

**THE IMPACT OF CREDIT RISK ON FINANCIAL PERFORMANCE OF
SOUTH AFRICAN BANKS**

By

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ABSTRACT

The banking sector is an important industry that needs to be safeguarded because its failure is bound to have a negative knock-on effect on the economy at large. The 2007-2009 financial crises were occasioned by banks assuming disproportionate levels of risk resulting in a high incidence of non-performing loans on their books. As such, this study examined the impact of credit risk on the financial performance of 18 South African banks for the period 2008 to 2018. Panel data techniques, namely the pooled ordinary least squares (pooled OLS), fixed effects and random effects estimators were employed to test the relationship between credit risk and financial performance proxied by non-performing loans (NPLs) and by return on assets (ROA) or return on equity (ROE) respectively.

The results of the study documented that credit risk is negatively related to financial performance. Thus, the higher the incidence of non-performing loans, the lower the profitability of the bank. Secondly, the study documented that growth has a positive effect on financial performance. This indicates that productivity capacity is ameliorated through bank development. Thirdly, it was found that capital adequacy is positively related to financial performance. While a greater capital adequacy ratio may instil confidence of stakeholders in a bank, making it competitive, a high capital base may be perceived as a lack of initiative and tying up resources which could have yielded better returns in alternative investments. Fourthly, the study did not find any conclusive relationship between size and financial performance. Lastly, the study found that bank leverage and financial performance are negatively related. The implications of the findings are that at a micro level, banks should observe prudent and stringent credit

policies in order to limit the incidence of non-performing loans. At a macro level, regulators must enforce supervision in order to ensure that banks manage their credit risk according to the regulations to minimise the risk of bank failure.

Keywords: *return on assets; return on equity; financial performance; credit risk; non-performing loans; banks; South Africa*

IRHUNYEZO

Umkhakha wezamazabanga kulibubulo eliqakathekileko eliding ukobana litjhejwe ngombana ukwehluleka kwalo kuqaleka kungaba nomthelela omumbi kezomnotho ngokubanzi bawo. Umraro wezomnotho weminyaka ephakathi kuka -2007-2009 yayikhambisana nesikhathi lapho amazabanga athoma ukuzifaka engozini ekulukazi, kanti lokho kwarholela ebujameni besehlakalo esikhulu seenkolodo ezingenzi inzuzo encwadini zamabanga. Yeke-ke, leli rhubhululo belihlola umthintela wesikolodo mayelana nobujamo beemali bamabanga weSewula Afrika ali-18 ukusukela ngomnyaka ka 2008 ukufika ku 2018. Amano wephanele yedatha, wona ngilawa *pooled ordinary least squares (pooled OLS)*, *fixed effects* kanye namatshwayo ameda alinganisa imithintela kusetjenzisiwe ngehloso yokuhlola itjhebiswano eliphakathi kobungozi besikolodo kanye nobujamo beemali obukhambisana neenkolodo ezingananzuzo (*non-performing loans*)(NPLs) begodu lokhu kukhambisana nenzuzo elethwa msebenzi wepahla eligugu (*return on assets*)(ROA) nanyana inzuzo elethwa magugu womnotho anjengemali/matjhezi (*return on equity*)(ROE) ngaleyo ndlela..

Imiphumela yerhubhululo itlolwe bona ubungozi bokulodisa buhlobene ngendlela embi nobujamo beemali. Yeke-ke, kutjho bona lokha izinga lezehlakalo zeenkolodo ezingangenisi inzuzo naliya phezulu, kutjho bona izinga lokwenza inzuzo ezincani nalo liya phasi emabhangeni. Kwesibili, irhubhululo litlolwe bona ukuhluma komnotho kunomthelela omuhle ebujameni beemali. Lokhu kutjengisa bona amandla wokukhiqiza asekelwa kuthuthukiswa kwamabanga. Kwesithathu, kuye kwatholakala bona iimali ezaneleko zikhambisana kuhle nobujamo beemali. Kanti godu, isilinganiso esikhulu seemali ezaneleko singaletha ukuzethemba kwabadlalindima ebhangeni,

lokhu kwenze ibhanga bona ibe sezingeni lokuphalisana, isisekelo esiphezulu sezeemali singathathwa njengokuthogeka komzamo wokuhlanganisa imithombo ebeyingaletha iinzuzo ezincono kwamanye amahlelo wokutjalwa kweemali. . Kwesine, irhubhululo akhange lithole nginanyana ngiliphi itjhebiswano phakathi kobukhulu kanye nobujamo beemali. Kokugcina, irhubhululo lithole bonyana ukuqiniswa kwebhanga ngeemali kanye nobujamo beemali kuzizinto ezingahlobani kuhle. Ilwazi elitholiweko lihlathulula bona ezingeni lamabhizinisi amancani, amabhanga kufanele aqale imigomo eqinileko yokukolodisa ukobana akwazi ukwehlisa izehlakalo zeenkolodo ezingangenisi inzuzo. Ezingeni lamabhizinisi amakhulu, iimbethamthetho kufanele ziqinise ilihlo ukobana aqinisekise ukuthi amabhanga alawula ubungozi bokukolodisa ngokwemithetho ukuphungula ubungozi bokwehluleka kwamabhanga.

Amagama aqakathekileko:*rinzuzo eyenziwa yipahla eligugu, inzuzo eyenziwa yipahla eligugu/matjhezi, ubujamo beemali, ubungozi bokunikela isikolodo, iinkolodo ezingangenisi inzuzo, amabhanga;iSewula Afrika*

AMAGQABANTSHINTSHI

Icandelo lezeebhanki lushishino olubalulekileyo olufuna ukukhuselwa kuba ukusilela kwalo ngokuqinisekileyo kunganesiphumo esigangqalanga esingasihlangu kuqoqosho ngokubanzi. Ixesha lobunzima kwezemali ngowe-2007-2009 labangelwa ziibhanki ngamazanga omngcipheko angalamananga athe agqibelela kwisihlo esiphezulu seemalimboleko ezingazaliyo kwiincwadi zazo. Kananjalo, olu phononongo luvavanye impembelelo yomngcipheko wonikezomatyala kwizinga lokuphuma nokungena kwemali kwiibhaki zaseMzantsi Afrika ezili-18 kwisithuba sowe-2008 ukuya kowe-2018. Uluhlu lweenkcukachalwazi zobugcisa, olubizwa ngokuba yi-*pooled ordinary least squares (i-pooled OLS)*, iziqikeleli zeziphumo ezizinzileyo kunye nezeziphumo zebhaqo zasetyenziswa ukuvavanya unxulumano phakathi komngcipheko wonikezomatyala kunye nezinga lokuphuma nokungena kwemali okumelwe ngokwelungelo ziimalimboleko ezingazaliyo (ii-NPL) kunye nembuyekezo yeeasethi (i-ROA) okanye imbuyekezo yezabelo (i-ROE) ngokulandelelana.

