

UNIVERSITY OF KWAZULU-NATAL

**FINANCIAL RISK MANAGEMENT AND BANK PROFITABILITY IN SOUTH AFRICAN
BANKS**

By

Sibusiso M. Mafu

210513349

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Finance**

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School of Accounting, Economics and Finance

Supervisor: Prof Mabutho Sibanda

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DECLARATION

I, Sibusiso M. Mafu, declare that:

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ABSTRACT

This study examined the connection between financial risk management and banks' profitability in a South African context. The relationship was segmented into three major financial risks; credit risk, liquidity risk and market risk. Theory assumes risk to have a negative relationship with profitability; however, some studies have proved otherwise. This study used top five banks in South Africa over a 10-year period spanning 2006 to 2015 and employed Fixed Effect Model based on the Hausman Test to estimate the relationship between credit, liquidity and market risk with profitability measure return on equity. The credit risk indicators (independent variables) employed in this study are non-performing loans to total loans, and loans and advances to total deposit. Two control variables leverage ratio and logarithm of total asset as proxy for firm size were also used. All variables were regressed against ROE as a profitability measure (dependent variable).

The findings indicate a significant relationship between profitability and non-performing loans, and leverage ratio at 1%, loans and advances to total deposit at 5%; while firm size (log total assets) is significant at 10% significance level. The liquidity risk indicators (independent variables) employed are loans and advances to total deposit, non-performing loans to total loans, LOG(total assets), market capitalisation to total assets, non-deposit dependence/external finance, equity to total assets. Control variables are non-performing loans, firm size (log total assets), GDP growth rate, and ratio of financing gap. The findings indicate that loans and advances to total deposit, non-performing loans, market capitalisation to total assets, and non-deposit dependence are significant at 1% significance level, firm size (log total assets), at 5% ; while equity to total assets, GDP growth and ratio of financing gap are insignificant.

The market risk indicators (independent variables) employed with three main variables are market capitalisation (log stock) to proxy equity risk, exchange rate to proxy foreign exchange risk, and lending interest rate to proxy interest rate risk. Three control variables were employed; inflation rate, GDP and monetary supply (M3). The findings show market capitalisation (log stock) is significant at 1%, exchange rate and GDP are significant at 10% significance level. An insignificant and negative relationship with lending interest rate was found. With the control variables, the findings showed that there is an insignificant and positive relationship between inflation rate and return on equity and a negative relationship between GDP and return on equity. The results are in conflict with the expected sign.

The study suggests that, with regards to credit risk, banks in South Africa should enhance their capacity in credit analysis and loan

administration while the regulatory authorities should pay more attention to banks' compliance to relevant regulatory requirements by the Basel Committee on Banking Supervision, put more effort in attracting deposits as they are a major determinant of liquidity followed by external funding liability and seek for effective hedging strategies to deal with the market risk volatilities.

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LIST OF ABBREVIATIONS

BASA	Banking Association of South Africa
BCBS	Basel Committee on Banking Supervision
BIS	Bank of International Settlements
BRICS	BRAZIL, RUSSIA, INDIA, CHINA AND RUSSIA
EAD	Exposure at Default
EaR	Earnings at Risk
ETA	Equity to Total Assets
FEM	Fixed Effect Model
FX	Foreign Exchange
GDP	Gross Domestic Product
IMF-IFS	International Monetary Fund – International Financial Statistics
INFL	Inflation
LA/TD	Loans and Advances to Total Deposit
LCR	Liquidity Coverage Ratio
LGD	Loss Given Default
LOG (TA)	Logarithm of Total Assets
MKT-CAP	Market Capitalisation
M3	Monetary Supply
NCA	National Credit Act
NDD	Non-Deposit Dependence
NPL/LA	Non-Performing Loans to Loans and Advances
NSFR	Net Stable Funding Ratio

PD	Probability of Default
ROA	Return on Asset
ROE	Return on Equity
REM	Random Effect Model
RFG	Ratio of Financing Gap
SACsi	South African Consumer Satisfaction Index
SARB	South African Reserve Bank
VaR	Value at Risk
ZAR/USD	South African Rand to American Dollar

CHAPTER ONE

INTRODUCTION

1.0 Introduction

In a world where financial education has become ever more important in light of the different scenarios affecting the economic and business environment that we operate in, the research into financial risk and profitability in the banking sector has become crucial and detrimental to corporate and macroeconomic stability. South Africa as a thriving nation with significant economic roles as a member of BRICS as well as the G20 has experienced a rocky last couple of years with a number of issues bring to light the need for financial risk management and profitability research in the banking sector.

Consequence of the above, the background leading to the study is clearly laid out by providing an understanding of the concept of financial risk, bank profitability and regulatory requirements. The problem statement is defined and explained with clarity as to the goals and objectives of the research. The justification of the study is subsequently provided in this section followed by the scope and the organisation of the whole study.

1.1 Background

The work presented here sought to study the effects of financial risk management with a particular focus on the performance of the banking sector in South Africa. In a study carried out, a notion was put forward that amongst all financial firms, the banking sector has the most risk (Adekunle A Owojori, 2011). Its riskiness is due to the nature of business where the ratio of borrowed capital to owners' equity is usually quite high. This leverage nature of banks makes them more exposed to losses and catastrophic events (Quey-Jen, 1996). According to Adekunle (2011), even a good lender cannot withstand the persistent run on deposits. As banks are mainly funded by depositors, if depositors decide to withdraw their funds spontaneously these banks would be subject to losses.

In the case of liquidity run, the bank will be compelled to shut down (Adukunle, 2011). Moreover, bank performance has received great attention globally and a large number of empirical studies have been conducted. Scholars and industry specialists are narrowing and investigating on the deteriorating health of the banking institutions resulting from the global

financial crisis (Webb, 2010). According to Funso, Kolade, and Ojo (2012), bank profitability evaluation studies are imperative in advancing knowledge in the banking industry because banks play a crucial task in assisting economic growth. The intermediary role that banks play is the catalyst of any country's economic growth (Klapo and Ayeni, 2012). Bank profitability can be measured using two broad approaches; accounting and statistical approaches. Ncube (2009) employed the accounting methodology in his research that made use of financial ratios, in assessing bank performance in South Africa. However, Kabnurkar (2001) viewed the accounting methodology (financial ratios) as very limiting in evaluating bank performance; as a result scholars in management sciences are in constant search for new and advanced methods.

1.1.1 Financial Risk Management and Profitability

All forms of businesses established to make profits are exposed to uncertainties and risks. In that space, banks and other corporations in the financial sector are faced with a lot of risk: credit, interest rates, foreign exchange rate, liquidity, market and commodity risk, and operational risk (Cooperman, Mills, & Gardner, 2000). However, according to Adeusi, Akeke Obawale and Oladunjoye (2013) there are three major financial risks affecting banks; credit, liquidity and market risk. Coyle (2000) defined credit risk as failure from a borrower to repay the loan amount as it falls due and also called it default risk. Credit risk volatilities are regarded as number one risk in banks and they have the ability to deteriorate the loan book and the asset quality of the bank (Alshatti, 2015). The Basel Committee (2008) defined liquidity risk as a risk that arises when the bank fails to meet its short term financial obligations. Liquidity risk exists in two types: (1) Asset liquidity which arises when an asset fails to sell because there is no liquidity in the market and (2) funding liquidity risk arising from liabilities that are not met at the time they become (Gomes & Khan, 2011). Market risk is the risk that arises when the value of a portfolio (either an investment portfolio or a trading portfolio) decreases due to the changes in market risk factors (McKinsey, 2012).

According to Toutou and Xiaodong (2011) profitability is the measure of how organisations deploy capital funds to generate profits. It is indicative of banks' financial health and it can be used as a performance measure. Mabwe (2010) posited that risk erodes on banks' profitability and rising levels of risk deteriorate the health of banks. Moreover, scholars use three measures of profitability as we will see in the literature review namely; return on equity (ROE), return on asset (ROA) and net interest margin (NIM). Scholars that are more interested in capital intensity of banks were most likely to use ROA. Those interested in the profitability of banks

predominantly used ROE and those interested in interest income generation were more likely to use NIM (Pandey, 2015; Eugene & Brigham, 2011).

1.1.2 South African Context

The World Economic Forum Competitive Survey for the period 2015-2016 ranked South Africa 8th out of 140 countries in the Financial Sector Development (BASA, 2016). Furthermore, the Banking Association South Africa posited that even though the South African banking industry was a highly concentrated industry, it was still competitive and continued to keep up with the international best banking practices (BASA, 2016). The South African Reserve Bank in December 2015 reported a 15.7% growth in total assets of South African banks to R3.6 trillion. These assets were largely composed of loans and advances at 74.5 %. An indicator of banking sector credit risk impaired advances decreased from R114.8 billion in 2014 to R112.4 billion in December 2015. However, impaired advances were expected to grow as the economy worsened. Again SARB (2015) reported that the main source of funds in banks still remained deposits. In December 2015, deposits constituted 84% of banks' total liability.

On the contrary, the banking sector profitability measured by return on equity (ROE) decreased from 16.64% to 16.35% in December 2015. Despite the positive impact of banks on the economy, banks still faced challenges. In April 2016, Standard and Poor (as reported by Banking Association of South Africa) warned South African banks that they were growing credit risk as economy worsened. SARB (2015) reported that consumers were still constrained because of slow employment rate, sluggish disposable income growth and rising inflation. This, combined with tighter affordability criteria following the implementation of amendments to the National Credit Regulations had resulted in constrained growth in retail credit exposure.

SARB (2015) reported that South African financial markets faced two tragic events. The first event was the 9th December 2015 when the Minister of Finance was unexpectedly replaced. Subsequent to this event large quantities of South African financial assets were sold. The second event was on the 11th January 2016 when the exchange rate depreciated to a level of R17.91 against the US-Dollar from R16.35. Both these events negatively impacted the financial markets which resulted in increased the levels of risk.

1.1.2.1 Regulatory Requirements

In South Africa, the South African Reserve Bank (SARB) is responsible for the regulation of banks under the Banks Acts (1990). The law governs the public companies that take deposits from the public. Under the wing of bank regulators is the National Credit Act (NCA) which was introduced to protect the consumers with regards to all credit related agreements, ranging from micro loans to home loans and from overdrafts to retail financing. The NCA informs consumers on the information they need to know before executing credit agreements and purchases. Moreover, there is Basel Committee on International Banking Supervision that is based in Switzerland that governs how banks ought to operate internationally. Basel Committee first established the Basel Framework in 1988 (referred to as BASEL I) and in 2004 issued the second publication called International Convergence of Capital Measurement and Capital Standards also referred to as BASEL II. BASEL II emphasises on international convergence of capital and improved disclosure with the objective of improving market discipline and supervisory processes and procedures. Nevertheless, the Basel Committee in 2008 introduced BASEL III which will be fully operational in 2019, addressing more liquidity requirements like liquidity coverage ratios (LCR) and net stable funding ratios (NSFR) which BASEL I and II did not address (SAICA, 2016).

1.2 Research Problem

The global financial crisis ever-changing regulatory requirements and advancement in technology exposes the banking system to enormous risks on a daily basis. These challenges continually escalate on an unexpected rate and directly affect banks' performance. However, not much has been done to mitigate the effects of risk on banks' overall performance. Given that the biggest gap in the banking sector is financial risk management, after noting that Financial risk management has not been analysed with an umbrella perspective to incorporate all three major risks (credit, liquidity and market risk) has therefore greatly motivated this study. Much of previous literature focused on credit risk with very little being done on liquidity and market risk. Although Shen, Chen, and Chuan (2009) found that banks seldom faced liquidity problems. they posited that there had been some significant concerns given the recent global economic instability and global banking crisis. Thus, the interaction of financial risks and bank profitability needed to be interrogated to ascertain the drivers of bank profitability. A deeper understanding of dynamics of financial risk management is imperative as these three major risks could affects the decision making in asset pricing of banking products which ultimately affects the affordability of citizens especially in growing economies like that of

South Africa (Alper & Anbar, 2011). The banking sector health is very important in growing economies as the banking system fuels the growth and development of the country, if this sector is not financially protected against risk it could result in stagnant economies and poverty deterioration (Al-Khour, 2011).

1.3 Research Objectives

This study aims:

1. To assess the effects of credit risk on profitability of South African banks.
2. To establish the correlation between liquidity risk and profitability using the South African banking sector.
3. To establish the effect of market risk on banks' profitability in the South African context.

1.4 Research Questions

The key questions guiding the research are:

1. What is the impact of credit risk on banks' profitability in a South African context?
2. Does liquidity risk and profitability have any relationship with South African banks?
3. Does market risk have any impact on the profitability of South African Banks?

1.5 Justification of the study

What was discovered in the study of risk management is that much of the literature focused on credit risk as opposed to overall financial risk (inclusive of liquidity and market risk). The reason for this was due to the fact that much of the volatilities in banks were due to credit risk. However, as discussed in the background, it was also noted that recent findings tinted on macroeconomic factors such as interest rate, exchange rate, inflation and GDP. Even though these factors relate more to market risk, they are also interrelated with liquidity risk. Nonetheless, there have been some studies in South Africa on bank profitability. They only looked at profitability as a standalone not in light of risk. This study therefore investigated the overall financial risk and profitability from an umbrella perspective.

The study aimed at establishing the link between financial risk and profitability. The results then assisted in providing recommendations to mitigate risk in terms of level of credit, access to liquidity and the external macro-economy. The findings also provided insight on the most

successful strategies banks had been using to handle risk. This overall should then assist the South African Reserve Bank (SARB) in formulating guidelines that will enhance risk management in the banking sector. It is perceived that the academics will benefit from the information of the study and contribute to the existing body of knowledge. The study also provided background information to research organisations and scholars and identified gaps useful for further research.

1.6 Scope of study

This study focused on financial risk management and profitability; mainly credit, liquidity and market risk. The study used a South African context focusing on perceived top five banks in terms of market share; namely FirstRand LTD, Barclays Africa LTD, Capitec Group Holdings LTD, Standard Banks Group, and Nedbank LTD. The study was limited to these five banks because they have been the greatest contributors to the South African economy within the financial sector and another reason was the availability of their data consistent throughout the period under review (2006-2015). This study employed the return on equity (ROE) across three objectives as a profitability measure against risk indicators that relate to credit, liquidity and market risk.

1.7 Chapter Summary

This chapter was the introduction of the envisaged study. It covered the background on financial risk and profitability, the South African banking sector, technological advancement and regulatory requirements. A further explanation of the research problem, research objectives and questions were also provided. The chapter also summarised the scope, overview of the methodology and organisation of the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Scholarship surveys on both the theoretical and empirical fundamentals upon which the concepts and views established in the current work are built are the foundation of this chapter. The chapter had a clear focus and analysis of literature encompassing the views and philosophies held by a number of scholars and academics as well as some governing authorities on the contributing factors of financial risk management, the determining factors of bank performance and the effects of financial risk management on bank performance, guidelines or strategies and measures of financial risk. This chapter then formulated the foundation on which the regression models developed in the subsequent chapter for empirical estimation were founded on.

2.1 The Concept of Financial Risk Management

2.1.1 Credit Risk

Many researchers who have studied causes of bank difficulties highlighted a few factors (Santomero, 1997). Problems pertaining to credit particularly flaws in strategies when managing risk associated with credit were recognised as the significant contributor of banking problems. Loans constituted a gigantic percentage of credit as they habitually accounted for 10 to 15 times of a banks' equity (Kitwa, 1996). Thus, the banking business was possibly confronted with problems where the quality of loans gradually weakened. This would further escalate at each successive stage, from the approval of the loan to monitoring and supervisory phases. This delinquent is exaggerated particularly when risk management strategies in relation to policy stipulations and process concerning credit processing are non-existent and are weak. Kitwa (1996) observed that these glitches were severe in developing countries.

Credit risk was defined by Chen and Pan (2012) as the magnitude of variation of worth in debt mechanisms and products owing to fluctuations in the principal credit quality of debtors and counterparties. Coyle (2000) defined credit risk as losses which arise when debtors default on their loan payments whether intentionally or due to financial inability. Credit risk is the

vulnerability confronted by banks when borrowers default in abiding to their debt responsibilities. This type of risk alternatively known as “counterparty risk,” when not properly managed has the ability of driving the bank into great financial distress (Singh, 2013). Management of this risk maximises the risk-adjusted rate of return of a bank through keeping exposure within a tolerable limit (Kargi, 2011; Funso, Kolade, & Ojo, 2012).

Effectively managing credit risk is inextricably associated with the development of banking technology, which enables for the rise in the rapidity of decision making and at the same time decrease the charge associated with credit risk control. This notion has a proviso that a broad base of partners and contractors are required (Lapteva, 2009). Credit risk has been found to be one of significant risks attached to any bank by the nature of their activities. Effectively managing this risk not only keeps the banking business a viable and profitable endeavour but also add to the general stability of an economy as well as efficient resource allocation (Psillaki, Tsolas, & Margaritis, 2010). Banks may suffer huge losses due to the inability of minority of loan holders to pay their debts (Gestel & Baesens, 2008; Alshatti, 2015). The Basel Committee also lends from this concept as from its early days of formulation.

Management of this risk is very crucial in the measurement and optimisation of banks profitability (Aduda & Gitonga, 2011). The lasting sustainability of any financial institution was therefore deemed dependent on efficient credit risk management that would guarantee loan repayments by loan holders. This was serious in handling asymmetric information complications as the consequence of it was a decrease in the degree of loan defaults (Basel, 2008). Powerful management structures forced risk comprises of launching an appropriate credit risk environment. This put emphasis on working under a comprehensive credit issuing practice, upholding a suitable credit management that comprised of supervising, processing and sufficient measures over credit risk management (Hibbeln, 2010).

Executive officers of a bank must guarantee in the management of credit risk that all procedures and rules are effectively communicated at all levels of the banking institution and that everyone partaking in the management of credit risk fully comprehends what is expected of them. Effective management systems for credit risk (comprising of identifying; measuring, assessing and evaluating risk, as well as monitoring and regulating) are guidelines and tactics which plainly summarise the framework and apportionment of a bank’s credit facilities and the manner of management of credit portfolio; that addresses the origination of loans, appraisal, supervision and collection (Basel, 2008). The task of scrutinising borrowers had extensively

been advocated by Derban, Binner and Mullineux (2005) among others.

The disproportionate information philosophy from debtors eventually turns out to be vital in reaching efficient screening. Both qualitative and quantitative techniques of loan application screening ought to be used. There is need for emphasising that debtors' traits evaluated by qualitative models can be converted to figures with the total of values associated with a limit. Muraleedharan (2014) termed this procedure credit scoring. Greuning and Bratanovic (2009) ascertain that if the scoring techniques give meaningful results, they may be used as useful instruments in predicting the expected loan loss. Rengasamy (2014) and Kabnurkar (2014) postulated that quantitative techniques which are more superior to others, mathematically institute which elements are significant in the explanation of default risk as well as evaluation of the relative degree of significance of the elements resulting in bettering the default risk pricing. He also added that the technique enabled one to be additionally capable of screening out bad applications and be in a place to accurately determine any reserve required to offset predicted future losses.

2.1.2 Liquidity Risk

Rendering Bonfim and Kim (2012), the intricacy of the roles of banks gives increase to an inherent risk deeply rooted in their core task; the intermediary role they play. Banks use a small amount of resources that they own in granting credit and loans to firms (institutions) and consumers and thus provide them with the liquidity to finance their investment and loans to other customers. Most of the bank resources used to finance daily operations is typically related with liabilities to third parties conventionally in the form of bank deposits. The conversion of these liquid liabilities (Bank Deposits) into risky liquid (illiquid) assets in the form of advances capitalising on their maturity mismatch exposes them to liquidity risk (Jekinson, 2008). For a bank to reduce the maturity gap between bank assets and liabilities (inherent illiquidity), banks ought to find ways to effectively manage the liquidity risk by holding buffer of liquid assets principal to the balance sheet structure. Nevertheless, apart from the great opportunity cost of holding excessive cash or liquid assets as associated to the greater returns related with illiquid (risky) assets, it establishes a level of ineffectiveness on the side of the bank management as it confines the banks' ability to deliver liquidity to businesses (institutions) and customers. Henceforth, even though a bank has a good reason to hold a portion of liquid assets (e.g. cash, short term assets or government bonds), according to Bonfim and Kim (2012) these buffers are rarely ever adequate to entirely insure against a bank's run (liquidity risk).

Gomes and Khan (2011) also did a study on methods of strengthening the management of liquidity risk posited by the Basel Committee on Banking Supervision (Basel III). Gomes and Khan made an important clarification between funding and market risk. They specified that funding liquidity risk is the failure of a bank to produce coffers by converting assets held on their balance sheet to meet liquidity requirements on short communication. The amount of cash and other liquid assets that the bank holds are the key determinants of a bank's liquidity position, additionally by its financing structure and the kind of contingent obligations (liability) that may come due. Market liquidity risk was further expounded as the capacity of the bank to perform transactions in the financial market without substantial loss of value.

