THE DETERMINANTS OF COMMERCIAL BANKS' INTEREST RATE SPREAD IN NAMIBIA: AN ECONOMETRIC EXPLORATION

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR

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BY

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ABSTRACT

The objective of this study is to explore the main determinants of interest rate spread in Namibia's commercial banking industry using a panel data analysis of bank level data and time series analysis of macroeconomic data. The literature surveyed in this study suggests that the interest rate spread is influenced by several bank-specific, bank-industry, and macroeconomic variables. The data for the bank-specific model covered a sample period from the first quarter of 2004 to the last quarter of 2011 whilst the macroeconomic model included a sample period from the first quarter of 1991 to the third quarter of 2011. The unit root and cointegration analysis were applied in order to model the interest rate spread.

The results at the bank level suggest that the deposit market share reduces the net interest margin whilst the liquidity levels of a commercial bank increases the net interest margin. Furthermore, it was found that the tax paid by a bank and the capital ratio are not important determinants of the net interest margin. The results at the macroeconomic level implies, that the treasury bills rate reduces the interest rate spread whilst, inflation rate; exchange rate and the bank rate increases the interest rate spread. Thus, the contractionary monetary policy has an effect of increasing the interest rate spread and the expansionary fiscal policy has a negative influence on the interest rate spread.

TABLE OF CONTENTS

LIST OF TABLES

Table **Page**

LIST OF FIGURES

Figure **Page**

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DEDICATION

I wish to dedicate this thesis to my father, Mr. Richard Samahiya and mother Mrs. Peggy Samahiya.

DECLARATION

I, Obrein Muine Samahiya, hereby declare that this study is a true reflection of my own research, and that this work, or part thereof has not been submitted for a degree in any other institution of higher education. No part of this study may be reproduced, stored in any retrieval system, or transmitted in any form, or by any means (e.g. electronic, mechanical, photocopying, recording or otherwise) without the prior permission of the author, or The University of Namibia in that behalf.

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Obrein Muine Samahiya

LIST OF ACRONYMS

BA	Bankers' Acceptance
BON	Bank of Namibia
CR2L	Loans Concentration Ratio for the two biggest banks
DW	Durbin-Watson
ECM	Error of correction model
FE	Fixed Effects
FNB	First National Bank
GBP	Great Britain Pound
GCI	Gini Co-efficient Index
GDP	Gross Domestic Product
HHI	Herfendahl-Hirschman Index
HHID	Herfendahl-Hirschman Index for Deposits
HHIL	Herfendahl-Hirschman Index for Loans
IMF	International Monetary Fund
IRS	Interest Rate Spread
N$	Namibian dollar
NIM	Net Interest Margin
NIS	Net Interest Spread

NPLs	Non-performing Loans
NSA	National Statistics Agency
ODC	Other Depositor Corporations
OLS	Ordinary Least Squares
OPC	Operating Cost
PSC	Private Sector Credit
RE	Random Effects
RWCR	Risk Weighted Capital Ratio
SCP	Structure–Conduct-Performance
T1CR	Tier 1 Capital Ratio
SSA	Sub-Saharan Africa

CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.1 Background

In economics it is believed that financial sector development is an important contributor to economic growth and development (Bawumia, Belnye and Ofori, 2005). In the 1960s, developing countries were characterised by repressive financial policies, which meant that interest rates were controlled and credit was rationed. During the repressive years, both the lending rate and the deposit rate were fixed by monetary authorities and credit was rationed to target certain economic sectors, which were believed would spur economic growth and development (Fowowe, 2008). These policies had a limiting effect on the growth of the financial sector.

Fowowe (2008) further argues that lack of real growth in developing countries has been due to a repressed financial sector and therefore, developing countries needed to adopt financial liberalisation policies in order to realise real economic growth and development. The removal of all financial repressive policies which characterised the financial sector such as fixed interest rates and credit rationing would deepen the financial sector and open it to competition, thus leading to competitive deposit and lending rates and pave the way for the development of the financial sector, and consequently, economic growth (Chirwa, 2001). High deposit rates and low lending

rates would encourage more investments into the economy and thus, accelerate economic growth.

Commercial banks are special type of financial intermediaries and play an important role in economic growth and development. Their roles in the economy include, but are not limited to ensuring an effective and efficient payment system, providing a monetary policy transmission mechanism, collecting and analysing information, as well as undertaking credit evaluation, and monitoring activities.

It is imperative to understand the behaviour of commercial banks because of their importance to economic growth and development. The study of interest rate spread is important in many ways, as there is an important link between the interest rate spread and the banking industry efficiency (Folawewo & Tennant, 2008). The wider the interest rate spread, the more inefficient the banking system. The more inefficient the banking sector, the higher the cost of intermediation. This translates into reduced lending and investment, and subsequently reduced economic growth. The lending rate is the price (or cost) of credit to borrowers. The theory of demand suggests that the higher the price, the lower the demand, other things being equal. Therefore, the higher the lending rate, the lower the demand for investment. Reduced demand for investment may lead to reduced economic growth. High interest rate spread discourages saving, which is important for investment and economic growth.

In Namibia, commercial banks play an important intermediation role. Through the products or services they offer, households; businesses and public agencies can save and invest thereby contributing to the growth of the economy. Financial intermediation as a percentage of GDP grew from 2.0 percent in 1990 to 4.3 percent in 2010 (Ministry of Finance, 2012). The commercial banking sector is well established and compares well with other banks in sub-Saharan Africa (SSA) (IMF, 2007). However, the oligopolistic nature of the commercial banking industry has led to wider interest rate spreads and higher bank charges (NEPRU, 2005). In recent years, the Bank of Namibia (BON) has encouraged commercial banks to lower the spread between the bank rate and their lending rates. The BON has pointed out that commercial banks can reduce their lending rates by a bigger proportion than the bank rate's proportional decrease. Commercial banks are now required by the BON to disclose their service fees and charges, in order to promote competitive pricing among the banks, which would in turn benefit consumers.

1.2 Statement of the problem

The first decade of political independence was characterised by very wide interest rate spreads compared to the second decade. Wide interest rate spreads reflect the cost of capital to investors and may discourage investment, thus, potentially limiting economic growth. In addition, wide interest rate spreads undermine the operational efficiency of commercial banks in the sense that financial intermediation becomes more costly. The

operational inefficiency can lead to misallocation of resources and less lending and ultimately less investment which will have a bearing on economic growth. It is therefore, in the interest of the authorities to ensure that the commercial banks are efficient for them to contribute positively to economic growth and development.

Despite the fact that interest rate spread has narrowed from 9.3 percent in 1991 to 4.4 percent in 2011, the BON is still concerned about the level of interest rate spread (BON, 2009b). This study notes the limited empirical enquiry into the effects of bank-specific and macroeconomic variables on interest rate spread in Namibia's commercial banking industry. Therefore, this study attempts to contribute to the empirical evidence on interest rate spread in Namibia.

1.3 Objectives of the study

The main objective of this study is to explore the main determinants of interest rate spread in Namibia's commercial banking industry.

The specific objectives of the study are:

- To investigate the factors that influence interest rate spread at the bank level.
- To examine the appropriateness of the Fixed Effects Model against the Random Effects Model.
- To study how the macroeconomic variables impact on interest rate spread.

1.4 Research Questions

The main research question of this study is, which factors have influenced the interest rate spread in Namibia's commercial banking industry?

The specific research questions to be addressed by this study are outlined below:

- What factors influence the interest rate spread at the bank level?
- Is the Fixed Effects Model preferred over the Random Effects Model in determining interest rate spread?
- Which macroeconomic variables are important determinants of interest rate spread?

1.5 Hypothesis of the study

This study aims to test the following hypotheses:

H_0: interest rate spread is a function of bank-specific and macroeconomic variables.

H_1: interest rate spread is not a function of bank-specific and macroeconomic variables.

1.6 Significance of the study

There is wide evidence, which indicates that commercial banks as financial intermediaries play an important role in economic growth and development. This study informs the BON about policies that may be appropriate in reducing the interest rate

spread in the commercial banking industry. It further provides evidence on how macroeconomic policies may impact on the interest rate spread. In addition, this study is beneficial to the Ministry of Finance and the BON in the sense that the study analyzes the effects of both the monetary and fiscal policies on interest rate spread.

1.7 Limitations of the Study

The sample period for the bank-level analysis runs from 2004 to 2011 instead of 1991 to 2011 due to the lack of reliable bank-specific data. The study would have been more beneficial if the sample period included the early 1990s when interest rates were very high.

1.8 Outline of the Study

The rest of this paper is organized as follows: Chapter Two provides a discussion on macroeconomic developments and the performance of commercial banks during 1991 to 2011 and 2004 to 2011, respectively. In Chapter Three, both the theoretical and empirical literature is surveyed. The research methodology of the study is covered in Chapter Four, whilst Chapter Five presents and discusses the results and findings of the study. Chapter Six contains the conclusion and policy recommendations of the study.

CHAPTER TWO

MACROECONOMIC DEVELOPMENTS AND BANKING INDUSTRY PERFORMANCE

2.1 Introduction

This chapter discusses the macroeconomic developments and the performance of the Namibian commercial banking industry during the period 1991 to 2011 and 2004 to 2011, respectively, in order to provide a contextual framework necessary to understand the dynamics of interest rate spread. Trend analysis of both the macroeconomic and bank-level variables is carried out.

2.2 Macro-economic developments

Since its independence in 1990, Namibia has enjoyed a favourable macroeconomic environment. The economy has grown by an average of 4.0 percent between 1991 and 2009 (BON, 2011). Much of this growth has been primarily driven by the agriculture, mining, and fishing industries. The inflation rate averaged at 9.0 percent during the same period (BON, 2011).

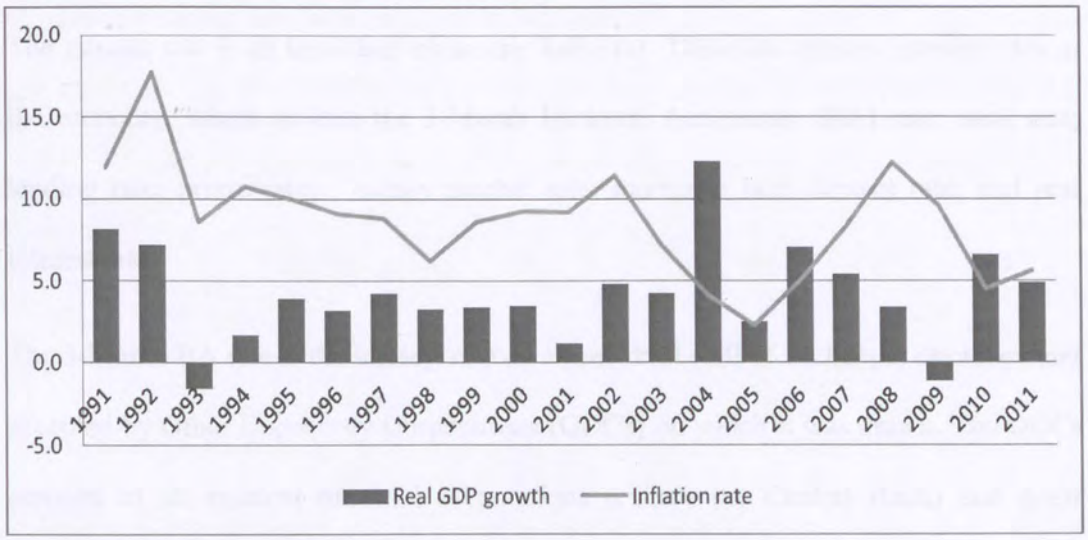
The global economic recession of 2008 and 2009 negatively impacted on the domestic economy, which was mainly in the mining and tourism sectors. The fall in the demand

for commodity exports compounded with the fall in international commodity prices adversely impacted domestic economic activities. Consequently, job losses in the diamond industry were over 1900, whilst the overall economy contracted by -1.1 percent in 2009 (BON, 2010).

2.2.1 GDP growth rate and inflation rate

The economic growth in Namibia has been generally stable with favourable macroeconomic policies. Figure 2.1 depicts real GDP growth rate and inflation rate from 1991 to 2011. The economic growth rate averaged at 4.2 percent over the 21 year period. The year 2004 was characterised by the highest economic growth rate as real GDP grew by 12.3 percent. The lowest economic growth rate at -1.6 percent was recorded in 1993. Most economic industries recovered from the global economic recession and as a result the overall economy recovered to record a real GDP growth rate of 6.6 percent in 2010. This economic recovery was primarily driven by the agriculture, mining, and fishing industries.

Figure 2.1: Real GDP growth rate and Inflation rate



Source: BON (2011)

As is evident in Figure 2.1 the inflation rate has generally trended downwards since 1992. The inflation rate averaged at 8.6 percent over the past two decades. The highest inflation rate was recorded in 1992 at 17.9 percent whilst the lowest inflation rate was in 2005 at 2.3 percent. Despite the favourable economic growth, many challenges such as the high unemployment rate; high incidence of poverty; high income inequality and other socio-economic challenges still remain unresolved. Unemployment is estimated at 33.8 percent with the most affected groups being rural people; women and the youth. Also 19.5 percent of the population is poor and income distribution is highly skewed with a Gini Coefficient of 0.5971 (National Statistics Agency, 2012).

