

**DETERMINANTS OF NET INTEREST MARGINS IN ZAMBIA  
(1998-2011).**

**BY**

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## DECLARATION

I, **DOREEN GEORGE MWANZA**, declare that this is my own original work and that it has not been previously presented, and will not be presented to any University for a similar degree award.

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## **CERTIFICATE OF APPROVAL**

This dissertation of **DOREEN GEORGE MWANZA** is approved as partial fulfillment of the requirements for the award of the Master of Arts Degree in Economics by the University of Zambia.

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## **ABSTRACT**

Net interest margins (NIM) have been an interesting issue and of great debate. In Zambia, NIM has generally been high thus, having low savings rate and high lending rates. This is not good for the economy because on one hand, it discourages savings thereby, reducing the levels of monies available for lending. On the other hand, it discourages investment in the economy because of high lending rates and hence impacts negatively on economic growth of the country. Therefore, this study investigates the determinants of NIM in Zambia using bank specific factors; credit risk, insolvency risk and equity. It is a purely microeconomic study. Secondary bank data was used in this study and it used a panel regression analysis using the autoregressive distributive lag (ARDL) model of Pesaran, Shin and Smith (1999) to a panel of 11 selected commercial banks in Zambia. It covers the period 1998 - 2011. The unit root test results showed that equity and insolvency risk were stationary in levels while net interest margins and credit risk were stationary after the first difference. This led to the use of the ARDL regression model. Credit risk was the only variable found to be significant in the short run and it was found to have a negative effect on net interest margins. However, in the long run, all variables were found to be highly significant and positively related to net interest margins.

## **DEDICATION**

DEDICATED TO MY MOTHER AND FATHER MR AND MRS G.N. MWANZA.

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## **LIST OF ABBREVIATIONS/ACRONYMS**

ASR	Average Savings Rate
BaDEx	Bonds and Derivative Exchange
BOZ	Bank of Zambia
CEE	Central and East European
COGS	Cost of Goods Sold
DBZ	Development Bank of Zambia
FSDP	Financial Sector Development Plan
FSU	Former Soviet Union
IFS	International Financial Statistics
IMF	International Monetary Fund
LDCs	Less Developed Countries
LUSE	Lusaka Stock Exchange
MoFNP	Ministry of Finance and National Planning
NBFI	Non-Bank Financial Institution
NIM	Net Interest Margins
OECD	Organization for Economic Co-operation and Development
PIA	Pensions and Insurance Authority
SADC	Southern African Development Community
SEC	Securities Exchange Commission
SSA	Sub-Saharan Africa
WB	World Bank

## CHAPTER ONE

### INTRODUCTION

This study aims to investigate the determinants of net interest margins (NIM) in Zambia. As financial intermediaries, banks play a crucial role in the operation of most economies and therefore, it is vital to investigate the determinants of net interest margins (NIM). This is because if NIM is high, it is expensive to borrow as lending rates are high. This therefore discourages people or businesses to borrow and thereby negatively affecting investment levels and the economy at large. On the other hand, it discourages savings in the economy because savings rates are very low. The efficacy of financial intermediation can also affect economic growth. Crucially, financial intermediation affects the net return on savings, and the gross return for investment. The spread between these two returns mirrors the bank interest margins. (Levine, 1996). In this paper, we investigate the determinants of net interest margins in Zambia and it will be a purely microeconomic study.

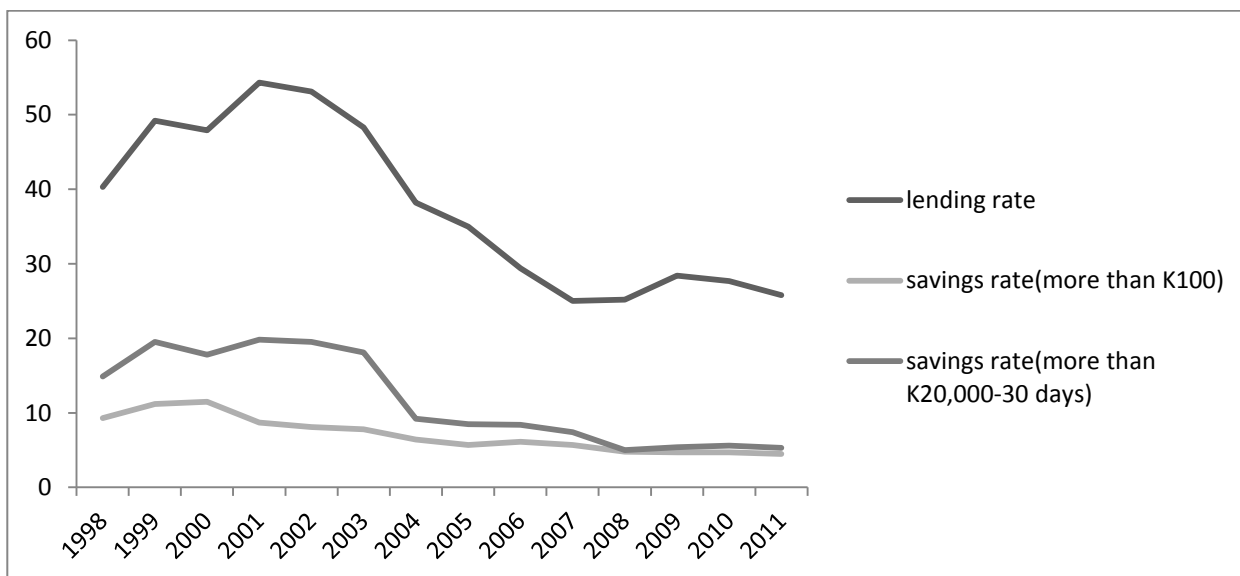
Net interest margin (NIM) is defined as a measure of the difference between the interest income (or revenue) generated by banks and the amount of interest paid out to their lenders (for example, deposits) and it also incorporates transaction costs. This is closely related to interest rate spreads. A negative value denotes that the firm did not make an optimal decision because it would mean that interest expenses were greater than the amount of returns generated by investments. Net interest margins of banks are crucial to economic development but this hasn't been researched thoroughly in Zambia to explore various variables especially bank specific ones. There are only very few studies in Zambia about the determinants of Net Interest Margins (NIM) which are insufficient and none focused on bank specific factors. Therefore, this study has focused on the determinants of NIM considering the importance of interest income as a component of bank revenue as this has been a gap in contemporary literature. It is therefore vital to note that banks play an important role in economic development as they are the base of the financial systems in all countries. Hence, understanding the determinants of NIM is important for the well being of the financial system. (Ugur A. and Erkus H, 2010).

Zambia had been experiencing strong but declining growth for instance, it recorded a growth rate of 6.4% in 2013 which was lower than that of the previous year (7.3% in 2012). The main drivers were the secondary and tertiary sectors. Inflation had stayed within single digits since 2009 though pressures started rising in 2013. To act on this inflation pressure, the Bank of

Zambia (BOZ) increased the policy rate by 25 basis points twice in 2013 in order to reach 9.75%. By the end of 2013, inflation was at 7.1% which was mainly due to non-food inflation. However, average annual inflation for 2013 was at 7.0% compared to 6.6% of 2012. (World Bank, 2014).

Commercial banks interest rates have discouraged borrowing and therefore investment. This is due to the huge gap between lending rates and savings rates. Simpasa, (2010) noted that sustained wide interest rate spreads; high levels of market concentration with high profit indicators have reinforced the view that Zambian banks exercise market power in pricing bank products and services. In April 2012, the Bank of Zambia (BOZ) introduced the debut BOZ policy rate in line of improving the conduct of monetary policy and also as a measure to lower the cost of borrowing funds. This signaled a shift from targeting monetary aggregates to targeting interest rates. This therefore ensured that banks no longer made their own base rates but instead used the BOZ policy rate as their reference rate in the determination of their actual lending rates. Government also reduced corporate tax of commercial banks by 5%, thus having corporate tax at 35%. These measures contributed to reducing the lending interest rates though the savings rate remained the same. The average lending rates (ALR) decreased to 18.6% in June 2012 from 23.6% in December 2011. However, average savings rate (ASR) for amounts above K100 and 30-day deposit rate for amounts exceeding K20, 000 remained unchanged at 4.3% and 5.3% respectively. (Bank of Zambia, 2012). Figure 1.1 below shows the lending rates and savings rate (for amounts more than K100 and more than K20, 000) for Zambia for the period 1998-2011(which is the scope of this study).

**Figure 1.1 Lending and Savings (more than K100 and more than K20,000-30 days) rates in Zambia (1998-2011).**



Source: Bank of Zambia, 2012.

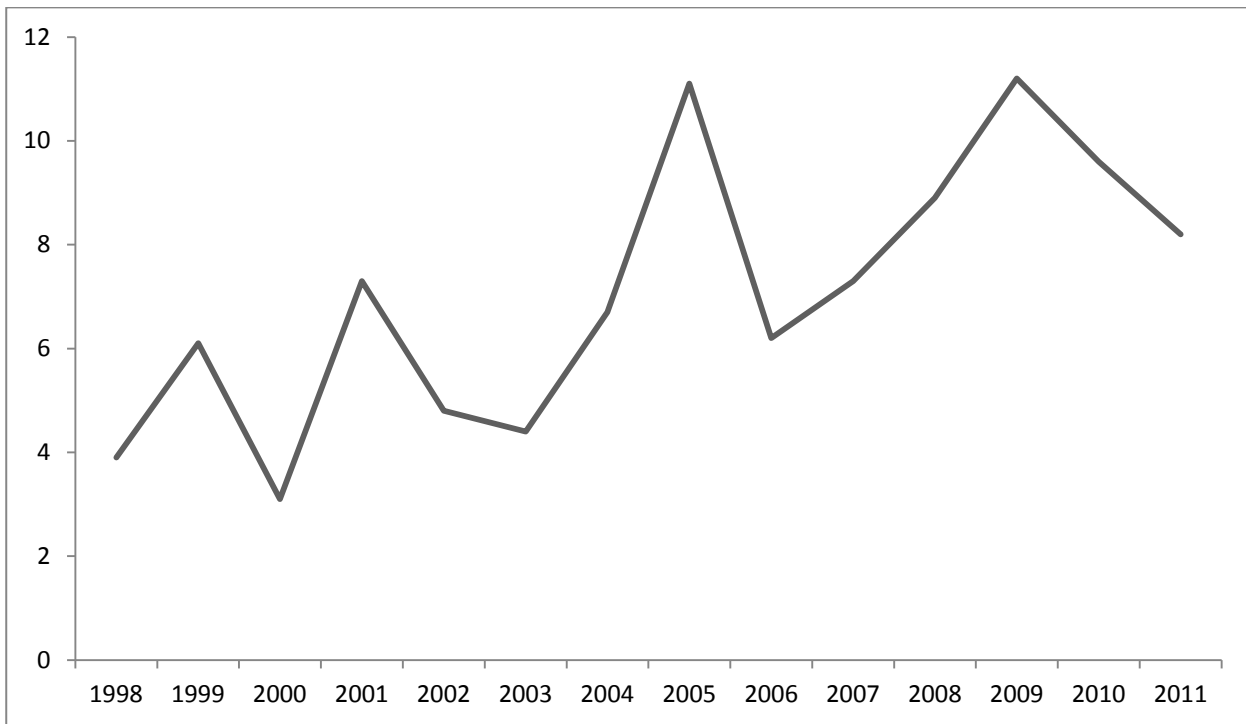
Figure 1.1 above shows the lending and savings rates for Zambia for the period 1998-2011. It is clear that the gap between lending rates and savings rates is very large in Zambia. This therefore discourages borrowing as the cost of borrowing is very high. On the other hand, it discourages savings and therefore, deposits are negative in real terms thereby, discouraging investment in the economy.