With regards to the theory of market liquidity risk, the Bank for International Settlements (BIS) in (1999) deliberated on the numerous magnitudes by which significant movement in asset prices could ascend and these comprised of; immediacy, breadth, depth and resilience. BIS described immediacy as the speed with which transactions of a specific magnitude can be achieved. Breadth is the dissimilarity in the cost of an asset from mid-market costs and is for the most part appraised by the bid-offer scatter. Depth alludes to either the size of transactions that can be carried out without affecting prevailing market costs or the measure of requests on the request books of market-creators. Resilience is the rate at which value changes that happen amid the carrying out of a transaction come back to previous levels. These factors thus go a long way to affect market liquidity risk in diverse ways.

Market and financing liquidity dangers multiply one another as it is hard to sell when different investors confront funding issues and it is hard to get financing when the security is difficult to sell. Gomes and Khan (2011) again made the assertion that interactions between these two kinds of liquidity risk could result in devastating liquidity consequences where poor conditions for subsidizing liquidity prompt a reduction in market liquidity and thus add to a further decay in financing liquidity. Brunnermeier (2009) gave a strong indication that without sufficient management of liquidity-risk, banks that are faced with a liquidity stun regularly take part in rash sale of assets, amass liquidity and decrease loaning to the real economy. These activities thus result in the rise in probability of market interruptions and liquidity stuns confronted by different organizations bringing about a drawn out weakening in market liquidity that severely affects real financial development.

2.1.3 Market Risk

Research has shown that much of the variability in banks is associated with credit risk and profitability is mostly associated with differences between banks (Gestel & Baesens, 2008). However, literature has also shown that market risk (macroeconomic factors) also exert remarkable impact on bank's profitability and risk; in elucidating this, the currency exchange, GDP, CPI, interest rate, and activities of the stock exchange are greatly associated with risk and performance of banks (Warue, 2013; Kiganda, 2014; Sara & Muhammad, 2013). According to Kiganda (2014), these results provide supporting data to three components of theoretical analysis of the association that financial institutions have with the economy. The first one is that the impact of actual credit increase on credit risk and profitability of a bank is in agreement with the reasoning that complexities in managing the performance of a bank results in the weakening of its standards governing loan policy in periods of accelerated growth. Second proposition advocates that the complexities that banks have in their strategies to monitor borrowers' viability and the impact of collateral values that serves as security for loans in signalling borrower credit worthiness play a crucial role in deciding on the supply of credit. Finally, the outcomes agree well with what has been analysed theoretically, proposing that cyclicity in specialists' inclinations for outfitting plays a vital role on risk and profitability of a bank (Anum & Qodus, 2012).

2.2 Theoretical Framework on the Determinants of Financial Risk

2.2.1 Financial Intermediation Theory

Financial intermediation in the banking sense is the process by which the banks take money from the depositors/savers (surplus parties) and transform it into different types of loans and advances and give to borrowers (deficit parties) (Gurley & Shaw, 1960; Alin, 2009; Greenbaum & Thakor, 2007). The relationship is depicted on the figure 2.1 below. However, in the process of doing that, risk arises. Credit risk arise as deposits are transformed into loans, liquidity risk arises because depositors' money has been lent to third parties (Alin, 2009). The market risk arises as banks would require liquidity in the financial market and find it exposed to market risk factors like interest rate, exchange rate, and equity risk (Alin, 2009).

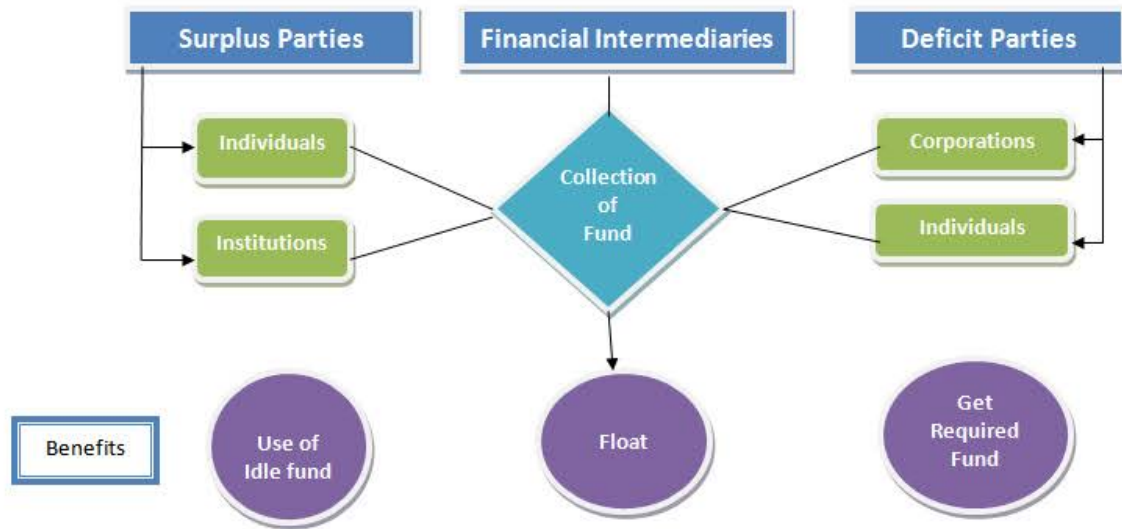


Figure 2.1 Financial Intermediary Process

Gurley and Shaw (1960) are the founding fathers of the financial intermediation theory. When they found the theory, they based it on two theories; informational asymmetry and the agency theory (Gurley & Shaw, 1960). The existence of the theory in principle was explained by the following factors; regulation method, incomplete information and high transaction costs. The theory further assumed that financial intermediaries existed because the markets were imperfect. They posited that intermediaries would exist for as long as market imperfections were in existence and the converse was true (Bolton and Freixas, 2000) as cited by Alin (2009). However, the neoclassical model of a perfect market, the Arrow-Debreu world, assumed that complete markets meaning there were no market imperfections (Allen & Santomero, The theory of Financial intermediation, 1998).

According to their research, there were no individuals that could influence prices and everyone in the market was a price taker. Borrowing and lending conditions were the same across all parties concerned and thirdly, the costs of acquiring information, performing transactions and those associated with insolvency were close to non-existent. Fourthly the economies of scale and scope were absent and fifthly all market participants had *ex ante* and *ex post* immediate and full data on all elements and occasions pertinent to the (future) value of the transacted financial instruments (Anthony, 2012; Alin, 2009).

With the perfect market theory, the availability of perfect information (free of charge) would allow investors and savers to easily connect to engage in business transactions. Since the theory

assumed perfect information, therefore market parties would have homogeneous expectation and act rationally. However, because the perfect market is not a real but rather an ideal situation, a financial intermediary would be required due to market imperfections (Iyare & Moore, 2011). This is the basis of the informational asymmetry and agency theory. Informational asymmetry can be categorised *ex ante* resulting in the challenge of extreme selection; associated with producing the moral danger; or *ex post* leading to the necessity for applying some expensive check and inspecting methods, hence, increasing risk (Masoud & Hardaker, 2012).

The market imperfections generated by the information asymmetry lead to different forms of transaction costs (Anthony, 2012). The emergence of financial intermediaries were to eliminate transaction costs (Bencivenga, Valerie, Smith, Bruce, Star, & Ross, 1996). Hence, according to the study that was done by Diamond and Dybvig (1983) they said banks were considered to be in coalition with depositors to ensure that the individuals who set aside against the dangers that could influence their condition of liquidity are protected. A year later another study done by Diamond (1984) revealed that financial intermediaries (banks) as authorised agents of the savers were able to achieve economies of scale. Thus, savers or depositors trusted banks that they would invest their money on viable projects.

Moreover, the studies that related to information asymmetry analysed the bank and the borrower and they mainly analysed the loan granting process and problems relating to adverse selection and moral hazards (Gertler & Nobuhiro, 2010). Secondly, the financial intermediation theory's second area of concern was the transaction cost explicated by Benston and Smith Jr. (1976) and later advanced by Fama (1980). This theory unlike the informational asymmetry did not contradict with the assumptions of the perfect hypothesis. This methodology depended on the contrasts between the advancements utilized by the member. Along these lines, intermediaries were seen just like a coalition of individual banks or indebted individuals who misused the economies of scale at the level of exchange advances (Brunnermeier, Markus, & Yuliy, 2014). The idea of exchange cost did not contain only the expenses with respect to the exchange costs for the sums or of foreign exchange but additionally those associated with research, assessment and monitoring. In this way part of monetary intermediaries would be to change the assets' attributes such as due date and liquidity. The alleged subjective change of money related resources, offers liquidity and open doors for enhancement of arrangements (Brunnermeier, Markus, & Yuliy, 2014). The last

financial intermediary pillar is in view of the strategy for managing the banking sector and the economy (Rampini & Viswanathan, 2015). This way of looking at things was produced by Guttentag, and Lindsay (1968) and by Merton (1995). Intermediaries' resolvability and liquidity were found to be impacted by the approach taken in terms of regulatory instruments. Diamond and Rajan (2000) and Zhiguo and Krishnamurthy (2012) revealed that the regulatory measures around the capital of intermediaries impacted their well-being, the capacity for renegotiating and the technique for recuperating debts.

2.2.2 Shiftability Theory

Allusion by Toby (2006) to the foundation of liquidity risk in the history of United States of America banks with the Shiftability Theory of the banking system which explicated that the liquidity of a bank hinges on its ability to move its assets (e.g. short term instruments) to another institution at a reasonable price. When this theory was formulated sentiments in cases where the huge number of investors would withdraw their investments, the banks would trade investor portfolios so as to pay off the money acquired by the investors. One of the founding fathers of this theory avowed that Liquidity is equivalent to Shiftability. Shiftability theory was therefore the main tool that readdressed the traditional idea that the bank should finance its operations through loans to a new doctrine that investments could also be used as a source of liquidity.

However, the shortfall of this theory was that even though an individual bank might be able to meet its liquidity requirements through the shifting of assets, the sentiments may not be possible for all banks combined. This argument was due to the fact that not all banks had adequate cash to shift to other banks. This caused a bit of a mismatch in the banking sector during 1930s as all or most banks wanted to be sellers not buyers; because of this mismatch, financial analyst said what was required were the external agents that would intermediate or perhaps inject cash into the banking system so as to take a position of a buyer as all banks wanted to be sellers (Toby, 2006). Unfortunately, the US Federal Reserve Bank could not intervene resulting in the crashing of most banks (Toby, 2006). Nonetheless, this study will utilise stock market development (market capitalisation) to proxy capital markets ability to generate liquidity as shiftability assumed that focusing more on investing would improve liquidity.

2.2.3 Financial Fragility Structure and Crowding-out of deposit Theory

Furthermore, academics and researchers have been arguing on two opposing views on bank capital and creation of liquidity. From the first perspective, bank capital has a tendency to hinder creation of liquidity through two different impacts: the financial delicacy structure and deposits crowding-out. The financial fragility structure assumes that capital ratios have to be kept lower so as to improve creation of liquidity (Diamond and Rajan, 2001). As a result greater capital ratios force out deposits and in so doing reduce creation of liquidity (Archarya & Viswanathan, 2010; Gorton & Winton, 2000). In layman's terms, the effect caused by the financial fragility structure is the consequence of the financial intermediation process. As banks have access to information of the borrowers, they are able to assess the profitability of their debtors (Gertler & Nobuhiro, 2010). Hence, agency problems arise as banks benefit from asymmetry and the bank might extract rents from depositors' money by calling for a larger portion of the loan revenue.

In a case where depositors resist paying the higher costs, the bank simply holds back on its monitoring attempts (Lin, Ma, & Xuan, 2011). The theory further assumes that the more the depositors are aware of this information asymmetry the more they become reluctant to deposit (Rengasamy, 2014). As a result, the bank has to seek for ways to win depositors' trust by espousing a delicate financial structure to a big portion of liquid deposits. An agreement with investors alleviates the banks hoarding issue since contributors can keep running on the bank if the bank threatens to hold back. As a result, financial fragility favours the creation of liquidity as it permits the bank to pull together more resources in order to disburse more loans (Marozva, 2015). In the current research, ratio of loans and advances to total deposit will be employed to proxy liquidity creation as presumed by the financial fragility structure theory.

On the contrary, more capital has a tendency to alleviate financial fragility and heightens a bank's power of bargain impeding the trustworthiness of its obligation to depositors, hence higher capital ratios tend to reduce liquidity creation (Arbabian & Grayeli, 2009). Above and beyond, Gorton and Winton (2000) in their study of liquidity provision, bank capital and macro-economy demonstrated that a higher capital proportion could lessen creation of liquidity via another effect deposits crowding out. They came to a conclusion that deposits were a much more compelling liquidity fence for proxies than interests in bank equity. Depositor's money is entirely or partly insured and withdrawable at face value. Therefore, the greater the capital share, the lesser the liquidity creation effect (Diamond & Rajan, 2001). The second view assumes that more capital improves the capacity of a bank to generate liquidity. "Creation of

liquidity heightens the vulnerability of the bank to risk as losses escalate with the degree of illiquid assets to gratify customers' liquidity demands (Allen and Gale, 2004). Bank capital allows the bank to take more risk (Toutou & Xiaodong, 2011). Therefore from the second perspective; the greater the capital ratio the greater the liquidity formation. These newly formed theories linking capital and liquidity generation were empirically verified by Berger and Bouwman (2009). This was done on data from a sample of commercial banks in the United States covering the period from 1993 to 2003, and found that there was a positive relationship for big banks and a negative one for small ones. Likewise, this study will employ a proportion of equity to total asset to indirectly determine the levels of capital adequacy.

2.2.4 Market Power Hypothesis

In elucidating a profit generation association, a market-power (MP) hypothesis suggests that MP is the top most parameter that results in a change in profitability (Claessen & Laeven, 2004). The relative market-power (RMP) premise asserts that only those corporations holding a lion's share in the market and well-varied product portfolio hold the price fixing authority for their products and therefore are in the right spot to obtain profits that are above normal (Guillen, Rengifo, & Ozsoz, 2014). For this situation, price fixing at a market-wide scale is not seen, but is only done by a few market leaders. Firms holding a smaller chunk of the market share are compelled to work as though under impeccable rivalry and are highly unlikely to realise the same profits that are above normal. Kasman and Carvallo (2013) showed that banks with market power are able to pass on to customers cost of raising capital buffers and provisioning for risk. A better way of indirectly determining MP and market imperfections is, therefore, firm-specific market share (market capitalisation).

2.2.5 Arbitrage Pricing Model

The Arbitrage pricing model advocates that the return on each stock of investment is dependent partly on prevalent macroeconomic influences or factors and partly on noise-events that are unique to a particular bank or entity; these factors are systematic market risk factors. According to Brealey and Myers (2003) for any individual stock, there are two sources of risk: the risk that branches from the inescapable macroeconomic elements (e.g. exchange rate, interest rate, GDP, inflation etc) which cannot be eradicated by diversification, and the risk arising from possible events that are unique to the company. That is, diversification does not eliminate unique risk and thus diversified investors can therefore ignore it when deciding whether to buy or sell a stock since the risk premium is affected by factor or macroeconomic risk and not by

unique risk (Brealey and Myers, 2003). This study will also incorporate interest rate, exchange rate, GDP, inflation, and monetary supply to evaluate the market risk on bank profitability.

2.2.6 Liquidity Preference Theory

This looks at interest rates from the perspective of supply and demand of money in the banking sector. The theory was first established by Keynes (1936) where he specified that the demand for money is expressed as a function of level of income and interest rate. $MD=f(Y, r)$ where: MD = money demanded, Y = Level of income and r = interest rate. This structure holds that the loan fee is dictated by the connection of market activity of cash stock. According to Keynes (1936) cash is requested for the most part for the accompanying intentions; as a medium of exchange, for security reasons and speculative reasons. He additionally expressed that financial specialists will dependably favour short-term securities to long-term securities. The only incentive that can make investors choose long term securities is when they yield great amounts in interest as compared to short-term ones. Along these lines, the trend in terms of yield will dependably be upward inclining. This is dependent on the perception that, all factors constant, individuals like to clutch money (liquidity) and that they will request a premium for putting resources into non-liquid resources, for example, securities, stocks, and land.

The hypothesis proposed that the premium requested for separating with money increments as the term for recovering the money increased. (Tonye & Priye, 2014). The transactions demand for money relates to the need for cash and to meet current assets and business transactions (Okpara, 2010). Auerbach (1988) postulated that the rate in increment of the premium backed off with the expansion in the period for recovering the money. In money related terms, this hypothesis is communicated as forward rates ought to surpass the future spot rates. Indaba (2011) stated that the expectation about changes in bond prices or in current market interest rates determines the speculative demand for money. According to Reilly and Norton (2006), the hypothesis of liquidity inclination holds that long-term securities ought to give higher returns than short-term commitments since financial specialists will give up a few respects put resources into short maturity commitments to keep away from the higher price instability of long maturity bonds. This study will employ lending interest rate to proxy effect of interest rate on profitability which is affected by the demand of money (loans). According to Huang, J., Sun, Z., Yao, T., and Tong, Y. (2014) a measurable connection exists between liquidity preference and loanable size amount, as both are affected by the level of interest rate.

2.3 Theoretical Literature on the Risk Indicators of Financial Risk

2.3.1 Credit Risk

Non-Performing Loans (NPLs) to Loans and Advances: Of all the risks that a bank faces, credit risk is a significant factor with respect to the profitability of the bank due to the fact that a large proportion of the profits realised by the bank comes in the form of interest paid by debtors (Boahene, 2012). Nevertheless, the risk attached to interest rates is directly connected to credit risk meaning that an increase in interest rates is concomitant with loan default (Nsobilla, 2015). The same idea was also posed by Drehman, Sorensen, and Stringa, 2008 where they stated that these two risks are inseparable. Thus, an increase in non-performing loans is counterproductive. According to Ahmad and Ariff (2007), a non-performing loan is one that has not been serviced for a period of more than three months. Owing to the growing welter of non-performing credits, the Basel II Accord gave emphasis on sound management practices that effectively dealt with credit risk. The result of complying with this Accord is improved bank performance as a result of meaningful steps being taken in order to tackle credit risk.

Ahmad and Ariff (2007) noticed that a lot of banks in markets like Asia-Pacific and Latin America realised greater proportions of non-performing loans and noteworthy increase in credit risk in seasons of banking and financial crunches. These phenomena saw a lot of banks in Thailand and Indonesia shutting down. NPLs decreased the liquidity of banks, credit extension and it backed off the development of the real sector with direct outcomes on the execution of banks, the firm which was in default and the economy in general (Alshatti, 2015).

Bank Size (Total Assets): the theory suggested that firm size had influence on a firm's performance and could be traced back from the conventional neoclassical philosophy and economies of scale theory (Maja, 2012). Economies of scale occur in three forms; financial, organisational and technical reasons. With financial reasons the firm may benefit from lower interest rates and discount due to large quantities that it purchases (Mesut, 2013). With organisational reasons the firm may benefit because of specialisation in certain areas of expertise. And with technical reasons a firm can benefit through division of fixed costs because of large number of units its purchases. In association with these assumptions, firm size was anticipated to positively impact a firm's profitability (Banchuenvijit, 2012). However, on the contrary, some theory advocated about the negative relationship between firm size and performance; diseconomies of scale. Diseconomies of scale may be due to managers pursuing

self-centred goals replacing firm's goal of profit maximisation with managerial utility maximisation function (Maja, 2012).

Total Loan and Advances to Total Deposit: Loan to deposits is net loans and leases divided by total deposits. The higher the loans relative to deposits, the lower the liquidity due to greater amounts of cash disbursements to bank borrowers in relation to the amount of cash receipts from bank depositors. Lower liquidity diminishes the flexibility of banks to analyse their cash obligations when due but yields opportunities of higher profitability due to interest revenues.

Leverage Ratio: Total debt to equity, a debt management measure, is the ratio of total debt funding to equity funding (Boahene, 2012). Higher debt funding holds the potential for increasing returns to shareholders (ROE) through lower requirements of equity investments. This occurs as long as company returns from investment on assets exceed interest costs (Lane, 2009). A firm's financial structure has the ability to influence its ability to generate profit (Lane, 2009). According to Dare and Sola (2010), firms have a choice to choose to be levered or unlevered. Levered firms are firms that inject debt to finance its operations, while unlevered firms do not employ debt on their capital structure, they finance themselves. Banks are highly leveraged as they are mainly funded by the deposits (Kutsienyo, 2011). As a result, the firm subsequently increases the cost of equity and financial risk as more debt is injected (Westerfield & Ross, 2000).

