.00	2.70
2007	6	6.70	5.70	5.90	2.60	17.10	11.71	4.86	8.00	59.70	2.71
2007	7	5.87	8.40	7.20	2.60	15.60	11.82	3.87	10.92	56.00	2.70
2007	8	5.93	6.90	11.20	2.80	11.40	12.13	4.11	8.96	47.00	2.90
2008	9	6.11	8.90	7.10	2.67	10.17	6.91	2.71	11.00	54.10	3.84

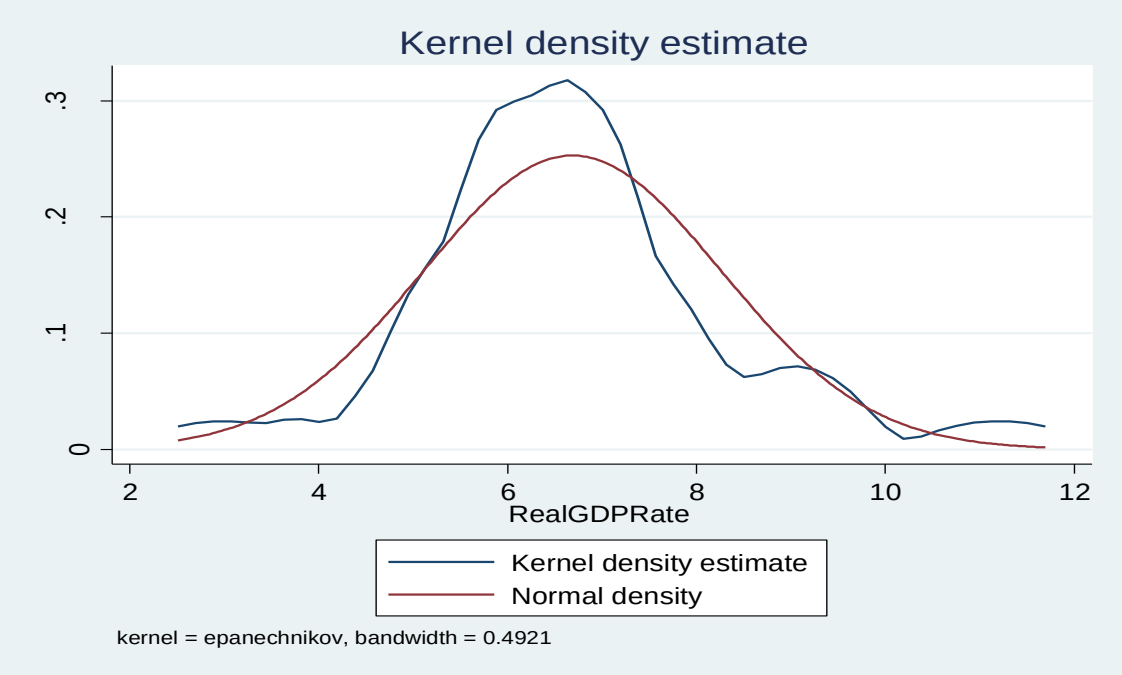
2008	10	6.32	9.40	7.30	2.69	10.13	6.87	3.71	12.01	45.78	3.85
2008	11	7.24	10.30	9.10	2.67	10.99	7.02	3.94	9.88	48.30	4.04
2008	12	7.07	12.50	5.70	2.71	13.33	7.05	4.56	10.00	45.33	4.72
2009	13	4.20	13.10	5.60	2.72	6.97	11.63	3.70	13.60	51.10	5.95
2009	14	4.84	11.20	5.20	2.69	4.52	11.96	3.00	13.10	47.12	5.63
2009	15	5.60	11.70	5.30	2.66	4.48	12.38	3.09	12.00	51.20	5.88
2009	16	5.87	12.50	5.40	2.72	6.14	13.43	2.62	11.65	48.89	5.77
2010	17	6.90	9.80	6.50	2.87	5.89	12.00	2.72	13.80	47.00	4.06
2010	18	6.72	8.20	6.60	2.82	2.90	12.23	3.26	12.70	52.91	4.14
2010	19	5.80	5.80	6.40	2.61	4.27	12.24	2.84	14.00	56.00	4.21
2010	20	6.80	6.80	6.50	2.50	5.95	12.24	2.66	13.90	45.00	3.99
2011	21	5.80	7.30	7.40	2.61	6.39	10.00	3.55	7.40	49.60	5.85
2011	22	6.10	9.70	7.60	2.40	4.70	10.10	2.86	8.54	50.92	6.02
2011	23	6.60	14.60	7.20	2.39	7.18	10.13	3.64	6.86	44.76	6.03
2011	24	6.54	19.00	7.40	2.79	14.98	10.26	3.55	7.44	48.00	6.04
2012	25	5.60	19.80	6.40	2.86	16.48	10.66	4.24	7.97	56.20	8.03
2012	26	5.87	18.70	6.20	2.88	14.31	10.95	4.57	6.99	62.00	5.87
2012	27	6.20	14.70	6.40	3.02	14.13	10.98	4.44	8.00	60.11	5.89
2012	28	7.00	12.40	6.40	2.88	13.98	10.99	4.59	8.20	57.90	5.91
Source: Calculated from Barclays bank quarterly financial statement data											