Iziphumo zophononongo zingqine ngamaxwebhu ukuba umngcipheko wonikezomatyala unonxulumano olungaluhlanga nezinga lokuphuma nokungena kwemali. Ngoko ke, okona isihlo seemalimboleko ezingazaliyo siphezulu, kokona inzuzo yebhanki iphantsi. Okwesibini, uphononongo lungqine ngamaxwebhu ukuba uhlumo lunesiphumo esihle kwizinga lokuphuma nokungena kwemali. Oku kudandalazisa ukuba isakhono sokuvelisa senziwa ngcono ngophuhliso lwebhanki. Okwesithathu, kufunyaniswe ukuba isilinganiso senkunzi sinxulumene ngokukoko nezinga lokuphuma nokungena kwemali. Ngelixa umlinganiselo wesilinganiso

senkunzi omkhulu unganika ukuthembeka koqoqosho kwabachaphazelekayo kwibhanki leyo, kuyenze ukuba ibe kwizinga lokukhuphisana nezinye, isiseko senkunzi ephezulu singathathwa njengokusilela kokusungula kunye nokudibanisa imithombo engeyivelise iimbuyekezo ezingcono kutyalomali olulolunye. Okwesine, uphononongo alukhange lufumanise naluphi na unxibelelwano olubonakalayo phakathi kobungakanani nezinga lokuphuma nokungena kwemali. Okokugqibela, uphononongo lufumanise ukuba inkxasomali yebhanki kunye nezinga lokuphuma nokungena kwemali zinxulumene ngokungakuhlanga. Okubhekiselele kokufunyanisiweyo kukuba kwicandelo loshishino olunganeno, iibhanki kufuneka ziqwalasele imigaqonkqubo yamatyala enobulumko nengqongqo ngenjongo yokunciphisa isehlo seemalimboleko ezingazaliyo. Kwicandelo loshishino olubanzi, abalawuli kufuneka banyanzele ukubekwa kweliso ukuqinisekisa ukuba iibhanki zilawula umngcipheko wonikezomatyala lwazo ngokwayamene nemigaqo ukunciphisa umngcipheko wokusilela kwebhanki.

Amagama angundoqo: *imbuyekezo yeeasethi; imbuyekezo yezabelo; izinga lokuphuma nokungena kwemali; umngcipheko wonikezomatyala; iimalimboleko ezingazaliyo; iibhanki; uMzantsi Afrika*

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DECLARATION

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The Impact of Credit Risk on Financial Performance of South African Banks

I declare that the above thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submit the thesis to originality checking software and that it falls within the acceptable requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.

SIGNATURE:



DATE: 28 February 2020

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LIST OF ACRONYMS

CAR	Capital Adequacy Ratio
CAPM	Capital Asset Pricing Model
FAIS	Financial Advisory and Intermediary Services
FE	Fixed Effects
FICA	Financial Intelligence Centre Act
FSR	Financial Sector Regulation
IFRS	International Financial Reporting Standards
IRMSA	Institute of Risk Management South Africa
LM	Breusch Pagan Lagrange Multiplier test
NCA	National Credit Act
NCR	National Credit Regulator
NPLE	Non-Performing Loans to Equity
NPLR	Non-Performing Loans Ratio
OLS	Ordinary Least Squares
RE	Random Effects
ROA	Return on Assets
ROE	Return on Equity
SARB	South African Reserve Bank
WACC	Weighted Average Cost of Capital

CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.1 Introduction

The heart of any financial system lies in the banking sector. The 2007 to 2009 global financial crisis has necessitated the need for better approaches in all systems to have an efficient economy which at the same time looks after the welfare of its people (Ötokerobe & Podpiera, 2010). It disclosed the prominence of maintaining financial stability and how all risks are intertwined. Credit risk continues to be a problem in the South African banking system. Sound credit risk management is explored in this study to resolve credit risk issues that make lending complex, demanding and unprofitable (Kolapo, Ayeni, & OKE, 2012). The volatile worldwide, political and economic environment demands greater management acumen in the credit environment to contribute to the financial performance of banks. Risk management is at the centre of financial sector supervision to improve financial performance of banks and prevent them from failure (Mikes & Kaplan, 2013).

According to the South African Reserve Bank, SARB (2018), household debt at the end of March 2018 rose by 3.9 percent to R1.6 trillion, and there was also increase in private sector borrowing. Credit is important since it increases the borrower's spending which drives the economy. This makes the role of banks important, since banks are the main source of credit in any economy, and loans are a sizeable origin of credit risk (Fredrick, 2012). As the world progresses in the fourth industrial revolution 4IR introducing 5G and Artificial Intelligence (AI), the latest banking software systems must

be developed to better cope with the evolution of the significant credit growth increase and safeguard banks from collapsing. It is important to refine the credit risk models used to measure default risk, which include, traditional, modern, default and mark-to-market models, since risk is a science expressed in numbers. On the other hand, it is necessary to expose banks charging illegally inflated interest rates based on race, since credit is also an art which requires judgement.

More research is required to establish which cost control activities in banks have an effect on financial performance (Chimkono & Muturi, 2016). Similar to many businesses, the overall task of banks is wealth creation for the shareholders (Chisasa, 2014). The constitution of South Africa leads all legislation to protect consumers and make the credit environment fair for everyone (Hawthorne, 2005). Measures to avoid unlawful provisions of credit agreements is pertinent and must be strictly adhered to in accordance with section 90 of the National Credit Act, to show commitment to deal with risks.

A fundamental problem of local macro-economics is that capital is scarce and contracts are being poorly managed and enforced, which increases credit risk, and as a result, affects financial performance (The Basel Committee, 2006). A credit portfolio has a significant role to play in deciding on the amount of capital a bank needs to have. Higher capital is required when pursuing higher credit, and a bank is a risk seeker. Furthermore, banks seek to lower the cost of capital, and to maximise the return on capital when conducting business to stay competitive (Tettey, 2014).