2.3.2 Liquidity Risk

2.3.2.1 Bank Size (Log Total Assets)

The size of a bank, computed as the natural log of the sum of a bank's assets increases its liquidity levels as it impacts its ability to mobilise resources from different sources as well as the cost associated with it (Bonaccorsi, 1992). Bunda and Desquilbet (2008) assimilated bank size in the elements influencing banks' liquidity risk from rising "economies with panel data regression analysis. The outcome revealed that bank size had a positive effect on liquidity risk. Shen, *et al.* (2009) regarded the size of a bank as one of the key determining factor to liquidity risk ("an endogenous determinant of bank profitability") and the outcome was a non-linear association between the size of a bank and the associated liquidity risk. They discovered a positive relationship between bank size and liquidity in a certain range, beyond which it was negatively related. Adding the square of bank size to the list of variables ascertained these

findings. Other studies furthermore suggested that liquidity risk decreased as the size of the bank increased (economies of scale) and that banks had the ability to obtain money cheaply owing to implicit guarantee but beyond particular levels; they would begin to face liquidity risk due to diseconomies of scale (Mesut, 2013). Also, associated with the conclusions from such studies were the huge financial commitments associated with several branch openings and thus the vulnerability to liquidity risk. It was thus expected that as the size of a bank increased, they would obtain the intrinsic ability to mobilise considerable deposits with ease and for that matter were then able to grant more loans at any point in time coupled with the higher operating cost associated with expansion (Lee, 2009). Big firms had more competitive power because of market share compared to small firms (Jónsson, 2007).

2.3.2.2 Finance Gap Ratio

The risk of liquidity originating from potential failure of banks to provide for decrease in liabilities or to finance growths on the side of assets on a financial statement is regarded as a significant determining factor of profitability (Kosmidou, 2005). It is expected that banks with a higher financing gap ratio expend most of their hard cash, trade liquid assets and moreover rely greatly on non-deposit capital to make up for the gap; consequently, increasing the cost of funding and hence reducing profitability (Shen, *et al.*, 2009). In the case where there is a competitive market for deposits, greater liquidity tends to be adversely related to interest margin. Ismail (2011) stated that in order to anticipate liquidity gap or liquidity mismatch, banks must frequently match assets and liabilities. Through this process the bank is able to allocate correctly its assets based on maturity mismatch. However, liquidity management is a dilemma if banks want to maintain high liquidity. This is because profits will be low and on the contrary low liquidity results in high profits (Darmawan, 2014). Demirgüç-Kunt, and Huizinga (1998) showed that banks a huge supply of liquid assets in government securities and in cash have higher chances of receiving lower interest income compared to those with a meagre liquid asset base. It is thus anticipated that financing gap would be positively related to ROE and ROA (Saunders & Cornett, 2014).

2.3.2.3 Equity to Total Assets

In literature, this ratio, ETA for short, is normally used to proxy for capital and adequacy strength which is one of the substantial intrinsic contributing factor to profitability. Banks possessing higher capital-asset ratios are regarded as comparatively safer in case loss or bankruptcy occurs, and the other way round (Shen, *et al.*, 2009). Moreover, an appreciation in

the capital of a bank enhances the propensity of greater incomes resulting in reduced cost of financial distress (Siaw, 2013). The lesser risk of being in financial distress thus results in an increased creditworthiness of a bank and subsequently lessens the price of getting external capital. Osuka and Richard (2013) hold that capital adequacy is a noteworthy driver of profitability. Based on Vong and Chan (2009), ETA measures the ability of a financial institution to survive bankruptcy and losses. Highly capitalised banks have the ability to reduce funding costs which in turn increases profitability (Ghazouani & Moussa, 2013). Literature on the link between profitability of a bank and capital maintains ETA as a discrete parameter of profitability and consequently depicts a positive connection (Naceur & Kandil, 2009; Barth, 2003; & Kosmidou, 2005) . The implication is that banks that possess greater ETA will therefore not be as reliant on externally sourced capital and consequently maximise their profitability. Although a positive connection between capital sufficiency and ROA is expected, it is expected that a negative link with the ROE will exist as banks with a competitive advantage possess a minor fraction of equity. This entails that as the denominator gets smaller, with a given level of profit after tax, the ROE rises (Alshatti, 2015).

2.3.2.4 Non-performing loans to total loans

The proportion of non-performing loans to loans is employed in the indirect determination of credit risk (Nsobilla, 2015). Differences in credit risk will possibly mirror fluctuations in the strength of the loan portfolio of a bank which in turn affects the profitability of the financial institution (Cooper, Jackson, and Patterson, 2003). Acknowledging that differences in profitability are mostly ascribed to differences in credit risk, Klapo and Ayeni (2012) assert that a bank's profitability is inversely related to its amplified exposure to credit risk. There is therefore a great concern about not just the volume of loans made but rather the quality of them. It is from this perspective that Miller and Noulas (1997) proposed that banks heavily exposed to loans with high risk attached to them increase the build-up of loans that are not paid back and thus decrease their profitability. Nevertheless, agreeing to the fact that high risk is commensurate with high returns (in the form of income on interest), Maudos and Fernandez (2004) indicated that the risk associated with a debtor defaulting on their loan payment (credit risk) calls for the application of a risk premium by the bank as part of the interest rate attached to the loan facility. This supports the argument that banks that take up more credit risk exhibit higher interest margins. According to Arko (2012) a greater proportion of loans expended become non-performing loans. The deteriorating health of non-performing loans is the number one cause of distress in developed and developing economies (Mombo, 2013). Doliente (2005)

also specified that the pinch of credit risk is felt in the additional risk premium which is levied by banks to recoup lost revenue from interest rates. Thus, it is predictable that NPL negatively impacts ROA and ROE (Aduda & Gitonga, 2011).

2.3.2.5 Non-Deposits Dependence (NDD)

The reliance of a bank on external funding sources apart from that obtained from depositors cannot be over-emphasised in assessing its probability of facing liquidity risk. Shen, *et al.* (2009) regarded it as a contributing factor to liquidity risk and therefore they employed the proportion of external funding to total liabilities to indirectly determine its dependence on non-deposits. Another study by Valeriu and Nimalathasan (2010) stated that external financing (debt) was positively related to profitability ratios namely gross, operating and net profit ratios. Banks heavily depending on wholesale funding and other money market tools instead of core deposits to finance loans and other financial obligations have the likelihood of facing liquidity risk compared to those that engage in the practice of the contrary. Shen, *et al.* (2009) cautioned that the larger the funds these banks would desire to appropriate from the money market, the grander the liquidity risk they would face. It is thus obvious that non-deposit dependence and liquidity risk are expected to be positively related. Harwood (2015) stated that external funding is beneficial in that it increases tax free income and improves firms' market value.

2.3.2.6 Market Capitalisation to Total Assets

Pandey (1999) highlighted that capital markets fundamentally have two roles which are liquidity and valuing securities. Liquidity can basically be explained as the capability of the stock markets to turn assets into money and facilitating asset transfer with no loss in value at each level of transaction. Capital markets play a role in turning securities liquid through mediating transactions between numerous investors at significantly low to no cost. Under this market type, prices are determined by demand and supply. All data on securities is published openly thus allowing for fair determination of securities prices (Ali-Mustafa, Al-Qudah, & Mahmoud, 2013). While the level of economic activities influences the stock market, the stock market also influences the level of economic activities (Oluwatoyin, Gbadebo, & Odularu, 2009).

2.3.3 Market Risk

2.3.3.1 Inflation

Bank performance has been found to be a function of inflation. Generally speaking, loan interests and bank income is high when the rate of inflation is also high. According to Hussain and Farhana (2012), there is both a direct and indirect relationship of rising prices in all industries of the economy. Bashir (2003) indicated that a bank's profitability is positively impacted by inflation that has been planned for whereas inflation that has not been forecasted produces a negative effect. Correctly forecasting on future inflation rates gives banks the opportunity to adjust their interest rates in accordance to what has been forecasted. The result is that revenues increase at a rate faster than that of expenses ultimately resulting in higher profit margins. This was also supported by research carried out by Bourke (1989).

The negative aspect of inflation comes in when operating expenses are increasing at a faster rate than the inflation rate itself. Al-Timmi, Alwan, and Rahman (2011) discovered that the impact of rising prices and interest negatively affect loan agencies and profitability. Khan, Shahid, Bari, Anam, Shehzad, and Siddique (2014) stated that the costs of living and price increase climb much quicker than wages and salaries, consequently consumers fail to repay loans and mortgage bonds in time. Perry (1992) also spoke about the negative impact of inflation where he stated that any unexpected increase in the rate of inflation resulted in cash flow challenges for debtors leading to them prematurely terminating their loan agreements. Likewise, Hoggarth, Milne, and Wood (1998) concluded that high and variable inflation has the potential to pose challenges in terms of planning and loan negotiations.

2.3.3.2 Lending Interest Rates

This is the cost/fee a debtor pays for the exchange of borrowed capital/assets from a lender/financial institutions (Crowley, 2007). This can also be alternatively defined as rent of money. Interest rates are central in a capitalistic economy and are generally stated as a percentage per annum. As a price of money, interest rates reflect market data regarding expected drop in the buying power of money or impending inflation (Ngugi, 2005). It is widely believed that fluctuations of market interest rates exert significant influence on bank performance. Based on the work by Samuelson (1945), under general conditions banks' profits usually increase with rising interest rates. He argued that the banking system as a whole is immeasurably helped, rather than hindered by an increase in interest rates. A more accurate measurement of how fluctuations in market interest rates affect banking firms largely depends on the sensitivity of bank's assets and liabilities (interest rates and volume) towards variations in open market rates (Mwangi, 2012). Stiglitz and Weiss (1981) advanced arguments against

high interest rates. They pointed out that an attempt to charge higher interest rate negatively affected the quality of a bank's loan because of two effects: incentive and adverse selection effects. First, it raised the overall riskiness of the portfolio of assets. Rising interest rates reduced the returns on all projects and made less risky projects unprofitable (incentive effect) (Were & Wambua, 2013). This would make firms switch to more risky projects as interest rates arose. Secondly, banks had to screen borrowers. This was because at a high borrowing interest rate, borrowers would be less worried about the prospect of non-payment (adverse selection effect). This implied that the rational profit maximising will practice credit rationing which defeated the assumption generally made in financial liberalisation literature, that of interest rate liberalisation eliminating credit rationing (Mang'eli, 2012).

2.3.3.3 Gross Domestic Product

This is the widely used macroeconomic indicator for determining a nation's total economic activity (Sara & Muhammad, 2013). The rate at which GDP grows reveals the status quo of the economy. The expectation out of this is that GDP impacts the demand for loans. The economic conditions and the specific market environment would affect the bank's mixture of assets and liabilities. When GDP increases, banks may earn a higher profit by taking on higher risk, which boosts profits (Khrawish, 2011). Sufian and Habibullah (2009) pointed out that the GDP is anticipated to impact various factors associated with the demand and supply for loans and deposits. A favourable economic climate has a positive influence on the supply and demand of banking services. The rate at which an economy grows puts a limit on the rate of growth of a bank and its profitability. This means that a well-managed bank makes reasonable profits from loans and the sale of securities when there is a good growth rate of the economy. Under these circumstances, profitability is also enhanced by an increase in demand for financial transactions, which also puts a demand on loans to fuel such transactions (Ghazouani & Moussa, 2013). A strong economic climate is also characterised by a great need for financial services which in turn result in increased cash flows, profits and non-interest earnings for the bank. Therefore, the growth rates of GDP and the profitability of the bank are positively related (Siaw, 2013).

2.3.3.4 Exchange Rate

This has been adopted as the standard (or index) for measuring a country's international competitiveness based on its currency. A highly competitive currency has a lower index. It is believed that volatile exchange rates have an effect on the cash flow that is expected by a

corporation. This makes those firms with an international presence underperform as their home currency changes affecting costs and revenues (Amihud and Levich 1994). Diffu (2011) stated that understanding the concept of foreign exchange is imperative as it impacts on the companies' finance costs and profitability. Lee and Niannian (2010) have shown that firms that have robust currency risk management frameworks have higher firm performance.

2.3.3.5 Money Supply Change (M3)

Money supply is the sum of currency outside banks and deposit liabilities of commercial banks. Deposit liabilities are defined in narrower and broader senses as follows: narrow money (M1); broad money (M2); and extended broad money (M3). The Reserve Bank has been targeting monetary aggregate (broad money M3) in its policy decisions. Rotich (2007) posited that at times of high inflation, or positive output, the Reserve Bank responded by reducing money supply. Money supply (M3) is anticipated to have a positive impact on profitability of commercial banks. Akomolafe (2014) opined that the stability of a country lies on the stable financial sector and monetary policy. As the central bank increases money supply, banks are able to extend loans to borrowers and the more profit they can then make (Solomon, 2012).

2.3.3.6 Market Capitalisation LOG (Stock)

It is imperative to recognise the degree of effect unto which the trade of a share in a stock market has on the profitability and performance of a firm. Unlike a money market, a capital market is one that specialises in raising medium to long-term capital. It is a system of specialised financial institutions connecting traders and users of medium to long-term capital. Its purpose is to provide resources for supporting industrial growth and in so doing increasing profitability.

Okechukwu (2004) highlighted some of the ways in which a stock market can contribute to economic growth. The first area of note was related to Funds transfer freedom. The view was that all economies with colossal rising capital markets had loose laws on the exchange of assets and with regards to remote speculation, on direct and portfolio venture. At the end of the day, foreign investors were permitted to obtain and also repatriate capital and profits without unnecessary limitations. This would advance development and subsequently the improvement of the economy (Ali-Mustafa, Al-Qudah, & Mahmoud, 2013).

Another area was to do with the availability of infrastructure. Research showed that a contemporary capital market flourished with the accessibility of accurate and dependable

information and data that was distributed to all involved parties. This would then guarantee proficient communication (Okechukwu, 2004). Linked to this area was the allocation of efficiency. The role of capital market would be to allocate scarce savings to productive investments in a way that would benefit everyone (Oluwatoyin, Gbadebo, & Odularu, 2009). The last two areas involved pricing efficiency and capital efficiency. Capital markets would ideally use prices as signals for efficient capital allocation and the demand and supply forces would also play an imperative role in setting these prices. Efficient market hypothesis assumed information efficiency processing. Hence, capital assets were correctly valued, at any time, by the available information (Siaw, 2013). Capital efficiency meant limited resources were efficiently allocated by the capital market to productive investments in order to profit everyone (Ali-Mustafa, Al-Qudah, & Mahmoud, 2013).

2.4 Empirical Literature on the Determinants of Financial Risk

2.4.1 Credit Risk

In 2001, The Basel Committee defined Credit Risk as the likelihood of losing the loan in part or in total as a result of credit events such as defaulting on loan repayments. Klapo and Ayeni (2012) said the number one key risk of a bank is credit risk. The trend for financial institutions to suffer financial distress is due to high exposures of bank to credit risk. Thus, numerous researches have been conducted to evaluate the effectiveness of credit risk management and the notion that there is a positive correlation between credit risk management and bank performance. Boahene, Dasa, and Agyei (2012) conducted a study on the bank performances of selected large banks in Ghana to evaluate the relationship between credit risk management and performance. Panel data was used, extracting primary data from the six largest banks in Ghana. In their findings, they discovered that a noteworthy association existed between risk management and the performance of banks.

Njanike (2009) in his study of credit risk management as a tool for survival in Zimbabwean banks discovered that the failure to effectively managed credit risk contributed to a greater extent on the banking crisis and demise in Zimbabwe in the early 2000's. In his study, he used questionnaires to conduct a survey using over six months' worth of data. Klapo, *et al.* (2012) did a study on five commercial banks in Nigeria. Panel data modeling was used to conduct the study. At the end of their research they recommended that Nigerian banks should enhance their capacity on credit analysis and in administering key loan risk indicators (e.g. ratio of non-performing loans). Again, another study was done in Nigeria by Kargi (2011) on credit risk

management and profitability of banks. In his study, he made use of financial ratios extracted from annual financial reports and regress data using regression, descriptive and correlation techniques. In his study, he showed that credit performance in banks improved following the regulatory changes.

Furthermore, in the same year Al-Kouri (2011) also did a study on the specific risk factors on the overall performance of banks. The study was done on 43 banks that operated in the Gulf Cooperation Council countries. In his study, he used the fixed effect regression model narrowly focusing on liquidity, capital and credit risk. He discovered that indeed these three risks are correlated with performance of the bank when measured against ROA. Singh (2013) conducted a study on Indian commercial banks to assess the connection between credit risk management and bank performance. In his study, Singh revealed that for any bank to achieve financial soundness it required effective risk management. Alshatti (2015) also did a study on the effect of credit risk management on the performance of banks in Jordan. Again, panel regression model was employed to examine the impact of credit risk management on bank performance. He recommended that for banks to improve their profit they take into consideration the key risk indicators affecting their credit books.

Kayode, Obamuyi, Owuputi, and Adeyefa (2014) did a study investigating the influence of credit risk on performance of banks in Nigeria. A panel estimation of six banks from the year 2000 to 2013 was done using the random effect model framework. Their results showed that credit risk was undesirably and considerably connected to bank performance measured by ROA. This suggests that an increased exposure to credit risk reduces bank profitability. They also found that total loans positively and significantly impacted on bank performance. An investigation by Hakim and Neaime (2001) which looked into the impact that liquidity, capital and credit had on bank performance in Egypt and Lebanon showed that the banks were managed efficiently and the regulations around them were effectively applied. Manzura and Juanjuan (2009) noted that NPLs had an effect on profitability more than capital adequacy ratio had and credit risk management affected profitability differently for all the banks studied.

Kithinji (2010) indicated that the larger part of the profits was affected by other parameters other than credit and non performing loans. Aduda and Gitonga (2011) discovered that credit risk management had a reasonable level of effect on profitability. Epure and Lafuente (2012) looked at the performance of banks with respect to risk for the period from 1998 to 2007 in Costa Rica. The study revealed that regulatory changes consequently resulted in performance

improvements and that the differences in performance between banks were because of risk and non-performing loans. The study also showed that they had a negative effect on efficiency and return on assets whereas the capital adequacy ratio positively impacts the net interest margin. Miller and Noulas (1997) established a negative association between profitability and credit risk meaning that the greater the risk the greater the loss of value due to defaulting clients resulting in difficulties in a bank's ability to maximise profits.

Felix and Claudine (2008) studied the link between credit risk management and the performance of a bank. They discovered that ROE and ROA were inversely correlated to the proportion of non-performing loans to total loans in so doing resulting in a drop in profitability. Aremu, Suberu, and Oke, (2010) also found that non-performing loans threatened profitability in Nigerian banks. A study by Ahmad and Ariff (2007) which looked into determining factors of credit risk in banks operating in emerging economies in comparison to those in developed nations yielded the result that regulation played an important role for banks that had multiple products and services in their portfolio. The study also revealed that the quality of management was crucial in banking systems in third world economies that were loan-dominated. Another noteworthy determining factor of potential credit risk is the rise in loan loss allowance. The research additionally pointed out that credit risk in banks in developing economies was greater compared to established markets. Indiael and Dickson (2013) did a study in Tanzania analysing credit risk and performance and found a significant relationship. The credit risk pointers portrayed a negative association between bank performance and credit risk which showed that poor bank performance was due to higher credit risk. Ahmed, Takeda and Shawn (1998) showed that loan loss allowance positively impacted NPLs. As a result, an increase in loan loss allowance signified an escalation in credit risk and a weakening of loan quality. This in turn would then cause an adverse affect on the performance of the bank.

2.4.2 Liquidity Risk

Liquidity performance is the ability to meet obligations as they fall due. For a banking institution, it is very important to manage liquidity risk for the sustained viability of a bank. Basel I (1988) and Basel II (2004) set out clear standards for credit and market risk. Basel II goes further in taking an in-depth analysis of operational risk. However, little was covered with regards to liquidity risk. In Basel III (2013), the Basel committee became more explicit on liquidity requirements and the development of the liquidity coverage ratio. Gup and Kolari (2005) motioned that for a bank to better manage its liquidity requirements, it should first

estimate its fund's needs (deposit inflows and outflows) as well as loan variance. In their study, they revealed that interest rate had a massive impact on deposit flows. From these studies, we can deduce that high levels of interest rates lead to low levels of liquidity, whereas low levels of interest rates lead to high levels of deposit inflows.