2.2.2 Interest rate and inflation rate

The interest rate is an important economic indicator. There are various interest rates in the economy, which include the 3-Month Bankers' Acceptance (BA) rate; bank rate; lending rate; prime rate; , money market rate; mortgage rate; deposit rate; and real interest rate.

The 3-Month BA rate is the interest rate on a time draft (bill of exchange) drawn on and accepted by Other Depository Corporations (ODCs) on which it was drawn. The ODCs consists of all resident financial corporations (except the Central Bank) and quasi corporations that are mainly engaged in financial intermediation and that issue liabilities included in the national definition of broad money. There are currently seven financial intermediaries in Namibia, namely, the First National Bank of Namibia, Standard Bank of Namibia, Nedbank Namibia, Bank Windhoek, Agribank of Namibia, National Housing Enterprise and the Namibia Post Office Savings Bank.

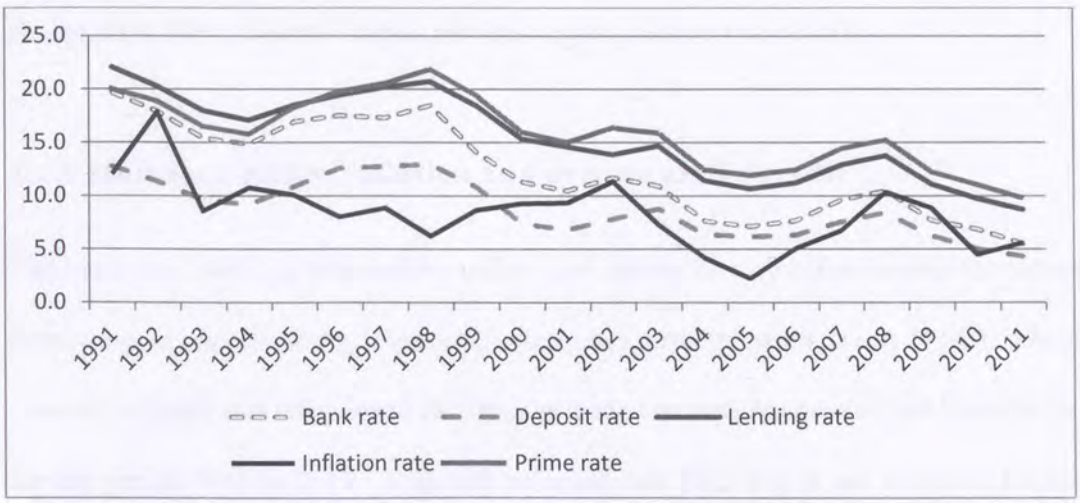
The bank rate is the rate charged by the Bank of Namibia for advances on specific collateral to ODCs (i.e. commercial banks). It is the cost of credit to the banking sector and therefore eventually affects the cost of credit to the general public. The money market rate refers to the inter-bank interest rate; the rate at which banks extend credit to each other. The deposit rate refers to the weighted average deposit rate of the ODC's. The lending rate refers to the weighted average lending rate by commercial banks to borrowers. The prime rate is the rate of interest charged by ODC's for loans made to its

most credit-worthy business and industrial customers. The interest rate spread is the difference between the bank rate and the lending rate. The mortgage rate is the interest rate charged on a loan for the purpose of financing construction or purchasing of real estate. The real interest rate is the rate of interest adjusted to allow for inflation; or the nominal interest rate less the rate of inflation.

In this section, the interest rates of concern are the bank rate; lending rate; prime and deposit rates, which are presented in Figure 2.2. The bank rate is used by the BON as a monetary policy tool. It is used to curb inflation or stimulate domestic credit, which eventually stimulates the economy. The high bank rates of the early 1990s, manifested in high lending rates and prime rates. In 1991, both the bank rate and lending rate peaked at 19.7 percent and 22.1 percent whilst the prime rate was at its uppermost at 21.8 percent in 1998. The high interest rates could have been due to the relatively high inflation rates of the early 1990s. The inflation rate was as high as 12.0 percent and 17.9 percent in 1991 and 1992, respectively.

However, the year 2011 was characterised by the lowest interest rates over the past two decades. The bank rate plummeted to its lowest at 5.5 percent and both the lending and prime rates dropped to 8.7 percent and 9.8 percent, respectively.

Figure 2.2: Interest rates and inflation rate: 1991 – 2011



Source: BON (2011).

The lowest bank rate at 5.5 percent recorded in 2011, reflects the expansionary monetary policy that the BON has pursued since 2008 in light of the global economic recession that slowed domestic demand. The expansionary monetary policy has contributed to the economic recovery. Similar to the trends in interest rates, the interest rate spreads were highest in the early 1990s and lowest in recent years. The interest rate spread was as high as 9.3 percent, 8.9 percent and 8.3 percent in 1991, 1992, and 1993, respectively. However, the interest rate spread has declined since 2008 and recorded its lowest value at 4.4 percent in 2011. The deposit rate rose from 12.7 percent in 1997 to its peak of 12.9 percent in 1998 before it dropped to its lowest value of 4.3 percent in 2011. Over the past 21 years, the real interest rate has been negative during the past two

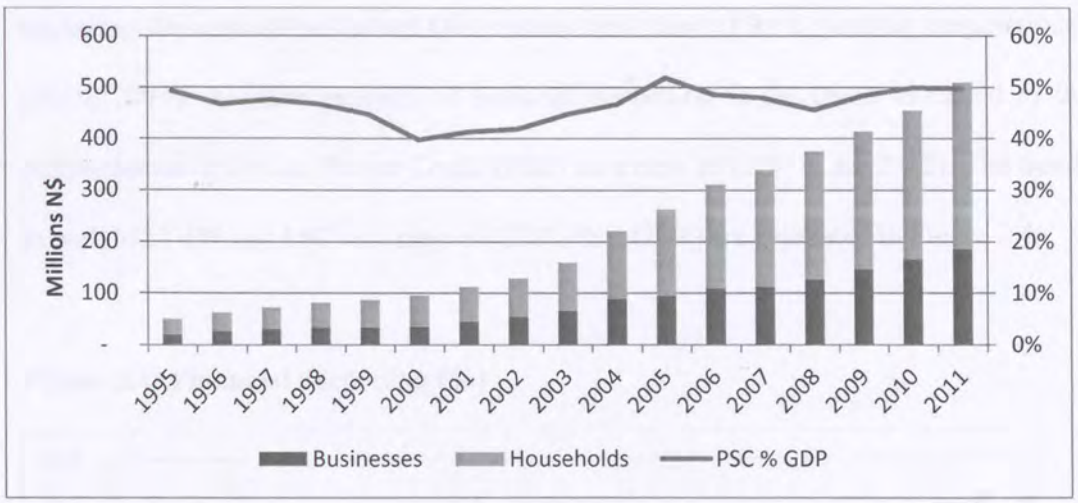
decades, its lowest having been noted at -6.5 percent in 1992. However, with the exception of 2011, the real interest rate has stayed positive since 2003.

2.2.3 Monetary policy, inflation and private sector credit

The bank rate, which is a monetary policy tool helped to curb inflation and encourage borrowing in the economy. Figure 2.3 describes private sector credit (PSC), which consists of loans and other credit facilities extended to both businesses and households, for the period 1995 to 2011. It should be noted that PSC data is not available for the years before 1995. Credit extension to households account for 60.3 percent of total PSC while credit extension to businesses account for 39.7 percent.

PSC grew from N$50 million in 1995, N$96 million in 2000, N$263 million in 2005, to N$509 million in 2011, which reflects the general downward trend in interest rates since 1991 and the accommodative monetary policy stance being pursued by the BON. The fact that the percentage of non-performing loans is fairly low at an average of 2.7 percent in 2011 implies that the re-payment burden on the private sector is generally minimal. The growth in private sector credit is driven mainly by household demand. Credit extension to households plummeted at 58.2 percent in 1998 and peaked at 66.7 percent of the total PSC in 2005. Contrastingly, credit extension to businesses was at its lowest at 33.3 percent in 2005 and at its highest at 41.8 percent in 1998.

Figure 2.3: Credit extension to the private sector



Source: BON (2012).

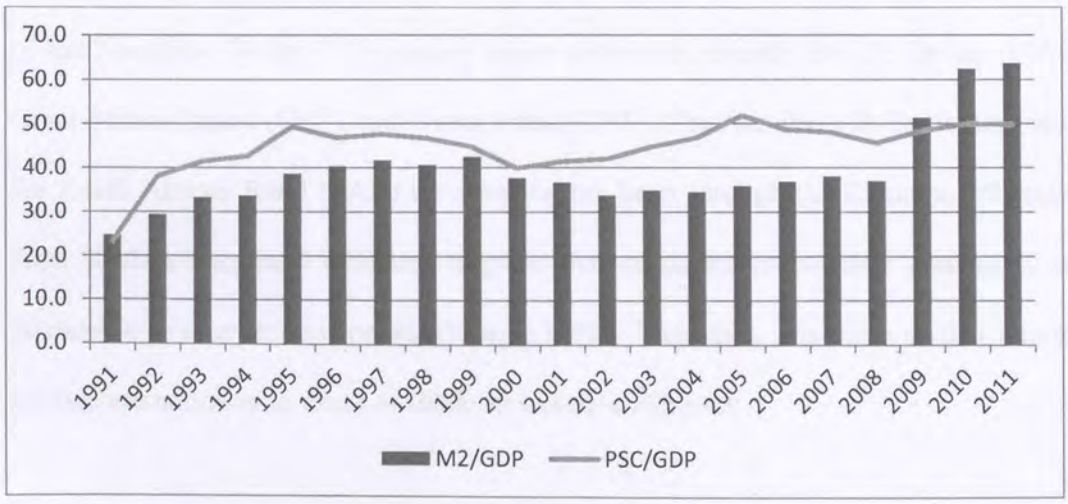
The Private Sector Credit as a percentage of GDP was highest at 51.8 percent in 2005 and lowest at 39.8 percent in 2000. In 2008, the PSC as a percentage of GDP slowed down from 47.9 percent in 2007 to 45.6 percent in 2008 probably due to the effects of the global financial crisis, but has since steadily increased up to 49.8 percent in 2011.

2.2.4 Financial deepening

Financial deepening refers to the increased supply of financial securities, such as shares; bonds and other assets in the economy (Ndebbio, 2004). Financial deepening is usually measured by the ratio of broad real money balances to real GDP (M2/GDP). "Broad Money Supply (M2) is defined to include currency outside depository corporations;

transferables and other deposits in the national currency of the resident sectors, excluding deposits of the Central Government and those of the depository corporations" (BON, 2011). Another measure of financial deepening is the credit extended to the private sector or Private Sector Credit (PSC) as a ratio of GDP (Eita, 2012). The trends in both M2/GDP and PSC as a ratio of GDP (PSC/GDP) are presented in Figure 2.4.

Figure 2.4: Financial deepening (%)



Source: World Bank (2012).

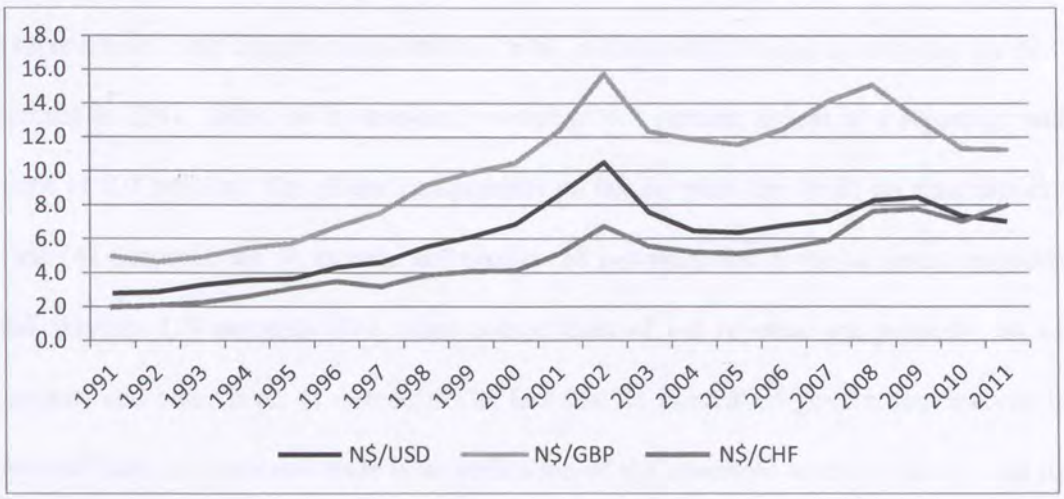
Financial deepening has a bearing on the interest rate spread. Financial deepening in Namibia, in general, has been on an upward trend since 1991. Both M2/GDP and PSC/GDP were at their lowest at 24.7 percent and 23.2 percent, respectively, in 1991, but have since rose to their peak 63.7 percent in 2011 and 51.8 percent in 2005, respectively. The slowdown in both M2/GDP (at 37.0 percent) and PSC/GDP (at 45.6

percent) in 2008 compared to 2007 may have been due to the global economic recession, which could have negatively impacted domestic demand for credit and GDP.