Credit risk, is the risk of default on a debt, or whether or not a loan will be fully paid, and being capable to meet debt obligations (Vassalou & Xing, 2004). Credit risk is also referred to as default risk. Lending or credit granting entails uncertainty. It involves the risk of losing out on an investment due to defaults on a credit obligation. Credit risk results from, among various other things, weak credit standards, and poor economic conditions. Strategic thinking is required during an economic boom by lenders to exercise restraint on growing credit and monitor the process to avoid potential non-performing loans (Rinaldi & Sanchis-arellano, 2006). The theory elucidate non-performing loans to mean those outstanding for more than three months.

Over-indebtedness of borrowers and irresponsible lending are both crucial elements to control in order to manage credit risk and address the deficiencies of the credit granting system in South Africa (OECD Economic Surveys, 2013). The National Credit Act (NCA) No. 34 of 2005 defines over-indebtedness as “the inability to settle obligations under credit agreements in a timely manner”. Section 81 (2) of the NCA requires commercial banks to conduct a fair and objective assessment for responsible lending. The reality of such cases was evidenced by African Bank, which failed in South Africa as a consequence of lax credit standards that led to an increase in unsecured loan defaults (Batra, 2014).

The National Credit Act governs the South African credit industry, and is pivotal in this study in modern economic policymaking that leads to good credit risk management, as it ensures fundamental stability in the economic environment. The NCA is there for transparency through fair and objective lending and the National Credit Regulator’s (NCR’S) job is to ensure compliance and at the same time protect consumers. The

regulation of banks assists in the process of lending and credit administration to identify potential problems in credit risk. Pure and speculative risks, which affect the profitability and viability of banks, have to be both controlled by regulations (Tettey, 2014).

South African consumers were governed by both the Usury Act 73 of 1968 and the Credit Agreement Act 75 of 1980 before the National Credit Act (NCA) 34 of 2005 was enacted. The former Acts had failed to deliver on financial intermediation to make credit accessible for the poor majority in South Africa (Botha, 2014). The introduction of the NCA has eminently transformed consumer credit in South Africa and made the objective of financial inclusion a reality. The change was made to stop reckless lending and eradicate over-indebtedness in efforts to improve the living standards of South Africans (National Credit Regulator, 2007). International Financial Reporting Standards (IFRS) 9, which replaced International Accounting Standards (IAS 39), and which prepares banks for default and in so doing stabilises the banking industry (Silvia & Cristina, 2015).

Banks are key in financial evolution with their role of providing credit in economic growth of developing countries (Ally, 2013). Loans transform the lives of many as it builds economic empowerment. The NCA helps banks have impetus to manage credit risk and control debt through financial development strategies which offer opportunities to previously disadvantaged designated groups. It emphasises the need to create a fair environment which is more conducive to credit expansion (National Credit Regulator, 2007).

Liquidity is a key indicator, which is crucial to bank success. Crisis management is easier when a bank has readily available liquid assets (Shah & Khan, 2017). Liquidity challenges result from deteriorating loan quality, leading to credit losses. The credit losses which make banks unable to pay depositors and/or other lenders amounts due to them. Evidence has been found that having a healthy cash flow helps the banks not to be highly geared. The use of cash flow drivers, when analysed together, can assist to improve performance, reduce financial waste, and make better business decisions. Inherent risk is part of business, which makes expected future cash flows unpredictable (Sheikh, 2013). Analysis of business drivers provides a plan with steps to minimise the chances of things going wrong and become resilient having ability to manage complexity under pressure.

This study conducts an empirical assessment of the quantitative impact of credit risk on South African banks from 2008 to 2018. Focus will be placed on establishing the relationship and evaluating the effect of non-performing loans on profitability of banks. This is because loans are the biggest line item on the statement of financial position of banks from the lending function which is the main business activity. Unemployment was ranked as the top risk according to the 2019 Institute of Risk Management (IRMSA) risk report in South Africa. This raises a business continuity concern in banks, since people without jobs lack the ability to pay on the loans they owe.

1.2 Background

Overdrafts and loans are germane to credit risk exposure of banks. Hence, the analysis of the trend during the period 2008 to 2017 under investigation is salient. The

reason for this is that loans and overdrafts must be managed for a bank to survive and stay profitable (Abbas, Zaidi, Ahmad, & Ashraf, 2014). Loans present credit risk, which is by far the most significant risk among the diverse risks which banks encounter in their operations. Hence, thorough credit assessment is vital to ensure an effective credit process.