Furthermore, the operating costs of commercial banks are also high, especially given moderate lending and depository services. This makes the provision of financial services unaffordable. Savers are discouraged to save because of low interest on savings and investors are discouraged to borrow because of high lending rates thereby, reducing investment opportunities in the country. This is evident given high commercial banks rates. (GRZ, 2011). This in turn negatively affects employment opportunities in the economy and also negatively affects the development process in the country. This makes them vulnerable to adverse changes in the financial markets and could threaten their long-term solvency.

However, Zambia's successful issuance of its debut euro bond of USD 750 million signified the country's strong credit standing and a stable fiscal, economic and political environment. The Financial market and sector in Zambia has developed to high and stable standards in the past few years. The Bank of Zambia, The Ministry of Commerce and The Ministry of Finance are all key

players in this transition that have been monitoring credit growth and interest margins in Zambia. NIM for Zambia have been high and increasing over time. This can be justified by the data for the scope period of this study; i.e., 1998-2011. (World Bank, 2012). The values and trend of net interest margins in Zambia for the period 1998-2011 are shown in figure 1.2 below for more clarity and easy caption.

**Figure 1.2: Bank’s net interest margins in Zambia, 1998-2011.**



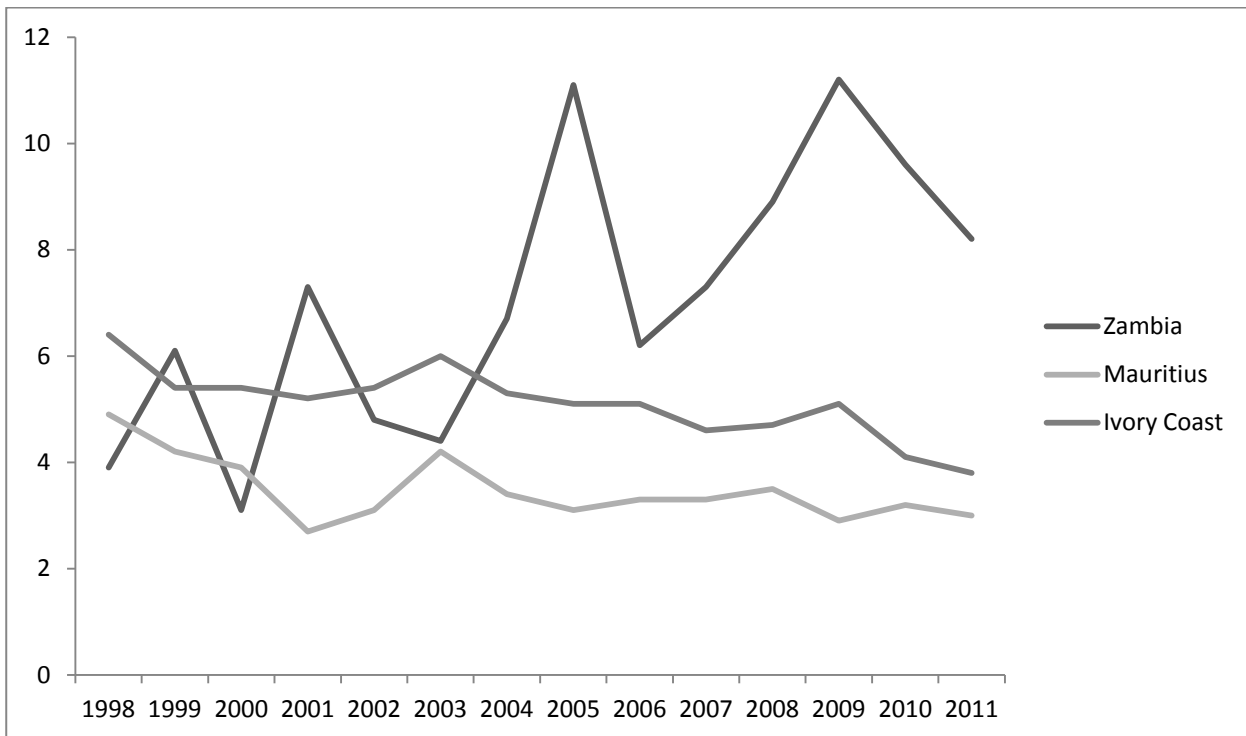
Source: World Bank, 2012.

Figure 1.2 above shows the value and trend of banks' net interest margins in Zambia for the period 1988-2011. It is clear that NIM has generally been increasing over time though fluctuating and that net interest margins are relatively high. High values indicate that commercial banks have a high return on their loans. The average value for Zambia during that period was 7.05 percent with a minimum of 3.07 percent in 2000 and a maximum of 11.23 percent in 2009. (World Bank, 2012).

In Sub-Saharan African (SSA) region, Zambia is also one of the countries with relatively high net interest margins. This study compared Zambia to two other countries in SSA region i.e. Mauritius and Ivory Coast which were randomly selected and it was seen that Zambia has relatively high margins. This study did a comparative analysis for the period under consideration of this study which is 1998-2011 and the result is as depicted in figure 1.3 below.



**Figure 1.3 Net Interest Margins-Comparative Analysis for Zambia, Mauritius and Ivory Coast (1998-2011).**



Source: World Bank, 2012.

From figure 1.3 above, it can be seen that compared to the other two countries in the SSA region, Zambia has had relatively high net interest margins over the past years. This can be attributed the huge gap between the lending rates and savings rate over time.

The issue of testing for the determinants of net interest margins has been under the focus of several financial and banking literatures. Such concern is stimulated from the crucial role made by the interest margin towards banks, as main financial intermediaries, profitability as well as stability, reflecting direct influence on economic growth i.e., the impact made on net return to savings and the gross return for investment. Quaden, (2004) sites that efficient banks benefit the real economy by allowing high returns on savings and low borrowing costs. This therefore increases investment costs in the economy and development. However, the need to provide better understanding of the behavior of interest rates following the mixed experiences of many Less Developed Countries (LDCs) with interest rate liberalization is another attribute behind examining the determinants of interest rate margin.

Furthermore, there has been a growing concern, in the developing countries in specific, toward the level and structure of interest rates that have remained inflexible with high interest rate margins during the post-liberalization period. In practice, while interest margins between lending and deposit interest rates is a key variable in the financial system, it reflects the additional cost of borrowing related to intermediation activities performed by banks in linking borrowers with the ultimate fund lenders. When spread is too large, it can contribute to financial disintermediation as it discourages potential savers with too low returns on deposits and limits financing for potential borrowers, causing a reduction in the investment opportunities and therefore the growth potential of the overall economy. (Valverde et al, 2004).

### **1.1 Statement of the problem.**

Despite the growth of credit and the decline in interest rate on commercial bank lending in the last few years, lending interest rates are too high compared to savings rate and therefore, this has led to high net interest margins (NIM). Negative real rate on savings discourage savings and high lending rates negatively affects investment. The BOZ policy rate was about 18.75% (as of late 2013) on loans and among banks, this varied but with a little difference whereas the savings rate is very low. For instance, one of the major commercial banks in Zambia, finance bank, their lending rate is 18.50% minimum to 18.75% maximum per annum (as of late 2013) which is within the range of the BOZ policy rate. On the other hand, their interest paid on a fixed deposit account ranges between 7%-11% per annum depending on the amount held in the account and on the savings account; it ranges between 3%-3.5percent per annum which is also in the same range with all commercial banks. Another example can be Barclays bank whose lending rate is 18.50% on corporate lending and 18.75% on personal lending (as of late 2013) whereas interest paid on their fixed deposit account ranges from 4% to 11% per annum; and for their savings account, it ranges from 0.00% to 4.50% per annum (as of late 2013) depending on the money held in the account. It is therefore evident that NIM is high among commercial banks in Zambia. The sector's net interest margin, a measure of the cost of intermediation, is at the high end. This therefore, calls for a case to investigate the determinants of net interest margins in Zambia.

## **1.2 General objective**

To investigate the determinants of Net Interest Margins (NIM) in Zambia.

### **1.2.1 Specific objectives**

1. To identify and examine the determinants of NIM in Zambia.
2. To analyze the policy implications of the factors identified and how they can benefit Zambia.

## **1.3 Hypotheses**

This study tests the following hypotheses;

1. There is a positive relationship between credit risk and net interest margins (NIM).
2. There is a positive relationship between insolvency risk and NIM.
3. There is a positive relationship between equity and NIM.

## **1.4 Significance of the study**

This study will help policy makers in the economy in formulating policies towards reducing net interest margins (NIM) by understanding its key drivers. If NIM is reduced, it will contribute to economic growth of the economy by promoting savings and investment (both local and foreign). Moreover, high levels of investment in the country will also bring other positive aspects to the economy like increased employment levels, reduced poverty levels, improved production levels and exports, thereby, boosting economic growth. Apart from that, this study will also add to the body of knowledge for the behavior of banks in Zambia. A lot of similar studies have been done in other countries but to the best of my knowledge, most of them are cross country analysis studies using different variables. There are very few similar studies which were done in Zambia on NIM. One of them, for instance, was done by Banda (2010) but it was focusing on macroeconomic factors and it used time series data in its analysis. The author recommended that a study focusing on bank specific factors should be done and this study covers that gap. The results however, cannot be generalized because of different methodology and variables used. Therefore, this study adds and strengthens the existing knowledge of determinants of NIM in Zambia by taking a different approach in terms of methodology and variables. It is a panel study and it focuses on bank specific factors. An opportunity therefore exists to investigate the

determinants of net interest margins in Zambia, in view of the growing number of local and international transactions.

### **1.5 Scope of the study**

This study covers the period 1998-2011. This period has been chosen because of the quality and availability of bank data.

### **1.6 Organization of the study**

This paper has six chapters. Chapter one has covered the introduction part of the study. Chapter two covers the overview of the banking system in Zambia. Chapter three covers the literature review on the determinants of net interest margins. Chapter four then covers the methodology and chapter five covers the empirical results and discussions and finally, chapter six concludes the study and brings out necessary recommendations.

## CHAPTER TWO

### OVERVIEW OF THE BANKING SYSTEM IN ZAMBIA

Zambia's financial system has developed to stability in the past decade. For over 20 years until the early 1990s. The Lending rates rose higher because of poor paying culture. Dominant policies, combined with a steep fall in the external terms of trade, led to economic decline. In the second half of the 1990s, reforms were spread under a Financial Sector Development Plan (FSDP) that was implemented to address weaknesses in the financial sector, identified in a Financial Sector Assessment Program (FSAP). However, following the liberalization of the economy in the early 1990s, there have been considerable developments recorded in general and financial sector in particular. These developments include proliferation of banks and non-bank financial institutions, which have necessitated the review of supervisory policies as well as legal and regulatory frameworks. This improved the supervisory frameworks and no bank closure has been recorded since 2002 and there has been significant growth in the banking sector. (1).