Some empirical studies revealed that liquidity risk impact on bank performance was diverse. Molyneux and Thornton (1992) discovered a positive impact made by liquidity. On the flip side, Bourke (1989) found there to be a negative effect. Poorman and Blake (2005) did a study on liquidity risk. Their study, which addressed new ideas and metrics pertaining to liquidity risk, revealed that it was not sufficient to use liquidity risk ratios to measure bank performance. There were other factors that ought to be considered to obtain consistent and reliable results. Decker (2000) reported that it was very difficult for a bank to obtain funds when the bank did not have adequate liquidity probably when converting assets with an aim of not losing value. Nevertheless, the more recent study that was done by Shen, Chen, Kao (2009) on bank liquidity risk in Taiwan used twelve major commercial banks. Unbalanced panel data model was employed in this study and they used financing gap as a dependent variable. They found that in the overall bank risk, liquidity risk was endogenous in determining bank performance. They also discovered that the main risk factors were external finance and components of liquid assets, macro-economic factors, as well as supervisory and regulatory requirements.

Marozva (2015) did a study on connection between liquidity and performance of banks in South Africa for the period from 1998 to 2014. This investigation used the Auto Regressive Distributed Lag (ARDL)-bound testing approach and the Ordinary Least Squares (OLS) to study the relationship between net interest margin and liquidity. The study observed that a significantly negative connection existed between net interest margin and funding liquidity risk. However, there was an insignificant co-integrating association between the two measures of liquidity and net interest margin.

Tabari (2013) examined the influence of liquidity risk on bank performance using of panel data related to banks in Iran for the period starting from 2003 to 2010. This research used two groups of parameters only specific to a particular bank and macroeconomic variables and the outcome was that the parameters; bank size, assets, GPD and inflation had a positive impact on bank performance while liquidity and credit risk adversely affected its performance. The empirical analysis of data based on 5066 banks in Europe over the period between 1998 and 2004. Lucchetta (2007) hypothesised that interest rates had an effect on the risk-taking ability

of a bank as well as its decision to maintain liquidity. The study concluded that across Europe, the interest rate between banks had positive effects on the liquidity held by banks and their resolve to be lenders in the interbank market. The main parameter that influenced the resolution to loan in the interbank market was the liquidity price which was dependent on the demand and supply of liquidity and on the risk-free interest rate. The results also showed a negative relationship between fiscal arrangement loan fee and the choice of a bank to hold liquidity and to loan in the interbank market.

Arbaban and Geraili (2009) studied the influence of a bank's capital base on the profitability of business establishments accepted on Tehran's stock market. They revealed a positive connection between the proportion of short-term loans to the asset and profitability of the company as well as between the proportion of total debt to the asset and profitability. However, the proportion of long-term debt to assets was negatively related to profitability. A study by Chirwa (2003), the Malawian Commercial revealed that profitability and capital adequacy ratio were negatively related. Abor (2005) looked into the same issue from a Ghanaian perspective and found that the proportion of short-term debts to the asset was positively related to profitability while on the other hand, the proportion of long-term debt to the asset was negatively related to profitability.

A direct and positive link between asset management and profitability of a bank was found by Havrylchuk and Emilia (2011). Accordingly, an efficient bank was expected to be more profitable because of its ability to maximise on its net profit income. In their study of the bank-specific and macroeconomic factors of liquidity risk between 57 United Kingdom local banks within the period 1985 to 2003, using the proportion of liquid assets to total assets as a yardstick for liquidity risk, Aspachs (2005) made some critical observations. They indicated that the likelihood of obtaining funding from the creditor of last resort, which ought to lessen the motivation for stocking liquid assets had a positive relationship with liquidity risk. The desire to achieve higher net interest margins which functions as a measure of opportunity cost for holding cash had a positive effect on liquidity risk the same way loan growth does as higher loan growth hints a surge in illiquid assets. They further indicated that despite the fact that bank size had a non-linear (no definite) effect on liquidity risk, GDP growth as an indicator of business cycle and short term interest rates which brings out the monetary policy effect both positively impacted liquidity risk.

Still, with the ratio for liquid assets to total assets as quantifying criteria for liquidity risk (dependent variable), Bunda and Desquilbet (2008) were analysing the factors affecting the risk of liquidity of banks from developing nations using panel data regression analysis. The outcome revealed that bank size positively affected the risk of liquidity and the proportion of equity to assets negatively affected liquidity risk. Once more, the presence of prudential regulation compelling banks to be liquid enough together with the share of public expenditure on GDP as a way of determining the supply of relatively liquid assets and the inflation rate which increases the susceptibility of banks to insignificant loan values provided to customers all negatively affected liquidity risk. They also showed the relationship was a positive one during the financial crisis which was likely a result of poor bank liquidity. Considering exchange rate regime factors, banks in states with extreme regimes were less likely to face liquidity risk than in countries with intermediate regimes.

Rauch (2010) in their study of 457 German state-owned savings banks from 1997 to 2006 analysed the determinants of their liquidity creation. According to the study, macro-economic factors such as tight monetary policies had negative effects on bank liquidity creation through their interest rates. The unemployment level was linked to high loan demands and used as an alternative for the general condition of the economy; showed a negative effect on liquidity and thus a positive effect on liquidity risk. The negative influence meant that the healthier the economy, (the lower the unemployment rate) the more liquidity created by banks. They concluded that only macro-economic factors had strong association with liquidity risk and that bank-specific variables such as profitability and bank size, evaluated through the total number of customers a bank has, did not have any effect on liquidity creation.

Moore (2010) studied the impact caused by a financial predicament on the liquidity in Latin American and Caribbean banks over the period of 34 years spanning the period 1970 to 2004. The results based on monthly observations revealed that liquidity risk was positively associated with the business cycle in fifty percent of the nations under review and to the instability of the cash (withdrawals) to deposits ratio; an indication that commercial banks had the propensity to increase liquidity when the volatility of cash demand by customers arose and vice versa. The results further indicated that the effect of money market interest rate as an indicator of the opportunity cost of stocking liquidity is mixed. Countries with higher interest rates had a negative relationship with holding liquidity; thus indicating a positive link with liquidity risk and vice versa. Consequently, the relationship between financial crisis and bank liquidity

varied across countries depending on where there was a lending boom before the crisis or where banks were subject to large deposit withdrawals during the crisis making them more vulnerable to liquidity risk. Others were more liquid during the crisis especially in countries where the crises were accompanied by an exchange rate crisis that probably led banks to be more conservative in their liquidity though this practice had the propensity of deepening the crisis if companies could not access credit to finance their operations.

2.4.3 Market Risk

Market risk is the change in net asset value (NAV) due to change in underlying economic factors such as interest rates, exchange rates, and equity and commodity prices (McKinsey, 2012). Researchers and financial market analyst have different views on what can be accepted as the satisfactory market risk measure (David, 1997). Furthermore, Mckinsey and Company (2012) defined market risk as bank's trading book losses due to changes in foreign exchange rates, credit spreads, commodity prices, interest-rates and other economic factors whose values were set in public market. David (1997) ascertained that banks used mathematical and econometrical techniques to manage market risk. Chief among these models was value-at-risk (VaR) which was developed by JP Morgan chase. For the past 19 years VaR had been used as the standard measure of market risk.

Hamid (2005) did a study on determinants of market risk on commercial banks in Malaysia. In his study, he used pooling time series and cross section data and panel model was used as an analysis instrument. He therefore suggested that the comprehensive market risk management system should be a prerequisite as it contributed to the overall performance of a bank. Gizycki (2001) also did a study on effects of macroeconomic conditions on bank risk and profitability in Australia. The paper examined the variability of Australian banks credit risk during the 1990s. Marianne's study made use of the regression analysis to analyse these variations of the macroeconomic factors and their effect on banks profitability.

Warue (2013) did a study on the impact of macroeconomic and bank-specific factors on non performing loans in commercial banks in Kenya. In his study, he used panel data analysis. Warue's study discovered that the macroeconomic factors were important factors to look at when evaluating bank performance as they also had a substantial effect on the overall bank performance. Qinhua (2014) also did a study on the profitability of banks in China in light of the macroeconomic factors in the decade after the World Trade Organisation (WTO) Accession. Their paper made use of the panel data on 10 Chinese commercial banks during

1998-2012. The outcome of the study confirmed that macroeconomic factors had a substantial impact to the earning power of Chinese commercial banks.

Feing-Xiao (2008) investigated the effect of China's securities exchange on firm-level investment by utilizing panel data set developed by the creator of all firms listed in China for the time frame from 1992 to 1999 and by employing both fixed impacts and generalised method of moments (GMM) strategies. The outcomes demonstrated that securities exchange valuation impacted investment choices, especially amid the stock exchange boom of 1996-1999. In light of the present-esteem display, he found that securities exchange valuation in China veered off altogether from hidden essentials. Thus the current securities exchange extension in China was probably going to create a wasteful asset designation and cause hindering consequences for the economy. Different reviews call attention to that securities exchange improvement could have negative impacts by encouraging antagonistic hostile takeovers (Shleifer and Summers, 1988; Morck, Shleifer, and Vishny, 1990).

Akomolafe, Danladi and Babalola (2015) studied the effect of monetary policy on performance of banks in Nigeria using micro-panel analysis. Interest rate and money supply were used as representations for monetary policy, while profit before tax (PBT) represented performance. The analysis employed fixed effect regression, pooled regression, and random effect regression; although an investigation by Hausman showed that the most appropriate tool to use was fixed effect regression. The outcome of the investigation was a positive association between profits and monetary policies as indirectly determined by money supply and interest rate. Nevertheless, there was no statistical significance on interest rate at 1% and 5% significance levels. Okoye and Eze (2013) also carried out the same study and found out that monetary policy rate positively affected the performance of commercial banks. However, Enyioko (2012) showed that monetary policy had not improved the overall performances of banks significantly.

Guru, Staunton, and Balashanmugam (2002) studied on a sample of seventeen commercial banks during the 1986-1995 time periods in Malaysia. In this study, it was found that inflation positively affected bank performance. Naceur (2003) investigated the effect of banks' characteristics, final structure and macroeconomic indicators on banks' profitability and net interest margin in Tunisian Banking Industry for the 1983-2000 periods. It was also reported that there was a relationship between high capital ratios and profitability and net interest margins in banks that held them. Naceur (2003) also found out that inflation and growth rates

had negative effects and stock market development positively impacted profitability and net interest margin.

Ongore and Kusa (2013) argued that macroeconomic factors did not have a significant effect on profitability. Athanasoglou (2006) reported mixed results with regards to the same factors. Thus, it is hard to come to a conclusion of whether macroeconomic variables influence profitability in Kenya. This review accordingly, looked to connect the uncertain gaps found in literature on the impact of macroeconomic factors on profitability and the methodological loophole of generalisation by determining the impact of macroeconomic variables on bank productivity in Kenya with equity in core interest.

Ali, Farhan, and Zafar (2011) studied the macroeconomic and bank-specific factors of profitability in a Pakistani context. ROE and ROA were used as profitability indicators. Statistical techniques employed in this study were Pearson correlation and regression analysis. The outcome was that ROA and ROE were positively linked to bank size, total deposits to total assets ratio and operating income/total assets ratio, but then ROA had a negative relationship with credit risk and capital. GDP was also found to be a significant factor that impacted on a bank's profitability.

A study was also done by Alper and Anbar (2011) on what factors impacted bank profitability in Turkey from the year 2002 to 2010. Using panel data analysis, the outcome of their research was that ROA was directly proportional to asset size, real interest rate and non-interest income/assets while it was adversely affected by loans. They also found that a bank's profit had little or nothing to do with capital ratio, net interest margin, deposits, inflation and GDP. A similar study using data from 2005 to 2009 analysed the contributing factors to banks' profitability (Anum and Qudous, 2012).

Using regression analysis, the findings of their research were that internal variables such as interest income, credit risk and loans substantially affected a bank's profitability. They also found out that profits were not a function of bank size, as well as other factors such as exports, imports, discount rates and inflation. Safarli and Gumush (2012) carried out an investigation to establish the external and internal factors influencing the banking sector in Azerbaijan. The 'CAMELS' model was employed to assess performance and Panel data regression analysis was applied to establish the elements of profitability. The conclusion arrived at was that GDP and inflation negatively impacted banks' performance.

Husni, Walid and Ali (2011) investigated the factors impacting the Jordan Islamic banks from the year 2005 to 2009. The statistical analysis model used in this study was the Multiple Linear regression model. The outcome was that ROE had a noteworthy relationship with total income/total asset and total equity/total asset. Fadzlan and Royfaizal (2008) looked into the same issue in the context of Philippines, with data from the year 1990 to 2005, using a Multivariate regression model. The outcome was that profitability was negatively associated with credit risk, bank size and expenses management while conversely portraying a positive connection with capitalisation, non-interest income and inflation. They also found that other macroeconomic elements like market capitalisation and Money supply insignificantly impacted banks performance.

Azam and Siddiqui (2012) looked into the profitability of foreign and locally owned banks in Pakistan. It was discovered that domestic banks were less profitable in comparison to foreign banks and that GDP and inflation had a greater impact on local banks than foreign-owned ones.

2.5 Determinants of Bank Profitability

Previous studies used three major profitability measures for banks which; ROA, ROE and NIM. The ROA reflects the ability of a bank to make reasonable profit from its assets whereas ROE specifies the returns realised by shareholders on their investment. NIM determines the gap between the interests paid to investors versus that received from debtors. Numerous investigations have been undertaken by many scholars from all over the world using the same performance indicators and achieved different results. However, this study made use of ROE.

Goddard, Molyneux, and Wilson (2004), carried out an investigation into the profitability of banks in Europe (Spain Denmark, Germany, the UK, Italy and France) in the period from 1992 to 1998 using a cross-sectional and a dynamic panel analysis. Using ROE as the dependent variable, the research used size, business diversification, capital adequacy, credit risk and ownership type as well as dynamic effects as the explanatory variables. The outcome showed that regardless of the increasing competition between banks, there was a noteworthy persistence of atypical profits from year to year. It was also evident that the relationship between size and profitability was relatively weak. The connection between the importance of off-balance-sheet businesses (OBS) in a banks' portfolio and profitability was positive for the UK.

The relationship between the capital–assets ratio and profitability was positive though this finding

did not reflect the expected theoretical relationship between risk and return since a high CAR (capital-asset ratio) signified that a bank was operating over-cautiously and ignoring potentially profitable trading opportunities. However, it was revealed that high CAR takes care of the cost of insurance against bankruptcy, signalling a higher future profitability and thus creating a positive association between CAR and ROE. There was no systematic association between type of ownership and profitability based on the pooled estimation across all countries. In all the countries, cross-sectional estimation, cooperative banks were less profitable than commercial and savings banks, though the effect was only significant at the ten per cent level.

2.6 Financial Risk Management Strategies

2.6.1 Credit Risk

2.6.1.1 Credit Risk Strategies

The strategies by Klapo and Ayeni (2012); strategies mentioned are not limited to the list; Credit securitisation- where a buyer would purchase a contract from a seller and pays the seller in return. Should the third party default the seller would compensate the buyer. Securitisation is more of any insurance policy (Chen & Pan, 2012). Credit analysis - process by which counterparties are screened so as to grant credit to the most qualifying applicants. Where a bank can estimate the likelihood of default, hence, produce the expected credit loss. Moreover, in this regard, they can work with the credit bureau to get information of a borrower (Aduda & Gitonga, 2011). Compliance to Basel Accord- Basel accord is the institution that regulates banking globally ensures soundness and stability in the banking system (Basel, 2008). Credit derivatives- credit derivative in concept is almost the same as credit securitisation. It is an instrument sold to a third party other than the lender to protect the loan portfolio should the credit default take place. These instruments consist of forward contracts, options and swaps (Klapo & Ayeni, 2012).

2.6.1.2 Measures in Credit Portfolio

The three listed measurement techniques in credit portfolios by Hebbeln (2010) are briefly explained below as follows: Probability of default (PD): According to Hibbeln (2010) PD is defined in context of the Basel Framework. PD is the likelihood that a debtor defaults within 1 year. Default is defined according to either or both of the two following scenarios; The bank assumes that a debtor is likely going to fail to pay their loan repayments in full, without

recourse by the bank to actions such as realising security (if held). No payment has been made to the bank for at least 90 days since the last payment. Overdrafts also fall in this category when they are past due.

Loss given default (LGD): Gives the portion of loans and advances exposure that cannot be recuperated by the bank should the debtors default. Moreover, obligor specific features the LGD can greatly hinge on the contract-specific features such as the value of collateral and the superiority of the credit obligation. There likewise exists a significant direct relation between the LGD and the supposed recovery rate (RR). Both variables normally yield values in the range of 0% to 100% but the loss given default can also be greater than 100% as workout costs arise when the bank attempts to recuperate the remaining risk. Should the bank be unsuccessful to recuperate the loan, the full loss amount can be greater than the defaulted exposure principal to an operational LGD greater than 100% and to an RR smaller than 0%, correspondingly (Hibbeln, 2010).

Exposure at default (EAD): entails the present outstanding which are previously drawn by the obligor. Moreover, the obligor might draw a share of the commitments (COMM) foremost to an amplified EAD. This portion is termed the credit conversion factor (CCF). In spite of the fact that the exposure at default is a random variable, it is often associated with the expected gross exposure of the facility upon default of the obligor (Basel, 2008; Hibbeln, 2010).

Using these three components, a bank can quantify the loss of a single credit or of a credit portfolio (PF) that consists of n different loans (Hibbeln, 2010).

2.6.2 Liquidity Risk

2.6.2.1 Liquidity Risk Strategies

The following are strategies by the Basel Committee on Banking Supervision (2008). Strategies are not limited to the ones mentioned here.

Supervision of liquidity risk - banks ought to institute a stout liquidity risk management framework for the management of sufficient liquidity. This helps in maintaining high quality liquid assets which is also a tool for withstanding stress events (impairment of secured and unsecured funding).

Articulation of liquidity risk tolerance - a bank has got numerous ways to express risk tolerance; qualitative and quantitative. This is the core task of the senior management.

For a bank to properly project the assets cash flow, off-balance sheet items and liabilities it should find noble methods to identify liquidity risk, measure, monitor and control.

This process also assists in knowing the triggers associated with off-balance sheet positions. A bank should identify measure, monitor and control a bank's liquidity risk positions for the four major reasons (BCBS, 2008): Future cash flows of assets and liabilities. Sources of contingent liquidity demand and related triggers associated with off balance sheet positions, currencies in which a bank is active, and lastly, correspondent custody and settlement activities.

2.6.2.2 Liquidity Risk Measures

The Basel Committee on Banking Supervision (BCBS, 2008), recommended two quantitative metrics in analysing a bank's liquidity risk at any point in time. These were Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR), which were designed to fulfil two discrete, yet complementary, goals. These two were to make certain that banks had a sufficient supply of liquid assets, while at the same time implementing a rational and prudent maturity mismatch.

The goal of LCR was to encourage short-term flexibility by guaranteeing that a bank had sufficient high-quality liquid assets to endure a severe stress situation that goes on for a month. The Net Stable Funding Ratio was developed to achieve the second objective of the Basel III liquidity standards: promoting longer-term resilience by encouraging banks to fund their activities with more stable sources of funding. That is, the NSFR was a longer-term structural ratio designed to address liquidity mismatches and to encourage an increased dependence on medium and long-term capital, therefore growing the average maturity of banks' liabilities (BCBS, 2008). Liquidity Coverage Ratio intended at growing banks flexibility to a critical month-long situation. The Basel committee measure liquidity coverage ratio as the store of high-quality liquid assets to total net cash out-flows over the next 30 calendar days $\geq 100\%$. Put differently, to achieve funding requirements and withdrawals on provisional liabilities over the next 30 days, the LCR required banks to hold a stock of unfettered high-quality liquid assets equal to or greater than stressed net cash outflows. The prerequisite must be fulfilled unceasingly and conveyed to managers on at any rate on a monthly basis, with an ideal lag time of two weeks or less (BCBS, 2008)

2.6.3 Market Risk

2.6.3.1 Market Risk Strategies

According to the Basel Committee there are three major market risks which are: Interest rate risk which is defined as the risk of losing as a result from variations in interest rates. As a

consequence of an incongruity of interest rates on its assets and liabilities and/or timing dissimilarities in the maturity thereof, a bank may experience catastrophic loss or deterioration in revenue owing to variations in interest rates. The second one is foreign exchange risk which is defined as the possibility of losing as a result of the difference between presumed and prevailing foreign currency rates in the situation where a bank has a long position or short position on a net basis with respect to its assets and liabilities denominated in foreign currencies (McKinsey, 2012). The third one is price change risk defined as the risk of losing as a result of a decrease in the worth of assets owing to variations in the prices of securities. However, market risk in a broader sense is defined as systematic risk meaning it incorporates other macroeconomic factors such as political risk, gross domestic and inflation. (David, 1997).