2.2.5 Exchange rates

Exchange rates are important indicators of macroeconomic stability. More stable economies are those with minimum exchange rate fluctuations. Macroeconomic stability is a necessary condition for growth and development. Figure 2.5 shows the performance of the Namibian Dollar (N$) against major currencies, namely the US Dollar (USD), Great Britain Pound (GBP), and Swiss Franc (CHF). The Namibian Dollar is pegged to the South African Rand (ZAR) on a one-to-one basis through the Common Monetary Area (CMA). Empirical evidence suggests that stable macroeconomic conditions are favourable to interest rate spreads (Ngugi, 2001). Therefore, it is believed that interest spreads are narrower in times of stable economic conditions.

Figure 2.5: Exchange rate of the Namibian dollar against major currencies



Source: BON (2011).

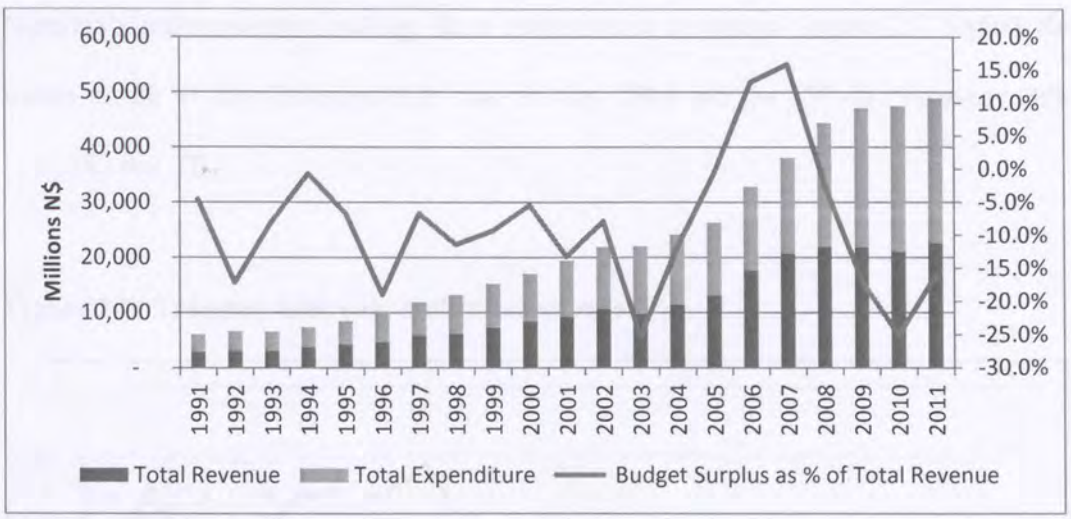
During the period 1991 to 2011, the Namibian Dollar fluctuated mostly between N$3.0 and N$7.6 against the USD with an average exchange rate of N$6.1 per USD. The N$/GBP and the N$/CHF exchange rates averaged at N$10.0 and N$ 4.8 during the same period. The early 1990s were characterised by a strong Namibian Dollar. The Namibian Dollar against both the USD and CHF was strongest in 1991 at N$2.8 per USD and N$2.0 per CHF. The Namibian Dollar to the GBP exchange rate was strongest in 1992 at N$4.6 per GBP, being at its weakest value against both the USD and GBP in 2002 at N$10.5 and N$15.8, respectively, whilst it plummeted to N$8.0 against the CHF in 2011.

2.2.6 Fiscal Developments

Tax revenue is the biggest component of total government revenue accounting for 92.7 percent in 2011, followed by non-tax revenue at 6.2 percent, grants at 1.1 percent and loans at 0.0 percent. The major components of tax revenue are taxes on international trade (41 percent); tax on income and profits (38 percent); and domestic taxes on goods and services (19 percent). The other components of tax revenue are property tax (1 percent) and other taxes (1 percent). The fact that 41 percent of government income is derived from international trade is an indication of the openness of the economy and its vulnerability to external shocks.

Namibia has pursued an expansionary fiscal policy since 1990. The trend in government revenue and expenditure from 1991 to 2011 is depicted in Figure 2.6. The year 2006 was characterised by the biggest growth in tax revenue with a growth rate of 34.0 percent whilst the smallest growth rate of -8.0 percent was recorded in 2003. The negative growth rates of 1 percent and 3 percent in 2009 and 2010 could be attributed to the global economic recession, which reduced tax revenue from international taxes. The only negative growth rates in government expenditure were noted in 1993 and 2011 at 5 percent and 1 percent, respectively. The biggest growth rate in government expenditure at 29.0 percent was recorded in 2008, which could have been due to the introduction of the Targeted Intervention Programme for Employment and Economic Growth (TIPEEG).

Figure 2.6: Government revenues and expenditures



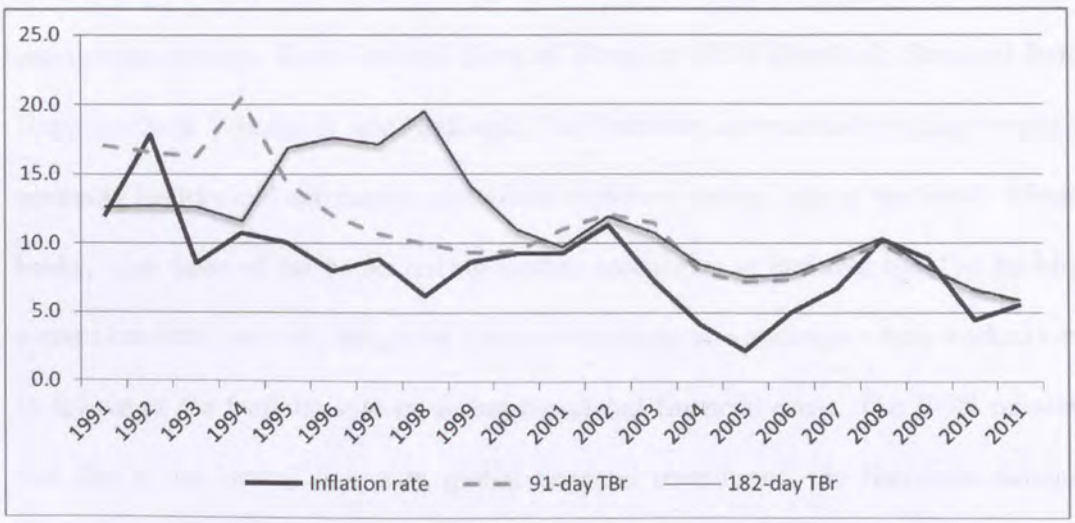
Source: BON (2011).

The biggest budget deficit was 25.4 percent in 2003 and 25.2 percent in 2010. The budget deficit of 25.2 percent could be due to the reduced revenue from international trade owing to the global economic crisis of 2008 and 2009. Revenue from taxes on international revenue declined from 20.7 percent in 2007 to 9.9 percent in 2008, 5.1 percent in 2009 and -15.7 percent in 2010 before it increased to 6.2 percent in 2011.

Treasury bills are short-term government securities issued by the Government of the Republic of Namibia in bearer form. The holder is entitled to sell it and to payment at redemption. Treasury bills are issued on a discount basis, with initial maturities of 91 days, 182 days and 365 days. Thus, the 91-day Treasury Bills rate is a rate of interest earned by the bearer on a 91-day Treasury Till. In exception of 1992, 2008 and 2009

treasury bills rates have been above the inflation rate during the past two decades of Namibia's independence, making them attractive to investors. Figure 2.7 depicts the trends in the 91-day Treasury Bills rate (91-day TBr) and the 182-day Treasury Bills rate (182-day TBr).

Figure 2.7: Treasury bills rate and inflation rate (%)



Source: BON (2011).

As is evident from Figure 2.7, the early 1990s were characterised by relatively higher treasury bills rates compared to recent years. However, there has been a general downward trend in the treasury bills rate since 1991. For instance the 91-day TBr was as high as 17.0 percent, 16.6 percent and 16.2 percent in 1991, 1992 and 1993, respectively. Since 2008, both the 91-day and 182-day treasury bills rates have been on

a downward trend reaching their lowest over the past two decades at 5.8 percent and 5.9, respectively.

2.3 Structure and performance of the commercial banking system

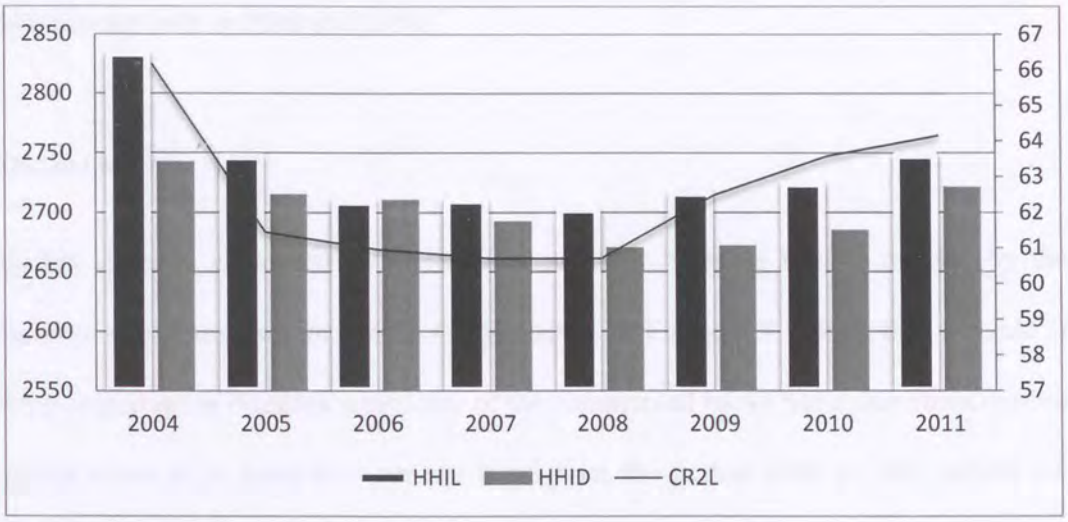
This section discusses the structure and performance of the commercial banking sector in Namibia. The commercial banking system in Namibia consists of four banking institutions, namely, First National Bank of Namibia (FNB Namibia); Standard Bank Namibia; Bank Windhoek; and NedBank. The Namibian commercial banking system is generally healthy and adequately capitalised with very strong links to the South African banks, with three of the banks having mother companies in that country. The banking system has little link with the global financial institutions, a situation which worked well in favour of the banking system during the global financial crisis. The BON reported that due to its limited link with global financial institutions, the Namibian banking sector experienced minimal effects of the global financial crisis during the first six months of 2009 (BON, 2009b).

2.3.1 Structure of the banking system

The structure of the banking system is an important aspect that can have serious implications in terms of market power and competition (BON, 2011). In the theory of industrial organisation, the Structure-Conduct-Performance (SCP) theory points out that the structure of the market determines the conduct and the performance of firms in that market (Martin, 1994). The market structure, therefore, in terms of number and size distribution of firms in an industry are important factors in determining the conduct and performance of firms.

Though the banking sector is financially healthy and stable, it is characterised by four commercial banks and is considered to be highly concentrated and less competitive (BON, 2011). The perceived high service fees charged by commercial banks may be due to limited competition (Sunde, 2010). The BON in its Financial Stability Report of September 2011 indicated that both the Gini Concentration Index (GCI) and the Herfendahl-Hirschman Index (HHI) for the banking sector deteriorated since December 2010. Figure 2.8 refers to market concentration defined in terms of the Herfendahl-Hirschman Index for loans (HHIL), Herfendahl-Hirschman Index for deposits (HHID) and Loans Concentration Ratio for the two biggest banks (CR2L).

Figure 2.8: HHIL, HHID and CR2L



Source: BON (2011).

As is evident in Figure 2.8, both the HHID and HHIL were at their peaks in 2004 at 2743 and 2834 points, before they both decreased to 2670 and 2702, respectively, in 2008. The high indices in 2004 are indicative of a relatively high concentration compared to 2008. Nevertheless, both HHID and HHIL rose to 2672 and 2716 in 2009, and further to 2685 and 2724 points, respectively in 2010. In 2011 the HHID slightly declined to 2722 whilst the HHIL further increased to 2748 points.