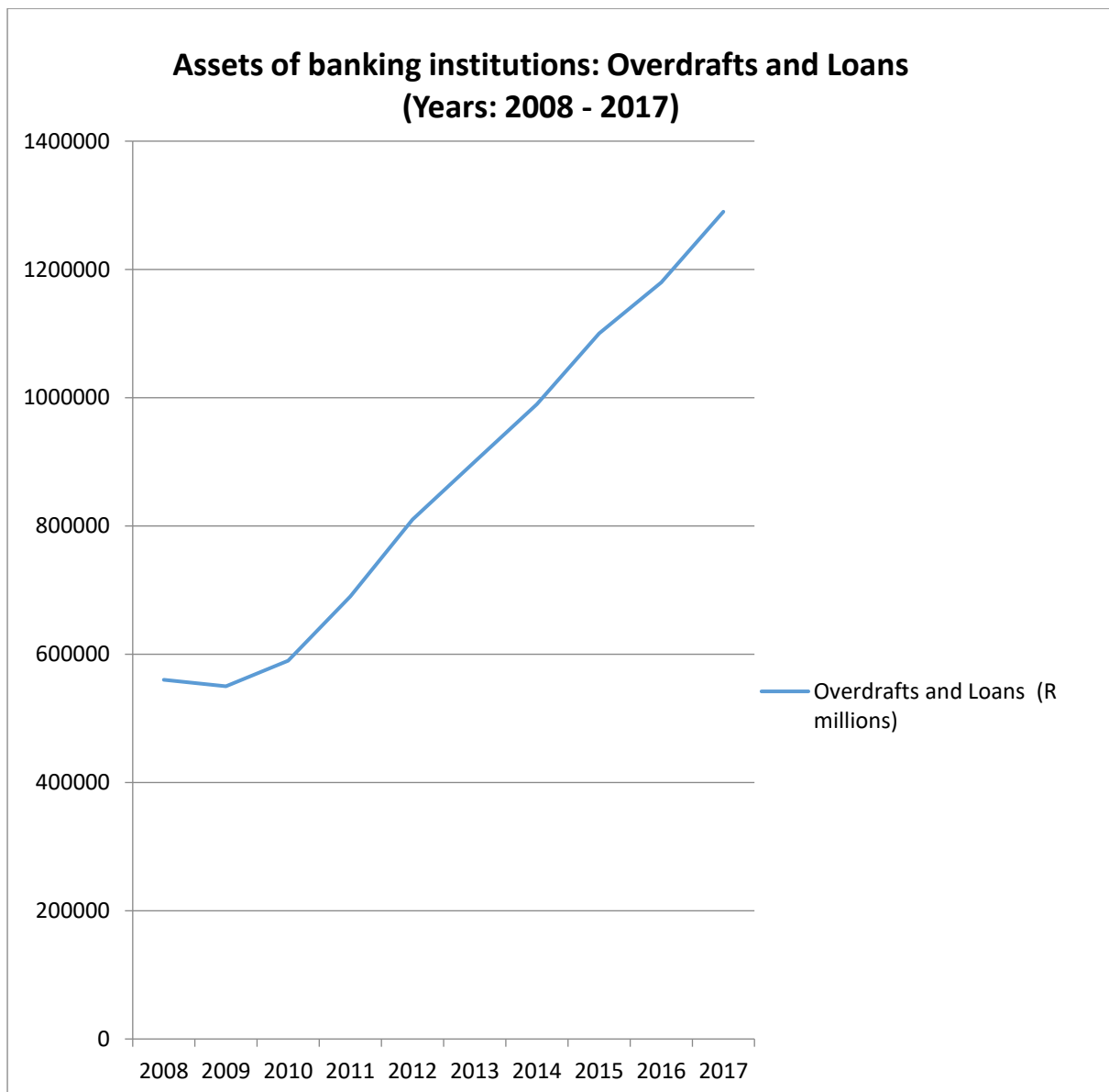


Figure 1.1: Trends in South African banks assets for the period 2008-2017

Source: South African Reserve Bank 2018

Figure 1 presents an upward trend of overdrafts and loans from 2008 to 2017 with a slight kink in 2009. The drop, according to the South African Reserve Bank (SARB), results from the increase in the repo rate, which affects the prime rate. South African banks were sourcing funds from SARB at a high rate, which they passed on to their borrowers. The effect of such is that when rates are high, it becomes costly to repay and numerous clients are not willing to borrow. Considering an increase in the loan portfolio in banks in Figure 1, if loans are not settled, bank failures will negatively affect the economy of the country. As stated in the Financial Sector Regulation (FSR) First Edition 2018, South African banks have left their credit lending standards unchanged since 2016. This is worrisome, considering how fast things are changing, where more stringent standards are inevitably required.

The banking sector's profitability, measured by the return on equity (R.O.E) ratio, declined from 17.4% in February 2017 to 16% in January 2018 (Financial Stability Review, 2018). Banks generate income mainly through giving credit; therefore interest on loans constitutes the highest source of revenue of banks which contributes a great deal towards financial performance (Mirach, 2010). Credit management is a total lending process from giving out debt by banks to the final recovery of amounts given. Non-performing loans hinder the growth of credit needed to improve banks performance (Abel, 2007). Non-performing loans, with their effect on profitability, have huge potential to cause bank failures.