2.6.3.2 Guidelines and Procedure in Market Risk Management

Identification of Market Risks

Interest rate risk: The risk of the present estimation of assets and liabilities (taking into account those assets and liabilities that do not appear on the balance sheet) being impacted by variations in loan costs. The following risks should be considered as potential sources of interest rate risk: yield curve risk, re-pricing risk, premise hazard, and optionality. Deposits, bonds, loans and financial derivative products are examples of products that have interest risk associated with them (Samuelson, 1945; Were & Wambua, 2013; Mwangi, 2012).

Foreign exchange risk: This is the risk associated with variations in the rate at which foreign exchange indices change. This risk is found in items such as assets and liabilities that are valued in foreign currencies, “foreign exchange transactions, derivatives of foreign exchange transactions (forward contracts, futures, swaps, options, etc.), assets and liabilities whose cash flow (redemption value, coupon rate, etc.) are determined in reference to foreign exchange rates” (Levich, 1994; Diffu, 2011; Havrylchyk & Emilia, 2011).

Stock risk: This is the risk associated with fluctuations in stock prices on the stock market. See (Morck, Shleifer, & Vishny, 1990; Al-Tamimi, Alwan, & Rahman, 2011; Feng-Xiao, 2008). Commodity risk: This is the risk associated with changes in commodity prices. See (McKinsey, 2012) for detailed definition.

Measurement of Market Risk

The accompanying are cases of estimation and investigation procedures with respect to market risk (BIS, 2016). Firstly, the analysis of the balance of positions, “unrealised profits/losses and realised profits/losses, gap analysis and static and dynamic simulation analysis based on the replacing-based ladder and maturity ladder the sensitivity analysis (duration, BPV (basis point value), GPS (grid point sensitivity), scenario analysis using static and dynamic simulation. And value at risk (VaR) and earnings at risk” (EaR).

Monitoring of Market Risk

The risk management department is by regulated rules and policy. It monitors the market risk that a bank faces and measures it up based on the prevailing conditions at the bank (external environment – economy, markets etc; internal environment – risk profile, risk limit usage status, etc) (Milanova, 2010). Monitoring of Compliance with risk limits; the status of compliance is appropriately monitored to see if it is still within the risk limits (Andersen, Bollerslev, Christoffersen, & Diebold, 2007). Reporting “to Board of Directors or equivalent; The type (boundaries and flaws) and strength of the market risk determination and analysis tools (techniques, assumptions, etc.)” (Andersen, Bollerslev, Christoffersen, & Diebold, 2007). Feedback to Office (Trading, Banking) Divisions; feedback on results of risk measurement, analysis and review in light of the status of market risk is provided by the Market Risk Management Division (Andersen, Bollerslev, Christoffersen, & Diebold, 2007; Federal-Reserve, 2016).

Control and Mitigation of Market Risk

Counter measures to Cases where unmanageable market risks exist; the market risk management department makes available sufficient data to the board of directors or their equivalent for use in making decisions for businesses affected by not properly managed risks or when the risks is not small to be neglected. (Milanova, 2010). Counter measures “to cases where risk limits are exceeded information is immediately provided to the board of directors or their equivalent under the circumstance where the bank has surpassed the risk restrictions (Milanova, 2010).

Review and Revision

Sophistication of market risk management: reviews are carried out in order to inform the bank on the shortcomings and limits of the methods available for measuring and analysing market

risk. This also helps in the implementation of counter measures to balance out the shortcomings identified. (Federal-Reserve, 2016; Milanova, 2010). Revision of market risk identification; regular checks are to see if risks not under management are changing with the changing business environment (Milanova, 2010).

2.7 Chapter Summary

The chapter provides a sound literature review that offers a survey of scholastic reviews and views which offer background analysis into the research topic. As highlighted in the research problem that not much has been done in covering financial risk as a topic with much of previous studies focusing on credit risk, the research objectives were covered with that view in mind. Given South Africa has very little that has been previously researched with regards to risk management.

Nonetheless, the chapter begins by first explaining the concepts of credit, liquidity, and market risk on how they are interrelated and how they impact overall financial risk. The definitions offered thorough insight into different understanding of the three concepts and particularly their relevance in light of the economical meaning with what South Africa has been going through in the banking sector over the last five years with credit rating reviews as well as recovering from numerous issues in the political and socio-economic environment. Upon the clear elucidation of the definitions above, this was then followed by the introduction to the theoretical frameworks. The first framework discussed in the chapter was Financial Intermediation Theory which showed how financial intermediaries (banks) incur risk because of the intermediary role they play in taking money from the surplus unit (depositors/savers) and give it to deficit units (debtors/borrowers). The ideology of investing in financial markets to acquire liquidity (e.g. Stock market) was further justified by the Shiftability Theory of liquidity. The theory emphasised on the ability of a bank to shift its assets to the third party so as to achieve required liquidity.

The relationship between capital ratios and liquidity was further explained by the Financial Fragility Structure and Crowding-Out of Deposits framework.

The theory assumed that high capital ratios could be detrimental to the liquidity health of a bank. Some theorists advocated that market power could influence profitability of a firm; the Market Power Hypothesis illuminated the relationship between stock market development and profitability.

The Arbitrage Pricing Theory explained the impact of macroeconomic factors on the financial

market and profitability of firms. The relationship between interest rate and money demand was explained by the Liquidity Preference Theory. Level of loans demanded and deposit was deemed dependent on the level of interest rate.

Moreover, the study reviewed the theoretical and empirical literature on the variables of credit, liquidity, and market risk. Funso, Kolado and Ojo (2012) did a study on the effect of credit risk in Nigeria and they found a negative relationship between non-performing loans and return on asset. Non-performing loan were employed as a proxy for credit. The results were in agreement with the expected relationship as advocated by Santomero (1997). Shen, *et al.* (2009) found that the connection between liquidity risk and profitability was mixed based on the geographical location, economic conditions and level of anticipated risk. This, given the South African context would mean using the five local banks in the case study used, the reactionary behaviour based on credit, liquidity and market risk affecting their profitability would not be very predictable according to the script.

Again, market risk relationship with profitability was expected to be mixed. Qinhua (2014) said the main variables in market risk, four variables being foreign exchange, interest rate and equity risk could take either positive or negative signs. From these variables, we have all four having a significant role in the economy of South Africa as well as impacting the banking sector and financial performance of the aforementioned banks in the case study.

Empirical literature that related to credit risk of previous studies was useful in providing a departure point for drawing parallel lines and contextualising with the South African banking sector (Alshatti, 2015; Aduda & Gitonga, 2011; Boahene, 2012; Funso, Kolade, & Ojo, 2012).

Liquidity risk and profitability studies done by previous researchers show that liquidity risk and profitability are related (Siaw, 2013; Irina Bunda, 2003; Jenkinson, 2008). Market risk and the macroeconomic impact on profitability was also seen as a crucial relationship that required scrutinisation given the happenings in the South African economy (Alper & Anbar, 2011; Sufian & Habibullah, 2009; Qinhua Pan, 2014).

Therefore, the study sought to fill the gap within the body of literature and risk management practices by extending on the existing studies mentioned above. Strong links in the relationship were established and agreed upon by different researchers which proved relevance of risk to the strategic outlook that banks predominantly took in the countries researched. The studies showed that banks in the first world countries where research was done showed that a strong relationship existed between the three risks and financial performance.

Market risk, credit risk and liquidity risk are the three most influential risk factors that have had significant influence on various banks in the world. The next chapter details the methodology used in this study with particular focus on proving relevant quantitative proof pertaining to the study at hand.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter outlines the scope and the data sources used in this research. Further specification and justification of the econometric model assumed by the research while providing strong reasons for the variables adopted in the models. The chapter thus sequentially provided clear emphasis on the scope and sources of data for the study, the conceptual and functional econometric models, the estimation procedures followed in estimating the econometric models, the arguments for the choice and justification of the variables used in the econometric models and finally the conclusion.

3.1 Data Sources and Research Design

Data: This study sought to establish the effect of financial risk management of South African Commercial banks' performance utilising annual data from 2006-2015. The time period was motivated by the National Credit Act (NCA) (35 of 2005) which was designed to protect the consumers in the credit market and enhance credit accessibility in the banking service. The NCA aimed at addressing the grey areas in the South African credit market. This study used annual reports of banks for bank-specific data; non-performing loans and advances, loans and advances to total deposit, total assets, loan provision to classified loans, ROA, ROE, leverage ratio, total equity to total assets, and net-interest expense to total assets obtained from Bloomberg. The macroeconomic data; GDP growth rate, inflation rate (CPI), Lending Interest Rate, Exchange rate, and Annual Monetary Supply was obtained from the International Monetary Fund (IMF) online. The sample ;used five Standard Bank Group, FirstRand Group, Nedbank Group, Capitec Holdings LTD, and Barclays Africa.

Sample Justification: According to the South African Consumer Satisfaction Index (SACsi) the above five banks were ranked top five according to market capitalisation. One of the reasons as to why the study was only limited to the top five was that these banks had been consistent in the last 10 years in releasing their data accordingly. This enabled us to avoid unbalanced data sets which would cause more complications when performing statistical analysis. Secondly, banks which were huge in terms of the stock market (market capitalisation) were the ones that attracted the investors the most (Boahene, 2012).

Annual Data: The banks released financial ratios and bank-specific financial reports annually as being the rationale behind annual data. Moreover, benefits of annual data included being ease to compute, ease to model, ease to identify changes in trends and better for strategic long term forecasting (Baltagi, 2001). However, some of the macroeconomic data is released daily, e.g., foreign exchange rate, stock market prices while some can range from monthly to annual, e.g. GDP. This study used annual data throughout the three main objectives. The reason for this was consistency, readability, and comparability between the objectives. Daily data takes long to process and more plausible for short term tactical forecasting. Previous studies that used annual data are Qinhuia (2014), Boahene (2012), Siaw (2013), Klapo and Ayeni (2012).

3.2 Econometric Specification and Tests

The data of the banks was cross sectional and time series related. Therefore, the panel data regression method was adopted. The choice of this model was a decisive advantage over other types of data and time series. It was advantageous in that it realised the cross-sectional relationship and took care of possible heterogeneity of which time series did not (Gujarati, 2007). This study used the balanced panel. In this study, five banks were used, meaning there are five cross sections ($i = 5$) and period ($t = 2006 \dots 2015$). The dependent variables were ROE and ROA as proxies that measured bank profitability following the study by (Alshatti, 2015; Boahene, 2012; Ellouze, 2015; Funso, Kolade, & Ojo, 2012). Eviews 8.1 was used.

Standard linear specification for a panel data regression model

$$Y_{i,t} = \alpha_i + \beta'X_{i,t} + \varepsilon_{i,t}$$

Where:

$Y_{i,t}$ – ROE(dependent variable) for bank i in time t ,

i – Number of observation from 1 up to N and

t – Time, from 1 up to T,

$X_{i,t}$ – explanatory variables vector bank i in time t ,

α – constant,

β' – coefficients representing the slope of variables, and

ε_i – error term.

3.2.1 Developing Panel Data

1. Fixed Effect Model.
2. Random Effect Model.

The choice of these two models was based on the assumption that the banks were heterogeneous, thus ignoring the pooled ordinary least squares (OLS) regression model that denies the heterogeneity or individuality that may exist between these five banks (Podesta, 2000; Studenmund, 2011; Baltagi, *Econometric Analysis of Panel Data*, 2013).

Fixed Effect Model: the fixed effect model allows heterogeneity or individuality among five banks by allowing it to have its own intercept value. This model assumes that, though the intercept value may differ across banks but it does not vary over time. It is time invariant. The fixed effects model is an econometric model that characterises the observed quantities in terms of dependent variables that are treated as if the measures were non-random. This model centers on the hypothesis that the discrete specific effect is interconnected with the explanatory variables (Baltagi, *Econometric Analysis of Panel Data*, 2013; Gujarati & Sangeetha, 2007; Studenmund, 2011).

Random Effect Model: this model suggests that all five banks have the same mean value of the intercept value and the cross-sectional variances in the intercept values of each bank are replicated in an error term. This model assumes that there are no fixed effects, in that it allows individual effects (Baltagi, *Econometric Analysis of Panel Data*, 2013; Gujarati & Sangeetha, 2007).

Thus, the choice between the Fixed Effect and the Random Effect is pivotal around the hypothesis one makes around the possible correlation between the cross-section specific or individuals, error component denoted as (ϵ_i) and the regressors denoted by (X) . If the assumption is that the error component and regressors are uncorrelated the random Effect Model would be suitable, however if error term and the regressors are correlated, the Fixed Effect Model accepted. Gujarati and Sangeetha (2007) lends us these helpful observations in deciding as to which model to choose; If t is large and i is small, minute differences are seen in the parameters estimated using the Random Effect and the Fixed Effect Models. Therefore the decision is based on computational ease. However, based on this assumption the Fixed Effect Model is superior. If the cross sections (i) are large and the time series (t) are small the estimation results obtained by the two models can be significantly different. With the Random Effect Model $[\beta_{1i} = \beta_1 + \epsilon_i]$, where ϵ_i represents the cross-sectional random component, while the Fixed Effect is treated as the fixed not random. In the latter instance, statistical inference is conditional on the experiential number of cross-sections in the sample and this is fitting if it is believed intensely that the individual or number of cross sections in the sample is not random depictions from a sample that is large. Therefore, this will make the Fixed Effect Model more plausible in this situation.

Conversely, if the number of cross-sections in the sample is considered as random depictions, then Random Effect Model is fitting, as in that instance statistical inference is unconditional. If the individual error term (ϵ_i) and one or more explanatory variables are correlated, then the Random Effect Model estimators are biased, while those obtained from Fixed Effect are unbiased. After having estimated the random and the fixed effect models we had to decide which model was good and fitted the data estimated perfectly that we could accept. This was done by conducting Hausman tests. The Hausman test decided whether the estimated coefficients, taken as a group, were significantly different from the two models; Fixed Effect and Random Effect Model (Baltagi, *Econometric Analysis of Panel Data*, 2013). However, if the fixed effect model produce desired result, it will be selected as the superior method as the

data for this study fit well with the properties of the fixed effect model.

3.2.1.1 Hausman Test:

H₀: Random Effect Model is Appropriate

H₁: Fixed Effect Model is Appropriate

Should the P-value be statistically significant 5% significance we would reject the null hypothesis and accept the alternative hypothesis meaning we would use the fixed effect model, otherwise the random effect model (Baltagi, *Econometric Analysis of Panel Data*, 2001; Baltagi, *Econometric Analysis of Panel Data*, 2013).

3.2.1.2 Descriptive Statistics Analysis

In this study, we also looked at the descriptive statistics for all the quantitative variables; the mean, median, maximum and minimum performance of the banks. We also interpreted the kurtosis and Jarque Bera tests for normality of distribution. The kurtosis measured the peakness (or flatness) of a distribution. Normally distribution has the kurtosis of 3. A kurtosis greater than 3 is indicative of a sharp peak with heavy tails closer to the mean (leptokurtic). A kurtosis less than three is indicative of the opposite of a flat top (platykurtic). Jarque-Bera tests whether the data has skewness and kurtosis matching normal distribution have an expected skewness of 0 and excess kurtosis of 0 (which is the same a kurtosis of 3) (Studenmund, 2011; Baltagi, *Econometric Analysis of Panel Data*, 2013).

3.2.1.3 Jarque-Bera

H₀: There is normal distribution.

H₁: Not normally distributed

Should the P-value be statistically significant 5% significance we would reject the null hypothesis and accept the alternative hypothesis that there is non-normality (Baltagi, *Econometric Analysis of Panel Data*, 2013; Studenmund, 2011).

3.2.1.3 Multicollinearity Test

It is always important to bias estimators when modelling data in econometrics. It is imperative that multicollinearity is absent. Multicollinearity problem exists when two or more explanatory variables are highly correlated (Baltagi, *Econometric Analysis of Panel Data*, 2013; Studenmund, 2011). This may result in the instability of the coefficients and their standard

deviation may increase. It is tested using the correlation matrix. Correlation matrix is a good tool to analyse pair wise correlation between variables, where the positive coefficients indicate the positive relationship between explanatory variables and the negative coefficients represents the negative relationship. Nonetheless, Studenmund (2011) argued that a correlation coefficient greater than 0.8 indicated a serious problem of multicollinearity.

3.2.1.4 Testing the Suitability of the Model using F-Test

It is important to evaluate whether the explanatory variables used in the model affect the dependent variable before we can even conclude that risk management has any effect on the performance of the bank. In doing that, the F-statistic test was conducted and one of the following hypotheses rejected.

H₀: The model is not appropriate if the explanatory variables do not affect the dependent variable.

H₁: The model is appropriate if the explanatory variables do affect the dependent variable.

Decision rule is as follows: We accept the null hypotheses if the F-statistic is greater than 5% significance level or we accept the alternative if the F-statistic is less than 5% significance level (Baltagi, *Econometric Analysis of Panel Data*, 2013; Studenmund, 2011).

3.3 Credit Risk Regression

Objective one: To determine the effect of credit risk on the profitability “of South African banks.

Many factors can be considered to evaluate credit risk on performance of South African Banks. However, this study only used the risk and performance indicators mentioned below, following the study by Funso, Kolade and Ojo (2012). Panel data was used in their study; thus, this paper similarly adopted it. However, there was an addition of two variables from their original study which was a log of total assets and leverage ratio as advocated by Boahene (2012) in his study of credit risk in Ghanaian banks. Log of total assets measures bank size in relation of its assets and theory suggests that the bigger banks benefits from economies of scale (Goddard, *et al.*, 2004). Then the leverage ratio represents the capital structure of the firm and the motivation for the addition of this variable is that theory suggests that banks with more debt tends to perform better because of the shield on interest tax that huge debt carries to the business

(Boahene, 2012).

3.3.1 Risk Indicators (Independent variables)

- I. Non-performing loans and advance (NPL/ LA)
- II. LOG (Total Assets) (LOG(TA))
- III. Loans and advances to total deposit (LA/ TD)
- IV. Leverage Ratio (DEBT/EQUITY)

3.3.2 Performance Indicator (Dependent Variable)

- I. Return on Equity (ROE)

Therefore, the econometric equation for the model is specified as

$$ROE_{i,t} = \alpha_i + \beta_{i,t} NPL/LA + \beta_{i,t} \text{Log}(TA) + \beta_{i,t} LA/TD + \beta_{i,t} LR + \epsilon_{i,t}$$

Table3. 1Credit Risk Indicators

PARAMETER	DEFINITION	EXPECTEDSIGN	PREVIOUS RESEARCH
ROE	Profitability = ROE(Net Income to Total Equity Fund) of Bank <i>i</i> in time <i>t</i>		(Alshatti, 2015; Boahene, 2012; Ellouze, 2015; Funso, Kolade, & Ojo, 2012; Kosmidou, 2005; Singh, 2013)
NPL-LA	Non-Performing Loans / Total Loans and Advances of Bank <i>i</i> in time <i>t</i>	Negative/Positive	
SIZE	“The log of Total Assets of Bank <i>i</i> in time <i>t</i> ”	Positive/Negative	
LA/TD	Loan and Advances/total deposit of Bank <i>i</i> in time <i>t</i>	Positive	
LR	Leverage Ratio= Debt/Equity of Bank <i>i</i> in time <i>t</i>	Positive	
E	The error term		

3.3.3 Relationship between Profitability and Risk Indicators

Non-Performing Loans to Loans and Advances: Theory suggests that non-performing loan advances (NPL/ LA) are expected to have a negative impact with Return on Equity (ROE). Non-performing loans are the loans that are categorised as bad performing loans due to debtors failing to pay their obligations within 90 days' period. Therefore, a bank regards these loans as non-performing because there is a possibility of losing the whole loan amount (Boahene, 2012; Klapo & Ayeni, 2012).

LOG (Total Assets): Again, theory suggests that the size of a bank denoted by LOG (TA) has a positive impact on the performance of a bank. The gains linked to firm size, if handled well, comprise of economies of scale, enhanced productivity of operation due to increased capacity to bear the cost of acquiring better technologies, high bargaining power, capability to put resources into innovative work (Goddard, Molyneux, & Wilson, 2004) as cited by (Siaw, 2013). However, the sign of firm size can also be negative representing diseconomies of scale. These benefits could possibly contribute to decreased cost of daily operations and improved profitability (Kosmidou, 2005). For example, bigger banks are well on the way to lure greater and less expensive loans, on account of their high guarantee limit. Likewise, they have greater chances of winning better contracts with prospects of high profits compared to minor banks (Boahene, 2012).

Loan and Advances Ratio: Loans and advances are expected to have a positive effect on ROE. This represents the capability of a bank to cover the withdrawals made by its customers. However, if the ratio is too high, that might be detrimental to the bank because it may not have enough liquidity to cover any unanticipated liquidity requirements and on the contrary, if the ratio is too low, the bank may struggle to earn as it wishes to (Siaw, 2013; Boahene, 2012).