The CR2L of 66.0 percent noted in 2004 implies that the two biggest commercial banks in the credit (or loans) market controls more than half of the market, which is a relatively high concentration. However, the CR2L declined from 66.0 percent in 2004 to

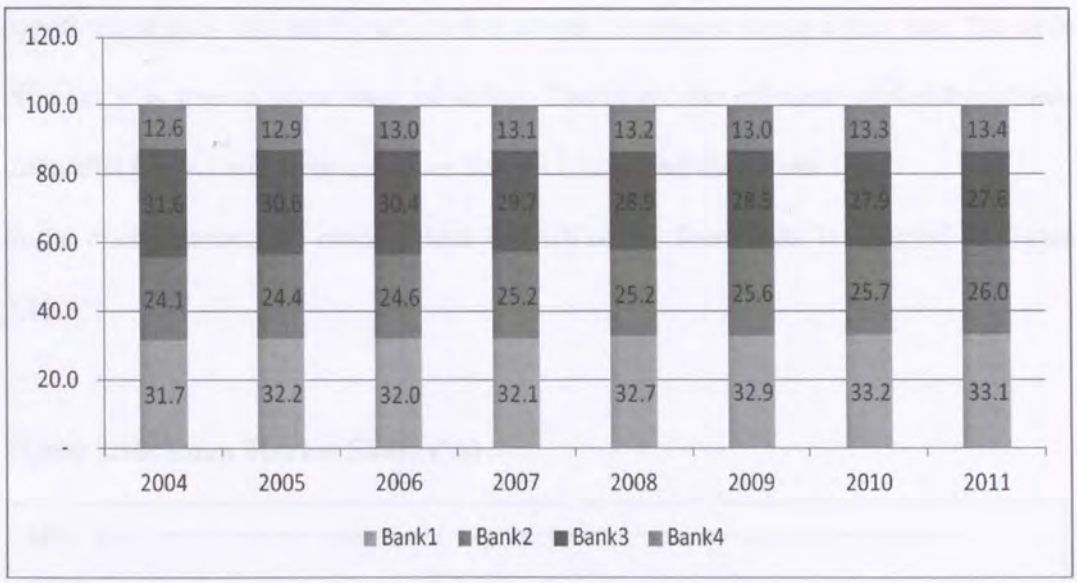
61.0 percent in 2008 before slightly increasing to 62.0 percent in 2009 and further to 64.0 percent both in 2010 and 2011.

Market Share

Market share is calculated as the total deposits or loans of bank i divided by the industry's total deposits or loans. As illustrated in Figure 2.9 below, this variable is fairly important in Namibia where two of the commercial banks had a combined deposit market share of at least 60.0 percent throughout the period 2004 to 2011 whilst the smallest commercial bank had a deposit market share ranging between 12.6 percent and 13.4 percent during the same period. The notations Bank 1, Bank 2, Bank 3 and Bank 4 denote each of the commercial banks surveyed in this study. The true identity of the four commercial banks is concealed due to the sensitive nature of the data.

As of December 2011, the biggest bank had a deposit market share of 33.1 percent compared to the smallest bank, which had only 13.4 percent market share. It should be noted that the definition used for deposits in this study excludes all non-bank deposits.

Figure 2.9: Deposit Market Share (%)



Source: BON (2011).

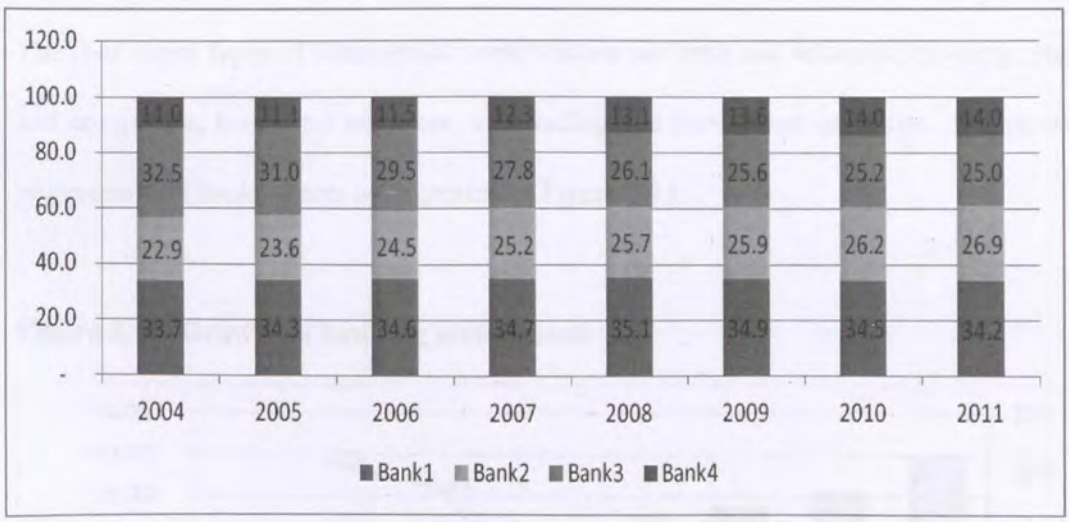
According to Figure 2.9, the market share of Bank 1 slightly increased from 31.7 percent during 2004 to 33.1 percent in 2011. The deposit market share increased by almost 2 percentage points for Bank 2 from 24.1 percent in 2004 to 26.0 percent in 2011. In 2004 the deposit market share of Bank 4 was 12.6 percent compared to 13.4 percent in 2011. However, Bank 3 lost its market share in the deposit market by 4.0 percentage points during the same period.

The SCP theory of industrial organisation suggests that a firm that has a larger market share (or market power) is likely to charge a higher price than a firm with a smaller market share. Therefore, the SCP theory implies that the interest rate spreads of Bank 1 would be wider than the interest rate spreads of Bank 4 due to its larger market share,

which could enable it to exercise market control. On the contrary, the efficient market hypothesis argues that the bigger market power (or market share) a firm has, the more efficient it is due to economies of scales. Therefore, the efficient market hypothesis infers that Bank 1 will have narrower interest rate spread than Bank 4.

In the credit market, the market share of each of the four banks is depicted in Figure 2.10.

Figure 2.10: Loan Market Share (%)



Source: BON (2011).

Figure 2.10 indicates that, in the credit market, Bank 1, as in the deposit market, holds the biggest share of the market throughout the period under consideration; however, unlike in the deposit market its market share has only increased by 0.5 percent during

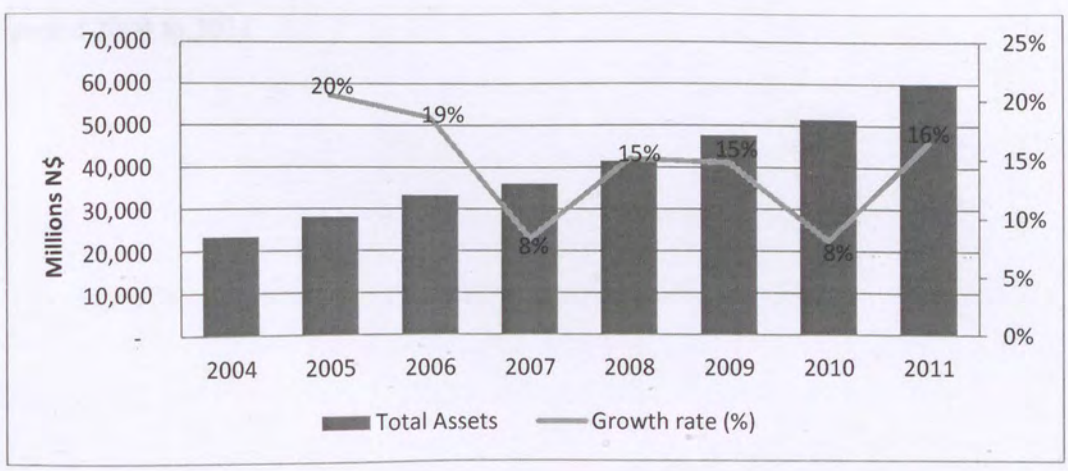
the period. Bank 2 is the biggest gainer with an increase in market share of 4.0 percentage points between 2004 and 2011, followed by Bank 4 at 3.0 percentage points in the same period. However, Bank 3 lost part of its market share by 7.5 percentage points during the same period.

2.3.2 Performance of the banking system

Total assets

The four major types of commercial bank's assets are cash and balances; property, plant and equipment; loans and advances; and trading and investment securities. The growth in commercial banks assets is illustrated in Figure 2.11.

Figure 2.11: Growth in banking sector assets



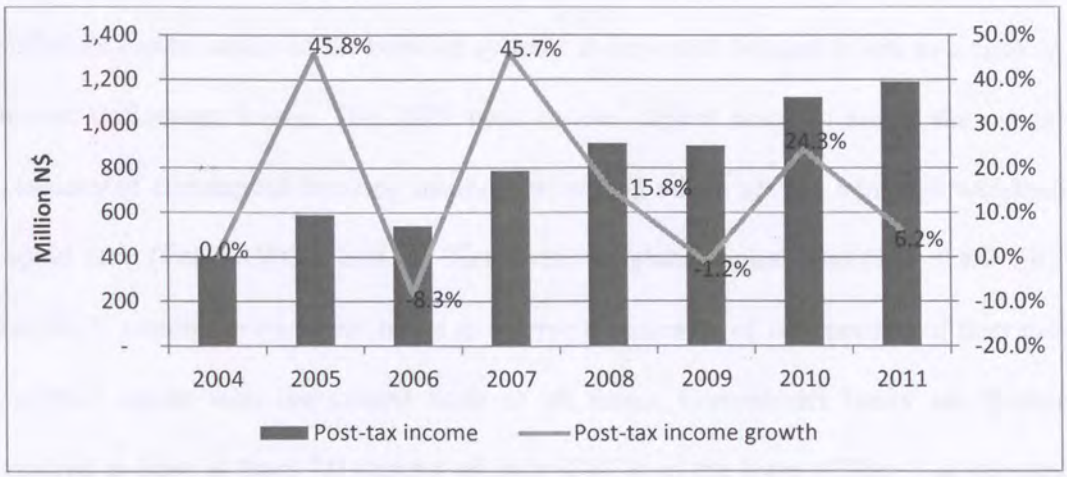
Source: BON (2011).

As indicated in Figure 2.11, total loans and advances constitute 73 percent of these assets. Total assets grew from N$23,399 million in 2004 to N$59,971 million in December 2011 representing a 65.7 percent growth. The growth rate in total assets shows a fluctuating trend. Total assets grew by 20.4 percent between 2004 and 2005, 18.5 percent between 2005 and 2006 and 8.2 percent between 2006 and 2007. Total assets expanded by 15.0 percent, 14.7 percent and 8.0 percent in 2007 to 2008, 2008 to 2009 and 2009 to 2010, respectively. Between 2010 and 2011 total assets increased by 16.4 percent.

Profitability of the commercial banking sector

The global financial crisis of 2008 and 2009 underscored the importance of a stable and financially sound banking system. Indeed, profitability is a key indicator for banking stability. Figure 2.12 outlines the growth in commercial banks' post-tax income for the period 2004 to 2011.

Figure 2.12: Commercial bank-industry income



Source: BON (2011).

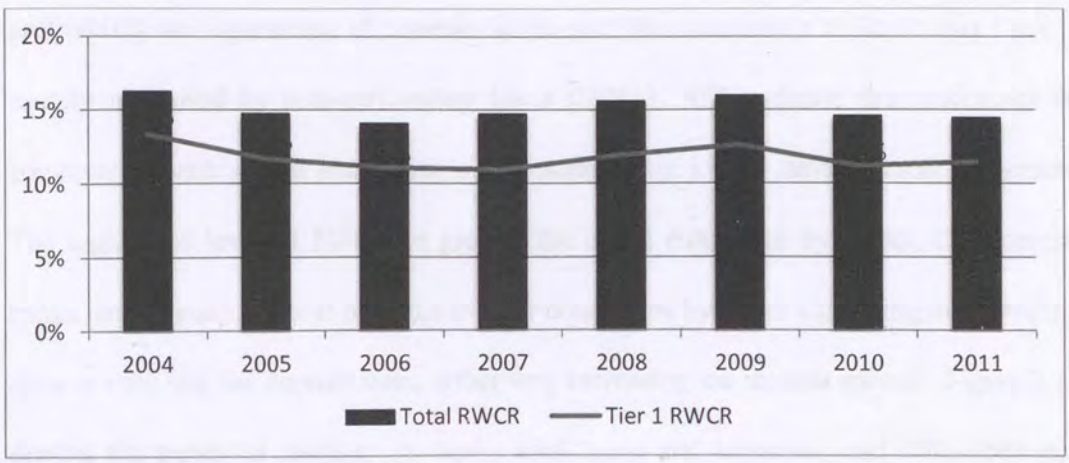
Figure 2.12 suggests that the post-tax income grew by approximately 34 percent between 2004 and 2011. In absolute terms, post-tax income rose from N$400 million in 2004 to N$1.2 billion in 2011. However, there were big fluctuations in after-tax income on a yearly basis. The biggest increases in after-tax income where recorded in 2005 (45.8 percent) and 2007 (45.7 percent). On the negative side, post-tax income plummeted by -8.3 percent in 2006. Another negative growth rate of 1.2 percent was noted in 2009 which could be attributed to the global economic crisis. Post-tax income recovered and rose by 24.3 percent in 2010 before declining to 6.2 percent in 2011.