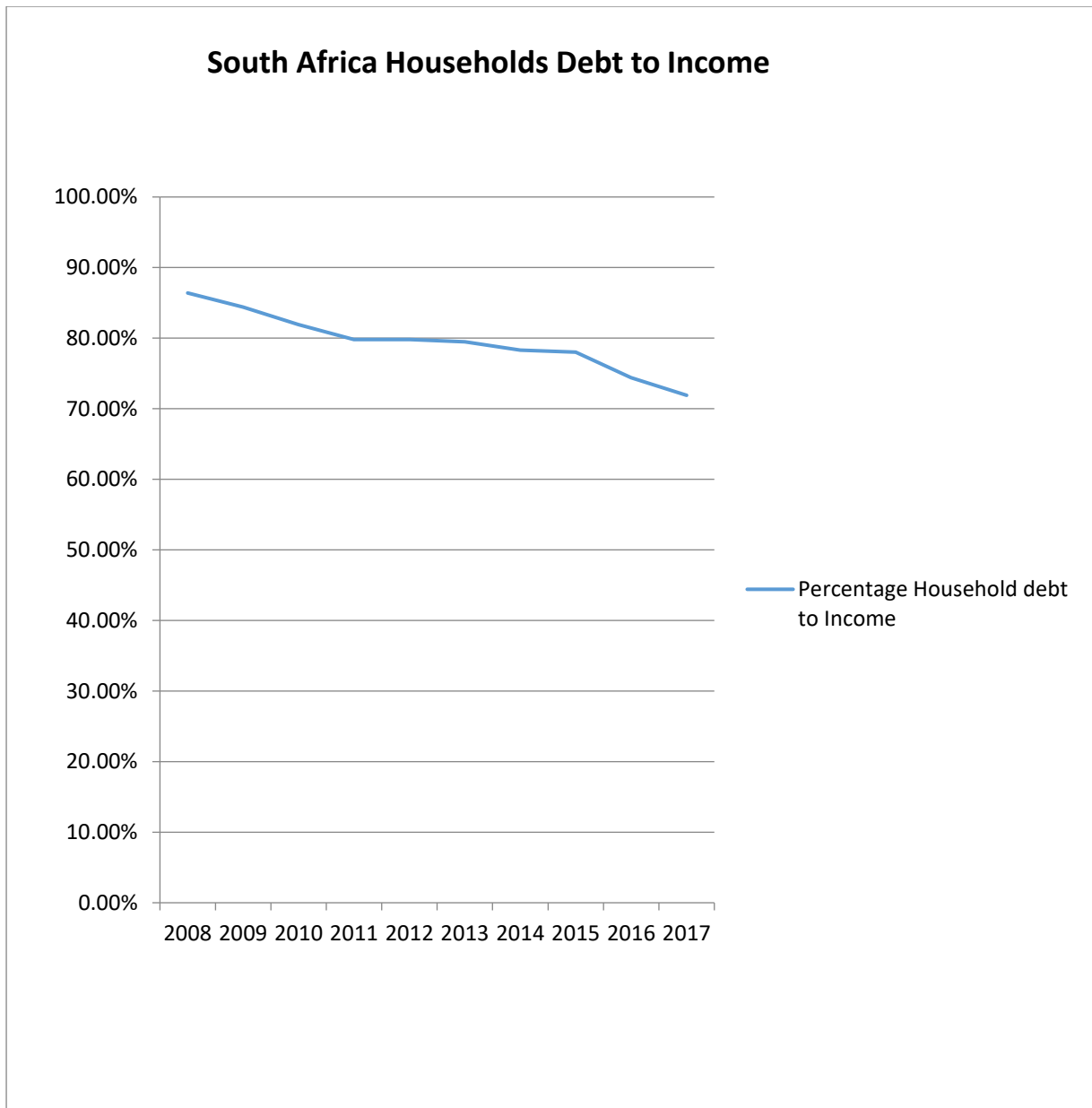


Figure 1.2: South Africa Household Debt to Income

Source: South African Reserve Bank (2018)

Even though the trend in Figure 2 is showing a decline in household debt to income, it is still high and needs to be managed. The international financial crisis contributed a great deal in 2008, explaining why it was high in comparison to recent years. Figure 2 illustrates a drop to 71.9% in 2017 from 86.4% in 2008. The fourth quarter, which ended in December 2017, recorded an overall net worth of new credit given from R123.64

billion to R135.71 billion, with a combined figure of credit applications to 10.48 million by December 2017 (National Credit Regulator, 2017). Banks contributed 76.64% of the credit that was granted.

Household consumption is projected to be the principal driver of economic growth in South Africa (World Bank, 2017). Hence, the role which loans will play is substantial. When using ROE as a measure of the banking sector’s profitability, according to SARB annual report of 2017/18, January 2018 recorded 16% profitability from 17.4% in February 2017 (SARB, 2018). This is an indication of a decline on banks performance. If we look at data from the South African Reserve Bank a year from April 2017 to April 2018, there is a visible increase of non-performing loans ratio to 3.3% in South Africa as illustrated on Figure 3 below.

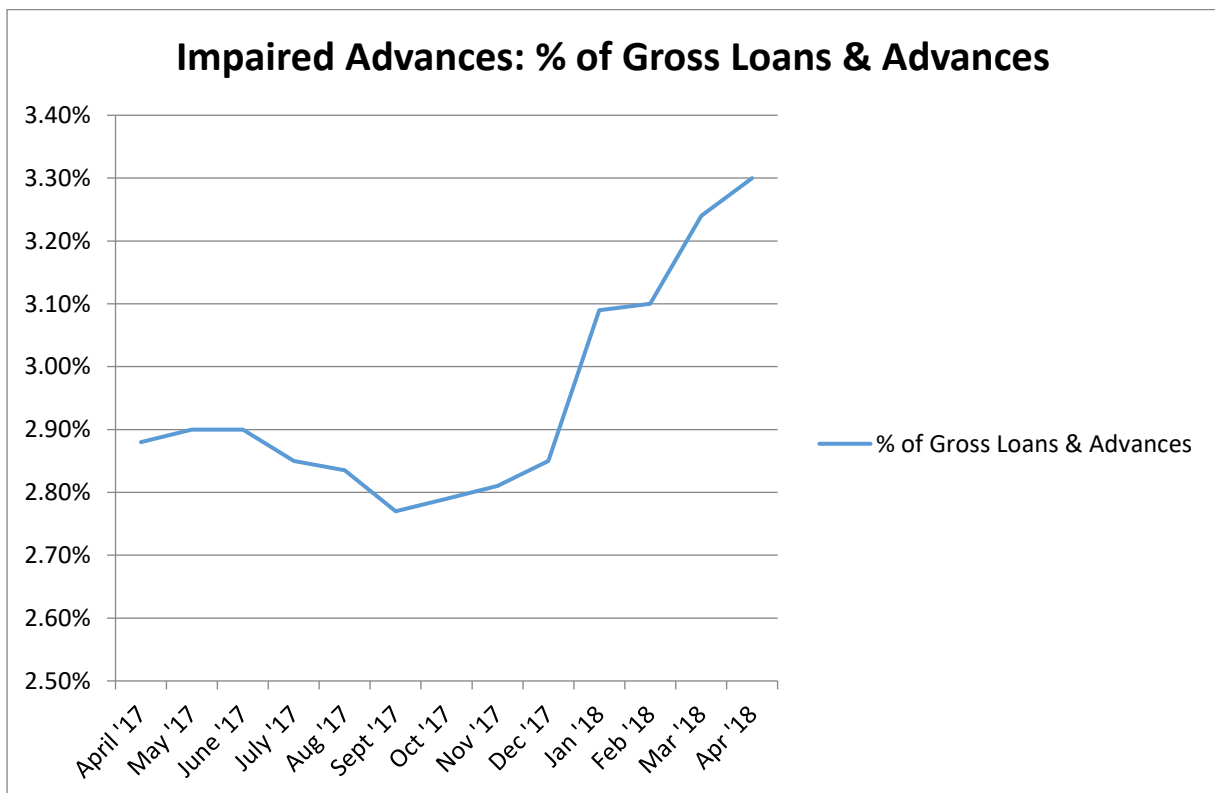


Figure 1.3: Impaired Advances: % of Gross Loans and Advances

Source: South African Reserve Bank (2018)

The National Credit Amendment Bill and the 'debt relief' programme will bring challenges to accessing loans in South Africa, especially for those with a gross monthly income of \leq R7 500 (National Credit Amendment Bill, 2018). Consequences for people in this segment has seen unsecured credit granted drop from 46% in Q1/2013 to 26% in Q3/2017 (The Banking Association South Africa, 2018). The Banking Association of South Africa documented those with total outstanding unsecured debt \leq R50 000 and earning \leq R7 500 who could qualify to apply for debt intervention to have a total of R33 976 560 355 outstanding in banks. Credit risk assessment will be questionable with the recent debt relief bill, and a possible escalation in cost of credit will influence credit risk.