Leverage Ratio: The leverage ratio is expected to have a positive sign. It is used to proxy the capital structure of the firm. Banks that have huge amounts of debt are better capable to improve their firm value or profitability compared to banks with less the reason being due to the additional discipline and interest tax shield that is brought by high debt. This is in agreement with what was found in earlier research in Ghana (Kargi, 2010) and correspondingly advocated by the agency cost hypothesis. Thus, it is in line with the Modigliani and Miller's second proposal, which stipulates that a company's worth is to a greater extent dependent on its capital.

3.4 Liquidity Risk Regression

Objective two: To ascertain the relationship between liquidity risk and profitability in South African banks

Again, there are many factors that can be used to investigate the effect of liquidity risk to bank performance. However, this study will follow the study by Siaw (2013) in his study of liquidity risk in Ghana. Siaw study applied the panel data technique to interpret the data. However, this study replaced and added some variables due to irrelevance and unavailability of data.

3.4.1 Risk Indicators (Independent Variables)

- I. Loans and Advances to Total Deposit (LA/TD)
- II. Non-Performing Loans to Total Loans (NPL)
- III. LOG(Total Assets) (LOG(TA))
- IV. Market Capitalisation to Total Assets (MKT/TA)
- V. Non-Deposit Dependence/External Finance (NDD/EFD)
- VI. Inflation Growth Rate (INFL)
- VII. Ratio of financing Gap to Total asset (RFG/ TA)
- VIII. Equity to Total Assets (ETA)

3.4.2 Performance Indicator (Dependent Variable)

- I. Return on Equity

The econometric equation for the model is a follow:

$$\text{ROE} = \alpha_i + \beta_{i,t} \text{LA/TD} + \beta_{i,t} \text{NPL} + \beta_{i,t} \text{LOG(TA)} + \beta_{i,t} \text{MKT/TA} + \beta_{i,t} \text{NDD/EFF} + \beta_{i,t} \text{RFG/TA} + \beta_{i,t} \text{ETA} + \beta_{i,t} \text{INFL} + \epsilon_{it}$$

Table 3.2 Liquidity Risk Indicators

VARIABLE	DEFINITION	EXPECTED SIGN	PREVIOUS RESEARCH
ROE	Profitability = ROE (Net Income to Total Equity Fund) of Bank i in time t		
SIZE	Size = the log of Total Assets of Bank i in time t	Negative or Positive	
ETA	Proportion of equity to total assets. A proxy of capital adequacy of Bank i in time t	Negative or Positive	
NPL			

	Ratio of non-performing loans to loans and advances. Measure of credit risk of Bank i in time t	Negative or positive	(Siaw, 2013; Shen, Chen, & Chuan, Bank Liquidity Risk and Performance, 2009; Tabari, 2013; Irina Bunda, 2003; Aspachs, 2005; Saunders & Cornett, 2014);
MKT/TA	Ratio of market capitalisation to total assets. Proxy for market power of Bank i in time t	Positive	
NDD	The ratio of non-deposits dependence to total liabilities of Bank i in time t	Positive	
GDPc	GDP Growth Rate of Bank i in time t	Positive	
LA/TD	Ratio of loan and advances to total deposit of Bank i in time t	Positive	

3.4.3 Relationship between Profitability and Risk Indicators

Loan and Advances to total deposit: Loans and advances are expected to have a positive effect on Return on equity. This represents a bank's ability to cover the withdrawals made by its customers (Siaw, 2013).

Non-performing loans to Loans: The ratio of non-performing loans is used to proxy for credit risk in bank performance, one of the main determining factors of bank profitability. Variations in credit risk will possibly reflect changes in the well-being of a bank's loan portfolio which successively affects the profitability of the financial institution. There is therefore a great concern about not just the volume of loans made but rather the quality of it. Financial institutions heavily vulnerable to high risk loans increase the accrual of unpaid loans and thus decrease their profitability (Klapo & Ayeni, 2012; Boahene, 2012)

Market Capitalisation to Total Assets: The relationship between a firm and its shares in the stock market is expected to be positive. It is the measure of market power of a bank. It is expected that the higher the level of capitalisation, the lesser the competition and the lesser the vulnerability to liquidity risk. The opposite is true since banks would have to work extra hard in order to mobilise appreciable levels of deposits when there is stiff competition in the industry (Shen, 2009). Stock market development could also increase liquidity and provide a vehicle for risk diversification. We therefore find that more liquidity and diversification reduce the risk and the cost of investing in those long-term projects with higher returns and therefore could

result in efficient resource allocation by promoting more and better investment.

Finance Gap Ratio: Theory suggests that finance gap ratio has positive/negative relationship with ROA. A negative value indicates a lower amount as well as a lesser risk of liquidity and vice versa. The expectation is that banks having high liquidity gaps will utilise their cash, sell the reserved liquid assets and depend on external financing that excludes deposits (Siaw, 2013). This is the amount of money required by the bank to fund its future projects and operations (Saunders and Cornett, 2006). It is usually acquired from venture capital loans, angel investors, and loans from other financial institutions.

Equity to Asset: The proportion of equity to assets (ETA) is used to indirectly determine the capital strength, or in modern language, capital adequacy. Theory suggests that banks having high capital-asset proportions are regarded as comparatively safer when loss or liquidation occurs. Moreover, it is assumed that a growth in capital possibly will increase anticipated income by decreasing the anticipated costs of financial distress (Shen, 2009). A bank's credit worthiness is increased by reduced risk and accordingly decreases the cost of funding. Thus, banks having higher equity to assets quotient have a reduced need for external funding and hence greater profitability (Kosmidou, 2005).

Non-Deposit Dependence: Regarded as one of the sources of liquidity risk by Shen, *et al.* (2009). Based on that, they indirectly determined non-deposit dependence using the ratio of external funding to total liabilities. Banks heavily depending on general borrowings and other money market instruments rather than core deposits to finance loans and other financial obligations have the likelihood of facing liquidity risk compared to banks that engage in the practice of the contrary. It is thus obvious that non-deposit dependence and bank liquidity risk are expected to have a positive relationship.

3.5 Market Risk Regression

Objective three: To establish the influence of market risk on banks profitability in South Africa

There are many macroeconomic factors that may affect the banking sector but this paper focused on the ones listed below as they were the most significant. Moreover, this paper followed Qinhua (2014) in the study of macroeconomic factors in China's commercial banks with panel data application. However, there was one variable that was added, exchange rate. It is a widely-held view that exchange rate volatility should affect corporate expected cash flows

and hence its performance by causing changes in the home currency denominated revenues (costs) and the terms of competition for firms with international activities (Levich, 1994).

3.5.1 Risk Indicators (Independent Variables)

The risk indicators are listed below as follows;

- I. LOG(GDP)
- II. Money Supply Growth Rate (M3)
- III. Inflation (INFL) Growth Rate
- IV. Exchange rate ((LOG)ZAR/USD (EX))
- V. Lending Interest Rate
- VI. Market Capitalisation/Total assets

3.5.2 Performance Indicator (Dependent Variable)

- I. Return on Equity

Therefore, the econometric equation for the model is a follow:

$$\text{ROE} = \alpha_i + \beta_{i,t} (\text{LOG})\text{GDP} + \beta_{i,t} \text{M3} + \beta_{i,t} \text{INFL} + \beta_{i,t} \text{ZAR/USD} + \beta_{i,t} \text{LIR} + \beta_{i,t} \text{MKT/TA}_{i,t} + \epsilon_{it}$$

Table 3.3 Market Risk Indicators

VARIABLE	DEFINITION	EXPECTED SIGN	PREVIOUS RESEARCH
ROE	Profitability = Return on Equity (Net Income to Total Equity Fund) of Bank i in time t		(Kiganda, 2014; Illo, 2011; Kosmidou, 2005; Sara & Muhammad, 2013)
GDP	GDPC annual real GDP	Positive	
M3	M3= annual money supply growth rate	Positive	
(LOG)INFL	INFL annual consumer price index growth rate	Positive/Negative	
(LOG)ZAR/USD	South Africa to American annual exchange rate	Positive/Negative	
LIR	Annual Lending Interest rate	Positive/Negative	

LOG(STOCK)	Natural log of stock	Positive/Negative	
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3.5.3 Relationship between Profitability and Risk Indicators

Gross Domestic Product: The most used macroeconomic factors that literature uses in studying bank performance are GDP growth rate and annual percentage change of inflation (INF). GDP is a measure of total economic activity of all products produced within the country and it is the number one indicator of the country's economic prospect. Theory and economists posit that an economy that is doing well motivates banks to loan more and allows them to set higher interest bettering the quality of their assets and profitability in their banking books. Previous studies found that economic growth had a positive effect on bank's performance (Siaw, 2013).

Inflation: Inflation is a proxy for consumer price index in the economy and it is also one of the most watched indicators in macroeconomics. However, two distinctions in studying inflation are imperative to look at: the first scenario is when inflation is appropriately anticipated and interest rates are adjusted to allow revenues to rise faster than the costs of credit institutions, if this theory holds it is therefore anticipated to positively impact the profitability of a bank. The second scenario is when inflation is not appropriately anticipated and banking institutions are not able to alter interest rates, in this case the inflation rate has the opposite effect in that the costs of credit institutions exceed the income and as a result inflation will have a negative effect on the bank profitability. Therefore, the expected sign is ambiguous it could be either positive or negative (Gizycki, 2001; Siaw, 2013)

Monetary Supply (M3): The South African Reserve Bank (SARB) are the controllers of monetary supply in South Africa, in doing this they apply their quantitative monetary policies and that has a great impact on the performance of a bank. If the SARB decides to increase the money supply they simultaneously increase the funds in banks, thereby increase the interest revenues of the banks. Furthermore, if the banks have more funds this causes an increase in demand for bonds; that raises the price of bonds. Higher bond prices lead to lower interest rates, which stimulates consumption and increase investment, expand the scale of commercial bank credit, thereby increasing the profitability of commercial banks (Rotich, 2007).

Exchange Rate ZAR/USD: Theory suggests that exchange rate volatility should affect corporate expected cash flows and hence its performance by causing changes in the home

currency denominated revenues (costs) and the terms of competition for firms with international activities (Levich, 1994). Ndungu (2000) asserts that exchange rate policy in Kenya has undergone various shifts mostly driven to a large extent by the economic events especially balance of payment crisis. Obadan (2006) put forward an argument that the exchange rate plays a role in connecting the price system in different countries thus enabling traders to compare price directly. Changes in exchange rate has a powerful effect on imports and exports of the countries concerned through effects on relative prices of goods. The exchange rate becomes unstable the more the banks find it difficult to control credit and loan books, hence increasing credit risk (Owoeye & Ogunmakin, 2013).

Lending Interest Rate: According to Saunder (1995), lending interest rates influence the overall economic activity including the flow of goods, services and financial assets within the economy and as well as the whole world. He points out that interest rates relate to the present value to the future value of money. According to Samuelson (1945), under general conditions, banks' profits increase with rising interest rates. According to Were and Wambua, (2013) lending interest rate on the revenue side operates via two channels. The first channel assumes that the interest rate increase causes an increase in the income generated through new acquired assets. Second, assumes that the effect hinges on the amount of loans and securities held. Mang'eli (2012) interest rate spread affects the performance of commercial banks through far reaching effect of lending rates interest rates.

LOG (Stock) Market Capitalisation: There are both complementary effect substitution effect between direct financing and indirect financing and therefore the relationship between the banking sector and financial markets are uncertain. Development of financial markets weakens consumers' demands for banks, creating a competitive relationship between them. Meanwhile, there is a certain complementary relationship between the banking sector and financial markets because their mutual promotion roles in the development process (Qinqua, 2014).

3.6 Chapter Summary

The study employs Panel Data for studying the relationship between profitability and financial risk management. Data was collected from Bloomberg, IMF-IFS, and SARB. The risk indicators across three objectives are estimated on Panel Data Fixed Effect Model based on the Hausman Test. Data is over 10-year period 2006-2015. Eviews 8.1 was employed to execute statistical data. All this was done in accordance with the research objectives in order to

have objective quantitative information upon which to draw conclusions. The chapter provides a fitting foundation for chapter four which then elucidates the results and their meaning in relation to the study for purposes of solving the research problem.

It is paramount in appreciating the different models and statistical tools defined above and also their overall relevance and importance in light of the different research objectives which serve to underline the link between risk and financial performance. Therefore the chapter acutely delves into the factors such as the exchange rate, inflation and different variables which cement the study hypotheses and assist in the conclusions made in the following chapter. The next chapter presents data analysis findings tying in results obtained based on the foundations built by the literature review in chapter two and methodology presented in chapter three.

CHAPTER FOUR

RESULTS AND DISCUSION

4.0 Introduction

The results and discussions of the model specified in chapter three are presented here. The chapter is organised into sections based on the introductory analysis of the data used by the study which is basically the descriptive statistics of the regression variables. The chapter is centred on the findings of the approximations of profitability and financial risk; credit, liquidity and market risk using return on equity as a dependent variable. The results are run on the Fixed Effect Model across credit, liquidity and market risk.

4.1 Credit Risk Output

The credit risk output relate to objective one. There are four variables employed namely; non-performing loans, leverage ratio log of total assets and loans and advances to total deposits. The data is in a 10-year interval period 2006-2015. The data relates to the five banks executed on Eviews 8.1 Panel Data.

4.1.1 Descriptive Statistics Analysis

Table 4.1 Descriptive Analysis of Credit Risk

	ROE	NPL_LA	LR	LOGLOG_TA	LA_TD
Mean	19.74600	5.308000	15.38000	12.50234	71.83500
Median	18.40000	4.350000	10.64000	13.54769	87.80000
Maximum	32.00000	19.00000	124.4600	14.27221	142.8000
Minimum	11.80000	1.300000	0.430000	6.204760	0.800000
Std. Dev.	5.592678	3.353758	23.82301	2.296324	40.97197
Skewness	0.343224	1.686380	3.964347	-1.577277	-0.583964
Kurtosis	1.858857	6.921393	18.38380	4.077029	2.355014
Jarque-Bera	3.694622	55.73505	624.0117	23.14833	3.708461
Probability	0.157661	0.000000	0.000000	0.000009	0.156573
Sum	987.3000	265.4000	769.0000	625.1172	3591.750
Sum Sq. Dev.	1532.624	551.1368	27809.25	258.3821	82256.42
Observations	50	50	50	50	50

On average, the performance of (Return on Equity) of South African Banks studied over the

period 2006-2015 was 19.75%, which was relatively low. The performance was reasonable given the fact that the South African economy was not performing well during these years. The standard deviation was also small; with order of magnitude of 5.6%. Furthermore, the minimum performance was 11.8% and the maximum performance was 32%. On average, the performance of non-performing loans to gross loans and advance (NPL_LA) of South African banks studied over the period under review was 5.31%. The maximum and minimum are 19% and 1.3%, respectively, and the standard deviation was 3.5%. For its part, the leverage factor performance (LR) of South African banks studied over the period 2006-2015 was 15.39%. The maximum performance was 124.5% and the minimum was 0.43%. The standard deviation was 23.8%. The average performance of Loan to total deposit ratio was (LA_TD) of South African banks in this same period was 71.8% and the attached standard deviation was 41%. The maximum and minimum performances were 142.8% and 0.80% respectively. Moreover, the performance of LOG (Total Assets) of South African banks was 12.5%. On its maximum performance, it was 14.3%, while on its minimum performance it was 6.2%. The standard deviation was 41%.

The Series show features of non-normality which is common in financial time series data. All the series have a coefficient of kurtosis of either less than or greater than 3 against the standard value of 3 for a normal distribution and a non-zero coefficient of excess kurtosis. The series was non-normally distributed; hence, Jarque-Bera was significant. The P-value of a Jarque-Bera was 0% for NPL-LA, LR, and LOGLOG-TA indicating non-normal distribution; while ROE and LA-TD indicated normal distribution (kurtosis) at 0.16% and 0.16%, respectively. ROE, NPL-LA, LR had respective positive skewness 0.34%, 1.7%, 3.96%; while LOGLOG-TA, and LA-TD were negatively skewed; -1.6% and -0.58% respectively. ROE, NPL-LA, LOGLOG-TA and LA-TD peak distribution were 1.85%, 6.92%, 4.1%, and 2.4% respectively. LR had the highest peak distribution.

4.1.2 Multicollinearity Test

Table 4.2 Correlation Matrix of Credit Risk

	LA_TD	LOGLOG_TA	LR	NPL_LA
LA_TD	1.000000	-0.180922	-0.034232	0.056164
LOGLOG_TA	-0.180922	1.000000	0.132032	-0.527387
LR	-0.034232	0.132032	1.000000	-0.315649
NPL_LA	0.056164	-0.527387	-0.315649	1.000000

Studenmund (2011) argued that a correlation coefficient greater than 0.8 indicated a serious problem of multicollinearity. The positive coefficients indicated the positive relationship between explanatory variables and the negative coefficients represented the negative relationship. Nonetheless, the correlation coefficient matrix showed that the problem of multicollinearity between the explanatory variables did not exist. The maximum correlation coefficient was found between NPL_LA and LOGLOG_TA (-0.527). Nonetheless, the researcher considers this percentage within the acceptable limits as it was less than 0.8.

4.1.3 Fixed and Random Effects Model

We ran both Random and Fixed effect models and did the Hausman test to decide as to which model to choose. The choice of these two models is based on the assumption that the banks are heterogeneous, thus, ignoring the pooled ordinary least squares (OLS) regression model that denies the heterogeneity or individuality that may exist between these five banks (Podesta, 2000; Studenmund, 2011; Baltagi, Econometric Analysis of Panel Data, 2013).

Table 4.3 Fixed Effect Model Credit Risk

DEPENDENT VARIABLE: ROE

* ** *** 10%, 5% and 1% level of significance respectively.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	28.46362***	4.390752	6.482631	0.0000
LA_TD	0.031766**	0.015764	2.015050	0.0505
NPL_LA	-1.033009***	0.196884	-5.246779	0.0000
LR	0.081217***	0.017297	4.695473	0.0000
LOGLOG_TA	-0.541132*	0.302782	-1.787203	0.0813
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.815442	Mean dependent var		19.74600
Adjusted R-squared	0.779431	S.D. dependent var		5.592678
S.E. of regression	2.626590	Akaike info criterion		4.930799
Sum squared resid	282.8580	Schwarz criterion		5.274963
Log likelihood	-114.2700	Hannan-Quinn criter.		5.061859

F-statistic	22.64405	Durbin-Watson stat	1.945546
Prob(F-statistic)	0.000000		

To choose the most accurate method to interpret our data for objective results we employed both FEM and REM and performed the Hausman test to decide the best approach.

Table 4.4 Random Effect Model Credit Risk

DEPENDENT VARIABLE: ROE

* ** *** 10%, 5% and 1% level of significance respectively.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	47.70950***	3.136574	15.21070	0.0000
LA_TD	-0.041920***	0.009325	-4.495410	0.0000
NPL_LA	-0.282262**	0.137880	-2.047164	0.0465
LR	0.070429***	0.016620	4.237645	0.0001
LOGLOG_TA	-1.962601***	0.195671	-10.03012	0.0000
Effects Specification				
			S.D.	Rho
Cross-section random			1.76E-06	0.0000
Idiosyncratic random			2.626590	1.0000
Weighted Statistics				
R-squared	0.609283	Mean dependent var		19.74600
Adjusted R-squared	0.574553	S.D. dependent var		5.592678
S.E. of regression	3.647897	Sum squared resid		598.8219
F-statistic	17.54324	Durbin-Watson stat		1.399496
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.609283	Mean dependent var		19.74600
Sum squared resid	598.8219	Durbin-Watson stat		1.399496

Model Choice

In order to choose as to which model was superior between the above estimated models (fixed/random effects models); the Hausman Test was conducted.

Hausman Test

H₀: Random Effect Model is Appropriate

H₁: Fixed Effect Model is Appropriate.

Table 4.5 Hausman Test Credit Risk

CORRELATED RANDOM EFFECTS:		HAUSMAN TEST		
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.	
Cross-section random	45.798649	4	0.0000	

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LA_TD	0.031766	-0.041920	0.000162	0.0000
NPL_LA	-1.033009	-0.282262	0.019753	0.0000
LR	0.081217	0.070429	0.000023	0.0244
LOGLOG_TA	-0.541132	-1.962601	0.053390	0.0000

Results: the probability value, p-value was 0.0000 and 100% significant. Meaning we rejected the null hypothesis that random effect model was suitable in favour of the alternative hypothesis.

Consequently, the fixed effect model was then used to analyse the effect of credit risk management on South African banks' profitability.