Capital adequacy

Sufficient capitalisation of the banking systems is important because it acts as a cushion against unforeseen losses. The BON uses various capital ratios to assess the capital adequacy of commercial banking institutions, among which are the total risk weighted capital ratio (Total RWCR) and the Tier 1 risk weighted capital ratio (Tier 1 RWCR). The BON requires commercial banks to reserve a minimum of 10.0 percent of their risk weighted assets with the central bank at all times. Commercial banks are further required to have at least 7.0 percent of their RWCR in the form of Tier 1 or primary capital.

Figure 2.13 indicates the trends in both Total RWCR and Tier 1 RWCR during the period 2004 to 2011.

Figure 2.13: Capital adequacy ratios



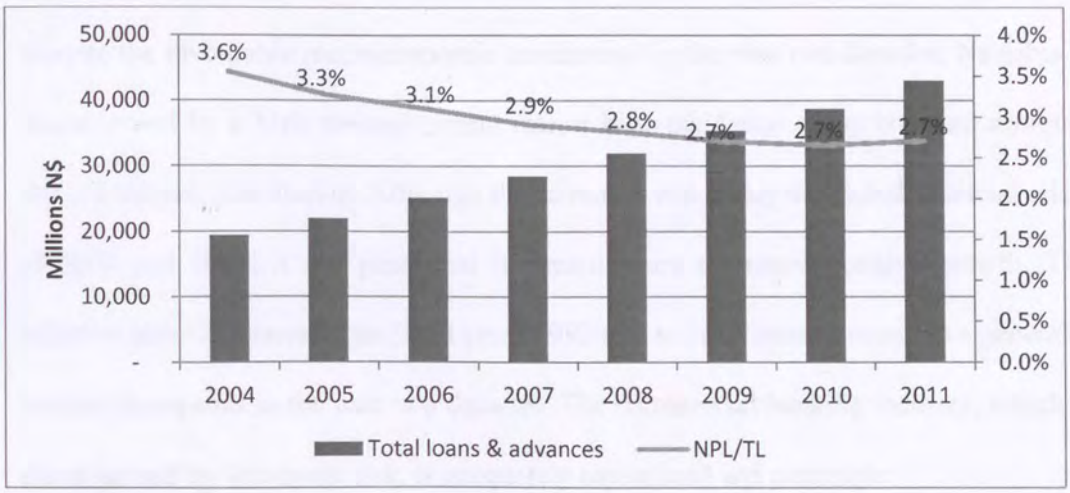
Source: BON (2011).

As is evident in Figure 2.13, the commercial banking system was sufficiently capitalised during the period under review. The Tier 1 RWCR has been consistently above 10.0 percent, well above the minimum requirement of 7.0 percent since June 2006, whilst the Total RWCR has been at least 14.0 percent throughout the period 2004 to 2011, clearly beating the minimum requirement of 10.0 percent. However, there has been a general decline in both the Tier 1 RWCR and Total RWCR since 2004. The Tier 1 RWCR declined from 13.3 percent in 2004 to 11.4 percent in 2011, whilst Total RWCR decreased from 16.2 percent to 14.4 percent during the same period.

Credit risk

Commercial banks face default risk. During bad economic conditions such as recessions or depressions, consumers' incomes shrink and their ability to pay back borrowed funds diminishes. Thus, the ability of consumers to pay back their loans may impact on the profitability and operations of commercial banks. The consumer's ability to pay back is usually measured by non-performing loans (NPLs). NPL indicate the percentage of commercial bank's total loans that is non-performing, i.e. 90 days or more in arrears. The higher the level of NPL, the greater the credit risk faced by banks. Commercial banks tend to push the cost of NPLs to their consumers by either increasing their lending rates or reducing the deposit rates, either way increasing the interest spread. Figure 2.14 depicts the trends in commercial banks total loans and advances, and NPLs between 2004 and 2011.

Figure 2.14: Total loans & advances and NPLs



Source: BON (2011).

As shown in Figure 2.14, total loans and advances in the commercial banking industry have been steadily increasing from N$19,363 million in 2004 to N$43,077 million in 2011 whilst the NPLs have declined from 3.6 percent to 2.7 percent during the same period, thus posing little credit risk to commercial banks. This trend suggests that the global economic crises did not have an impact on the ability of consumers to pay back borrowed funds.

2.4 Conclusion

Despite the favourable macroeconomic conditions for the past two decades, Namibia is characterised by a high unemployment rate, a high incidence of poverty and a highly skewed income distribution. Although the economy was hit by the global financial crisis of 2008 and 2009, it has recovered in recent years to record positive growth. The inflation rate has generally declined since 1992 and as such interest rates have generally trended downward in the past two decades. The commercial banking industry, which is characterised by low credit risk, is adequately capitalized and profitable.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

This chapter provides the theoretical and empirical literature review on the determinants of commercial banks' interest rate spread in Namibia. There is a wide-range of literature on the determinants of interest rate spread. There are two measures of interest rate spread in the literature, namely ex-ante interest spread and ex-post interest spread.

The ex-ante spread also known as interest rate spread is determined prior to performing any financial intermediation activity, and is normally calculated as the difference between the lending interest rate and the deposit interest rate. The ex-post spread also known as the net interest margin is a measurement of the net yield of bank financial intermediation. It measures net interest income as a percentage of earning assets. These two measures of interest rate spread are applied and used interchangeably in this study.

3.2 Theoretical Literature Review

According to Da Silva et al., (2007) there are two theoretical approaches to interest rate spread, namely, the monopoly model by Klein (1971) and the dealership model of Ho and Saunders (1981). Both models suggest that interest rate spreads are influenced by a range of bank-specific, bank-industry and macroeconomic variables, such as operating

costs, credit risk, market structure, the size of the deposit and credit operations of a bank, the interest rate, inflation rate and exchange rate.

3.2.1 The Monopoly Model

The monopoly model also known as the Klein-Monti Model considers a monopolistic bank as a firm whose main business is to produce deposit (D) and loan (L) services. The difference between deposits and loans can be borrowed on the interbank market. The interest rate on the loan market and deposit market is denoted by (r_L) and (r_D), respectively. The bank's inverse demand function for loans is given by $r_L(L)$, with derivative $r'_L(L) < 0$ and the inverse supply function of deposits is $r_D(D)$, with derivative $r'_D(D) > 0$. The bank's cost of managing loan and deposit services is represented by a convex cost function, $\mathrm{C}(L, D)$.

The interest rate on the interbank market is denoted by (r) and α stands for the proportion of the bank's deposits that is required by the central bank and takes values between zero and one $(0 \leq \alpha < 1)$. The required reserves are non-interest bearing and therefore represent a cost to the bank. It is believed that the bank has monopolistic power in at least one of the markets which affects its business operations. Consequently, this monopolistic power manifests itself in interest spreads. In this case, the bank is able to charge a price higher than its marginal cost.

Therefore, the bank's profit maximization problem is given by:

$$\underset{(L,D)}{max} \quad \pi(L,D) = [r_L(L) - r]L + [r(1-\alpha) - r_D(D)]D - C(L,D)$$

The first order conditions are:

$$\frac{\partial \pi(L,D)}{\partial L} = r'_L(L)L + r_L(L) - r - C'(L,D) = 0$$

$$\frac{\partial \pi(L,D)}{\partial D} = r(1-\alpha) - r'_D(D) - r_D(D) - C'(L,D) = 0$$

The model assumes that the marginal cost of loans and deposits is positive, that is,

$$\frac{\partial C}{\partial D} > 0; \quad \frac{\partial C}{\partial L} > 0; \; \frac{\partial^2 C}{\partial D^2} > 0; \; \frac{\partial^2 C}{\partial L^2} > 0$$

The optimal interest margin on loans and deposits is given by:

$$\frac{1}{\varepsilon_L(r^*_L)} = \frac{r^*_L - (r + C'_L)}{r^*_L} \tag{1}$$

$$\frac{1}{\varepsilon_D(r^*_D)} = \frac{r(1-\alpha) - C'_D - r^*_D}{r^*_D} \tag{2}$$

where: ε_L is the interest elasticity of loan demand; ε_D denotes interest rate elasticity of deposit supply; C'_L represents the marginal cost of loan services; and C'_D is the marginal cost of deposit services.

The equations (1) and (2) state that the banking firm, operating in monopoly competition conditions, sets the prices of its loan and deposit services in such a way that the Lerner indices are equal to the inverse of the interest elasticity of the loan demand and deposit supply functions. Therefore, the less sensitive the loan demand and deposit supply functions are to interest rate variations, the greater will be the bank's margin in both the loan and deposit-taking operations and, thus, the greater the interest margins.

The theory of the firm suggests that the size of a firm has implications on its behaviour. Larger firms are believed to exercise market power, thereby influencing their behaviour. For example, a monopoly firm is a price setter and sets its price above its marginal costs which in turn, makes it to earn abnormal profits. Monopolies are believed to be inefficient. Similarly, larger commercial banks are believed to exercise market control over smaller banks and influence the market price which in this case, is interest rate spread. Whereas the monopoly model argues that bigger banks tend to have wider interest rate spreads than smaller ones, the efficient market hypothesis, argue to the contrary. Under the efficient market hypothesis, it is argued that bigger banks tend to have narrower spreads due to economies of scale. Thus, variables such as bank size and market power influence a firm's price decision.

In an oligopolistic market structure, the monopoly model argues that equations (1) and (2), then, become:

$$\frac{s}{\varepsilon_L(r^*_L)} = \frac{r^*_L - (r + C'_L)}{r^*_L} \quad (3)$$

$$\frac{s}{\varepsilon_D(r^*_D)} = \frac{r(1-\alpha) - C'_D - r^*_D}{r^*_D} \quad (4)$$

where, s represents the market share of the n^{th} bank.

Equations (3) and (4) suggest that the bank's interest margins on loan operations and deposit taking is an increasing function of its market share. Therefore a reduction in the number of banks in the market will increase bank concentration, resulting in an increase in interest margins. Thus, one of the outcomes of the monopoly model is that the interest spread is an increasing function of banking sector concentration.

Similarly, the Structure-Conduct-Performance (SCP) theory of industrial organization maintains that the market structure of an industry has a bearing on the conduct and performance of the firms in that industry. It posits that market concentration encourages firms to adopt less competitive behaviour (such as collusion) which leads to inefficient

markets. The SCP theory argues that firms adopt anti-competitive strategies such as collusion and such behaviour impacts on their performance (Tushaj, 2010). Therefore, the SCP theory implies that market concentration has is positively related to interest rate spread.

3.2.2 The Dealership Model

The dealership model views a bank as an intermediary between the borrower (firms) and the final lender (households). In this model, the bank faces two types of uncertainty. The first uncertainty is due to lack of harmonisation between the loans and deposits which leads to an interest rate risk for the bank. For example, assuming that a bank faces unexpectedly higher demand for loans than the deposits and free reserves it has, in such a case, the bank has no option, but to finance the surplus credit demand through the inter-bank market which exposes the bank to a refinancing risk in the event that the interest rate (inter-bank interest rate) rises. If the bank faces an oversupply of deposits over loans, then it will apply those deposits on the inter-bank market, which exposes the bank to a reinvestment risk if the interest rate falls.

The volatility in interest rates charged on loans in the inter-bank market is a direct reflection of a country's macroeconomic stability. Thus, the less stable a country's economy is or the greater the variation in inflation rate and exchange rate is and other

macroeconomic factors, the greater will be the resulting volatility of the basic interest rate, and consequently the greater the interest rate spread.

The second uncertainty that the bank faces concerns the default risk by its customers. The dealership model postulates that a bank lacks knowledge, ex-ante, about the likelihood of default by its customers in the credit market and that this uncertainty exposes the bank to a credit risk. The more exposure to default risk the bank has, the more likely the bank will widen its interest rate spread in order to shield itself against the risk. This suggests that the interest rate spread is directly related to non-performing loans, thus the higher the NPLs the wider the interest rate spread.

The fact that commercial banks operate within a macroeconomic environment, factors such as inflation rate, bank rate and income level impact on the repayment of loans, operating costs, demand for loans and so forth. The repayment of loans, demand for loans, operating costs and other bank-specific factors, in turn, affects the profitability of banks (Ngugi, 2001). In order to increase profitability or guard against the erosion of their assets, it is natural for banks to adjust their interest rates (deposit or lending rates, or both). Thus interest rate spreads are widened by unfavourable macroeconomic conditions such as low economic growth, high inflation rate, high tax rate and high exchange rate volatility.

3.3 Empirical Literature Review

Some empirical studies such as those by Ngugi (2001), Chirwa and Mlachila (2002) and Perez (2011) classified the determinants of interest rate spread into three categories, namely (i) bank-specific, (ii) bank-industry or market, and (iii) macroeconomic determinants.

3.3.1 Bank specific characteristics

Bank specific characteristics are those features pertaining to an individual bank which influence the bank's lending and deposit rates. In Kenya, Ngugi (2001) investigated the factors that influence interest rate spread from 1991 to 1999 and found bank specific characteristics such as excess liquidity, transaction costs and non-performing loans to be significant. Poor or low economic growth is associated with low incomes which is likely to decrease the ability of consumers to pay back loans thus increasing non-performing loans. In turn, increasing non-performing loans puts pressure on lenders or banking institutions to increase their lending rates to shield themselves from potential losses, thus widening the interest rate spread. Perez (2011) found that market share and NPLs are the major determinants of interest rate spread in Belize. Perez (2011) also found that excess liquidity tended to widen the interest rate spread in Belize. Chirwa and Mlachila (2002) found that high monopoly power (or market power) contributed to high interest rate spreads in Malawi.