Furthermore, Zambia had completed its first international bond issue, and the fact that the Eurobond was over-subscribed 425 times at a cost of US\$12 Billion clearly revealed how confident the international investors were towards Zambia's economic and financial system. It is testament to a defined and stable financial system, worth of issuing a debut euro bond from the intended US\$500M to US\$750M. Out of this, it allocated \$20M to SMEs(DBZ), \$1.4M to bank and legal fees and \$14.6M to discount (advance interest). Moreover, Zambia was nominated as one of the top contenders for the Prestigious Finance Award for the Best Sovereign Bond Issuance for 2012 by the Europe, Middle-East and Africa Finance Magazine which is a leading emerging markets publication which focuses on the performance of capital markets in the entire Europe, Middle-East and African Region. They attributed the ratings to Zambia's promising investment prospects in the mining sector, positive economic growth trends, moderate general government debt, and a robust external balance sheet. (GRZ, 2013).

In order to ensure timely and credible information for the effective supervision of banks and other financial institutions, the Bank of Zambia has been playing a key role in developing the Bank Supervision Application System (BSA), which is a Southern African Development Community (SADC) region initiative. The BSA is a standardized tool designed for capturing supervisory information, financial and risk analysis and provides a workflow mechanism for communicating the different aspects of the supervisory process. Equally, the capital market has,

following the establishment of the Lusaka Stock Exchange (LuSE) and the repeal of the Exchange Control Act in 1994, boosted the financial system. There are 13 listed and 12 quoted companies on the LUSE. Risk based supervision is a structured, forward-looking process designed to identify key risk factors to which individual banks are exposed. This approach entails closer interaction with banks and allows early identification of risks as well as close monitoring of the nature and direction of risks as they emerge. The banking industry has recorded notable rapid growth in the last ten years. (Bank of Zambia, 2012).

## **2.1 Structure of the Financial Sector.**

The financial system in Zambia has three regulatory and supervisory bodies namely: Bank of Zambia (BOZ) which is the central bank of the country and it regulates banks as well as microfinance and other non-banking financial institutions (NBFIs); Securities and Exchange Commission (SEC) which regulates the capital markets; and Pensions and Insurance Authority (PIA) which regulates pensions and insurance companies.

BOZ has the responsibility of formulating and executing monetary and supervisory policies, with the ultimate objective of achieving price and financial systems stability. It also has a mandate to supervise all commercial banks and non-bank financial institutions (NBFIs) in Zambia. In 2012, banks in Zambia consisted of the Bank of Zambia and 19 commercial banks. Of these 19 commercial banks, 16 are foreign owned, 2 are owned by local private investors and 1 is jointly owned by the Zambian government and the Indian government. Zambia currently still has 19 commercial Banks. Some of the main commercial banks are ZANACO, Barclays Bank, Standard Chartered Bank and Stanbic bank. The Banks and Microfinance institutions have branches over the 10 provinces of Zambia and in multiple districts. This has promoted the circulation and availability of money for business in many areas of Zambia. There are also microfinance institutions which exist to occupy or cover up the void left by major banks in Zambia. The NBFIs as at the end of 2012 comprised of 8 leasing companies, 4 building societies, 1 development bank, 1 savings and credit bank, 1 development finance institution, 57 bureau de change, 1 credit reference bureau and 35 microfinance institutions. All these are regulated by the BOZ under the banking and financial services act of 2000. Moreover, BOZ promotes investment and makes sure that agents undertake their activities in a safe and sound environment and its mission is to achieve and maintain price and financial systems stability for balanced macroeconomic development. (Bank of Zambia, 2012).

SEC regulates Lusaka Stock Exchange (LuSE) and the Bond and Derivative Exchange (BaDEX) which was incorporated in 2009 and became licensed in 2011. The introduction of BaDEX is also a great development to the financial system in Zambia in the sense that it will give investors a chance to trade derivative products alongside bonds. It will also deepen the capital markets by introducing new products and liquidity and it will make Zambia become more visible to international markets which already have similar products in countries like South Africa, United States of America and UK. Moreover, the rise of BaDEX has broken monopoly of LuSE which will lower the lending rates and hence investors will also greatly benefit from that. It is an electronic market and therefore trading will be done electronically using computers, laptops, Ipads, and similar electronic items which are even better, easier as well as time saving and investors can also greatly benefit from that. (Bank of Zambia, 2013).

Pensions and Insurance Authority (PIA) regulates pensions and insurance companies and there are 9 insurance companies with branches all over the country. It is believed that increasing the minimum capital requirement for insurance firms operating in the country will increase the capacity for the firms to underwrite larger risks such as mining companies. Zambia's financial system has been stable and developing and it is very attractive to investors despite the exchange rate fluctuation. Looking at BaDEX which has broken monopoly LuSE had on capital markets, it will bring about a lot of competition which will lead to better and cheaper financial services. (Bank of Zambia, 2013).

## 2.2 Composite Ratings of Financial Performance.

Overall financial performance rating as at December 2013 was satisfactory. Table 2.1 below shows the composite rating of financial performance for December 2012-December 2013.

**Table 2.1 composite of financial performance Dec 2012-Dec2013**

<b>Performance Rating</b>	<b>Number of banks</b>	
	<b>Dec 2012</b>	<b>Dec 2013</b>
Satisfactory	10	11
Fair	9	7
Marginal	0	0
Unsatisfactory	0	1
<b>Total</b>	<b>19</b>	<b>19</b>

Source: Bank of Zambia, 2013.

Table 2.1 above shows that in 2012, 10 banks were rated satisfactory, 9 were rated fair but no bank was rated marginal or unsatisfactory. However, in 2013, the number of satisfactory banks increased from 10 (in 2012) to 11 while those rated fair dropped to 7 (from 9 in the previous year). On a negative note, one bank was rated unsatisfactory in 2013.

### **2.3 Market share and Performance Indicators by Banks.**

The banking sector's market share was still dominated by Zambia National Commercial Bank (ZANACO), Stanbic Bank Zambia limited (Stanbic), Standard Chartered Bank Plc (Stanchart) and Barclays Bank (BBZ) Plc based on the proportion of total assets and deposits. Based on total assets, these banks accounted for 58.0% while in deposit terms, they accounted for 60.3% compared to 61.5% and 61.7% at end December 2012 respectively. The banks that accounted for the largest portion of the industry's total profit before tax were Standard Chartered bank (28.4%), ZANACO (17.4%), Stanbic (15.1%), Barclays (10.9%) and Citibank (9.5%). (Bank of Zambia, 2013). This is shown in details in table 2.2 below.



**Table 2.2: Commercial Banks' Market Share and Performance Indicators as at 31 December, 2013**

<b>Bank</b>	<b>Total assets (%)</b>	<b>Total deposits (%)</b>	<b>Total loans (%)</b>	<b>Profit before tax (K'mn)</b>	<b>Return on assets (%) (pre-tax)</b>	<b>Return on equity (%)</b>	<b>Total regulatory capital ratio</b>
ZANACO	16.3	17.1	16.2	224	3.7	24.6	19.9
Stanbic	15	15.6	17.9	195	3.2	19.6	21.8
Stanchart	13.4	13.8	15.4	366	6.7	35.6	22.1
Barclays	13.3	13.8	16.9	141	2.6	15.1	15.3
Bank of China	7.2	7.5	1.4	53	2	11.1	105.1
Finance Bank	5.6	6.3	5	108	5	28.9	25.2
Citibank	5.5	4.8	1.6	123	6	15.8	94.3
First National	5	4.6	6.6	-10	-1.1	14.9	39
Indo-Zambia	4.7	4.9	4.8	57	3.1	12.3	25.4
BancABC	3.3	1.5	4.3	57	5.5	28.4	56.8
Investrust	3.2	3.3	4	13	1.1	10.2	14.1
Ecobank	2	1.9	1.4	-7	-1.6	-7	35.6
Cavmont	1.3	1.4	1.2	-27	-4.5	-33.8	24.7
United Bank	1	0.5	0.3	-13	-6.7	-45.5	56.8
First Alliance	0.9	0.7	1.1	24	5.5	11.4	42.5
Access Bank	0.9	1	0.5	-4	-1.2	-11.8	14.7
Intermarket	0.7	0.8	0.8	10	3.1	37.8	-5
First Capital	0.5	0.4	0.4	-9	-5.9	-24.4	69.3
AB Bank	0.1	0	0.1	-10	-22.2	-57.5	50.5
<b>Total/Weighted average</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>1,292</b>	<b>3.4</b>	<b>18.2</b>	<b>26.8</b>

Source: Bank of Zambia, 2013.

Table 2.2 above also shows that in terms of return on equity, Inter-market bank the biggest return on equity of 37.8% followed by Standard Chartered bank with 35.6%, then Finance bank with 28.9% followed by BancABC with 28.4% and then ZANACO with 24.6%.

## 2.4 Banks in Liquidation.

In 2013, there was a continuation of overseeing and managing of the liquidation process of the seven banks in liquidation. Of these seven banks, five declared dividends. Table 2.3 below shows banks in liquidation as of 31<sup>st</sup> December, 2013.