Fixed Effect Model: The study shows that loans and advances to total deposit, non-performing loans to loans and advances, leverage ratio, and log of total asset were key credit risk factors that influenced the performance of sampled banks in South Africa. Non-performing loan to loans and advances, and leverage ratio were significant at 1%, loans and advances significant at 5%, and logarithm of total assets was significant at 10% significant level.

Loans and Advances to Total Deposit: The results showed a positive and a significant relationship between loans and advances to total deposit and return on equity, at 5% significance level in accordance with the expected sign. The findings were in-line with the findings by Funso, Kolado and Ojo (2012). Both loans and deposits were equally important in the banking operation like two sides of the same coin. In general, the main source of income for the banks was interest from loans and advances. The primary function of the bank was to lend money to the borrowers in order to mobilise the interest revenue; this was the ultimate source of revenue for the banks. Normally all the banks try to increase the amount of loans to the borrowers for aggregate interest revenue in the financial statement. It is understandable that the banks offer more loans the more it goes on to generate high revenue and profit, Abreu and Mendes (2002). This means a 1% increase in loans and advances to total deposit increased the profitability of South African banks by (0.031766%).

Non-Performing Loans to Loans and Advances: The result showed a negative relationship between non-performing loans to loans and advances and return on equity, at 1% significance level in accordance with the expected sign. The findings were also in-line with the findings by Funso, Kolado and Ojo (2012); and Mwangi (2012). This meant that as the number of non-performing loans decreased the banks' profitability increased; therefore a converse relationship. Bank performance was dependent on the management practices pertaining to non-performing loan. This signified that the best practices in non-performing loan management had the prospect of improving the financial performance of that institution. Nonperforming loans can bring down investors' confidence in the banking sector, piling up unproductive economic resources even though depreciations are taken care of, and impeding the resource allocation process. Nevertheless, our findings showed that with a 1% increase in non-performing loans there was a (-1.033009%) in return on equity.

Leverage Ratio: The results showed that leverage ratio and ROE were positively related, at 1% significance level in accordance with the expected sign. Banks that had huge amounts of

debt were better capable to improve their firm value or profitability compared to banks with less; the primary reason for this being the additional discipline and interest tax shield that was brought by the high debt. This notion was in agreement with Modigliani and Miller's (1958) second proposition, which summarised that a company's worth was to a greater extent heavily dependent on its capital base. Nevertheless, our findings showed that a 1% increase in a banks' leverage ratio, return on equity increased by (0.081217%). These findings were in-line with the findings by Boahene (2012) and Lane (2009).

Log of Total Asset: The result showed a negative relationship between firm size (log of total assets) and return on equity at a 10% significance level. The prior expectation was of a positive relationship; indicating economies of scale. However, in this case South African banks seemed to have experienced diseconomies of scale. The findings were in-line with the findings by Becker (2010) and Mesut (2013). This meant, for a 1% increase in firm total assets, the banks' profitability would decrease by (-0.541132%). Nevertheless, this would not be surprising because much of the banks' assets were loans which were risky assets. An increase in risky asset may decrease profitability.

Suitability of the Research Model

H₀: The model is not appropriate; when the independent variable doesn't affect the dependent variable.

H₁: The model is appropriate; when the independent variable affects the dependant variable.

The Decision Rule

Accept H₀ If (Sig. *F*) > 5%

Accept H₁ If (Sig. *F*) < 5%

From the analysis output, the value of (Sig. *F*) was equal to (0.00000). Therefore, we accepted the alternative hypothesis and the model used was appropriate; meaning credit risk management had an effect on banks' financial performance.

Divergence in the Dependent Variable

The divergence of the dependent variables was explained by the independent variable (R-squared). R^2 suggested that 83% of the total variation in ROE across the banking firms was explained by joint variations in the four variables.

4.2 Liquidity Risk Output

The liquidity risk outputs relate to objective two. There were eight variables employed namely; loans and advances to total deposit, non-performing loans to loans and advances, log of total assets, market capitalisation to total assets, non-deposit dependence- external finance dependence, equity to total assets, gross domestic product change and ratio of financing gap to total assets. The data was based on a 10-year interval period 2006-2015. The data was taken from the five aforementioned banks, executed on Eviews 8.1 Panel Data.

4.2.1 Descriptive Statistics

Table 4.6 Descriptive Analysis of Liquidity Risk

	LOGLOG_MKT_CAP								
	ROE_	LA_TD_	NPL_LA_	TA_	_TA_	NDD_EFF_	ETA_AR_	GDPC	RFG_TA_
Mean	19.74600	71.83500	5.308000	12.50234	0.261096	56.10403	15.38000	5.912000	-5.299400
Median	18.40000	87.80000	4.350000	13.54769	0.130450	57.65825	10.64000	5.515000	-5.260000
Maximum	32.00000	142.8000	19.00000	14.27221	1.144000	85.28620	124.4600	9.350000	51.10000
Minimum	11.80000	0.800000	1.300000	6.204760	0.065600	32.25810	0.430000	3.370000	-55.74000
Std. Dev.	5.592678	40.97197	3.353758	2.296324	0.267994	8.843178	23.82301	1.555712	19.19664
Skewness	0.343224	-0.583964	1.686380	-1.577277	1.843372	-0.243876	3.964347	0.734500	-0.453402
Kurtosis	1.858857	2.355014	6.921393	4.077029	5.489516	6.054090	18.38380	3.394919	5.304804
Jarque-Bera	3.694622	3.708461	55.73505	23.14833	41.22869	19.92785	624.0117	4.820670	12.78003
Probability	0.157661	0.156573	0.000000	0.000009	0.000000	0.000047	0.000000	0.089785	0.001678
Sum	987.3000	3591.750	265.4000	625.1172	13.05480	2805.201	769.0000	295.6000	-264.9700
Sum Sq. Dev.	1532.624	82256.42	551.1368	258.3821	3.519217	3831.888	27809.25	118.5918	18057.04
Observations	50	50	50	50	50	50	50	50	50

On average, “the performance of (Return on Equity) of South African Banks studied over time the period 2006-2015 was 19.75%, the performance was relatively low. The performance was reasonable given the fact that the South African economy was not performing well during these

years. The standard deviation was also small; it was of order 5.6%. Furthermore, the minimum performance was 11.8% and the maximum performance was 32%.

On average the performance of non-performing loans to gross loans and advance (NPL_LA) of South African banks studied over the period 2006-2015 was 5.31%. The maximum and minimum performance figures were 19% and 1.3% respectively. The standard deviation was 3.5%. Loans and advances (LA/TD) registered 71.84% mean and the ratio was quite high. This was reasonable as it indicated the core activities of the South African banks. The standard deviation was also a high of 40.98%. The maximum and minimum performances were 142.8% and 0.80% respectively.

The log of total assets (LOG(TA)) had a mean of 12.50%, with a small standard deviation of 2.30%. The maximum and minimum performances were 14.27% and 6.20% respectively. Moreover, the market capitalisation to total assets (mkt-cap/ta) had a small mean of 0.26% associated with the standard deviation of 0.28%. The maximum and minimum performances were 1.14% and 0.66% respectively. On average the non-deposit dependence (NDD-EFF) was 56.10% with the standard deviation of 8.43%. The maximum and minimum performances were 85.29% and 32.29% respectively.

Moreover, the equity to total asset (ETA-AR) mean was 15.38% and standard deviation was 23.82%. The maximum and minimum performances were 124.46% and 0.43% respectively. Furthermore, the GDP change (GDPC) mean was 5.91% and standard deviation was 23.82%. The performances were 9.35% at maximum and 3.37% at minimum levels. Lastly, the ratio of financing gap (RFG/TA) mean was -5.299% and the associated standard deviation was 19.20%. Maximum and minimum performances were 51.1% and -55.74% respectively.

Again, the series showed features of non-normality which was common in financial time series data. All the series had a coefficient of kurtosis of either less than or greater than 3 against the standard value of 3 for a normal distribution and a non-zero coefficient of excess kurtosis. The series was non-normally distributed; hence, Jarque-Bera was significant. ROE, NPL-LA, MKT-CAP/TA, ETA-AR, and GDPC were positively skewed with 0.34%, 1.69%, 1.84%, 3.96% and 0.73%, respectively; while LA-TD, LOGLOG-TA, NDD-EFF and RFG-TA were negatively skewed with -0.58%, -1.58%, -0.24% and -0.45%.

Seven variables indicated normal peakness. ROE, LA-TD, NPL-LA, LOGLOG-TA, MKT-CAP/TA, NDD-EFF, GDPC, and RFG-TA distribution (kurtosis) peak levels were 1.86%,

2.36%, 6.92%, 4.01%, 5.5%, 6.1%, 3.4%, and 5.3% respectively. Only ETA-AR indicated the highest distribution peak level at 18.38%. The P-values of Jarque-Bera below 10% significance level were NPL-LA, LOGLOG-TA, MKT-CAP/TA, NDD-EFF, ETA-AR, GDPC, and RFG-TA indicating non-normal distribution; while ROE and LA-TD had values at 0.16% and 0.16% respectively.

4.2.2 Multicollinearity Test.

Table 4.7 Correlation Matrix of Liquidity Risk

	LOGLOG_T MKT_CAP_							
	LA_TD_	NPL_LA_	A_	TA_	NDD_EFF_	ETA_AR_	GDPC	RFG_TA_
LA_TD_	1.000000	0.056164	-0.180922	-0.107576	0.057149	-0.034232	0.043456	0.195516
NPL_LA_	0.056164	1.000000	-0.527387	0.347693	-0.408206	-0.315649	-0.030036	0.042337
LOGLOG_T								
A_	-0.180922	-0.527387	1.000000	-0.449972	0.381048	0.132032	-0.085638	-0.256429
MKT_CAP_								
TA_	-0.107576	0.347693	-0.449972	1.000000	-0.497036	-0.205669	0.072879	0.047974
NDD_EFF_	0.057149	-0.408206	0.381048	-0.497036	1.000000	0.347849	0.035882	-0.015448
ETA_AR_	-0.034232	-0.315649	0.132032	-0.205669	0.347849	1.000000	0.070921	0.061747
GDPC	0.043456	-0.030036	-0.085638	0.072879	0.035882	0.070921	1.000000	0.287150
RFG_TA_	0.195516	0.042337	-0.256429	0.047974	-0.015448	0.061747	0.287150	1.000000

Jolibert and Jourdan (2006) argued that a correlation coefficient greater than 0.8 indicated a serious problem of multicollinearity. The positive coefficients indicated the positive relationship between explanatory variables and the negative coefficients represented the negative relationship. Nonetheless, the correlation coefficient matrix showed that the problem of multicollinearity between the explanatory variables did not exist. The highest correlation coefficients were between mkt-cap/ta and ndd/eff (-0.49). The researcher considered this to be the acceptable limit.

4.2.3 Fixed Effects Model

This time we only ran the fixed effect model because of computational convenience that made it the superior method over the random effect model.

Table 4.8 Fixed Effect Model Liquidity Risk

DEPENDENT VARIABLE: ROE

* ** *** 10%, 5% and 1% level of significance respectively

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.574752	6.778340	-1.265022	0.2138
LA_TD_	0.067297***	0.017762	3.788828	0.0005
NPL_LA_	1.538030***	0.238607	6.445873	0.0000
LOGLOG_TA_	-0.808413**	0.361682	-2.235147	0.0315
MKT_CAP_TA_	-8.674975***	2.575200	-3.368661	0.0018
NDD_EFF_	0.200721***	0.064436	3.115066	0.0035
ETA_AR_	-0.003896	0.019578	-0.198999	0.8434
GDPC	0.110658	0.280681	0.394249	0.6957
RFG_TA_	-0.029571	0.024902	-1.187488	0.2426
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.902239	Mean dependent var		4.063600
Adjusted R-squared	0.870533	S.D. dependent var		8.064358
S.E. of regression	2.901680	Akaike info criterion		5.187352
Sum squared resid	311.5306	Schwarz criterion		5.684478
Log likelihood	-116.6838	Hannan-Quinn criter.		5.376660
F-statistic	28.45621	Durbin-Watson stat		1.377623
Prob(F-statistic)	0.000000			

Loans and advances to total deposit, non-performing loans, market capitalisation, and non-deposit dependence were significant at 1% significance level; logarithm of total assets significant at 5% whereas, equity to total assets, GDP change, and ratio of finance gap were highly insignificant.

Loans and Advances to Total Deposit: The results showed a significant and positive relationship between loans and advances to total deposit and return on equity at 1% significance level. The results were in accordance with the expected sign. The findings were in-

line with the findings by Syarif (2004) and Rengasamy (2014). The bank profit was based on the interest charged against the deposits; it meant the profit was generated through the positive difference between interest of loans and interest on deposits supported a study by Towpek (2006). Nonetheless, the findings indicated that a 1% increase in loans and advances resulted in (0.06% increase) in return on equity.

Non-performing Loans to Loans and advances: The results showed a significant and positive relationship between loans and advances and return on equity at 1% significance level; these results were quite shocking as they were in conflict with the expected sign. However, they were in-line with the findings by Boahene (2012). This implied that there was a positive and a substantial connection between credit risk and profitability of a bank. This could well be interpreted as; for an increase in the risk of loan holders defaulting on their payments would correspondingly result in a bank's profitability going up. This would be so because banks were able to charge exorbitant interest rates. Nonetheless, the implication was that with a 1% increase in non-performing loans, return on equity increased by 1.54%.

Log of Total Assets: The result showed a significant and negative relationship between bank size (LoglogTA) and return on equity at 5% significance level. The results were in accordance with the expected sign. However, they indicated the most unfortunate circumstance. It was expected that as the firm increased in terms of assets, the profit increased as well. However, our findings were in-line with the findings by Becker (2010) and Banchuenvijit (2012); indicating diseconomies of scale. Nonetheless, this meant for a 1% increase in total assets, South African Banks return on equity would decrease by (-0.81%).

Market Capitalisation: The results showed a significant and negative relationship between market capitalisation and return in equity at 1% significance level. The findings were in agreement with the expected sign; Goddard (2004), Thornton (1992) and Gul (2011) also experienced a negative relationship with the market capitalisation. This meant that well capitalised banks experienced negative returns. Nonetheless the results showed that for every 1% increase in market capitalisation, profitability (ROE) would decrease by (-8.68%).

Non-Deposit Dependence External Finance needed: The result showed a significant positive relationship between non-deposit dependence and return on equity; in accordance with the expected sign. The findings were in-line with the findings by Siaw (2013). A bank's reliance on external sources of funding other than deposits or wholesale funding cannot be over

emphasised in assessing its probability Shen (2009). This meant for every 1% increase in non-deposit dependence, profitability would also increase and (ROE) would also increase by (0.20%). The more the bank would borrow from the financial market the more it would increase its profitability. This can be justified by proposition two of capital structure by Modigliani and Miller, which stated that a company's worth was dependent on its capital base; firms with debt funding benefit from interest tax shield.

Equity to Total Assets: The results showed an insignificant and negative relationship between equity to total asset and return on equity. This was in agreement with the expected sign; also in-line with the suggestions by Siaw (2013). A positive relationship was anticipated between Capital adequacy (ETA) and ROA while a negative relationship was expected with the ROE since banks with a higher leverage have a smaller proportion of equity and thus as the value of denominator falls, with a given level of profit after tax, the ROE would ideally increase. That is why the findings showed that for a 1% increase in equity to total assets resulted in a decrease (-0.004%) in return on equity.

GDP Change: The results showed an insignificant but positive relationship with GDP and return on equity. The results were in accordance with the expected sign. GDP was anticipated to affect quite a number of factors associated with the demand and supply for loans and deposit and as its growth slowed down particularly during recessions. As a result, credit quality would deteriorate and defaults increase thus reducing bank returns. However, the results were inconclusive as they were highly insignificant. GDP change was added in the regression as a control variable.

Ratio of financing Gap: The results showed an insignificant and negative relationship between ratio of financing gap and return on equity. The findings were in-line with the expected sign. Kosmidou (2005) established a negative relationship between liquidity risk and bank profitability. However, the results were inconclusive as they were highly insignificant.

Suitability of the Research Model

H₀: The model is not appropriate; when the independent variable does not affect the dependent variable.

H₁: The model is appropriate; when the independent variable affects the dependant variable.

The Decision Rule

Accept H₀ If (Sig. *F*) > 5%

Accept H₁ If (Sig. *F*) < 5%

From the analysis output, the value of (Sig. *F*) was equal to 1%. Therefore, we accepted the alternative hypothesis and the model used was appropriate; meaning liquidity risk management had an effect on the banks' financial performance.

Divergence in the Dependent Variable

The divergence of the dependent variables was explained by the independent variable (R-squared). R² suggested that 90% of the total variation in ROE across the banking firms was explained by joint variations in the eight variables.

4.3 Market Risk Output

The market risk outputs relate to objective three. There were six variables employed namely; market capitalisation to total assets (Log of stock), South African Rand to American Dollar exchange rate, lending interest rate, monetary supply M3, inflation growth rate, and log of gross domestic product. The data related to a 10-year interval period 2006-2015. Data was obtained from the five aforementioned banks, executed on Eviews 8.1 Panel Data.

4.3.1 Descriptive Statistic Analysis

Table 4.9 Descriptive Analysis of Market Risk

	ROE	MKT_CAP_TZAR_USD_E A_	X_LN	LIR	M3	INFL	GDPLN
Mean	19.74600	0.261096	2.141379	10.68900	11.24300	5.912000	5.810610
Median	18.40000	0.130450	2.104702	9.915000	10.58500	5.515000	5.801606
Maximum	32.00000	1.144000	2.474856	15.13000	20.70000	9.350000	6.032127
Minimum	11.80000	0.065600	1.805005	8.750000	1.440000	3.370000	5.604478
Std. Dev.	5.592678	0.267994	0.221367	2.026858	5.366335	1.555712	0.142878
Skewness	0.343224	1.843372	0.200955	1.019522	0.344066	0.734500	0.109225
Kurtosis	1.858857	5.489516	1.771186	2.869427	2.910160	3.394919	1.575015
Jarque-Bera	3.694622	41.22869	3.482325	8.697402	1.003329	4.820670	4.329796
Probability	0.157661	0.000000	0.175316	0.012924	0.605522	0.089785	0.114762

Sum	987.3000	13.05480	107.0689	534.4500	562.1500	295.6000	290.5305
Sum Sq. Dev.	1532.624	3.519217	2.401154	201.2994	1411.080	118.5918	1.000293
Observations	50	50	50	50	50	50	50

On average the performance of (Return on Equity) of South African Banks studied over time the period 2006-2015 was 19.75% meaning the performance was relatively low. The performance was still reasonable given the fact that the South African economy was not performing well during these years. The standard deviation was also small; it was of order 5.6%. Furthermore, the minimum performance was 11.8% and the maximum performance was 32%. The market capitalisation on average was 0.26% with the standard deviation 0.27%; minimum and maximum performances were 1.14% and 0.07% respectively. The South African exchange rate to American Dollar (ZAR/USD) performance was on average 2.14% with a standard deviation of 0.22%. The maximum and minimum performance was 2.48% and 1.81%, respectively. The lending interest rate mean was 10.70% with the associated standard deviation of 2.03%. LIR performed at 15.13% maximum and 8.75% at minimum. The monetary supply (M3) performed at 11.24% on average and standard deviation of 5.4%. With regards to maximum and minimum performance, the South African banks had 20.7% and 1.44% respectively. The Inflation rate mean was 5.9% and the standard deviation was 1.55%. The maximum performance was measured at 9.35% and the minimum at 3.37%. Lastly, GDP mean was 5.82% and standard deviation was 0.15%. GDP at maximum and minimum performance was 6.03% and 5.61% respectively.

Series showed features of non-normality which were common in financial time series data. All the series had a coefficient of kurtosis of either less than or greater than 3 against the standard value of 3 for a normal distribution and a non-zero coefficient of excess kurtosis. The series was non-normally distributed; hence, Jarque-Bera was significant. All of the variables were positively skewed. ROE, MKT-CAP/TA, ZAR-USD-EX-LN, LIR, M3, INFL and GDPLN with the respective values 0.34%, 1.84%, 0.20%, 1.01%, 0.34%, 0.74%, and 0.1%. The distribution peak levels (kurtosis) range at the same levels; ROE, ZAR-USD-EX-LN, LIR, M3, INFL, and GDPLN with the respective values 1.85%, 1.8%, 2.9%, 2.9%, 3.4%, 1.6%. Only MKT-CAP/TA peaked highest at 5.5%. The P-value of a Jarque-Bera less than 10% significance level were MKT-CAP/TA, LIR, and INFL. They were indicative of non-normal distribution; while ROE, ZAR-USD EX-LN, M3, and GDPLN indicated normal distribution with the P-value greater than 10%.