Commercial banks pay interest both on used and unused deposits, thus excess liquidity or unused deposits represent an opportunity cost to them. Therefore, holding of excess funds drives interest rate spreads upwards in order for the banks to cover the cost of excess liquidity. Demirgüc-Kunt and Huizinga (1999) found that in developing countries, foreign owned banks tend to have wider interest rate spreads compared to domestically owned banks. In their study of interest rate spread, Claeys and Vennet (2004) found that capital adequacy and risk behaviour are important determinants of interest rate spread in Western and Eastern Europe. Gelos (2006) investigated the influence of bank-specific variables such as bank size, bank equity, overhead costs and foreign ownership on interest rate spreads in 14 Latin American countries. The study found that factors such as bank size (banks with a smaller market share) and large overhead costs contributed to higher interest rate spreads. Foreign ownership of a bank and the level of bank equity were found to be insignificant. In Pakistan, the share of interest-insensitive deposits in total bank deposits is a major determinant of interest rate spread (Khawaja and Din, 2007).

Hossain (2010) found that overhead costs and NPLs are positively correlated with high interest rate spreads in Bangladesh. Larger banks in Armenia were found to have lower interest rate spreads while at the same time interest rate spreads increased with market share (Dabla-Norris and Floerkemeier, 2007). This implies that as banks get bigger and their market shares get translated into market power they begin to exercise market

control, which leads to wider interest rate spreads. Non-interest income as ratio of total assets of a bank narrows whilst the deposit market share widens the interest rate spread in Bangladesh (Mujeri and Younus, 2009). Grenade (2007) found that operating costs and NPLs contributed to wider interest rate spreads among the countries in the Eastern Caribbean Currency Union.

3.3.2 Bank-industry factors

Perez (2011) in Belize, and Claeys and Vennet (2004) in Europe, found that the concentration of deposits was a significant determinant of interest rate spread. Gelos (2006) in a study of 14 Latin American economies using the five-bank concentration ratio found that high market concentration widens the interest rate spread. Hossain (2010) using HHI found that market concentration was a significant determinant of interest rate spreads during the pre-liberalisation period in Bangladesh, but not during the post-liberalisation era. However, Dabla-Norris and Floerkemeier (2007) found that both the deposit and loan market concentration widened interest rate spreads in Armenia.

In a panel study of 29 commercial banks in Pakistan, Khawaja and Din (2007) claimed that concentration in oligopolistic markets is usually high, thus encouraging collusive behaviour among the banks in the market. However, the study found no evidence that industry concentration had a significant effect on the interest rate spread in Pakistan.

Ngugi (2001) points out that other market specific determinants include ownership structure and control of banks, policy regime (whether interest rates are controlled or not), the market share of individual banks, and diversity of financial assets.

3.3.3 Macroeconomic factors

Afanasieff, Lhacer and Nakane (2002), and Demirgüc-Kunt and Huizinga (1999) found macroeconomic variables such as interest rate (bank rate), inflation rate, GDP growth, and corporate tax rate to be significant determinants of the interest rate spread. An increase in the bank rate represents an increase in the intermediation costs, thus, commercial banks widen their interest rate spread to cover up for the increase in costs. An increase in corporate tax is passed on by commercial banks to consumers through wider interest rate spreads since tax threatens profitability. Ngugi (2001) elaborates that unpredictable macroeconomic conditions tend to increase the risk of investments and therefore, investors are compelled to increase lending rates. Unfavourable macroeconomic conditions such as poor economic growth, high inflation rate and high exchange rate volatility tend to widen the interest rate spread. In addition, high inflation rate represent a cost to lenders since high inflation erodes their portfolio. Thus, it is expected that high inflation rate will encourage the lending institutions to increase their lending rates in order to cushion their assets against erosion. Ngugi (2001) found that

monetary policy tightening and increasing the treasury bills rate widens the interest spread.

In their study of interest rate spreads in Pakistan, Khawaja and Din (2007) assert that the macroeconomic policy environment has a bearing on interest rate spreads. This hypothesis is supported by Chirwa and Mlachila (2002) who investigated the effect of changes in the discount rate (bank rate) on interest rate spreads in Malawi. Chirwa and Mlachila (2002) found that wide interest rate spreads were associated with high discount rates (or bank rate), high reserve requirements (implicit tax) and high inflation rates.

Interestingly, Folawewo and Tennant (2008) found that population size, level of economic development, reserve requirement, level of money supply, discount rate, inflation rate, public sector deficits and government crowding out in the banking sector, are all important determinants of interest spreads in Sub-Saharan African countries. Crowley (2007) found that higher reserve requirements were associated with higher interest rate spreads in English-speaking African countries. In Latin America, Gelos (2006) found that high interest rates and reserve requirements were major contributors to high interest rate spreads, while GDP growth was associated with narrower interest rate spreads.

3.4 Conclusion

The literature surveyed in this chapter suggests that there are numerous factors that influence the interest rate spread within and across countries. These factors include bank-specific, bank-industry and macroeconomic variables. The impact of these factors on the interest rate spread vary across countries depending on the uniqueness of each country's financial and macroeconomic conditions.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

This chapter describes the methodology used in the study to analyse the main determinants of interest rate spread in Namibia. It covers the population and sample of the study, the data used in the study, and the statistical and econometric models applied in the study.

4.2 The Data Source and Data Analysis

The majority of the data used in this study were obtained from the Bank of Namibia while other data were taken from the World Bank. There are two separate models estimated, namely, the bank specific and macroeconomic models. The bank specific model employed a population and sample of four commercial banks. It applied panel data and covered a sample period from the first quarter of 2004 to the last quarter of 2011. The sample period from the first quarter of 1991 to the third quarter of 2011 was used for the macroeconomic model, which also employed time series data.

The study used the E-views software to analyse the data. The LLC unit root test and the ADF statistic were applied to test for stationarity or non-stationarity of the bank-specific and macroeconomic variables in order to establish their order of integration.

4.3 Empirical Model

The empirical model applied in this study focuses on the estimation of interest rate spread function. The model is based on two categories of determinants of interest rate spread, namely, bank specific and macroeconomic variables.

4.4.1 Empirical Model for bank-specific variables

The bank-specific model consists of the fixed effects model. The fixed effects (FE) model assumes that β_{0i} is an unobservable random variable that is potentially correlated with the observable regressors. If fixed effects are present and correlated with the observable regressors, then many estimators including pooled OLS are inconsistent. In this case, alternative estimation methods should be used to ensure consistent estimation of the slope parameters.

The fixed effects model for net interest margin is outlined below:

$$NIM_{it} = \beta_{0i} + \beta_1 LIQ_{it} + \beta_2 NPL_{it} + \beta_3 CR_{it} + \beta_2 TAX_{it} + \beta_4 DMS_{it} + \beta_5 CER_{it} + v_{it} \quad \ldots\ldots(5)$$

where: $\boldsymbol{t}$ is the time dimension of the panel, $\boldsymbol{i}$ captures the cross sectional dimension of the data, i.e. bank, β_0 and β_i represents the constant term and coefficients, respectively; $\boldsymbol{v}$ is the error term in the fixed effects model.

The dependent variable in equation (5) is net interest margin (NIM) and it measures net interest income as a percentage of earning assets and indicate the rate of return on assets that should be earning income. It is influenced by various factors, which are described below.

The variable liquidity abbreviated by LIQ is a proxy for excess liquidity and its coefficient β_1 is expected to have a positive sign since excess liquidity acts as an implicit tax. It is, therefore, believed that commercial banks with high levels of excess liquidity have the incentive to widen their interest margins. It is measured as a ratio of liquid assets to total assets.

Non-performing loans is denoted by NPL and is measured as a percentage of total loans that are not performing, i.e. 90 days or more in arrears. Poor economic conditions such as recessions, high inflation rates and high interest rates erode consumer income and the ability of consumers to pay back loans diminishes, thus, increasing non-performing loans. Therefore, the coefficient for this variable, β_2, is expected to have a positive sign

since increased non-performing loans puts pressure on commercial banks to widen their interest margins due to potential loss of revenue.

The Tier 1 risk weighted capital ratio (Tier 1 RWCR) represented by CR measures core capital in relation to risk weighted assets. It is a measure of the amount of a bank's core capital expressed as a percentage of its risk-weighted assets. Its parameter β_3 is expected to have a positive sign because higher capital levels act as an implicit tax and encourages a commercial bank to widen its interest margin in order to compensate for unutilised capital.

The variable TAX measures tax paid by a commercial bank as a percentage of its total income. The higher the amount of tax paid the less the net income, thus, a high tax rate encourages commercial banks to widen their interest margin. Therefore, the coefficient of TAX is expected to be positive.

The deposit market share denoted by DMS measures the percentage of a commercial bank's deposits in total industry deposits. The sign of its coefficient is ambiguous. In the presence of economies of scale, β_5 is expected to be negative in support of the efficient market hypothesis, which maintains that increased market share helps a commercial bank to be efficient and therefore able to maintain a narrow interest margin. On the contrary, β_5 may be positive refuting the efficient market hypothesis and supporting the

monopoly model which argues that the bank has monopolistic power in the deposit (or loan) market, where it behaves as a price setter. The bank, in this case, is able to charge a price higher than its marginal cost. It is believed that this monopolistic power manifests itself in higher interest margins.

The cost efficiency ratio, CER, is a proxy for operating costs and it measures non-interest operating expenses as a percentage of total income. An increase in the cost efficiency ratio indicates either that costs are increasing or income decreasing, thus, the lower the ratio the better. A ratio of 100% means that operating expenses totally offset income. Therefore, the coefficient for CER is expected to bear a positive sign since increased cost inefficiency (or operating costs) puts pressure on a commercial bank to widen its interest margin in order to contain increased expenses.

4.4.2 Empirical Model for macroeconomic variables

The model for macroeconomic variables is specified as:

$$LIRS_t = \varphi_0 + \varphi_1 LIFR_t + \varphi_2 LEXR_t + \varphi_3 LBR_t + \varphi_4 LTBR_t + \mu_t \quad \ldots\ldots(6)$$

where: φ_0 and φ_i denote the constant term and coefficients, respectively, and t represent time.

The dependent variable, LIRS, represents the logarithm of interest rate spread and is calculated as the difference between the average lending rates of commercial banks and their average deposit rates. IRS responds to changes in the inflation rate, bank rate and other explanatory variables.

$LIFR$ denotes the logarithm of inflation rate and it is measured as a percentage change in the Namibia Consumer Price Index (NCPI). φ_1 is expected to have a positive sign because a high inflation rate represents a cost to lenders since high inflation erodes their portfolio. Thus, it is expected that high inflation will encourage the lending institutions to increase their rates in order to cushion against the erosion of their assets, which, in turn, increase the interest rate spread.

$LEXR$ represents the logarithm of nominal exchange rate of the Namibian Dollar against the US dollar. Increased variability in the nominal exchange rate is expected to bring about economic uncertainty, which, in turn, increases the risk of investments and to this end investors are expected to increase their lending rates. Increase lending rates increases the interest spread, therefore, φ_2 is expected to bear a positive sign.

The logarithm of bank rate represented by LBR is the rate at which commercial banks borrow funds from the central bank. Commercial banks shift the increase in the bank rate to the consumers through an increase in the lending rate, thus, widening the interest

rate spread, ceteris paribus. Therefore, there is a direct relationship between the interest rate spread and the bank rate and it is expected that φ_3 will have a positive sign. Principally, φ_3 represents the monetary policy effects on the interest rate spread.

$LTBR$ is the logarithm of the treasury bills rate. The parameter φ_4 is expected to have a negative sign to reflect the effect of fiscal policy on the interest rate spread. Expansionary fiscal policy leads to a budget deficit which could be financed through the issuance of government bonds including treasury bills. This drives the prices of bonds upwardly and the interest rate (deposit rate) decreases, which, in turn, widen the interest rate spread. Thus, there is an inverse relationship between TBR and interest rate spread.

4.4 Econometric Methodology

This section discusses the econometric methodology applied in this study. It includes the discussion of unit root testing and cointegration.

4.4.1 Methodology for macroeconomic model

Time series data are characterised by non-stationarity. A stationary variable is one that has a stable mean, variance and auto covariance at any point in time (Enders, 2004). Regression involving non-stationary data often lead to spurious regression results. In such a case, regression results appear to be statistically significant when in fact, all that

is obtained is evidence of correlations rather than meaningful causal relationships (Harris and Sollis, 2003). A non-stationary variable; unless it combines with other non-stationary variables and form a cointegration relationship, the regressions involving the series can falsely imply the existence of a meaningful economic relationship.