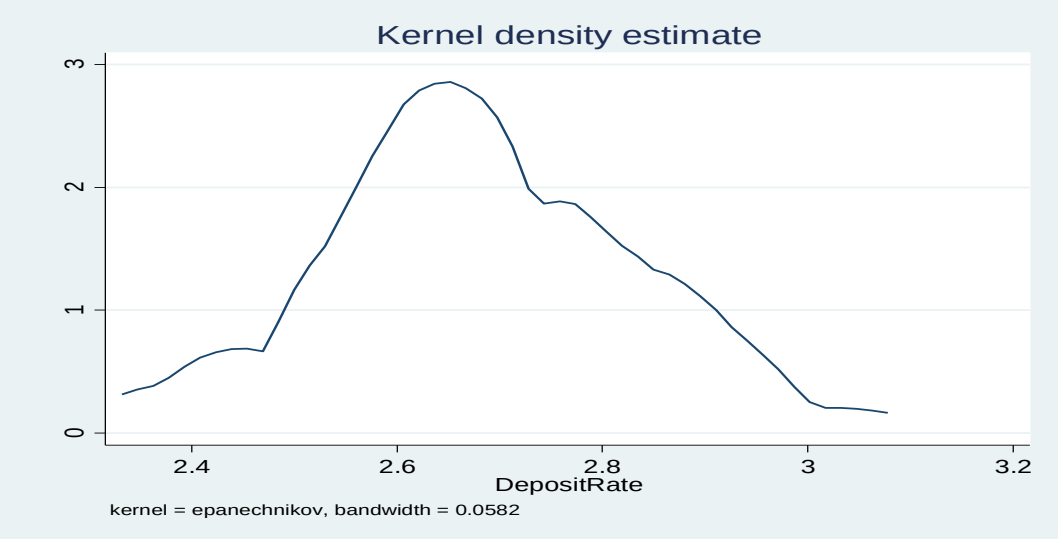
Appendix 3. BOT Commercial Banks Interest Rate Structure (Quarterly Average)