**Table 2.3 Banks in Liquidation as of 31<sup>st</sup> December, 2013.**

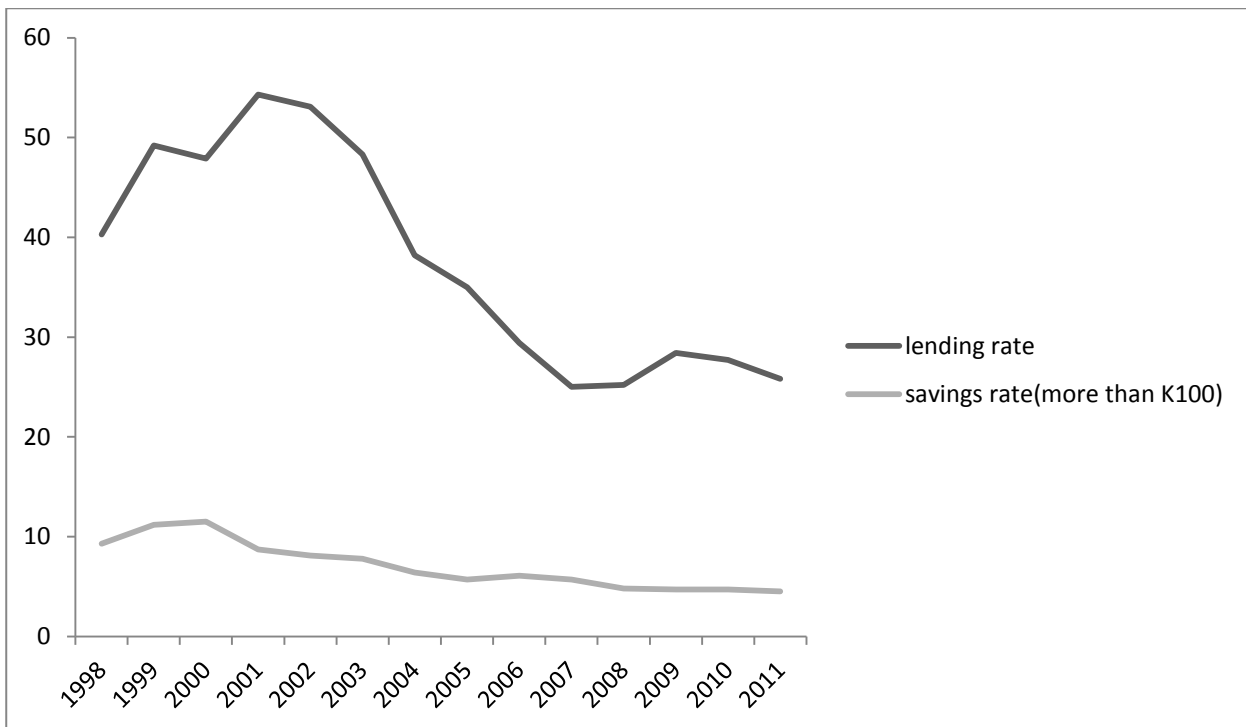
<b>Name of Bank in Liquidation</b>	<b>Receivership Date</b>	<b>Liquidation Date</b>
African commercial bank Zambia limited	13 <sup>st</sup> November, 1995	21 <sup>st</sup> February, 1996
Commerce bank Zambia limited	30 <sup>th</sup> March, 2000	14 <sup>th</sup> December, 2000
Credit Africa bank Zambia limited	28 <sup>th</sup> November, 1997	6 <sup>th</sup> March, 1998
First merchant bank Zambia limited	2 <sup>nd</sup> February, 1998	16 <sup>th</sup> March, 1999
Meridien Biao bank Zambia limited	15 <sup>th</sup> February, 1995	16 <sup>th</sup> August, 1995
Union bank Zambia limited	13 <sup>th</sup> February, 2001	29 <sup>th</sup> March, 2001
United bank of Zambia limited	9 <sup>th</sup> July, 2002	24 <sup>th</sup> May, 2006

Source: Bank of Zambia, 2013.

## 2.5 structure of Interest Rates in Zambia.

Interest rates on savings in Zambia over the years have been low compared to interest rates on loans (lending rate). This has created a huge spread between the two. Real interest rates had been negative though nominal rates went up immediately after the financial liberalization. This has discouraged both savings and investment in the country. (Sandi, 2009). In 2010, the lending rate was 27.7% while the savings rate was 4.7% which is a big gap. (Bank of Zambia, 2011). Figure 2.0 below shows the lending and savings rate for the years 1998-2011 (scope of this paper).

**Figure 2.1: Lending and Savings (more than K100) rates in Zambia, 1998-2011**



Source: Bank of Zambia, 2011.

Figure 2.1 above shows that the lending rates are too high compared to the savings rate in Zambia. This therefore results into commercial banks having high net interest margins.

The financial sector in Zambia has been liberalized since 1991. The government embarked on the financial sector reforms because of the limited contribution of the financial sector to economic development during the period 1964 to 1990, to make the financial sector viable the government devised and formulated the Financial Sector Development Plan (FSDP) to address the identified obstacles. The liberalization has led to the entry of new financial institutions into the industry. Though considerable progress has been made in implementing the FSDP, much remains to be done.

## **CHAPTER THREE**

### **LITERATURE REVIEW**

NIM is becoming of growing interest and it is a critical issue in the financial sector. It is therefore vital to pay great attention to it because the financial sector is the backbone to every economy. Before conducting any study, it is important to review literature as it acts like guidance in order not to repeat what another study elsewhere has done. This chapter will start with conceptual framework and thereafter, empirical review.

#### **3.1 THEORETICAL MODELS.**

There are theories which attempt to explain the determinants of NIM.

##### **3.1.1 Theory of the firm.**

The theory of the firm states that firms exist and make decisions in order to maximize profits. A starting point for discussing bank behavior within the framework of the theory of the firm was the paper by Klein (1971). He was one of the first contributors to the literature of banking in a microeconomic perspective. Klein (1971) and Monti (1972) developed the firm theoretical model. This model is about a risk averse bank facing both credit risk and interest rate risk. Banks have two markets; the loans market and the deposits market and eventually, both markets have to clear. In this case therefore, banks are in a static setting in which demands and supplies of deposits and loans simultaneously clear both markets. The firms' theoretical approach with deposit-rate setting is employed to analyze the effects of risk aversion and regulation of bank margins when the bank faces uncertainty about deposit quantity. Usually, optimal bank interest margin will be larger when the bank is risk averse than when the bank is risk neutral. (Wong, 1997). Hence, wider spreads entail a higher degree of banks risk aversion. Optimal bank interest margin reacts positively to an increase in credit risk, or an increase in interest rate risk. However, depending on whether a bank is a net borrower or a net lender, an increase in the interbank market rate has a disparate effect on optimal bank interest margin.

Further, the Klein-Monti model can also be said to be a model of industrial organization approach to banking in which banks are considered as profit maximizing firms that offer services to agents. These services are described by the services that banks buy from agents (i.e. loans) and sell to agents (i.e. deposits). Then the difference between the two (i.e. difference between volume of deposits and volume of loans) is the banks net position on the inter-market. It has

been shown that the model can derive various empirical predictions and therefore, has been a starting point for a number of empirical studies. However, the original Klein-Monti model only applies to a single monopoly bank but in most countries, there are several banks and hence, oligopoly models are also relevant for banking. Therefore, to extend this model, the standard and oligopoly models from the theory of industrial organization can also be used. (Martin, 1993).

### **3.1.2 “Cost of Goods Sold” (COGS) Approach.**

COGS approach refers to the carrying value of goods sold during a particular period. Zarruk (1989) brings in an alternative theoretical model of NIM for a banking firm that maximizes an expected utility of profits that relies on the COGS approach. He introduces uncertainty in the model through the deposit supply function that contains a random element. He states that under the assumption of decreasing absolute risk aversion, the bank spread increases with the amount of equity capital and decreases with deposit variability. Firms which are risk averse lower the risk of profit variability by increasing the deposit rate. In justifying this, Zarruk and Madura (1992) show that “when uncertainty arises from loan losses, deposit insurance and capital regulations, a higher uncertainty of loan losses will have a negative effect on NIM”.

### **3.1.3: The dealer model**

Ho and Saunders’s (1981) dealership model was extended by various writers including Angbazo (1997) who extended it by adding credit risk. He found that the ratio of non-performing loans to total loans had a significant effect on the bank spreads. Saunders and Scumacher (2000) also used the dealer model to analyze the determinants of NIM of some European countries and the US. Their results showed that opportunity cost of reserves and capital ratio had a positive impact on the interest margins. Furthermore, Brock and Saurez (2000) applied this model to investigate determinants of NIM in Latin American countries and found that high operating costs raised the spreads as did high levels of non-performing loans.

### **3.2: EMPIRICAL REVIEW.**

Literature shows that there are several studies on this similar topic that have been conducted with different methodologies and results. Banda (2010) focused on macroeconomic variables and market structure on the determinants of banking sector interest spreads in Zambia for the period 1995-2008. The explanatory variables chosen were; inflation, exchange rate volatility, reserve requirements and discount rates. He used quarterly time series data and the results showed that exchange rate volatility and inflation rate were statistically insignificant whereas reserve requirements and discount rates were found to be positive and statistically significant.

Sandi (2009) did a study on the price-concentration relationship in commercial bank deposit markets in Zambia and looked at the level of bank concentration as well as the relationship between concentration and the pricing of retail banking deposit rates. However, our study concentrates on the determinants of net interest margins in Zambia focusing on bank specific factors which is a point of departure from the above two studies done in Zambia.

Ahokpossi (2003) used a sample of 456 banks in 41 Sub-Saharan African (SSA) countries on the determinants of Bank interest Margins in Sub Saharan Africa. A panel of 2582 observations was used and the variables used were; bank specific variables, macroeconomic variables and market structure. Their results show that market concentration is positively related to interest margins, but the impact depends on the level of efficiency of each bank. In particular, compared to inefficient banks, efficient ones increase their margins more in concentrated markets. This indicates that policies that promote competition and reduce market concentration would help lower interest margins in SSA. In addition, their results also show that bank-specific factors such as credit risk, liquidity risk, and bank equity are important determinants of interest margins. They found credit risk and equity to be positive and significant whereas liquidity ratio was negative but significant. However, interest margins were found to be sensitive to inflation, but not to economic growth or public or foreign ownership. Therefore, this shows that there are regional differences within SSA regarding the level of interest margins even after controlling for other factors.

Flamini, McDonald, and Schumacher (2009), used a sample of commercial banks in SSA and found that high bank profitability (as measured by return on assets) was associated with credit risk, bank size, activity diversification, private ownership, and inflation. They also found a moderate persistence in profitability and a considerable lag in the impact of return on assets on

capital, suggesting that high returns are not immediately retained as equity increases. Their results showed that Market concentration was positively associated with interest margin, particularly for bank efficiency. Contrary to their expectation, market concentration first appeared to be negatively, albeit insignificantly, associated with interest margins. However, they explored the possibility that the impact of market concentration on interest margins depends on bank efficiency, by interacting concentration and bank inefficiency. In this specification, the impact of market concentration on interest margin was found to be positive, and the coefficient of the interaction between concentration and inefficiency was found to be negative and significant. This indicated that the impact of concentration on interest margins depends on bank efficiency. In other words, compared to inefficient banks, highly efficient banks increase their margins more in concentrated markets. Because inefficient banks have higher costs, when the market becomes more concentrated (say, when a competitor leaves the market) they can increase their margin by less than their efficient competitors. After controlling for bank-specific and macroeconomic variables, banks in SSA earn higher interest margins in concentrated markets. This contrasts with the result of Beck and Hesse (2009) who found that concentration lowers interest margins, in a broader sample of countries. Their result is only significant at 10 percent, when controlling for overhead costs. However, banks market share was found to be insignificant for the determination of interest margins. Bank liquidity risk, equity, and inefficiency were all found significant for the determination of interest margins. The liquidity ratio negatively and significantly affects interest margins, reflecting the possible need for less liquid banks (i.e., banks with high liquidity risk) to borrow emergency funds at a high cost. The results also highlighted the importance of credit risk for the determination of interest margins, because credit risk was found to be positively and significantly associated with net interest margins.

Furthermore, other studies have been conducted and some literature suggests that three types of factors affect interest margins: bank-specific factors, market structure and macroeconomic factors.

Bank-specific factors such as overhead, bank size, credit risk, and liquidity risk have been found to be important determinants of interest margins (Demirguc-Kunt and Huizinga, 1999). Saunders and Schumacher (2000) studied six European countries and the United States and found a trade-off between assuring bank solvency (high capital-to-asset ratios) and lowering the cost of financial services to consumers (low interest margins). Angbazo (1997) found that net interest margins of commercial banks reflect both default and interest rate premiums in his study on the

US banks. He also found that credit risk and liquidity risk increase interest margins (Carbo and Rodriguez, 2007).