Default is a phenomenon under scrutiny all over the world. Regardless of status as a first world or developing country, all banks experience non-performing loans. The reasons from one bank to another may differ, but non-performing loans have been increasing in South Africa. The credit risk exposure is much more for smaller banks in comparison to bigger banks in the country (Mishi, Sibanda & Tsegaye, 2016). This study will not focus on the credit risks faced by all providers of credit, but will concentrate on credit risks in banks. The reasons for doing this includes the state of the economy, continuous increase in default, as well as bank failures. The study seeks to establish the impact of credit risks on profitability of banks. The findings demonstrate the extent which credit risks affect bank performance.

1.3 Problem Statement

Regardless of constantly updated credit regulations by the NCR, NPLs are still a problem in South African banking system. In order for borrowers to be able to pay back loans, they will make use of sufficient cash flows from their income / business operations (Makhubela, 2006). An accurate assessment of borrowers should be done giving necessary time to repay what they owe. This reduces bank failures since credit risk is reduced. However, the nexus between NPLs and internal bank microeconomic factors is under-scrutinised (Ikram, 2016). Bank specific variables together with macro-economic variables affect NPLs of banks (Ekanayake & Azeez, 2015). This necessitates the need for efforts to fill the literature gap by exploring further on the impact of NPLs on South African banks performance.

At present, this reality puts a lot of pressure on borrowers, who ultimately fail to pay back loans in some cases, due to reckless lending (Chisasa, 2014). They are given unrealistic terms that lie beyond their capabilities, becoming over-leveraged failing to pay (Zewdie, 2017). Borrowers in some cases delude banks with information they provide to get loans. There is an emergence of shadow banking who lend to this segment and hence people end up taking too much credit. Institutions which offer credit even to blacklisted clients as an alternative form of finance create this problem.

When borrowers fail to honour their obligations, this results in bank failure, which is costly to investors, the banking public, and the economy of South Africa at large (Zeng, 2012). There has been low economic growth in South Africa, which affects the profitability of banks in an undesirable manner, and elevates credit risks (Financial

Stability Review, 2018). For this reason, it is crucial to establish the difficulties that affect the performance of banks which include investigation of factors that determine NPLs on a comprehensive extent.

If these problems, brought about by non-performing loans or low capital adequacy ratios, are not addressed, and an efficient credit granting system is not implemented, many will be left heavily mired in debt. When people are massively in debt they end up defaulting, which not only affects their credit profile, but means more broadly that the vicious cycle of poverty cannot be eradicated (BankerSA, 2016). There will be a ripple effect on to financial performance in terms of bank failure, since credit is an immense component of the health of banks themselves. Effective oversight of NPLs is imperative to boost bank performance and offer guidance on economic efficiency (Wanjira, 2010).

Research requires more extensive exploring which includes the topic under investigation of the connection between credit risk and profitability (National Treasury, 2011). Profitability of banks is threatened by the growth of non-performing loans (NPL), due to absence of risk management (Haneef, Rana, & Karim, 2012). Kargi (2011) confirms that credit risk management influences the profitability of banks, where the performance of banks can be vastly improved if risks are managed (Alexiou & Sofoklis, 2009). Conversely, Kithinji (2010) has suggested that other variables have an impact on profits beyond the factors of credit and non-performing loans.

Empirical research lends clarity to the nexus that exists between credit risks and performance of banks. Extensive research is needed to establish whether banks are failing to perform financially, due to a lack of effective credit risk management. Credit

risk management alleviates the effect of non-performing loans to circumvent collapse of banks, which lead to lower economic growth and higher unemployment, which was approximately at 29% in South Africa in 2019.

The banks which collapsed in South Africa were as a consequence of the poor management of credit risks which was depicted in the high levels of nonperforming loans. Low quality loans resulted in more non-performing loans which in turn reduced profits of banks (Gizaw, Kebede, & Selvaraj, 2015). Credit leads to debt which becomes an asset to the lender and a liability to the borrower, that is, the higher the risk the higher the return (Kaaya & Pastory, 2013). Credit is important since it increases the borrower's spending which drives the economy. Spending results in income for someone. Therefore, more income results in more spending and we have cycles. Cycles are from borrowing since debt fluctuates and presents economic swings. The changing banking environment demands that banks assess their strategies for improving profitability. You borrow from your future productivity to spend today. Credit matters most in the short-run since it boosts earnings. Therefore, results of the study will explain if the frameworks and policies for credit risk management have an impact on profitability of South African banks. Also, establish the extent to which growth, capital adequacy, size and leverage contribute towards the financial performance of the banks.

1.4 Aim of the study

The primary aim of the study is to establish the impact of credit risk on financial performance of banks in South Africa.

1.5 Research Question

The study aims to address the following research questions:

1. What is the impact of credit risk on financial performance of banks in South Africa?
2. If there is significant relationship between growth and the financial performance of banks in South Africa?
3. What is the relationship between capital adequacy and financial performance of banks in South Africa?
4. Does the financial performance of South African banks vary with bank size?
5. What is the relationship between the bank leverage and financial performance of South African banks?

1.6 Research Objectives

To guide the study, the following research objectives will be addressed, to:

1. determine the impact of credit risk on financial performance of banks in South Africa;
2. establish whether financial performance varies with growth of South African banks;
3. establish the relationship between financial performance and capital adequacy of South African banks;
4. determine if the financial performance of South African banks varies with bank size; and
5. establish the relationship between bank leverage and financial performance of South African banks.

1.7 Significance of the study

The study will assist to improve the understanding on the correlation between credit risk and financial performance. Resource allocation will be enhanced, as well as the return from the risks taken, thereby improving performance. The financial services sector makes sustainable development in South Africa possible, as it is essential in the economy of the country and is well-regulated, stable, transparent, competitive, and cost-effective (National Treasury, 2011). Since loans are a sizable component in banking, banks are more competitive in lending (Kaluwa & Chirwa, 2017). Statistics reveal a growing number of unsecured debts which have gone bad, and it is therefore crucial to devise methods to manage these, since this affects financial performance (Batra, 2014).

The economic environment within as well as outside banks means that both have potential to lead to default (Warue, 2013). It is therefore important to pay close attention to any change that can negatively affect the credit standing of borrowers. Efforts are made to minimise credit risks to improve financial performance in banks. When risks are well-managed in banks, bank failures will be eradicated and there will be a stable economy in South Africa. A well-structured banking system leads to a sound financial system which then results in an improved economy for the country. Hence, the study would benefit banks to have confidence in their policies to manage credit risks, which impact any potential profit, as there remains little published work on the topic (Tarawneh, 2006). Appropriate policies that will establish risk limits or positions must be periodically reevaluated.