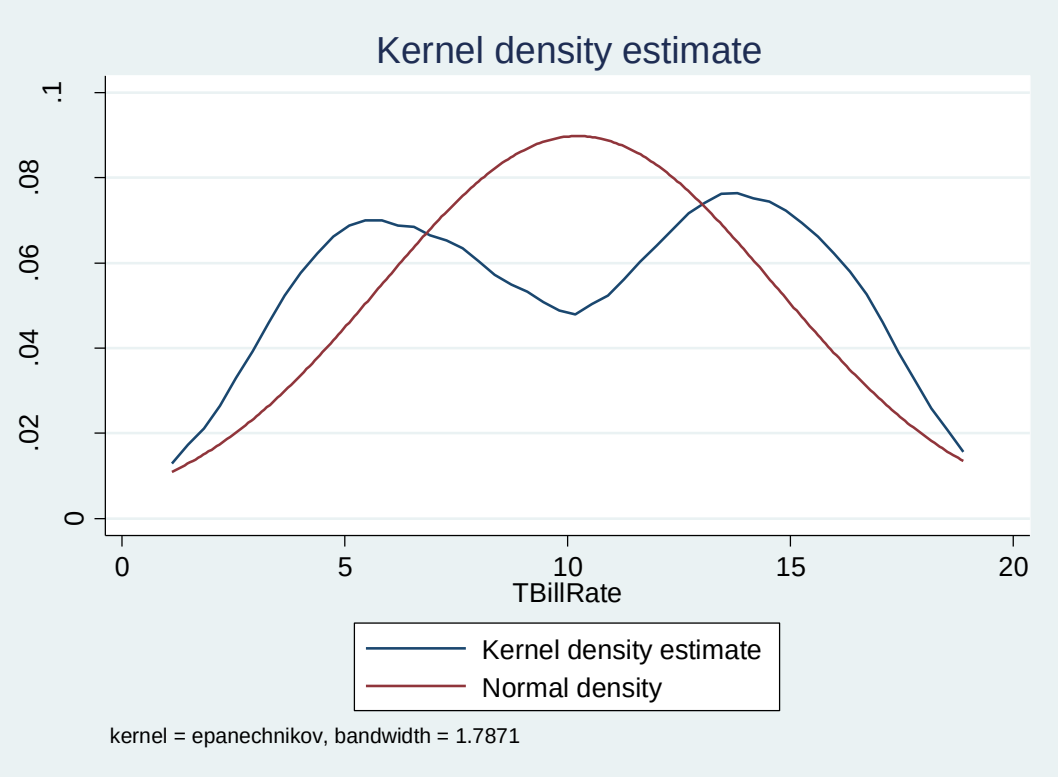
		Interest Rates			
End of Period	Quarter	**IRS**	**Savings Deposit Rate**	**Average Commercial Banks Lending Rates**	**Treasury Bills Rate**
2006	1	12.00	14.60	2.60	8.20
2006	2	12.80	15.40	2.60	12.00
2006	3	14.20	16.70	2.50	15.00
2006	4	13.80	16.40	2.60	16.00
2007	1	13.10	15.70	2.60	17.10
2007	2	13.30	15.90	2.60	15.60
2007	3	12.70	15.30	2.60	11.40
2007	4	13.60	16.40	2.80	10.17
2008	1	11.63	14.30	2.67	10.17
2008	2	12.13	14.82	2.69	10.13
2008	3	12.24	14.91	2.67	10.99
2008	4	13.34	16.05	2.71	13.33
2009	1	12.4	15.12	2.72	6.97
2009	2	12.79	15.48	2.69	4.52
2009	3	12.24	14.9	2.66	4.48
2009	4	10.63	13.35	2.72	6.14
2010	1	10.86	13.73	2.87	5.89
2010	2	11.15	13.97	2.82	2.90
2010	3	11.27	13.88	2.61	4.27
2010	4	11.07	13.57	2.5	5.95
2011	1	10.9	13.51	2.61	6.39
2011	2	11.14	13.54	2.4	4.70
2011	3	11.51	13.9	2.39	7.18
2011	4	10.67	13.46	2.79	14.98
2012	1	12.01	14.87	2.86	13.35
2012	2	12.43	15.31	2.88	13.81
2012	3	12.53	15.55	3.02	12.93
2012	4	12.65	15.53	2.88	12.85