The importance of market structure and the regulatory environment has been stressed by many studies. Carbo and Rodriguez (2007) used the Ho and Saunders (1981) framework to analyze the impact of market power on interest margins in seven European countries. They found that the relationship between bank margins and market power varies significantly across bank specializations, and market power increases as bank activities become more diversified toward non-traditional activities (including non-interest income). Regulation on bank entry, market structure, market transparency, and information sharing on borrowers also affect the efficiency of financial intermediation (Demirgüç-Kunt, Leaven, and Levine, 2003). Moreover, more segmented markets are associated with high market power, which in turn increases interest margins (Saunders and Schumacher, 2000).

Further, literature shows that macroeconomic conditions were also found to play an important role in determining interest margins. Saunders and Schumacher (2000) showed that interest rate volatility increases interest margins. Demirgüç-Kunt and Huizinga (1999) found that macroeconomic conditions, implicit and explicit bank taxation, and legal and institutional variables are important determinants of interest margins. Some studies stress the importance of credit and macroeconomic risk premia for the determination of interest margins (Angbazo, 1997).

The results described above have been confirmed to different degrees in various studies across different regions in the world. Studies of the banking sector in Armenia (Dabla-Norris and Floerkemeier, 2007) and in Latin America (Gelos, 2006), also confirmed the importance of bank-specific factors such as bank size, liquidity, and market structure for the determination of interest margins. For instance, in a study of Eastern European countries, Claeys and Vander Vennet (2008) showed that increased efficiency in the banking sector translated into lower interest margins in European Union (EU) accession countries, but not in non-accession countries.

Additionally, Beck and Hesse (2009) found that interest margins are consistently high in Uganda because of the small size of Ugandan banks, persistently high T-bill rates, and institutional deficiencies. They also found that interest spreads and margins vary significantly with the sectoral composition of the loan portfolio of banks, but there is little evidence for other variables



such as foreign bank entry, privatization, or changes in market structure in explaining variation in spreads or margins over time.

Apart from that, another study by Mlachila and Chirwa (2002) investigated the impact of financial sector reforms on interest rate spreads in the commercial banking system in Malawi. In investigating this, financial reforms were carried out throughout the 1990s and included the easing of entry requirements into the banking system, the introduction of indirect monetary policy instruments, and the adoption of a floating exchange rate. Using alternative definitions of spreads, results showed that spreads increased significantly following liberalization, and that the observe high spreads can be attributed to high monopoly power, high reserve requirements, high central bank discount rates and high inflation.

Various studies have shown that operational inefficiency leads to higher costs of intermediation and therefore to higher margins: Brock and Suarez (2000) and Gelos (2006) for Latin America; Carbo Valverde and Rodriguez (2007) for Europe. For example, in one of their studies, overhead/average assets were used as a proxy for operational inefficiency. The relationship between bank margins and growth will depend on the correlation between prices, costs, and the business cycle. Because prices and costs could be affected in different proportions, the impact of GDP growth on margins cannot be clearly determined (Carbo Valverde et al, 2003). But in general, the relationship is considered negative. During recessions, the default rate increases, credit risks are higher, and banks cover themselves with higher margins. Conversely, during booms, defaults decrease, activity is higher, and banks charge smaller margins.

Another variable that has been brought forward in literature is inflation, which is considered as a macroeconomic risk. Inflation can affect bank margins if lending and deposit rates adjust to monetary shocks at different speeds or to different extents. Inflation as a variable under focus is particularly important in a panel study among countries because countries face different inflation rates. However, if it is a panel study among banks within one country, it has no much impact because all banks in that particular country of interest will face the same inflation rate. Apart from that, in another study, focus was on market share and market concentration and both variables were computed using total bank assets. A bank's market share is its total assets relative to the market (country) total assets. Market share was a proxy for market power. Results showed that the higher the banks market share, the higher its interest margin, when it operates in a non-competitive environment. However, if the market is competitive, firms with large market share may have lower margins as a result of aggressive business tactics aimed at beating the

competition and gaining even bigger market share. Along with market share, market concentration also plays an important role in determining interest margins. According to the traditional Market Structure Conduct Performance (SCP) Hypothesis, concentration and bank margins are positively related. However, this relationship can become negative if it is affected by other variables. It is generally accepted that foreign-owned banks affect interest margins in developing countries.

Ho and Saundes (1981), starting from the conception of banking firms as mere intermediaries between lenders and borrowers finds that the interest margin has two basic components: the degree of competition of the markets and the interest rate risk to which the bank is exposed. This model has been extended in several studies: Allen (1988) widens it to permit the existence of different types of credits and deposits; McShane and Sharpe (1985) change the source of interest rate risk, situating it in the uncertainty of the money markets instead of the interest rates on credits and deposits, as in the original study by Ho and Saundes (1981); Angbazo (1997) extends the model to take into account credit risk as well as interest rate risk.

Furthermore, Wong (1997), attempted to take into account asymmetric information. Indeed credit risk was assumed independent of the loan rate charged by the bank. Wong assumed that the cumulative distribution function of credit risk shifts in the sense of first-order stochastic dominance as the lending rate changes. In other words, an increase in the lending rate increases the likelihood that the higher values of credit risk will be realised. Thus it gives rise to deterioration in borrowers' credit worthiness. The author finds that other things being equal; an introduction of incentive problems among borrowers lowers the optimal bank interest margin. The presence of the incentive problems in the lending market penalises any aggressive loan pricing behaviour of the bank. As a consequence, the bank sets a lower lending rate in order to partially protect itself against the opportunistic behaviour of borrowers.

Literature has also reviewed that one of the most common determinants of NIM is the capital to asset ratio. Angbazo (1997) used core capital to assets ratio to consider the insolvency risk and management quality and found a positive and significant relationship between this ratio and NIM. Further, Saunders and Schummacher (2000) who carried out a NIM study for the OECD countries also find a positive and significant relationship between NIM and equity to assets ratio. Maudos and Guevara (2004) and Cleays and Vennet (2008) also found a significant and positive relationship between NIM and capital ratio to assets ratio.

Brock and Suarez (2000) found different results for the determinants of interest margin for Latin American countries. For example, they found a positive and significant relationship between capital assets ratio and margin for Colombia and Bolivia. However, the results for other countries are insignificant, henceforth; they attribute this difference to the fictitious capital of banks in Latin American countries. Drakos (2003) who studied NIM of Former Soviet Union (FSU) and Central and East European (CEE) Countries found different results. When he pooled sample banks data together, he found a positive and significant relationship between capital ratio and NIM. However, when the countries are grouped as FSU and CEE countries, FSU countries capital ratio take a negative and CEE take a positive value, both of the coefficients are significant. Kasman et al. (2010) consider the banks behavior of new European (CEE) member countries and candidates countries banks pre and post consolidation period. They have found positive and significant relationship between capital ratio and NIM during the consolidation period. However, the positive and significant relationship changed to a negative one after the consolidation period.

Loans are a major source of revenue for banks and therefore, it must be considered as one of the factors influencing NIM. This has also been considered in literature among other variables. For instance, Angbazo (1997) used net charge off loans to loans ratio to investigate the role of default risk and found a positive and significant relationship with NIM. Furthermore, Brock and Suarez (2000) results were in line with these results despite defining default risk differently (they used different proxies for it). They found a positive and significant effect of non-performing loans to loans ratio for Colombia. However for other Latin American countries, they found a negative relationship between credit risk and NIM. Similar to this study, Drakos (2003) who measured credit risk by employing loan loss provisions to loans found a negative and significant relationship between FSU countries and positive but insignificant relationship for the CEE countries. Maudos and Guaveras (2004) findings, which used loans to assets ratio, support the idea of positive relationship in between credit risk and NIM. Claeys and Vennet (2008) who used the same credit risk measures with Maudos and Guevara (2004) also found a positive and significant relationship between credit risk measure and NIM for the Western and Accession European countries. For the non-accession countries the measure loses its significance. Kasman et.al (2010), who used both credit risk and default risk to examine the relationship, found a positive relationship between credit risk and NIM.

Another concept used in past studies is efficiency and different proxies have been used in different studies. For instance, Brock and Saurez (2000) used administrative and other expenses to perform loan ratio to represent efficiency in their study. They found a positive impact of this ratio to bank spreads in Latin American countries. Maudos and Guevara (2004) have also found positive relationship between cost to total assets ratio and NIM. In addition, they used cost to income ratio to account for the managerial efficiency and found a negative and significant relationship with NIM, which implies lower efficiency in management causes NIM to decrease. Kasman et. al. (2010) has also found similar result for managerial efficiency.

Furthermore, the structure or composition of assets and liabilities has direct implications to NIM through different channels. As a result of this, different studies employed different variables to reflect the role of assets and liabilities structure. For example Angbazo (1997) used net short term assets to book value of equity ratio to account interest rate risk and found a negative and significant relationship between NIM and this variable for his aggregated data. After disaggregating data, significance was lost for money centered banks and kept for regional and super-regional banks. Similarly Drakos (2003) found the same relationship for aggregated data. However, when he disaggregated the data significance of the variable disappeared for FSU and CEE countries and the coefficient sign changed to positive for the CEE countries. Using deposit compositions a proxy for funding policy, Claeys and Vennet (2008) found that stability in deposit composition contributes interest margin positively for western and accession countries, however it is not significant for non-accession countries.

Apart from that, volatility of interest rates which can affect NIM directly through loans and deposit and indirectly through assets and liabilities structure have also been examined by different researchers. Saundres and Schumacher (2000) found that volatility in both short and long term interest rates causes changes in NIM. Brock and Suarez (2000) found a positive relationship between interest rate volatility and NIM for the Latin American countries except Peru and Colombia. Maudos and Guevara (2004) have also found similar results for the EU countries.

**CHAPTER FOUR**  
**METHODOLOGY**

This paper used panel regression analysis using STATA 11.2. It adopted the use of the non stationary heterogeneous panels using the autoregressive distributive lag (ARDL) model.

**4.1 Theoretical model**

The theoretical model for Net Interest Margins (NIM) is as stipulated below;

$$Y_{it} = X_{it}'\beta + \mu_i + \varepsilon_{it}$$

Where;

$Y_{it}$  is Net interest margins,  $X_{it}$  represents bank attributes/ variables,  $\beta$  is a constant,  $\mu_i$  represents bank individual effects and  $\varepsilon_{it}$  is the error term. Since this study is a one country study (as opposed to a cross country panel study) and uses panel analysis method, it focused on bank specific variables because all banks face the same macroeconomic factors as well as same market structure.