The contribution will be to increase knowledge (literature) on the impact of credit risk on financial performance. Secondly the contribution will be made on practice, regulators enforcing stricter supervision and banks implementing improved policies which restrict the incidence of non-performing loans.

1.8 Dissertation Outline

The rest of the study is organised as follows:

Chapter 2: Literature review

This chapter begins by defining credit risk and bank performance. Both theoretical and empirical literature review is done on the various variables of interest in the study. This chapter considers the relationship of credit risk and financial performance in banks internationally and within emerging markets. The South African banking system is then explained in the context of its significance after consolidation of the relevant information on the topic, after which I summarise my findings.

Chapter 3: Research Methodology

The research design for this study is presented in Chapter Three. Quantitative research is explained and population and sample description given. The estimation

methods that were used for analysis as well as the panel data regression models are detailed. Chapter concludes with proxies used to perform robustness checks.

Chapter 4: Empirical Findings and Discussion

This chapter presents the results and discusses the findings. Descriptive statistics are given, and the econometric regression analysis results presented. A summary of findings is given with a brief description.

Chapter 5: Summary of Findings, Conclusions and Recommendations

The conclusion chapter is a summary of the study. It provides the link between the findings and the research objectives, and determines whether objectives were met and the contribution made. It then finishes with the area for further work.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the effect non-performing loans have on bank profitability in the South African banking sector. It then evolves to consider how banks are inevitably affected by credit risk either positively or negatively based on previous studies. The rest of the chapter is organised as follows: Section 2.1.1 provides an overview of credit risk and bank performance, illustrating how the two aspects relate to each other in the South African banking environment. Section 2.2 reviews the theoretical underpinnings of this study and elaborates on the essential elements. Section 2.3 deals with the determinants of credit risk, and 2.4 on financial performance of banks. Section 2.5 reviews the empirical literature in support of arguments used as the basis of the study. The last section 2.6, presents the fundamentals of the study, providing a conclusion of the literature review chapter.

2.1.1 Credit risk and bank performance

Banking risks are many, and include among many others, market, liquidity, operational, concentration, and credit risk (Sbârcea, 2017). Credit risk attracts the most attention, and is the most vital risk exposure, which is unavoidable in banks due to the nature of business. Credit risk refers to the uncertainty presented when one

party in a transaction fails to honour their financial obligation (Smit, Swart, & van Niekerk, 2003). In other words, it is risk which arises from the prospect that a borrower will fail to meet the terms of a contractual agreement, by defaulting on the payment of interest or the principal amount. The granting of credit entails uncertainty, because the future is unknown. Furedi (2009) goes further to state that not only are risks in the time to come unknown, but future risks are also unknowable.

Credit risk refers to a financial risk that can lead to bank failure if it is not controlled. Therefore, according to the Bank of International Settlement (BIS), credit risk must be identified, measured, monitored, and properly managed so as to ensure that the credit risks on loans are properly priced to acquire the set targets of returns from the information obtained during loan documentation (Kithinji, 2010). Deciding on how to price a loan is not easy in the process of granting credit. The desire to attain the highest profits possible involves charging higher interests, yet to have borrowers who repay loans requires lower than reasonable interest rates. Credit risk is the most regulated key risk in the banking sector (Alizadehjanvisloo & Muhammad, 2013), where competition on the credit market plays a role in regulating prices, as borrowers have the option to choose from a range of banks.

High indebtedness places a distinct burden on both the economy and social system (SARB Quarterly Bulletin, 2018). It is not obvious that all applications received by banks in the loan approval process are approved and processed, especially when the NCA is enforced correctly according to its mandate (NCA, 2005). Decision making on awarding loans is not complicated through use of data analysis (Salkic, 2013). When borrowers fail to meet the required standards they are rejected, with reasons given to

the applicants. Transparency strengthens credence in the banking system, and helps banks avoid fallacies on loan disbursement. It is imperative to circumvent giving credit to troublesome borrowers, and to deny the opportunity to borrowers who would have turned out not to honour the obligations. Credit risk is a notable financial risk, which has to be cautiously monitored and supervised so as to reduce default rate (Noomen & Abbes, 2018).

Non-performing loans represent cost to banks which lowers profit and in many times linked with bank failures and financial crises (Khemraj & Pasha, 2013), where the credit system is destabilised as a consequence of default (Mirach, 2010). Non-performing loans and challenges with the loan quality can put South Africa's financial stability at risk and at the same time hinder economic growth (Nikolaidou & Vogiazas, 2014). For this reason, banks must accurately evaluate all loans granted to safeguard the nation from economic turmoil.

Credit risk management helps to improve bank profitability and increase chances of survival (Al-shakrchy, 2017). This study advocates for banks to ameliorate credit risk management to attain additional profits. Profitability is usually a sign that the bank is performing well. The causes of default are not the same, or one-sided when analysed across different literature (Mirach, 2010). Empirical evidence from previous studies show mixed results on the nexus between credit risk and financial performance at banks (Mushtaq, Ismail, & Hanif, 2013). Several sources by different authors are used to analyse both contrasting and supporting views in this research.

Banks which manage their risks perform better (Jaseviciene & Valiuliene, 2013). Hence, a ratio that yields desirable results between risk level and profitability must be ascertained. This elucidates that the moment risk emerges, then the expected outcome of profitability is altered. Loans contribute the most source of credit risk to banks. For this reason, it is necessary that they are managed well, through adequate evaluation to improve performance.

Sustainable credit extension has been enabled due to good risk management (National Treasury 2011). Risk management ought to start with the analysis of the overall business strategy and objectives for continuity and sustainability. Risk management is part of the three lines of defence, with line management and the independent assurance providers within an organisation, as represented by the Risk Committee, which provides oversight over business processes and risks by policies and standards they develop (Greuning, Gallardo, & Randhawa, 1998). It also monitors and reports on risks. Good risk management is important to business success and ought to be aligned to business objectives in generating a choice of strategy, as well as ways of assessing risks on a continual basis. It is important to ensure that the cost of risk and the cost of risk management do not exceed the potential benefits provided to the organisation.