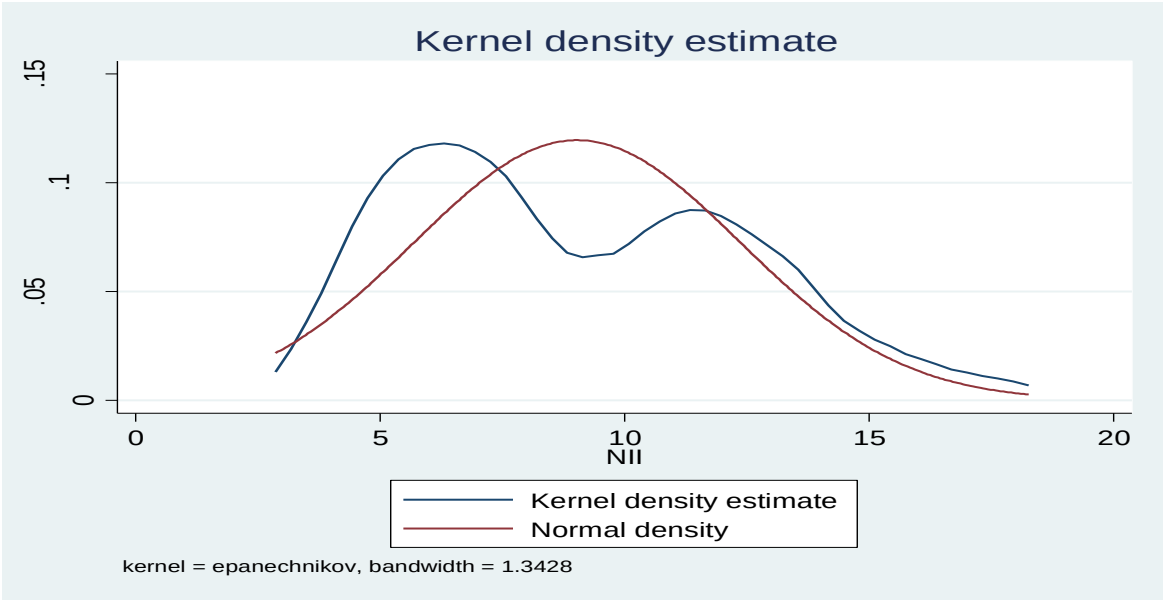
Appendix 4. Statistical test for normality