**4.2 Model specification.**

The model specification for Net Interest Margins (NIM) in Zambia draws from that employed by Pesaran, Shin and Smith (1999). The study used the non stationary heterogeneous panels using the autoregressive distributive lag (ARDL) model. To investigate the role of bank specific factors in determining interest rate margins, we stipulated the following model:

Assume a long run NIM function

$$nim_{it} = \theta_{0t} + \theta_{1t}C_{it} + \theta_{2t}E_{it} + \theta_{3t}I_{it} + \theta_{4t}O_{it} + \mu_i + \varepsilon_{it} \dots \dots \dots (1)$$

Where;

The number of banks  $i=1,2,\dots,N$ ; the number of periods  $t=1,2,\dots,T$ ;  $nim_{it}$  is the net interest margins;  $C_{it}$  is credit risk;  $E_{it}$  is equity;  $I_{it}$  is insolvency risk;  $O_{it}$  is Operational inefficiency and  $\varepsilon_{it}$  is the error term. If the variables are I(1) and cointegrated, then the error term is I(0) for all i. the ARDL (1,1,1) dynamic panel specification of (1) above is;

$$nim_{it} = \delta_{10i}C_{it} + \delta_{11i}C_{i,t-1} + \delta_{20i}E_{it} + \delta_{21i}E_{i,t-1} + \delta_{30i}I_{it} + \delta_{31i}I_{i,t-1} + \delta_{40i}O_{it} + \delta_{41i}O_{i,t-1} + \lambda_i nim_{i,t-1} + \mu_i + \varepsilon_{it} \dots \dots \dots (2)$$

The error correction reparameterization of (2) is;

$$\Delta nim_{it} = \phi(nim_{i,t-1} - \theta_{0i} - \theta_{1i}C_{it} - \theta_{2i}E_{it} - \theta_{3i}I_{it} - \theta_{4i}O_{it}) + \delta_{11i}\Delta C_{it} + \delta_{21i}\Delta E_{it} + \delta_{31i}\Delta I_{it} + \delta_{41i}\Delta O_{it} + \varepsilon_{it} \dots\dots\dots(3)$$

Where;

$$\phi_i = -(1-\lambda_i), \phi_{0i} = \frac{\mu_i}{1-\lambda_i}; \theta_{1i} = \frac{\delta_{10i} + \delta_{11i}}{1-\lambda_i}; \theta_{2i} = \frac{\delta_{20i} + \delta_{21i}}{1-\lambda_i}; \theta_{3i} = \frac{\delta_{30i} + \delta_{31i}}{1-\lambda_i}; \theta_{4i} = \frac{\delta_{40i} + \delta_{41i}}{1-\lambda_i}$$

The error-correction speed of adjustment parameter  $\phi_i$ , and the long run coefficients  $\theta_{1i}$ ,  $\theta_{2i}$ ,  $\theta_{3i}$  and  $\theta_{4i}$ , are of primary interest. With the inclusion of  $\theta_{0i}$ , a non-zero mean of the cointegrating relationship is allowed. One would expect  $\phi_i$  to be negative if the variables exhibit a return to long run equilibrium.

**4.3 Data sources**

This study employed a panel study of 11 selected commercial banks in Zambia for the period 1998 - 2011. 11 out of 19 commercial banks in Zambia were selected because the other banks are new banks and this study wanted to capture the longest period possible in its panel. The study used secondary data which was collected from the Bank of Zambia (BOZ).

**4.4 Identification of variables**

The variables and the proxies used in this study were selected using literature as well as their applicability to Zambian. The dependent variable is NIM whereas the explanatory variables considered in this study as postulated in literature are; credit risk, insolvency risk and equity.

**4.5 Definition of Variables.**

**Net interest margin (NIM)** is a measure of the difference between the interest income (or revenue) generated by banks and the amount of interest paid out to their lenders (for example, deposits). In other words, Net interest margins can be considered to be a performance metric that examines how successful a firm's investment decisions are compared to its debt situations. A negative value denotes that the firm did not make an optimal decision, because interest expenses were greater than the amount of returns generated by investments. NIM is calculated as shown below;

Net interest margin = Interest income (revenue)-Interest Expenses

**Credit risk** is measured as the ratio “loans/assets” in this study as was done in the study by Maudos and Guaveras (2004). In their study, they found that credit risk had a positive and significant effect on NIM. Apart from that, Ahokposi (2003) found that the higher this ratio, the more the bank is exposed to loan default risk, and banks would resort to higher margins to cover this risk.

**Insolvency risk** in a study by Angbazo (1997) was measured as “capital/assets”. This study will also use the same proxy to see the results for the case of Zambia. Angbazo (1997) found a positive and significant relationship between NIM and insolvency ration.

**Equity** has been measured as “equity/total assets” in this study. It is an important indicator of solvency. Well-capitalized banks face lower costs of borrowing and low risk of bankruptcy. As a result of the lower costs and low risk of bankruptcy, well-capitalized banks should charge lower margins. However, if banks are well capitalized because of regulatory constraints (high capital and reserve requirements), then high capital reflects risks and represents a premium on bank margins (Berger, 1995). In this case, the relationship between capital and bank margins could be positive.

**Operational inefficiency** was defined as total operational expenses/total assets but it will be a variable which will be the control. It will control for efficiency.

## **CHAPTER FIVE.**

### **EMPIRICAL RESULTS AND DISCUSSIONS.**

#### **5.1 Chapter introduction.**

This chapter presents the empirical results and discussions from the tests which were conducted. Levin-Lin-Chu (2002) unit root test was the first test conducted from which some variables were found to be stationary in levels whereas others were stationary after the first difference. This led to the use of the autoregressive distributive lag (ARDL) model and all variables were found to be highly significant in the long run. However, short run results showed that only one variable is significant. This is followed by a discussion of the results. This paper used panel regression analysis using STATA 11.2.

#### **5.2 Empirical results.**

##### **5.2.1 Descriptive statistics.**

Descriptive statistics for the variables used in the model shows the summary of the variables. This has been put in the appendix at the end of the paper.

##### **5.2.2 Testing for stationarity.**

The first test which was conducted was the unit root test for stationarity. It is a preliminary step in regression analysis to ensure that all variables are stationary because if variables which are not stationary are regressed, one may yield spurious results.

The unit root test which was used was the Levin-Lin-Chu (2002) test which assumes that all panels have the same autoregressive parameter but allows for individual effects, time effects and possibly a time trend. It also requires that panels have strongly balanced data and it is recommended for moderate sized panels. This test is also one of the unit root tests which displays the best power behavior compared to the other tests for unit roots. (Hlouskova J and Wagner M, 2005). Therefore, this study chose to use this test because of that. The Levin-Lin-Chu (2002) test for unit roots has a null hypothesis which states that panels contain unit roots while its alternative states that panels are stationary. The results for the Levin-Lin-Chu (2002) unit root test were as shown in table 5.1 below;



**Table 5.1: LEVIN-LIN-CHU unit root test results.**

<b>Variable</b>	<b>In levels</b>	<b>1<sup>st</sup> Difference</b>
Net interest margins (NIM)	2.1186 (0.9829)	-2.1293** (0.0166)
Credit risk	-0.0146 (0.4942)	-5.5029* (0.0000)
Equity	-1.8685** (0.0308)	
Insolvency risk	-3.2109* (0.0007)	
Operational inefficiency	-8.1966* (0.0000)	

Note: \* and \*\* represent 1% and 5% significance levels respectively. Not in brackets are the adjusted t-values. In brackets are the p-values.

Ho: panels contain unit roots

Ha: panels are stationary

Table 5.1 above shows the results of the unit root test. In brackets are the p-values while those not in brackets are the adjusted t-values. The results show that equity, insolvency risk and operational inefficiency are stationary in levels at 5%, 1% and 1% respectively and therefore, are integrated of order zero, I (0). However, net interest margins and credit risk are only stationary after the first difference at 5% and 1% respectively and therefore; they are I (1). These results therefore have shown that it is appropriate to use the autoregressive distributive lag (ARDL) model which requires that the variables are I(0) and I(1) but not I(2) because variables which are I(2) can invalidate the methodology. This is one of the features that make the ARDL model advantageous and unique over other models as it can be used with a mixture of I(0) and I(1) data. This model also uses one single equation which makes it easier to implement and interpret such complex models.

### **5.2.3: The autoregressive distributive lag (ARDL) model**

The previous section has shown that it is appropriate to use the ARDL model because the variables are at-most I (1) and this paper used the recommended one which is the ARDL (1,1,1) model. Thus, a regression is run which combines both the short run and the long run with the short run results lagged once. Therefore, the ARDL model using the pooled mean group (PMG)

estimator was run. In this context, the PMG model allows for heterogeneous short run dynamics and common long run results.

**Long run results.**

Long run results are often of much interest. The following results for the long run were obtained as shown in table 5.2 below;

**Table 5.2: Long run regression results from the ARDL model.**

<b>Variable</b>	<b>Coefficient</b>	<b>Standard error</b>
Credit risk	.024418*	.002537
Equity	.0281829**	.011582
Insolvency risk	.0390906*	.0106732
Operational inefficiency	-.2210476*	.0148667

Note: \* and \*\* means that the result is significant at 1% and 5% respectively. We controlled for Operational inefficiency because of its importance.

Table 5.2 above shows the long run results from the ARDL model. In this study, long run results are of much interest. The results above show that all variables have a positive effect on net interest margins and are highly significant. Credit risk and insolvency risk are significant at 1% while for equity is significant at 5%. A detailed analysis of the results is in the discussions section.

### Short run result.

The short run results were as shown in table 5.3 below;

**Table 5.3: Short run regression results from the ARDL model.**

Variable	Coefficient	Standard error
-error correction	-.3507892*	.1262294
D.credit risk	-.007687***	.0043012
D.equity	.0102805	.0238082
D.insolvency risk	.0087459	.0243515
D.operational inefficiency <sup>→</sup>	.0080524	.0291398
-Constant	3.766497*	1.19785

Note that \*and \*\*\* means significant at 1% and 10% respectively. <sup>→</sup>We controlled for Operational inefficiency because of its importance.

It can be seen from table 5.3 above that in the short run; only credit risk is significant at 10%. The error correction and the constant are also significant but at 1%. However, equity and insolvency risk are both insignificant. Furthermore, credit risk has a negative effect on net interest margins in the short run. The error correction speed of adjustment parameter is negative which implies that the variables exhibit a return to equilibrium in the long run. In other words, it will take a speed of adjustment of 35.1% for the variables to be in equilibrium in the long run.

### SUMMARY OF SECTION 5.2.

Before going into discussions of the results, it is important to give a summary of the empirical results. From the Levin-Lin-Chu (2002) unit root tests, equity, insolvency risk and operational inefficiency are integrated of order zero [I (0)] and thus, they are stationary variables. Equity was found to be significant at 5% while insolvency risk and operational inefficiency are significant at 1%. However, the other variables (net interest margins and credit risk) had to be differenced once for them to be stationary and thus, they are I (1). Net interest margins were found to be significant at 5% whereas credit risk was found to be significant at 1%. Since the

variables were I (0) and I (1) i.e. at-most I (1), it was appropriate to use the autoregressive distributive lag (ARDL) model for the analysis of both short run and long run regression results by lagging the variables once in the short run but running the variables in the long run as they are without lags.

### **5.3 DISCUSSIONS.**

Section 5.2 has outlined the results obtained from the regression analysis which was conducted. This section seeks to discuss the results.