In order to model the stationarity properties of the data, the study applies the Johansen econometric methodology. The Johansen Approach is preferred because it prevents the biasedness in OLS estimations. There are two steps that are involved in implementing it; firstly, testing for unit root to establish the order of integration of each variable; and secondly, testing for cointegration. Two or more variables are said to be cointegrated if their linear combination is stationary even though the series themselves may be non-stationary (Harris and Sollis, 2003).

4.4.1.1 Unit root tests

There are several unit root tests in the literature such as the Dickey-Fuller (DF) test, Augmented Dickey-Fuller (ADF) test, cointegration regression Durbin Watson (CRDW) test, Phillips-Perron (PP) test, Kahn and Ogaki test, Leyborne-McCabetest test and the Kwiatkowski, Phillips, Schmidt and Shin (KPSS) test. The DF type of tests such as the ADF and PP tests are the most popular types of unit root tests applied in empirical work due to their simplicity and their more general nature (Harris and Sollis, 2003). This study applies the ADF test.

The most basic form of the DF test involves estimating the following equation:

$$y_t = \rho y_{t-1} + u_t \qquad (7a)$$

where y represents the variable to be tested for stationarity, ρ is a coefficient and t is the time variable.

Equation (7a) can be transformed into the following:

$$\Delta y_t = (\rho - 1) y_{t-1} + u_t \qquad (7b)$$

$$\Delta y_t = (\rho^*) y_{t-1} + u_t \qquad (7c)$$

where $\rho^* = (\rho - 1)$ and Δ is the difference operator.

The hypothesis testing of the DF test considers a null hypothesis of $H_0: \rho^* = 0$ against an alternative hypothesis of $H_0: \rho^* < 1$. If $\rho^* = 0$, then y contains a unit root or it is non-stationary. The DF test assumes that y follows an autoregressive process of order 1, $AR(1)$. Its shortcoming is that if the series y does not follow an $AR(1)$ process, but it is rather generated by an $AR(p)$ process, the error terms, u_t will be autocorrelated in order to compensate for the misspecification of y. Therefore, the autocorrelated errors will invalidate the DF test. An improved test in the name of the ADF test corrects for the weaknesses of the DF test by assuming that y follows the $AR(p)$ rather than the $AR(1)$ process. In this case, equation (7a) will be transformed into the following equation:

$$y_t = \rho_1 y_{t-1} + \rho_2 y_{t-2} + \cdots + \rho_t y_{t-p} + u_t \qquad (8a)$$

Equation (8a) can be reformulated into the following:

$$\Delta y_t = \rho^* y_{t-1} + \rho_1 \Delta y_{t-1} + \rho_2 \Delta y_{t-2} + \cdots + \rho_{p-1} \Delta y_{t-p+1} + u_t \qquad (8b)$$

where $\rho^* = (\rho_1 + \rho_2 + \cdots + \rho_p) - 1$

If $H_0: \rho^* = 0$ against an alternative hypothesis of $H_0: \rho^* < 1$, then y contains a unit root. The DF t-statistic is computed as $[\rho^*/SE(\rho^*)]$, where SE denote the standard error obtained from the regression of equation (8b), and is compared against the DF critical values. The null hypothesis of a unit root is not rejected if the DF t-statistic is greater than the DF critical value. An alternative to the ADF test is the PP test, which applied non-parametric techniques to correct for autocorrelation of the error terms in the DF test. It should be noted that the appropriate lag length should be used in implementing these tests since too few lags may result in over rejecting the null hypothesis when it is true and too many lags may reduce the power of the test.

4.4.1.2 The Johansen Cointegration Approach

This study employs the Johansen Cointegration Approach. The vector z_t is defined using an unrestricted vector autoregression (VAR):

$$z_t = A_1 z_{t-1} + \ldots + A_k z_{t-k} + u_t \qquad (9a)$$

where; z_t is $(n \times 1)$ vector of variables; A_i is an $(n \times n)$ matrix of parameters, u_t denotes residuals or $(n \times 1)$ vector of innovations.

The vector, z_t, consists of (n) potentially endogenous variables. Each variable in is regressed both on its lagged values and the lagged values of other variables in the system. Equation (9a) is estimated using the OLS technique. The VAR can be reformulated into a vector error correction model (VECM) form:

$$\Delta z_t = \Gamma_1 \Delta z_{t-1} + \ldots + \Gamma_{k-1} \Delta z_{t-k+1} + \Pi z_{t-k} + u_t \qquad (9b)$$

where: $\Gamma_i = -(I - \mathrm{A}_1 - \cdots - \mathrm{A}_i)$; $(i = 1, \ldots, k-1)$ and $\Pi = -(I - \mathrm{A}_1 - \cdots - \mathrm{A}_k)$

Harris and Sollis (2003) states that the estimates of Γ_i and Π describes the short-run and long-run adjustment to changes in z_t, respectively. The vector Π denotes a matrix of long-run coefficients, defined as a multiple of two $(n \times r)$ vectors, (α) and (β) and they signify the speed of adjustment to disequilibrium, and a matrix of long-run coefficients, respectively. Equation (9b) encompasses $\beta' z_{t-k}$, which represents up to $(n-1)$ cointegration relationships in the multivariate model. If the rank of Π is equal to zero, it indicates that there are no cointegration relationships or $(r = 0)$, where r is the number of cointegration relationships in the system. In a case where Π has a full rank (i.e. $r = n$), it shows that all the variables in the VAR are stationary. In most cases, Π has a reduced rank, i.e. $r \leq (n-1)$, which points out that there are r cointegration vectors or stationary relationships. Cointegration is tested using the trace and the maximum eigenvalue statistics.

4.4.2 Methodology for bank-specific model

This subsection discusses the methodology applied to the bank-specific model. It provides a discussion on panel unit root tests. The bank-specific variables were found to be stationary in levels, therefore, cointegration testing was not carried out.

4.4.2.1 Panel unit root tests

There are two classes of panel unit root tests used in empirical work, namely, individual unit root tests and common unit root tests. Examples of individual unit root tests include the ADF-Fisher Chi square, the PP-Fisher Chi square test, and the Im, Pesaran and Shin (IPS) test, whilst the common root tests include the Levin, Lin and Chu (LLC) test, Breitung's test and the residual-based LM test. This applies the LLC panel unit root test, which takes the following form:

$$y_{it} = \delta_i y_{it-1} + \lambda x_{it} + \varepsilon_{it} \quad (10a)$$

x_{it} represents all exogenous variables in the model.

Simplifying equation (2) by subtracting y_{it-1} from both sides of the equation, we have

$$y_{it} - y_{it-1} = \delta_i y_{it-1} - y_{it-1} + \lambda x_{<it} + \varepsilon_{it}$$

$$\Delta y_{it} = (\delta_i - 1) y_{it-1} + \lambda x_{it} + \varepsilon_{it} \quad (10b)$$

Assuming that $\rho_i = (\delta_i - 1)$,

The Augmented Dickey Fuller type of model is then given as follows

$$\Delta y_{it} = \rho_i y_{it-1} + \lambda x_{it} + \sum_{j=1}^{p_i} \theta_{ij} \Delta y_{it-1} + \varepsilon_{it} \quad (10c)$$

If $\rho_i = 0$, or if the absolute value of $\delta_i = 1$, y_{it} contains a unit root and therefore, it is not stationary. The null hypothesis would be that there is a unit root (or common unit root) or that the variable of concern is non-stationary $(H_0 : \rho_i = 0)$ against an alternative hypothesis that the series is stationary $(H_1 : \rho_i < 0)$. The null hypothesis is rejected if the test statistic is greater than the critical value or if the probability value (p-value) is smaller than the significance level (i.e. 10%, 5% or 1%).

4.5 Conclusion

The study applied modern econometric tools of unit root and cointegration analysis to model the interest rate spread. Various reports from the Bank of Namibia were used as source of data. The ADF test and the LLC panel unit root tests were employed in order to establish the stationarity properties of the macroeconomic and bank-specific variables, respectively. Furthermore, cointegration analysis was applied to the macroeconomic model in order to establish whether a long run equilibrium relationship existed among the variables.

CHAPTER FIVE

ESTIMATION AND INTERPRETATION OF THE RESULTS

5.1 Introduction

This chapter presents the estimated results based on the empirical models discussed in the previous chapter. The Johansen procedure is applied only to the macroeconomic variables due to the non-stationarity of the data. The process begins with the stationarity test followed by testing for the lag length structure and then testing cointegration.

5.2 Results for the bank-specific model

This subsection presents and discusses the unit root test results of the bank specific variables as well as the regression results of the bank-specific model.

5.2.1 Panel unit root test results

The Levin, Lin and Chu (LLC) panel unit root test was applied to determine the stationarity properties of the bank-specific variables. The null hypothesis for this test is that there is presence of common unit root (non-stationary) in the series against an alternative hypothesis of no unit root (stationary). The null hypothesis is rejected if the p-value is smaller than the significance level. Table 5.1 depicts the results of the LLC unit root test.

Table 5.1: LLC unit root test results for the bank-specific variables

Series	NIM	LIQ	NPL	CR	TAX	DMS	CER
t-statistic	-2.565	-2.274	-0.752	-3.278	-11.457	-3.646	-5.498
Probability	0.0052	0.0115	0.2262	0.0005	0.0000	0.0001	0.000

The unit root test results suggest that the p-values for NIM, LIQ, CR, TAX, DMS and CER are all smaller than the 5 percent significance level. Since the p-values are smaller than 5 percent, the null hypothesis for the presence of a unit root is rejected at 5 percent significance level, implying that NIM, LIQ, CR, TAX, DMS and CER are all stationary in levels, thus, the concerned variables are integrated of order zero, that is, I (0). Since the variables are stationary in levels; this is a special case in which the variables are co-integrated. In this case, there is no need for a co-integration test (Asteriou & Hall, 2007). The p-value for NPL is greater than the 10 percent, 5 percent and 1 percent therefore the null hypothesis is not rejected at all significance levels, implying that the concerned variable is non-stationary in levels. The next step is to estimate the bank-specific model.

5.2.2 Presentation and discussion of regression results

The estimation results for the bank-specific model are presented in Table 5.2. The Hausman test was applied to test whether the RE model is preferred over the FE model. The null hypothesis is that the RE model is preferred against an alternative hypothesis that the FE model is preferred (or RE not preferred). The null hypothesis is rejected if

the probability value is smaller than the significance level (1 percent, 5 percent or 10 percent). The results of the Hausman test indicate that the p-value is close to zero, therefore, the null hypothesis of a RE model is rejected suggesting that the FE model is preferred.

Table 5.2: Regression results for bank-specific model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.92	1.25	7.92	0.00
LIQ	0.10	0.05	2.18	0.032
DMS	-0.16	0.05	-3.51	0.00
CER	-0.02	0.02	-4.11	0.00

Adjusted R^2 = 64%, F-statistic = 39.064 (Prob. = 0.000), Durbin-Watson = 0.96115, Hausman test = 130.672 (Prob. = 0.000), Redundant Fixed Effects Test = 93.739 (Prob. = 0.000)

The regression results suggest that the net interest margin FE model is a good fit with 64 percent of the variation in the net interest margin being explained by the model. The significant F-statistic confirms that the overall model is good. The redundant fixed effects test results of 93.739 with the p-value of 0.000 suggest that the individual FE coefficients are not redundant. Heteroscedasticity and serial correlation were taken care of since the model was estimated with robust standard errors.

The negative sign and significant coefficient for the deposit market share is consistent with the efficient markets hypothesis, which states that, as a commercial bank becomes bigger in terms of market share, it improves its operational efficiency and therefore gains economies of scale, which enables it to maintain narrower interest margins. The results refutes the claims of the Monopoly Model, which suggest that a bigger market share would enable a commercial bank to widen its interest margin because it is able to charge a price that is greater than its marginal cost. Thus, a 1 percent increase in the market share of a commercial bank, leads to a 0.16 percent decrease in its net interest margin. Gelos (2006) in Latin America and Dabla-Norris and Floerkemeier (2007) in Armenia found similar results. However, Perez (2011) in Belize, Chirwa and Mlachila (2002) in Malawi, and Mujeri and Younus (2009) found contrasting results.

Unexpectedly, the capital ratio was found to be statistically insignificant at all levels of significance. This result is different from the findings of Claeys and Vennet (2004), who found capital adequacy to be a significant determinant of net interest margin in Western and Eastern Europe.

The significant and positive coefficient for liquidity is consistent with expectations and implies that the liquidity position of a commercial bank is important and influences its interest margin decisions. The positive sign of the coefficient suggest that an increase in the liquidity position of a commercial bank leads to an increase in its net interest

margin. Therefore, a 1 percent increase in the liquidity ratio causes a 0.10 percent increase in the net interest margin of a commercial bank. This result is similar to those of Perez (2011) in Belize but differ from the findings of Afanasieff, Lhacer and Nakane (2002) in Brazil.

Contrary to expectations, the coefficient for the cost efficiency ratio is negative and statistically significant implying that as the cost efficiency of a commercial bank deteriorates by 1 percent it reduces its net interest margin by 0.02 percent. A decrease in cost efficiency implies an increase in operating costs. This result suggests that commercial banks which face increased operating costs do not shift the burden to their consumers through wider net interest margins. The finding differs from those of Gelos (2006) in Latin America, Hossain (2010) in Bangladesh, and Mujeri and Younus (2009) and Grenade (2007) in the Eastern Caribbean Community.