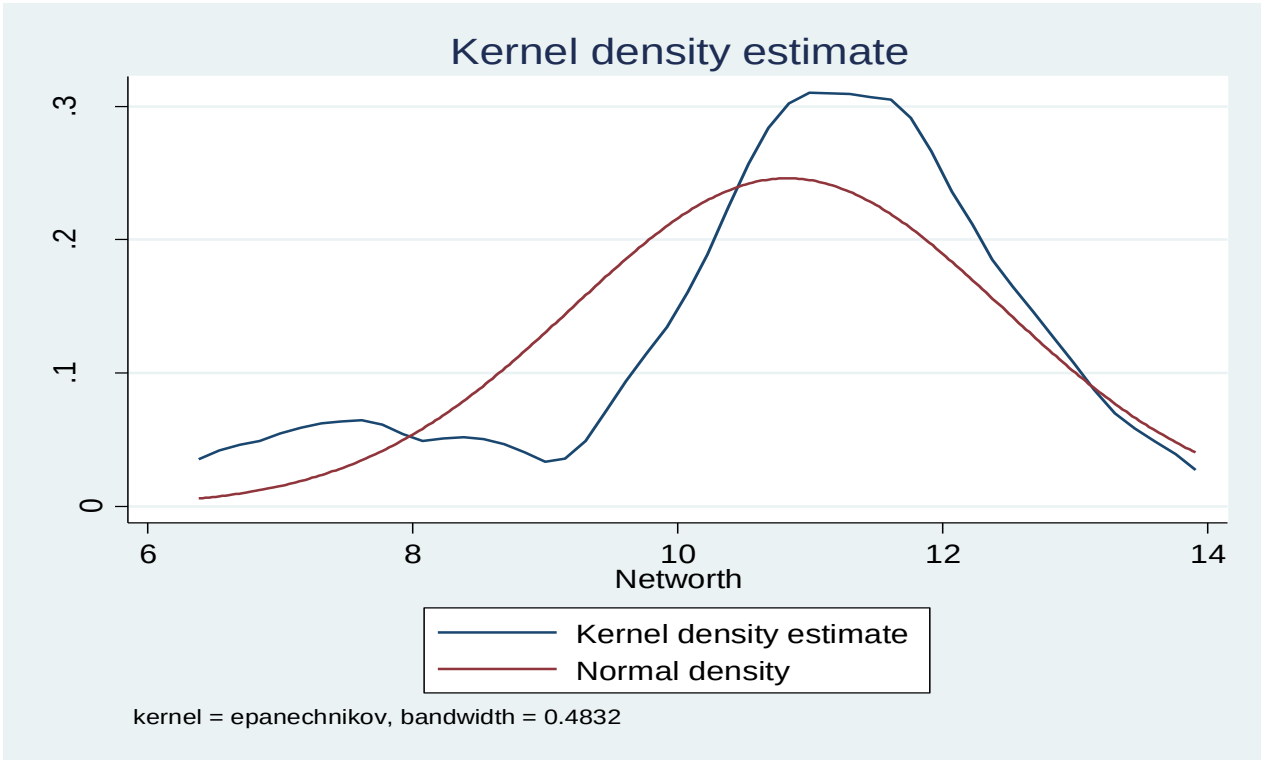


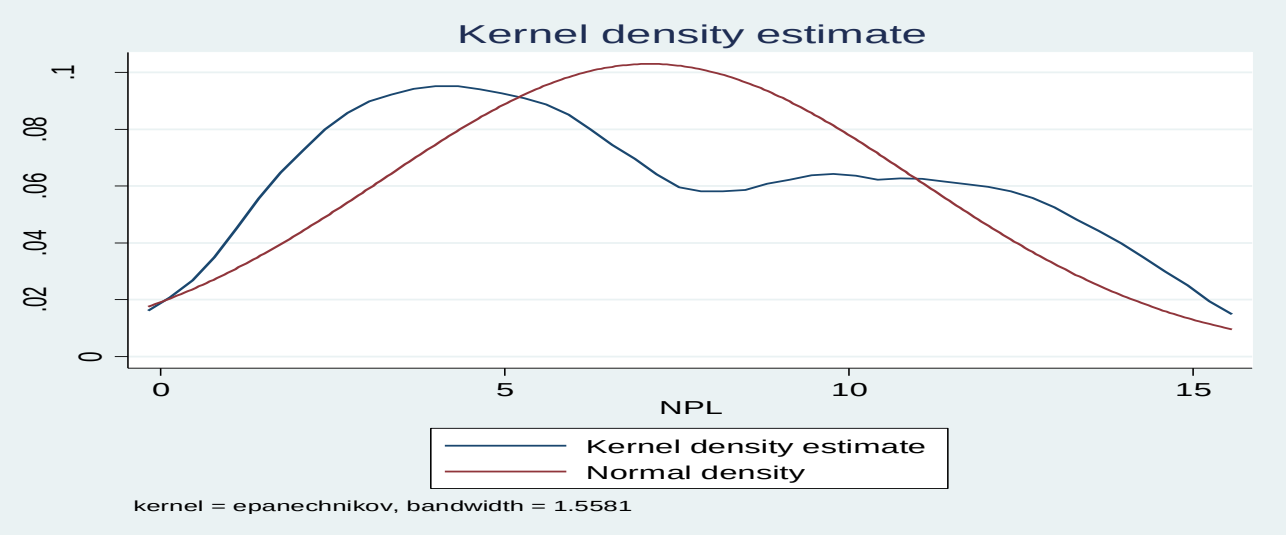


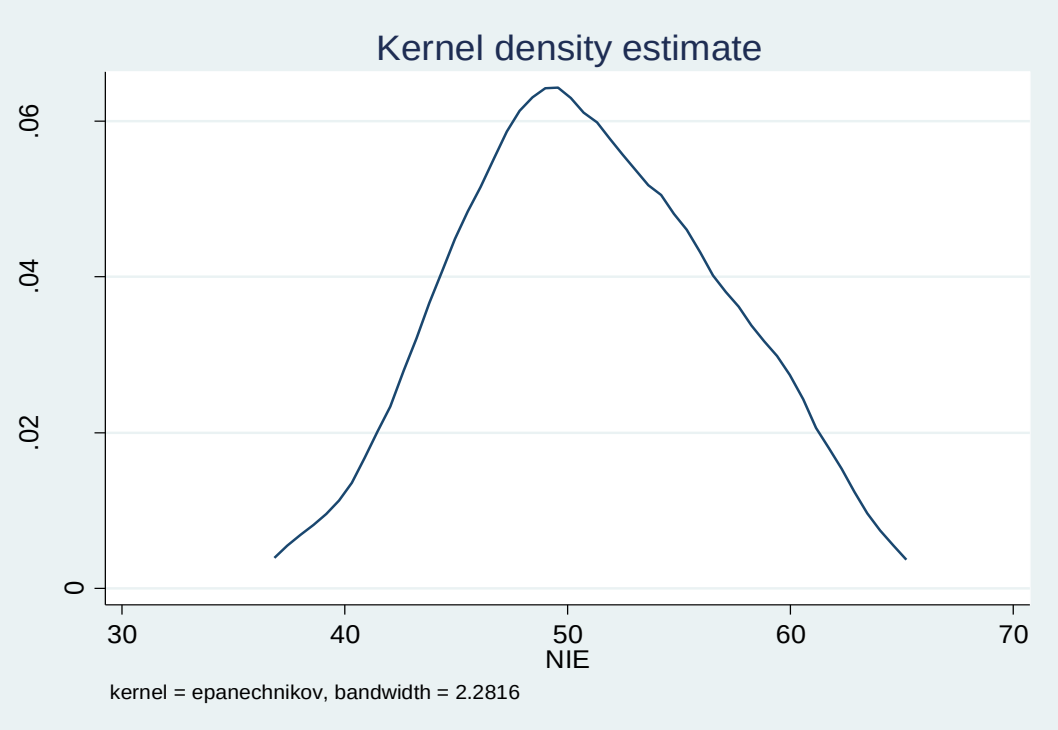

Kernel density estimate
0
1
2
3
2.4
2.6
2.8
3
3.2
DepositRate
kernel = epanechnikov, bandwidth = 0.0582

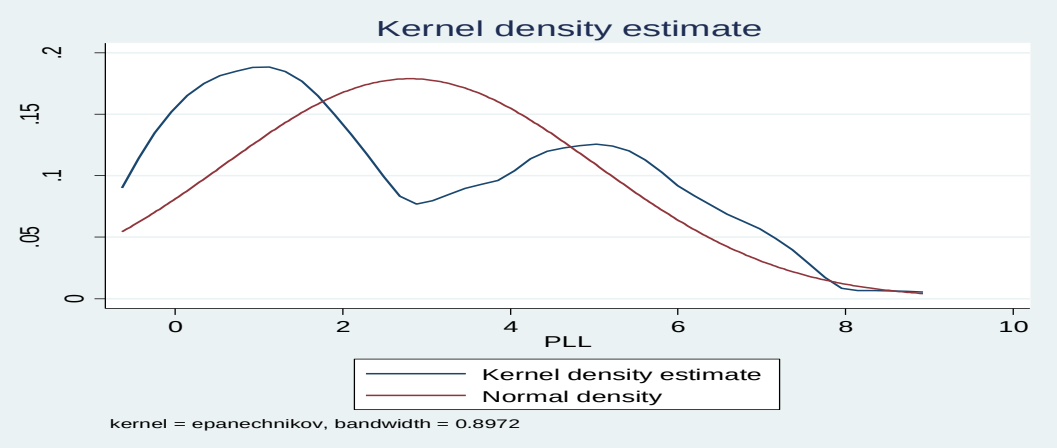

Kernel density estimate
0
.02
.04
.06
.08
.1
0
5
10
15
20
TBillRate
Kernel density estimate
Normal density
kernel = epanechnikov, bandwidth = 1.7871


Kernel density estimate
.15
.1
.05
0
0
5
10
15
20
NII
Kernel density estimate
Normal density
kernel = epanechnikov, bandwidth = 1.3428


Kernel density estimate
.3
.2
.1
0
6
8
10
12
14
Networth
Kernel density estimate
Normal density
kernel = epanechnikov, bandwidth = 0.4832


Kernel density estimate
0
.02
.04
.06
.08
.1
0
5
10
15
NPL
Kernel density estimate
Normal density
kernel = epanechnikov, bandwidth = 1.5581


Kernel density estimate
0
.02
.04
.06
30
40
50
60
70
NIE
kernel = epanechnikov, bandwidth = 2.2816



Appendix 5. Statistical test for heteroskedacity

```
. hettest

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

         chi2(1)      =     0.51
         Prob > chi2  =   0.4735
```

Appendix 6. Statistical for multicolleanility

```
. vif
```

Variable	VIF	1/VIF
lnnii	7.47	0.133879
lnpll	6.28	0.159246
npl	4.39	0.228010
lndepositr~e	1.43	0.699460
lnnetworth	1.38	0.727185
nie	1.36	0.734375
lntbillrate	1.24	0.805153
lnrealgdpr~e	1.11	0.897563
Mean VIF	3.08	