From the ARDL model, it was observed that the error correction speed of adjustment parameter is negative which implies that the variables exhibit a return to equilibrium in the long run. This means that in the long run, the variables will get back to equilibrium. It will take a speed of adjustment of 35.1% for the variables to be in equilibrium in the long run. From the short run results, only credit risk was found to be significant and it is significant at 1%. This implies that in short run, credit risk is the only relevant determinant of net interest margins. It has a negative and significant effect on net interest margins in the short run. This can be attributed to the fact that if credit risk is high in the short run, banks can recover much more from securities on lending in the short run thereby, leaving the margins low. However, short run results are not of high interest. Results of interest in this study are long run results.

In the long run, it is observed that all the variables are highly significant at 1% except for equity which is significant at 5%. Therefore, they are all main drivers of net interest margins and to influence net interest margins, it is important to deal with these risks as they are the main determinants of net interest margins. Therefore, government should use them in an attempt to influence net interest margins as such policies are bound to work. All the variables of interest have a positive and significant effect on net interest margins which is as expected.

As mentioned above, credit risk was found to have a positive and significant effect on net interest margins which confirms our hypothesis that credit risk has a positive and significant effect on NIM. A 1% increase in credit risk will lead to a 2.4% increase in net interest margins. This means that high credit risk leads to high net interest margins. Thus, they move in the same direction. This is true because it supports the economic expectation that during recession periods, default rate is high and therefore, credit risks are higher and banks cover themselves with higher margins. Conversely, during booms, default decreases because activity is high and hence banks may charge smaller margins. The results for credit risk were consistent with some

studies in literature and inconsistent with others. For instance, Ahokpossi (2013) on Sub-Saharan African (SSA) countries and Beck and Hesse (2009) on Uganda, Maudos & Guaveras (2004) on western and Accession European countries and Kasman et al (2010) found the same results despite using different methodologies.

Beck and Hesse (2009) did their study on Ugandan banks and despite Uganda and Zambia being in different geographical regions, the results for credit risk were found to be the same as that of this study. Claeys and Vennet (2008) used the same definition for credit risk as Maudos and Guaveras (2004) and also found a positive and significant result between credit risk and net interest margins for western and accession European countries. However, for non-accession countries, the measure lost its significance. Contrary to this, other studies found different results between credit risk and net interest margins. For instance, Brock and Saurez (2000) found a negative and significant relationship between credit risk and net interest margins for Latin American countries while Drakos (2003) found a negative but insignificant relationship between net credit risk and net interest margins for Former Soviet Union (FSU) countries and positive but insignificant relationship for the Central and East European (CEE) countries.

This paper found that equity has a positive and significant effect on net interest margins which confirms our hypothesis. This implies that equity and net interest margins move in the same direction, high equity leads to high net interest margins. This study has shown that 1% increase in equity will lead to a 2.8% increase in net interest margins. This result is in line with the hypothesis that banks in Sub-Saharan Africa charge a premium to account for the pressure of solvency regulations on lending activities. Thus, higher capital could be voluntarily raised by banks to signal their solvency or to fulfill a regulatory requirement. In either case, investors are compensated for their risk taking through higher margins. These results are in line with those found by Ahoppossi (2013) who found that equity had a positive and significant effect on net interest margins in a study done on net interest margins in Sub-Saharan African banks. Ahoppossi (2013) used random effects panel data and it was a very big panel. Despite different methodologies used, the result for the effect of equity on net interest margins is the same. This could be attributed to the fact that Zambia is in the Sub-Saharan Africa hence same geographical levels.

Lastly, insolvency risk was found to have a positive and significant effect on net interest margins which confirms our hypothesis. This study has shown that a 1% reduction in insolvency risk will result into a 3.9% reduction in net interest margins and vice versa for the increase. This result is

in line with the economic expectation that if insolvency risk is high, banks will charge high margins in order to try and offset the risk. These results are in line with those of Angbazo (1997) who also found a positive and significant relationship between insolvency risk and net interest margins in his study of the US banks despite different geographical environments and methodologies used.

## CHAPTER SIX

### CONCLUSION AND POLICY RECOMMENDATIONS

#### 6.1: Chapter introduction.

Net interest margins in Zambia have been high because of sustained high lending rates and low savings rates. However, there has been contemporary gap in existing bank literature on studies focusing on the determinants of net interest margins in Zambia using bank specific factors. This study therefore fills this gap by adding to existing knowledge. This chapter lays out the conclusions of the study and policy recommendations on net interest margins in Zambia. It will also give out the limitations of the study and future research areas of net interest margins in Zambia.

#### 6.2: Conclusion and Policy Recommendations.

Interest rates for commercial banks in Zambia have been too high thereby, leading to high net interest margins. This therefore raised the need to explore determinants of net interest margins using bank specific factors which was the major objective of this study. Thus, this study examined the determinants of net interest margins in Zambia for the period 1998-2011. It is a purely microeconomic study and it focused specifically on bank specific factors and the variables under consideration were; credit risk, equity and insolvency risk. The specific objectives of the study were to identify, examine and analyze the policy implications of the determinants of net interest margins in Zambia. There was no study in Zambia on this topic that focused on bank specific factors and therefore, this study has filled that gap of knowledge. This has therefore contributed to the body of knowledge in literature about determinants of net interest margins in Zambia on bank specific factors as it was important to fill this gap.

The study employed a panel regression analysis method using the autoregressive distributive lag (ARDL) model to examine both the short term and long term results. It was appropriate to use this model because after testing for stationarity, it was found that the variables were at-most integrated of order one. The ARDL model requires that the variables are I(0) and I(1) but not I(2) because variables which are I(2) can invalidate the methodology. This is one of the features that make the ARDL model advantageous and unique over other models as it can be used with a mixture of I(0) and I(1) data. This model also uses one single equation which makes it easier to implement and interpret such complex models. That is why this model was used in this study.

The results of this study support the hypothesis that net interest margins are affected by key bank specific variables. After a thorough analysis using data for a number of commercial banks in Zambia, this study concluded that in the short run; only credit risk was significant at 10% level of significance whereas the other two variables were insignificant. This implies that credit risk can be used on policies to influence net interest margins in the short run and that it is one of the key short run determinants of net interest margins. However, equity and insolvency risk can't influence policies concerning net interest margins in the short run. But long run results are of major interest to this study. In the long run, all variables were found to be statistically significant and they all exhibited a positive effect on net interest margins which supports the existing hypotheses and economic expectations. Therefore, this implies that all the variables influence policies on net interest margins in the long run. This is in line with the hypotheses of this study. Hence the government should use these variables in the formulation of policies towards reducing net interest margins as such policies are bound to work.

This study has confirmed that credit risk has a positive and significant effect on net interest margins. Hence, in order to reduce net interest margins, the government should put in place policies that reduce credit risk because if credit risk is reduced, net interest margins will also reduce and this will lead to increased economic growth in Zambia. Apart from that, the lender (bank) should also perform credit check on the prospective borrower and also seek reasonable security or guarantees. Commercial banks can also put up independent credit risk control units to monitor performance of their internal rating systems and this should be independent from personnel and management functions responsible for originating exposures. They should also separate credit risks from operational risks and quantify them both and make sure that they meet the minimum capital requirements, conduct supervisory review and exercise market discipline in order to reduce credit risk and net interest margins. If net interest margins are low, it means that the spread between interest on loans and that on deposits is reasonable and as such, people will be encouraged to save. This can be good for the economy because increased savings would boost investment and low rates on borrowing will attract both local and foreign investors. This will then boost economic growth in several aspects. For instance, increased investment will lead to increased employment thereby reducing poverty levels in the country. Moreover, increased investment also contributes positively to production levels and exports, thereby boosting economic growth.

Apart from credit risk, equity has also been found to be one of the main determinants of net interest margins in the long run. In the short run, equity was insignificant and so it doesn't have



any effect towards net interest margins. However, it has great effects on NIM in the long run. Therefore, commercial banks should ensure that capital allocations by institutional managers are more risk sensitive and reduce the possibility of regulatory arbitrage by attempting to align the real risk precisely with regulatory assessment. Further, other policies targeting to reduce net interest margins in the long run should also focus on reducing equity as it will lead to reduced margins. Hence the government can put up a policy that focuses on reducing equity to indirectly influence (or reduce) net interest margins. This will also lead to increased growth in the country.

Lastly, insolvency risk has been found to be insignificant in the short run implying that any policies that focus on insolvency risk are bound to fail. However, in the long run, it was significant and positively related to net interest margins. Therefore, commercial banks should maintain enough cash reserves and should also have enough assets and capital to cover risks. Failure to manage their risks properly can result in a misstatement of their risk/return profile and expose them to significant losses. Hence, policies towards net interest margins in the long run should also focus on insolvency risk as such policies are bound to work. Another variable, operational inefficiency was also used as a control.

This study had set out two specific objectives and all the objectives have been achieved. The first objective was to identify and examine the determinants of net interest margins and this study has identified all variables used to being determinants of net interest margins as they were all found to be significant in the long run. It has also examined that all the variables have a positive effect on net interest margins with different magnitude effects. Finally, the last objective was to analyze the policy implications of the factors identified and how they can benefit Zambia all of which have been analyzed and discussed in this study. All the hypotheses were also confirmed by the study.

### **6.3: Areas for Future Research and Weaknesses.**

Like any other study, this study also had some weaknesses. This study was limited to the chosen period 1998-2011. This was due to the quality and availability of data. This study was also limited to selected bank specific factors as determinants of NIM. It can therefore be interesting for further researchers to deal with specific structure of interest rates. Additionally, it can also be important to do a qualitative research on net interest margins as well as researching on the determinants of the structure of interest rates. This can greatly add new and important information that is not of public knowledge in Zambia as well as literature at large. Apart from that, this study was also limited to 11 selected commercial banks in Zambia and has used a panel regression analysis using the autoregressive distributive lag (ARDL) model. It is therefore important to undertake a comprehensive study that uses other methods of analysis on this topic.

## REFERENCES

- Ahokpossi C. 2013. Determinants of Bank interest Margins in Sub-Saharan Africa. IMF working paper. African Department. WP/13/34
- Angbazo, L., 1997. Commercial Bank Net Interest Margins, Default Risk, Interest Rate Risk, and Off-Balance Sheet Banking, *Journal of Banking & Finance*.
- Banda, C. M. 2010. The Determinants of Banking Sector Interest Rate Spreads in Zambia. University of Zambia, Lusaka. Zambia.
- Bank of Zambia, 2011. Annual Report. Lusaka, Zambia.
- Bank of Zambia, 2011. Financial and other Statistics. Lusaka Zambia.
- Bank of Zambia, 2012. Annual Report. Lusaka, Zambia.
- Bank of Zambia, 2012. Zambia Monetary policy Statement, July-December. Lusaka, Zambia.
- Bank of Zambia. 2013. Annual Report. Lusaka, Zambia.
- Beck, T. and Hess,H. 2009. Why Are Interest Spreads So High in Uganda? *Journal of Development Economics*.
- Berger, A., 1995. The Relationship Between Capital and Earnings in Banking, *Journal of Money, Credit and Banking*.
- Brock, P. and Suarez, 2000. Understanding the Behaviour of Bank Spread in Latin America, *Journal of Development Economics*.
- Carbo Valverde, J et. al, 2003. Deregulation, Bank Competition, and Regional Growth, *Regional Studies*.
- Carbo Valverde, S. and Rodriguez F. 2007. The Determinants of Bank Margins in European Banking, *Journal of Banking and Finance*.