5.3. Results for the Macroeconomic model

This subsection discusses the descriptive statistics and unit root test results of macroeconomic variables as well as the regression results.

5.3.1 Unit root test results

The first step in applying the Johansen cointegration test is to test for stationarity to establish the order of integration. The hypothesis to be tested is that the time series is non-stationary, that is, it has a unit root. The null hypothesis for a presence of a unit root is not rejected if the critical value is greater than the ADF test statistic in absolute value (Sundano, 2009). The ADF unit root test is applied. The Johansen Cointegration Approach requires that the concerned variables be integrated of the same order. Therefore this approach cannot be applied to the variables that are of different order of integration. The variables are tested, firstly, in levels, and secondly, in first difference. The unit root test results are reported in Table 5.3.

The unit root test results indicate that the ADF test statistic in levels is smaller than the critical value for all the variables at 1 percent and 5 percent significance level. Since the ADF test statistic is smaller than the critical values, the null hypothesis of a unit root is not rejected at both the 1 percent and 5 percent significance levels for all the variables in levels, thus, all the series are non-stationary.

Table 5.3: ADF unit root test results for macroeconomic variables

Series	ADF test-statistic in levels	1% critical value	5% critical value	ADF test-statistic First Difference
LIRS	-2.23	-4.08	-3.47	-7.85
LIFR	-3.33	-4.08	-3.47	-6.16
LEXR	-1.45	-4.08	-3.47	-7.28
LBR	-3.36	-4.08	-3.47	-5.21
LTBR	-2.72	-4.08	-3.47	-6.36

However, the ADF test results in first difference reveal that the ADF test statistic is greater than the critical value at 10 percent, 5 percent and 1 percent significance levels for all the variables. Therefore, the results suggest that all the series are stationary in first difference. The fact that all the variables are stationary in first difference implies that all the concerned series are integrated of order one that is I (1).

5.3.2 Lag structure

The next step in the Johansen cointegration approach is to determine an appropriate lag structure. The lag structure is used to determine the number of lags to include in the modelling process. The appropriate lag length should be one that has more asterisks. The Schwarz Information Criterion (SIC) was used to determine the appropriate lag length of the VAR. The results in Table 5.4 indicate that the optimal lag length is 1. Therefore lag 1 is applied in further analysis.

Table 5.4: Lag length structure for the macroeconomic model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	340.1308	NA	1.42E-10	-8.484323	-8.334358	-8.424242
1	500.0631	95.5711*	4.68e-12*	-11.90033*	-11.00054*	-11.53985*
2	519.2721	33.06869	5.46E-12	-11.75372	-10.10411	-11.09284

Notes: *Indicates lag order selected by the criterion. LR: sequential modified LR test statistic (each test at 5% level). FPE: Final Prediction Error. AIC: Akaike Information Criterion. SC: Schwarz Information Criterion. HQ: Hannan-Quinn Information Criterion.

5.3.3 Cointegration test results

The differenced variables lose their long-run properties; therefore, all macroeconomic variables were subjected to a cointegration test in order to determine their long-run equilibrium relationship. The Johansen-Juselius method is preferred over the Engle-Granger two-step procedure in a multivariate system. The null hypothesis to be tested is that there is no cointegration against an alternative hypothesis that there is at least one cointegrating relationship among the concerned variables. Cointegration exists if the trace statistic or the maximum eigenvalue statistic is greater than the critical value.

Table 5.5: Cointegration test results for the macroeconomic model

Trace Test				Maximum Eigenvalue Test			
H_0	H_1	Trace Statistic	5% Critical Value	H_0	H_1	Max-Eigen Statistic	5% Critical Value
r = 0	r ≥ 0	178.04*	69.82	r = 0	r = 1	60.74*	33.88
r ≤ 1	r ≥ 1	117.29*	47.86	r = 1	r = 2	38.79*	27.58
r ≤ 2	r ≥ 2	78.50*	29.80	r = 2	r = 3	33.07*	21.13
r ≤ 3	r ≥ 3	45.43*	15.49	r = 3	r = 4	25.28*	14.26
r ≤ 4	r ≥ 4	20.16*	3.84	r = 4	r = 5	20.16*	3.84

Notes: (1) *Denotes rejection of the null hypothesis of no cointegration at 5% significance level, (2) r stands for the number of cointegrating vectors in the system.

Given that the trace statistics are greater than the critical values, the null hypothesis of no cointegration is rejected and it is concluded that there are five cointegrating vectors in the system. The maximum eigenvalue test confirms the presence of five cointegration relations since the maximum eigenvalue statistic is greater than the critical values at 5 percent significance level. In summary, the cointegration test results suggest that there exist a long run equilibrium relationship between interest rate spread and its explanatory variables. The Johansen cointegration technique can be applied if there is at least one cointegrating relation between the variables.

5.3.3 Regression results for the short-run error correction model

After having established that there is a long run equilibrium relationship among the variables, the next step is to determine whether the long run relation will hold given the short run dynamics or disturbances. To do this, the short run error correction model (ECM) is performed. The ECM is specified as:

$$\Delta LIRS_t = \varphi_0 + \varphi_1 \Delta LIFR_t + \varphi_2 \Delta LEXR_t + \varphi_3 \Delta LBR_t + \varphi_4 \Delta LTBR_t + \varphi_5 ECM_{(-1)} + \mu_t \quad (4)$$

The ECM measures deviations of interest rate spread from its long run mean and is obtained from the long run relationship in the preceding sub-section. The ECM coefficient measures the speed of adjustment in current interest rate spread to its previous value. The bigger its coefficient in absolute terms, the faster the short run model converges to the long run model.

The results in Table 5.6 indicate that the overall short-run model is robust with a significant F-statistic of 24.5. The explanatory power of the model as measured by the coefficient of determination (R-squared) suggests that the interest rate spread is well explained by its independent variables. Therefore, an Adjusted R-squared of 0.59 implies that 60 percent of the variation in interest rate spread is due to the influence of the inflation rate, exchange rate, bank rate and the treasury bills rate. Several diagnostic

tests for the error correction model which were conducted suggest that the model is good. The insignificant Breusch-Godfrey Serial Correlation LM test suggests that there is no serial correlation in the model. The insignificant diagnostic tests such as the Autoregressive Conditional Heteroskedasticity (ARCH) test and White's Heteroskedasticity test imply that the model is free of heteroscedasticity. The Ramsey RESET test is insignificant indicating that the model is stable and good for forecasting. Therefore, the results suggest that the short-run model converges to the long run model.

Table 5.6: Regression results for the macroeconomic model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.00	0.00	0.58	0.56
DLIFR	0.06	0.02	2.39	0.02
DLEXR	0.12	0.07	1.72	0.09
DLBR	0.57	0.07	7.93	0.00
DLTBR	-0.15	0.07	-2.35	0.02
ECM(-1)	-0.18	0.07	-2.61	0.01

Adjusted R^2 = 0.592; F-statistic =24.500 (0.000); Durbin-Watson statistic = 1.75; Jarque-Bera test = 0.6022 (0.740); Breusch-Godfrey Serial Correlation LM test = 0.515 (0.600); ARCH test = 1.099 (0.298); White Heteroscedasticity test = 1.269 (0.234); Ramsey Reset test = 1.537 (0.219).

The inflation rate has a positive effect on the interest rate spread as expected and has a significant coefficient of 0.06. High inflation erodes the assets of commercial banks, thus commercial banks cushion themselves against inflation risk by widening their interest rate spreads. The finding is consistent with expectations and similar to the

findings by Chirwa and Mlachila (2004) in Malawi, Bawumia, Belnye and Ofori (2005), Da Silva et al. (2007) in Brazil and Afanasieff, Lhacer and Nakane, (2002).

The positive and significant coefficient for the exchange rate implies that as the Namibian dollar depreciates against the US dollar, the interest rate spread widens. Exchange rate volatility creates uncertainty in the economy and as a result commercial banks widen their interest rate spreads in order to shield themselves against the risk. Thus, a coefficient of 0.12 implies that a 1 percent depreciation of the Namibian dollar against the US dollar increases the interest rate spread by 0.12 percent. This finding is consistent with the theory and similar to the findings of Dabla-Norris and Floerkemeier (2007). However, it is different from the findings of Aekaeli et al. (2011) and Afanasieff, Lhacer and Nakane, (2002).

In line with expectations, the coefficient for the bank rate has a positive sign and is statistically significant suggesting that the interest rate spread widens in response to an increase in the bank rate. Thus, an increase in the bank rate by 1 percent leads to an increase in the interest rate spread by about 0.57 percent. This finding makes sense because commercial banks pass on the effect of an increase in the bank rate to consumers. The result implies that the monetary policy effects are transmitted to consumers through the commercial banking system. This result is similar to the findings of Da Silva et al. (2007) in Brazil.

As expected, the coefficient for treasury bills rate is negative and statistically significant. This suggests that an increase in the treasury bills rate leads to a narrowing interest rate spread. The results state that a 1 percent increase in the 91-day treasury bills rate leads to a 0.15 percent reduction in the interest rate spread. This finding may not be surprising because an increase in the treasury bills rate may give signals to the commercial banks that they stand to earn more from alternative sources thus narrowing their interest rate spreads. Therefore, the expansionary fiscal policy contributes to the narrowing of the interest rate spread. This result is similar to Ngugi (2001) in Kenya.

The coefficient for the error correction model is negative and less than unity as per expectation which implies that over time the interest rate spread converges to its long run state. The ECM coefficient of -0.18 suggest that on average there is an 18 percent feedback from the previous quarter's disequilibrium into the short run dynamic process and that the errors are correlated 18 percent in a quarter. The coefficient of 0.18 suggests a slow speed of adjustment to equilibrium.

5.5 Conclusion

The empirical results discussed in this chapter suggest that the net interest margin is influenced by the deposit market share, liquidity levels and cost efficiency of a commercial bank whilst the tax paid by a commercial bank and its capital levels are not important determinants of net interest margin. Furthermore, it was found that inflation rate, exchange rate, 91-day Treasury Bills rate and bank rate are important macroeconomic determinants of interest rate spread. Therefore, contractionary monetary policy has an effect of increasing the interest rate spread whilst the expansionary fiscal policy has a negative influence on the interest rate spread.

CHAPTER SIX

CONCLUSION AND POLICY IMPLICATIONS

6.1 Introduction

The objective of this study was to explore the main determinants of interest rate spread in Namibia's commercial banking industry using a panel data analysis of bank level and time series analysis of macroeconomic data. Very high interest rates were recorded in the early 1990s, but have gradually trended downwards in recent years. It is noted that the commercial banking industry is not very competitive and highly capitalised. The economy has been stable and has generally performed well since 1990. The literature surveyed in this study suggests that the interest rate spread is influenced by several bank-specific and macroeconomic variables such as non-performing loans, liquidity, GDP and inflation rate, among others. The study applied modern econometric tools of unit root and co-integration (in case of macroeconomic variables) to model the interest rate spread. The data for the bank-specific model covered a sample period from the first quarter of 2004 to the last quarter of 2011 whilst the macroeconomic model included a sample period from the first quarter of 1991 to the third quarter of 2011.

6.2 Summary of regression results

Interestingly, the study has found that bank-specific and macroeconomic variables are sensitive to different definitions of interest rate spread. The bank-specific variables perform very well under the net interest margin definition but poorly under the interest rate spread definition whilst the selected macroeconomic variables perform better under the interest rate spread than under the net interest margin definition. The results reveal that the fixed effects model is the appropriate model for net interest margin in Namibia. The empirical results suggest that the deposit market share; cost efficiency and treasury bills rate narrows the interest rate spread whilst liquidity; inflation rate; exchange rate and the bank rate widens the interest rate spread. Furthermore, it was found that the tax paid by a commercial bank and the capital adequacy are not important determinants of interest rate spread.

Therefore, it can be concluded that the stable macroeconomic environment which have prevailed in Namibia since its independence in 1990 have contributed to narrower interest rate spreads in recent years and have the potential to reduce it further. The narrowing interest rate spread in recent years also reflects the strong institutional and policy set-up of the commercial banking sector.

6.3 Policy Implications

These findings have several policy implications for the commercial banking industry. The fact that the bank rate has a positive effect on the dependent variable implies that contrationary monetary policy has an effect of increasing the interest rate spread. Therefore, the Bank of Namibia should be aware that reducing the interest spread requires a reduction in the bank rate. The commercial banks respond to an increase in the treasury bills rate by narrowing their interest rate spreads. In other words, the expansionary fiscal policy narrows the interest rate spread due to the potential income from treasury bills.

6.4. Recommendations for future Research

The study acknowledges that there are other important variables in the determination of interest rate spread which were not included in the estimation due to lack of data. Therefore, future research on interest rate spread should consider including variables such as real GDP, financial deepening, bank-industry concentration, foreign ownership of banks, reserve requirement and budget deficits. Furthermore, banks-specific variables from the early 1990s should be considered for future research.

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