4.3.2 Multicollinearity Test

Table 4.10 Correlation Matrix of Market Risk

	MKT_CAP_TA	ZAR_USD_EX		GDP	INFL	LIR	M3
	—	—					
MKT_CAP_TA							
—	1.000000	-0.048671	-0.014464	0.072879	0.063952	-0.018272	
ZAR_USD_EX							
—	-0.048671	1.000000	0.256577	-0.064523	-0.436437	-0.250066	
GDP	-0.014464	0.256577	1.000000	-0.335978	-0.753913	-0.392637	
INFL	0.072879	-0.064523	-0.335978	1.000000	0.748998	0.115256	
LIR	0.063952	-0.436437	-0.753913	0.748998	1.000000	0.282562	
M3	-0.018272	-0.250066	-0.392637	0.115256	0.282562	1.000000	

Jolibert and Jourdan (2006) argued that a correlation coefficient greater than 0.8 indicated a serious problem of multicollinearity. The positive coefficients indicated the positive relationship between explanatory variables and the negative coefficients represented the negative relationship. Nonetheless, the correlation coefficient matrix indicated that the problem of multicollinearity between the explanatory variables was absent. The highest correlation coefficients were between lending interest rate and inflation (-0.75%). However, the researcher considered this to be the acceptable limit.

4.3.3 Fixed Effects Model

Table 4.11 Fixed Effect Model of Market Risk

DEPENDENT VARIABLE: ROE

* ** *** 10%, 5% and 1% level of significance respectively.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	124.2590*	65.35284	1.901355	0.0647
MKT_CAP_TA_	-19.33425***	3.676689	-5.258604	0.0000
ZAR_USD_EX_LN	-7.896891*	4.183557	-1.887602	0.0665
GDPLN	-15.79361*	9.358652	-1.687595	0.0995
INFL	0.990666	0.930218	1.064983	0.2934
LIR	-1.367513	1.072342	-1.275259	0.2098
M3	0.204040	0.139007	1.467842	0.1502
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.741467	Mean dependent var		4.063600
Adjusted R-squared	0.675176	S.D. dependent var		8.064358
S.E. of regression	4.596145	Akaike info criterion		6.079852
Sum squared resid	823.8574	Schwarz criterion		6.500497
Log likelihood	-140.9963	Hannan-Quinn criter.		6.240036
F-statistic	11.18510	Durbin-Watson stat		0.941336
Prob(F-statistic)	0.000000			

The fixed effect model indicated three significant variables. Market capitalisation was significant at 1% significance level and ZAR/USD exchange rate and GDP were significant at 10% significance level while the other three variables were insignificant; inflation rate, lending interest rate and monetary supply (M3).

Market Capitalisation: The results showed a significant and negative relationship between the market capitalisation and return on equity at 1% significance level. The expected sign could have been either positive or negative depending on the relative extent of the complementary and substitutive effects between financial markets and the banking sector. The

findings were in-line with the findings by (Shleifer & Summers, 1988; Qinhua Pan, 2014; Morck, Shleifer, & Vishny, 1990). These results meant that for a 1% increase in market capitalisation or stock market development, bank profitability (ROE) decreased by (-19.33%).

Exchange Rate (ZAR/USD): The results showed a negative relationship between exchange rate and return on equity at 10% significance level. Again, the expected sign of the exchange rate could have been either positive or negative. Our findings were in-line with the findings by (Owoeye & Ogunmakin, 2013; Chow, Lee, & Solt, 1997). The results meant for a 1% increase in exchange rate, bank profitability (ROE) decreased by (-7.89). Negative exchange rate implied a negative relationship with accounting, transactional, translation of home dominated revenues of local banks to those of their trading partners.

GDP: The results show a negative relationship between GDP and return on equity, the results were in conflict with the expected sign at 10% significance level. A 1% increase in GDP, bank's profitability (ROE) decreased by (-15.79%). Nonetheless, the findings were in line with the findings by (Sara & Muhammad, 2013; Khrawish, 2011). These results meant; as the economy grew people required fewer activities with the banks.

Inflation Rate: The result showed an insignificant and positive relationship between inflation rate and return on equity. Therefore, these results were inconclusive. Our findings were in agreement with the findings by Sara and Muhammad (2013).

LIR: The result showed an insignificant and negative relationship between lending interest rate and return on equity. Therefore, these results were inconclusive. The findings were in agreement with the assumption by Stiglitz and Weiss (1981).

M3: The results showed a positive and insignificant relationship between monetary supply and return on equity. Therefore, these results were inconclusive. However, the findings were in line with the findings by (Amassoma, PI, & Olaiya, 2011).

The results that were obtained from the market risk equation were a clear indication that it was mostly the firm-specific and industry factors that determined a bank's profitability. The Market risk theory that assumed that it was the risk that could not be diversified away seemed to hold.

Suitability of the Research Model

H₀: The model is not appropriate; when the independent variable doesn't affect the dependent variable.

H₁: The model is appropriate; when the independent variable affects the dependant variable.

The Decision Rule

Accept H₀ If (Sig. *F*) > 5%

Accept H₁ If (Sig. *F*) < 5%

From the analysis output, the value of (Sig. *F*) was equal to (0.00000). Therefore, we accepted the alternative hypothesis and the model used was appropriate; meaning market risk had an effect on banks' financial performance.

Divergence in the Dependent Variable

The divergence of the dependent variables was explained by the independent variable (R-squared). R² suggested that 74% of the total variation in ROE "across the banking firms was explained by joint variations in the six variables.

4.4 Chapter Summary

The Panel Data Fixed Effect Model (FEM) based on the Hausman Test applied across three objectives revealed that the credit risk indicators (independent variables) relating to objective number one employed in this study were non-performing loans to total loans and advances, and loans and advances to total deposit which were the main variables. This was done along with two control variables leverage ratio and log of total asset as proxy for firm size. Everything regressed against return on equity (ROE) as profitability measure (dependent variable). Nonetheless, the findings indicated a significant relationship at 5% significance level with non-performing loans, loans and advances and leverage ratio; while firm size (log total assets) was significant at 10%. The liquidity risk indicators (independent variables) relating to objective two employed were loans and advances to total deposit, non-performing loans to total loans, LOG(total assets), market capitalisation to total assets, non-deposit

dependence/external finance, GDP growth rate, ratio of financing gap to total asset, equity to total assets.

Control variables were non-performing loans, firm size (log total assets), Gross Domestic Product growth, and ratio of financing gap. The findings indicated that loans and advances to total deposit, non-performing loans, firm size (log total assets), market capitalisation to total assets, and non-deposit dependence were significant at 5% significance level; while equity to total assets, GDP growth and ratio of financing gap were insignificant. The market risk indicators (independent variables) relating to objective three were employed with three main variables; market capitalisation (log stock) to proxy equity risk, exchange rate to proxy foreign exchange risk, and lending interest rate to proxy interest rate risk. Three control variables were employed; inflation rate, GDP and monetary supply (M3).

The findings showed market capitalisation (log stock) and exchange rate to be significant and we found an insignificant and negative relationship with lending interest rate. With the control variables, the findings showed that an insignificant and positive relationship existed between inflation rate and return on equity. We found a negative relationship between GDP and return on equity. The results were in conflict with the expected sign. All three objectives used return on equity as a profitability measure. The next chapter is the last chapter on summary, conclusions and recommendations.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

Presented here is a summary of the outcome of the research carried out. Conclusions were drawn based on the objectives of the study and policy recommendations were also provided. The chapter is organised into four sections: the summary, conclusions, recommendations and limitations of the study.

5.1 Summary

The aim of the study was to determine the impact of financial risk on the financial performance of banks in South Africa; with regards to credit, liquidity and market risk. The sample of the study consisted of five banks listed on the Johannesburg Stock Exchange. Firm specific data was extracted from Bloomberg and McGregor (BFA), and macroeconomic data was extracted from the International Monetary Fund – International Financial Statistics and the South African Reserve Bank; during the period 2006-2015. To assess the relationship between financial risk indicators and bank profitability with regards to credit, liquidity and market risk; the Panel Data fixed effect model was employed. In assessing the relationship between financial risk and profitability the study used the Eviews 8.1.

Objective One: To measure credit risk, two main variables were employed; ratio of non-performing loans to loans and advances and the ratio of loans and advances to total deposit. Control variables were leverage ratio to proxy banks' capital structure and log of total assets to proxy firm size. The ratio of non-performing loans was expected to be negatively related to profitability, while the ratio of loans and advances was projected to be positively related to profitability. With the control variables; leverage ratio was expected to be positively related to profitability, while the firm size (log total assets) could either have a positive or negative relationship depending whether the bank was experiencing economies or diseconomies of scale.

Nonetheless, the findings indicated a significant relationship at 1% significance level with non-performing loans, and leverage ratio, loans and advances at 5% ; while firm size (log total

assets) was significant at 10%. The results indicated that a 1% increase in loans and advances to total deposit increased the profitability of South African banks by (0.031766%), with a 1% increase in non-performing loans there was a decrease of (-1.033009%) in return on equity, 1% increase in a banks' leverage ratio, return on equity increased by (0.081217%). These findings were in-line with the findings by Boahene (2012) and Lane (2009). Furthermore, a 1% increase in a firm's total assets, the banks' profitability decreased by (-0.541132%). All four variables lived to their expected signs.

Objective Two: To measure liquidity risk four main variables were employed; loans and advances to total deposits, non-deposit dependence, market capitalisation to total assets and equity to total assets. Control variables used were non-performing loans, firm size (log total assets), Gross Domestic Product growth, and the ratio of financing gap. Loans and advances and non-deposit dependence were expected to have a positive sign, while market capitalisation to total assets and equity to total assets were expected to have either positive or negative signs. With control variables; non-performing loans were expected to have a negative sign even though some studies have obtained a positive relationship, firm size (log total assets) and ratio of financing gap could have either a positive or a negative relationship and GDP growth was expected to have a positive sign.

However, the findings indicated that loans and advances to total deposit, non-performing loans, market capitalisation to total assets, and non-deposit dependence were significant at 1% significant level, firm size (log total assets) at 5% significance level; while equity to total assets, GDP growth and ratio of financing gap were insignificant. The results indicated that a 1% increase in loans and advances resulted in an (0.06%) increase in return on equity; a 1% increase in non-deposit dependence profitability increased, ROE increased by (0.20%), 1% increase in market capitalisation, profitability (ROE) decreases by (-8.68%) and 1% increase in equity to total assets resulted in a decrease (-0.004%) in return on equity. However, the equity to total assets results were inconclusive. With the control variables, the findings showed that a 1% increase in non-performing loans, return on equity increased by 1.54%; 1% increase in total assets, South African Banks return on equity decreases by (-0.81%) representing diseconomies of scale, we found an insignificant and negative relationship between ratio of financing gap and return on equity. The findings were in-line with the expected sign.

Kosmidou (2005) established a negative relationship between liquidity risk and bank profitability. However, our results were inconclusive as they were highly insignificant. We

found an insignificant but positive relationship between GDP and return on equity. The results were in accordance with the expected sign. GDP was expected to influence many elements associated with the demand and supply for loans and deposit and as its growth slowed down particularly during recessions, credit quality deteriorated and defaults increased thus reducing bank returns. However, our results are inconclusive as they were highly insignificant. GDP change was added in a regression as a control variable.

Objective Three: To measure market risk we employed three main variables; market capitalisation to proxy equity risk, exchange rate to proxy foreign exchange risk, and lending interest rate to proxy interest rate risk. Three control variables were employed; inflation rate, GDP and monetary supply. All main variables could have either positive or negative relationship with profitability; likewise, with the control variables. Only market capitalisation is significant at 1%, and ZAR/USD and logarithm of GDP are significant at 10%. Inflation, lending interest rate and money supply (M3) are insignificant. The findings with regards to main variables showed that 1% increase in market capitalisation, bank profitability (ROE) decreased by (-19.33%); 1% increase in exchange rate, bank profitability (ROE) decreased by (-7.89%), and 1% increase in GDP bank profitability decreased (ROE) by (15.79%). We found an insignificant and negative relationship between lending interest rate and return on equity.

Therefore, these results were inconclusive. Moreover, with the control variables the findings showed that an insignificant and positive relationship between inflation rate and return on equity. We found a negative relationship between GDP and return on equity; the results were in conflict with the expected sign. A 1% increase in GDP, bank's profitability (ROE) decreased by (-15.79%); and we found a positive and insignificant relationship between monetary supply and return on equity. Therefore, these results were inconclusive. However, this was no surprise as it was expected that firm specific factors had more influence than external factors on profitability.

Robustness of the Study Model

This is the summary that entails testing the '-goodness of fit' of the model to the actual data and the extent to which the explanatory variables explained the variation in the dependent variable.

Objective One: The divergence of the dependent variables was explained by the independent variable (R-squared). R^2 suggested that 82% of the total variation in ROE across the banking

firms was explained by joint variations in the four variables while 18% were due to error term or chance or unexplained. And the F-statistic with the value of 22.64 and the Prob(F-statistic) 0.00000 which was highly significant thus all the independent variables jointly influenced ROE. The model therefore was considered robust or fitted well to the actual data.

Objective Two: The divergence of the dependent variables was explained by the independent variable (R-squared). R^2 suggested that 90% of the total variation in ROE across the banking firms was explained by joint variations in the eight variables, while 10% were due to error term or chance or unexplained. And the F-statistic with the value of 28.46 and the Prob(F-statistic) 0.00000 which was highly significant thus all the independent variables jointly influenced ROE. Therefore the model was considered robust or fitted well to the actual data.

Objective Three: The divergence of the dependent variables explained by the independent variable (R-squared). R^2 suggested that 74% of the total variation in ROE across the banking firms was explained by joint variations in the four variables “while 26% were due to error term or chance or unexplained. And the F-statistic with the value of 11.2 and the Prob(F-statistic) 0.00000 which was highly significant thus all the independent variables jointly influenced ROE. Therefore the model was considered robust or fitted well to the actual data.

5.2 Conclusion

Referring to the study findings, the study established that R-squared of credit, liquidity and market risk equations; 82%, 91%, and 74% respectively. This therefore meant that the variations in the dependent variable (ROE) were explained by the independent variables. This implied the strong explanatory power for the regressions. Therefore, we can accept the hypothesis that assumes that credit, liquidity and market risk have a relationship with the profitability (ROE). With respect to bank profitability measured by ROE, liquidity risk was revealed to be a major determinant of bank profitability due to the highest R-squared.

5.3 Policy Recommendation

Objective One: With regards to credit risk based on our conclusions, it is recommended that banks in South Africa should enhance their capacity in credit analysis and loan administration while the regulatory authorities (National Credit Regulatory, South African Reserve Bank and Banking Association of South Africa) should pay more attention to banks' compliance to relevant regulatory requirements by the Basel Committee on Banking Supervision. Just like any other type of business, banks are exposed to all kinds of risk, without

exception. The major contributor to serious challenges faced by banks was seen as poor credit risk management. As the study has revealed that much of credit risk was due to non-performing loans, thus South African Banks have to review their loan books and revise their credit granting process.

Objective Two: With liquidity risk; taking the various determinants of bank liquidity risk into consideration and how liquidity risk impacts bank profitability, an efficient management of it would not only harden to the benefit of banks but also to individuals and business entities and thus the whole economy at large. South African Banks have to put more effort towards attracting deposits as they are a major determinant of liquidity followed by external funding liability. Greater reliance on the stock market has to reduce as this study has found a negative relationship with profitability.

Objective Three: With market risk; South African Banks have to seek for effective hedging strategies to deal with the market risk volatilities. This research has indicated that market risk is negatively correlated with profitability; banks cannot diversify away this risk, therefore the best they could do is to at least find forecasting techniques to predict the future so as to better prepare.

5.4 Recommended Future Research

The main goal of this research was to look at the link between financial risk indicators and financial performance of commercial banks in South Africa. This research could be replicated by increasing the sample of analysis and establishing whether the results would be different from the current study. This study can be extended to include the whole of banking sector and not just commercial banks. The study may also be extended to cover other fields of performance measurement such as effectiveness, economy, prudence and soundness of commercial banks in other countries. Alternatively, future researchers could replicate the study but consider other methods of analysis such as P-ADRL, GARCH model, ARCH model, VAR model, and Co-integration analysis among other models and try to establish if the results would be different. Another study could be done but with the addition of more variables to establish their lagged effect on the performance of the commercial bank.

5.5 Limitations of the Study

A number of limitations could be pointed out for this study. Firstly, this study was limited to top five banks in South Africa and not the banking sector as a whole. Secondly, the sample size

taken could be considered small and other researchers could use a larger sample size. Thirdly, this study made use of one measure of financial performance, ROE. There were other measures of financial performance of commercial banks including ROA and Net Non-Interest Margin (NIM). Fourthly, this descriptive and correlational study relied on secondary data which had already been compiled by Bloomberg, McGregor (BFA), South African Reserve Bank (SARB) and International Monetary Fund – International Financial Statistics (IMF-IFS). Data was used as it was obtained and the researcher had no means of verifying the validity of the data which was assumed to be accurate for the purpose of this study. The study results were therefore subject to the validity of the data used.

5.6 Chapter Summary

This chapter gave us the summary of the study findings and the interpretations thereof and subsequent conclusions. Policy and future study recommendations were also identified in this chapter so as to enable future researchers to capitalise on any gap(s). The limitations related to the study were addressed in this chapter.

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APPENDICIES

Appendix I: Models Summary

MODEL	R-SQUARE	PROBABILITY	F-STAT VALUE
One	82%	0.00000	22.64
Two	90%	0.00000	28.5
Three	74%	0.00000	11.2

Appendix II: Turnitin Report

Mcom M	
ORIGINALITY REPORT	ORIGINALITY REPORT
<div>9%</div> <div>SIMILARITY INDEX</div>	<div>10%84</div>
PRIMARY SOURCES	PRIMARY SOURCES
<div>1</div> <div>WV</div> <div>Inter</div>	
<div>2</div> <div>etc</div> <div>Inter</div>	
<div>3</div> <div>WV</div> <div>Inter</div>	
<div>4</div> <div>WV</div> <div>Inter</div>	<div>2</div> <div>Internet Source</div>
<div>5</div> <div>bu</div> <div>Inter</div>	<div>3</div> <div>Internet Source</div>
<div>6</div> <div>WV</div> <div>Inter</div>	<div>4</div> <div>ccsenet.org</div> <div>Internet Source</div>
<div>7</div> <div>Su</div> <div>Stu</div>	<div>5</div>
<div>8</div> <div>CC</div> <div>Inte</div>	
<div>9</div> <div>St</div> <div>Stu</div>	<div>6</div> <div>Student Paper</div>
	<div>7</div> <div>Submitted to Coventry University</div> <div>Student Paper</div>
	<div>8</div> <div>Submitted to National Research Univers</div> <div>Higher School of Economics</div> <div>Student Paper</div>

Appendix III: Ethical Clearance



25 January 2017

Mr Sibusiso Mafu (210513349)
School of Accounting, Economics & Finance
Westville Campus

Dear Mr Mafu,

Protocol reference number: **HSS/0116/017M**
Project title: Financial Risk Management and Profitability in South African Banks

Full Approval – No Risk / Exempt Application

In response to your application received on 31 January 2017, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and **FULL APPROVAL** was granted for the protocol.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Dr Mabutho Sibanda
Cc Academic Leader Research: Dr Harold Ngilawa
Cc School Administrator: Ms Nondumiso Mfungeni

Humanities & Social Sciences Research Ethics Committee

Dr Shenuka Singh (Chair)

Westville Campus, Govan Mbeki Building

Postal Address: Private Bag X54001, Durban 4050

Telephone: 031 290 8567/8568/8569 Facsimile: 031 290 4830 Email: y.mhlop@ukzn.ac.za / nymanzi@ukzn.ac.za / mar.co@ukzn.ac.za

Website: www.ukzn.ac.za



Founding Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

Appendix IV: Proposal Qualification



COLLEGE OF LAW AND MANAGEMENT STUDIES
School of Accounting, Economics & Finance
Higher Degrees and Research Proposal Review Committee

30 January 2017

Student Name: Sibusiso Mafu

Student No: 210513349

Proposed Qualification: M-COM (Finance)

Title: Financial risk management and bank performance in South Africa

Dear Sibusiso

Thank you for presenting your proposal to the Higher Degrees and Research Proposal Committee on the 18th of November 2016 and for your re-submission on

Congratulations your proposal has been accepted, you may proceed with your research.

Yours Sincerely

A handwritten signature in black ink, appearing to read "Nondumiso Ngcengo".

Nondumiso Ngcengo

The logo of the School of Economics and Finance, featuring a stylized tree and the text "School of Economics and Finance", "POSTGRADUATE", "UNIVERSITY OF KWAZULU-NATAL", and "DURBAN".

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