- Claeys, S., and R. Vander Venet, 2008. Determinants of Bank Interest Margins in Central and Eastern Europe: A Comparison with the West, *Economic Systems*.
- Dabla-Norris, E., and H. Floerkemeier, 2007. Bank Efficiency and Market Structure: What Determines Banking Spreads in Armenia? IMF Working Paper No. 07/134 (Washington: International Monetary Fund).
- Demirgüç-Kunt, A. and Levine R. 2003. Regulations, Market Structure, Institutions, and the Cost of Financial Intermediation, NBER Working Paper No. 9890 (Washington: National Bureau of Economic Research).
- Demirguc-Kunt, A., and Huizinga H. 1999. Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence, *World Bank Economic Review*, Vol. 13.
- Drakos, K., 2003. Assessing the Success of Reform in Transition Banking 10 Years Later: An Interest Margins Analysis, *Journal of Policy Modelling*.
- Flamini, V. McDonald, and Schumacher L. 2009. The Determinants of Commercial Bank Profitability in Sub-Saharan Africa, IMF Working Paper No. 09/15 (Washington: International Monetary Fund).
- Gelos, R. 2006. Banking Spreads in Latin America, IMF Working Paper No. 06/44 (Washington: International Monetary Fund).
- GRZ, 2011. Bank of Zambia financial and other statistics. Lusaka, Zambia.
- GRZ, 2013. Ministry of Finance and National Planning, June 12. Lusaka, Zambia.
- Hlouskova, J. and Wagner, M. 2005. The Performance of Panel Unit Root and Stationarity Tests. European University, Italy.

- Ho, T. and A. Saunders, 1981. "The Determinants of Bank Interest Margins: Theory and Empirical Evidence," *Journal of Financial and Quantitative Analysis*.
- Kasman, A., et al, 2010. Consolidation and commercial bank net interest margins: Evidence from the old and new European Union members and candidate countries. *Economic Modelling*.
- Klein, M., 1971. A theory of the banking firm. *Journal of Money, Credit and Banking*.
- Levine, A., Lin C.F., Chu, C-JJ. 2002. Unit root test in Panel data: Asymptotic and finite sample properties. *Journal of econometrics*.
- Levine, R. 1996. Financial development and economic growth, Policy Research Paper 1678, The World Bank.
- Martin, S. 1993. *Advanced Industrial Economics*, Blackwell Publishers Inc, Oxford and Cambridge, Massachusetts.
- Maudos, J. and Guevara, F. 2004. Factors Explaining the Interest Margin in the Banking Sectors of the European Union, *Journal of Banking and Finance*.
- McShane, W. and Sharpe, G., 1985. A Time Series/Cross Section Analysis of the Determinants of Australian Trading Bank Loan/Deposit Interest Margins: 1962-1981, *Journal of Banking and Finance*.
- Mlachila, M., and Chirwa E. 2002. Financial Reforms and Interest Rate Spreads in the Commercial Banking System in Malawi, IMF Working Paper No. 02/6 (Washington: International Monetary Fund).
- Monti, M, 1972. Deposit, credit and interest rate determination under alternative bank objective functions. In : Karl Shell and Giorgio P. Szego, eds., *Mathematical methods in investment and finance*, North-Holland, Amsterdam.

- Pesaran, Shin and Smith, 1999. Bonds Testing Approaches to the Analysis of Long Run Relationships.
- Quaden, G. 2004. Efficiency and Stability in an Evolving Financial System, Belgium.
- Sandi, S, 2009. The Price Concentration on Relationship in the Commercial Bank Markets in Zambia, Master Thesis, University of Zambia, Economics Department. Zambia.
- Saunders, A., and L. Schumacher, 2000. The Determinants of Bank Interest Rate Margins: An International Study, *Journal of International Money and Finance*.
- Schumacher, L, 2000. The Determinants of Bank Interest Margins: An International Study, *Journal of International Money and Finance*, Vol 19.
- Simpassa, A. 2010. Characterizing Market Power and its Determinants in the Zambian Banking Industry, MPRA paper No. 27232.
- Ugur A. and Erkus H, 2010. Determinants of Net Interest Margins of Banks in Turkey, *Journal of Economic and Social Research*.
- Valverde, et, al, 2004. Banks, Financial Innovations and Regional Growth. Department of Economics. University of Granada, Spain.
- Wong, K. 1997. On the determinants of bank interest margins under credit and interest rate risks. *Journal of Banking and Finance*.
- World Bank, 2011. World Bank Data. Washington DC. USA.
- World Bank, 2012. World Bank Data. Washington DC. USA
- World Bank, 2014. Zambia Economic Brief, Promoting Trade, Competitiveness. Washington, DC. USA.
- Zarruck, E. 1989. Bank margin with uncertain deposit level and risk aversion. *Journal of Banking and Finance*.

Zarruk, E. and J. Madura. 1992. Optimal Bank Interest Margin under Capital Regulation and Deposit Insurance. In: The Journal of Financial and Quantitative Analysis.

(1) [www.bis.org/review/r110307f.pdf](http://www.bis.org/review/r110307f.pdf)

## APPENDIX.

### Descriptive statistics.

This shows the summary of all the variables for each year.

#### **Year=1998**

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Net interest margins	11	8131.355	10411.2	-1447	29929.4
credit risk	11	0.2549856	0.13548	0	0.3807063
equity	11	0.1736346	0.1064341	0.079348	0.4464607
insolvency risk	11	0.1891022	0.1878645	0.0398909	0.6523964
operational inefficiency	11	0.1892881	0.2151699	0.0471501	0.7730631

#### **Year=1999**

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Net interest Margins	11	12483.28	20392.45	-22871	47400.9
credit risk	11	0.270724	0.1625127	0.0033003	0.5661216
equity	11	0.1804952	0.124066	0.0662832	0.5203522
insolvency risk	11	0.1743977	0.1633243	-0.0749316	0.5203522
operational inefficiency	11	0.1944014	0.2825993	0.0486799	1.037937

#### **Year=2000**

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Net interest margins	11	21081.81	26515.37	-14698	71293
credit risk	11	0.2557115	0.1250943	0.0016026	0.4730696
equity	11	0.1808713	0.1127782	0.0933226	0.4984405
insolvency risk	11	0.169323	0.1228734	0.0604243	0.4984405
operational inefficiency	11	0.1641211	0.1904857	0.0235443	0.7190338



**Year=2001**

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<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Net interest margins	11	29790.99	35375.11	-10948	101847
credit risk	11	0.2261298	0.1214951	0.0024032	0.4570096
equity	11	0.1584594	0.0946382	0.0081834	0.3397558
insolvency risk	11	0.1646152	0.1372892	-0.042689	0.4314213
operational inefficiency	11	0.1306046	0.141785	0.0282234	0.5432086

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**Year=2002**

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<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Net interest margins	11	41324.42	46341.42	-9620	132153
credit risk	11	0.1749355	0.0931277	0.0056039	0.3161207
equity	11	0.1650915	0.081832	0.0800019	0.3375596
insolvency risk	11	0.2075427	0.2056196	0.0213208	0.7568898
operational inefficiency	11	0.1233375	0.104569	0.0362427	0.4122965

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**Year=2003**

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<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Net interest margins	11	43695.48	44306.48	869	145176
credit risk	11	0.2088683	0.1309101	0.0050916	0.4130791
equity	11	0.1499694	0.0880743	0.0705554	0.3665749
insolvency risk	11	0.2400568	0.3576206	0.013717	1.281715
operational inefficiency	11	0.1171548	0.066083	0.0509338	0.2831821

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**Year=2004**

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<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Net interest margins	11	54533.72	49705.63	1067	154242
credit risk	11	0.2536779	0.1487859	0.0163316	0.5036819
equity	11	0.1415499	0.1036903	0.0632899	0.4061082
insolvency risk	11	0.2304654	0.3519408	0.0130253	1.241652
operational inefficiency	11	0.1090838	0.0722448	0.0499925	0.2929471

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**Year=2005**

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<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Net interest margins	11	75430.82	65438.53	2922	174187
credit risk	11	0.2648539	0.1402665	0.0009811	0.5030121
equity	11	0.1440532	0.0984611	0.0493146	0.4120973
insolvency risk	11	0.1981935	0.2394789	0.0122022	0.8531445
operational inefficiency	11	0.1000285	0.0621229	0.0486991	0.2719247

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**Year=2006**

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<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Net interest Margins	11	76216.83	60153.36	7938	157551
credit risk	11	0.3072571	0.1720877	0.0058001	0.5748136
equity	11	0.1096887	0.0716979	0.0245137	0.2837149
insolvency risk	11	0.1193833	0.09034	0.0150378	0.2971488
operational inefficiency	11	0.0744096	0.0459113	0.0131154	0.1837139

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**Year=2007**

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<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Net interest margins	11	87326.52	68018.61	6469	187936
credit risk	11	0.3524484	0.1836261	0.0019545	0.6061327
equity	11	0.1082902	0.0748827	0.0300924	0.3051016
insolvency risk	11	0.1116412	0.071551	0.0290615	0.2967671
operational inefficiency	11	0.0695396	0.0419879	0.0149275	0.1704417

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**Year=2008**

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<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Net interest margins	11	111799.5	97827.42	6262	297663
credit risk	11	0.3972174	0.1850371	0.0324713	0.7012716
equity	11	0.1254354	0.0726115	0.0634451	0.2955608
insolvency risk	11	0.1350157	0.0653131	0.0696663	0.2884472
operational inefficiency	11	0.080519	0.0457653	0.0128618	0.1912414

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**Year=2009**

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<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Net interest margins	11	133937.3	126092.6	2587	405003
credit risk	11	0.3979687	0.1779888	0.1176023	0.7127212
equity	11	0.1231376	0.068049	0.0430727	0.2619101
insolvency risk	11	0.1270911	0.0607284	0.0533764	0.255901
operational inefficiency	11	0.0855046	0.0435219	0.0080373	0.1701437

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**Year=2010**

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<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Net interest Margins	11	124770.5	117042.9	3478	342562
credit risk	11	0.4108874	0.1823225	0.0493227	0.6756716
equity	11	0.1202698	0.0796747	0.0340366	0.2584006
insolvency risk	11	0.1245171	0.0725585	0.0340366	0.2534707
operational inefficiency	11	0.0708525	0.0388713	0.0065899	0.1198154

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**Year=2011**

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<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std.Dev.</b>	<b>Min</b>	<b>Max</b>
Net interest margins	11	141562.5	131915.4	13463	389205
credit risk	11	0.4251128	0.1480927	0.0951879	0.7092173
equity	11	0.1201484	0.0830189	0.0438271	0.2756355
insolvency risk	11	0.1096683	0.0852734	-0.0085652	0.2756355
operational inefficiency	11	0.0685328	0.0278289	0.0152263	0.1139375

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