Risk can be about opportunities, as much as it can signal a threat. Other studies revealed a favourable relationship between credit risk and the financial performance of banks (Boahene, Dasah & Agyei, 2012). According to the research, regardless of an increase in credit risk, profitability remained high. Reasons suggested to explain the relationship were the exorbitant interest rates, and fees charged. Contrary to this

view, evidence from other research show that an increase in credit risk results in reduced bank performance (Kaaya & Pastory, 2013).

Credit risk exposure has to be within acceptable risk to be able to improve financial performance (Basel Committee on Banking Supervision 2000). It is difficult to correctly measure credit risk exposure. Banks contain the spread of risk exposure through diversification. It is when banks are able to mitigate risks to acceptable levels that they flourish (Mirach, 2010).

Risk appetite and risk tolerance are important concepts which differ from firm to firm according to the leadership at Carnegie Mellon University. They state that risk tolerance and appetite will vary according to the risk attitude of those identifying and managing the risks and will vary according to the opportunity being sought. Risk appetite refers to the amount and type of risk that an organisation is willing to take to achieve its strategic objectives. Risk appetite influences how the banks operate, how they allocate resources, and the risk culture they adopt. Previous studies have revealed that those banks that tend to have more losses harbour a greater risk appetite (Khemraj & Pasha, 2013).

A theoretical literature review follows, analysing previous research, which provides relevance of the study. Thereafter, a review of the empirical literature is provided of both developed and developing countries.

2.2 Theoretical Literature Review

Prevailing theories relevant to this topic are examined in this section by means of which to identify aspects of importance for focus in this study. Interrogating previous approaches adopted helps identify knowledge gaps and tackle the topic in a manner that will add value and advance knowledge on the subject.

Exposure to credit risk is a leading source of problems of default for banks, which ultimately affects their overall performance (Basel Committee on Banking Supervision, 2000). An increase in credit risk has a negative effect on the performance of a bank. One of the essential elements for a bank to be successful, is to manage credit risks with mastery (Abbas et al., 2014). Lax credit standards involving reckless lending practices for borrowers contribute towards this exposure not to be manageable.

Correct credit analysis reduces the probability of default of the borrowers, since it results in high quality loans. There is a great need for a pragmatic approach to handling credit risks through good portfolio risk management to determine the best asset combination for investment (The Basel Committee, 2006). The proxy that will be employed in credit risk is non-performing loans (NPL). In this study, the term credit risk will be used synonymously with non-performing loans (NPL).

A loan is regarded as non-performing if, from the date of maturity, it meets the criteria of not being collected in a period of more than 90 days (Jolevska & Andovski, 2014). The best approach to understanding credit risk and finding ways to lessen the impact arising from non-performing loans is to analyse the financial performance of banks

(Bhattarai, 2015). Financial performance is a measure of good use of scarce resources to create and maximise those profits (Tarawneh, 2006). The profitability of banks has an indirect relationship with the levels of non-performing loans (Kargi, 2011).

The role of banks in business is to borrow from those who have more than what they need, and lending it to those who do not have (Westhuizen, 2004). Banks take in deposits and give out loans to borrowers who need finance for their operations, as a business to earn profit at an acceptable level of risk. When the capital in banks falls, banks tighten their credit granting standards accordingly (Berlin, 2009), so as to reduce the credit risk exposure. This exposure is minimised in nations with better legal and institutional conditions (Makri & Papadatos, 2013).

In order for banks to be in charge of credit risk, a credit policy is essential as stated in the Banking Act, which was later perfected by the law on credit institutions (Sverko, Prga, & Vrdoljak, 2010). A credit policy with guidelines of how credit should be administered is important in all banks in the complex global banking environment. Policies that ensure loans are granted to those with the ability to pay back what they owe and minimise loan delinquency (Karuri, 2014).

2.3 Determinants of Credit Risk of Banks

The determinants of non-performing loans are interest rates, macroeconomic (external) and bank-specific (internal) variables (Gila-Gourgoura & Nikolaidou, 2017). Macro-economic variables cover economic growth rate, inflation rate, and lending interest rate. Risk management is lacking in the event of high NPLR which diminish

profits (Aliu & Sahiti, 2016). Monitoring and follow-ups help handle default after issuing loans. The financial crisis has led some banks to become risk averse due to the rise in credit risk (Cucinelli, 2015).

The assessment and measurement of the identified credit risk exposure ought to be done with the aim of managing and controlling risk. It is for this reason that it is important to take into account any performance and inefficiency measures which act as signs for potential problematic loans (Louzis, Vouldis & Metaxas, 2012). The non-performing loans ratio (NPLR) measures the non-performing loans in proportion to total loans awarded.

Credit worthiness of borrowers, interest rates, inflation, lending policy, size and growth will further be explained to help understand the link with credit risk of banks.

2.3.1 Credit worthiness of borrowers

The ability of a borrower to pay back debt is an important part of the credit granting process. Credit worthiness is the first step in the loan approval process. It is considered right at the beginning because chances of default are minimised if borrower is credit worthy. It is fundamental to conduct both a financial and non-financial analysis when examining a borrowers' credit worthiness. The time to assess the client's credit worthiness is also just as important (Swope, 2005). This study argues that it is better to take longer to conduct the process as adequate to a thorough assessment. A person applying for credit must be thoroughly evaluated or investigated, to assess suitability and reliability for a loan.

It is, however, important to note that eventually borrower performance is also affected by systematic risk which represent how unexpected changes in macroeconomic and financial market conditions affect repayments (M. Botha & Vuuren, 2009). This illustrates how complex it is to decode a banks' exposure to risk. The dynamics of credit worthiness can easily be altered by other factors, such as unemployment. A borrower can be credit worthy today, having a job, and in a few months the place of work experiences challenges and retrenches workers.

Lending should be based on capital, character, capability, purpose, employment, amount, repayment, term and collateral (Mirach, 2010). Lenders should investigate record, ability, and experience on the borrower's credit report. The history of repayments on borrowed amounts and the balance sheet of the borrower play an important part on the assessment of credit worthiness (Kana, 2017). This is the reason why banks, in most cases, ask borrowers to submit tax returns and financial statements with their applications. Coupled with this, debt capacity can be ascertained through cash flow projections, which can show returns on investments (Nguta & Huka, 2013). Projections will reveal the effects of inflation, and whether there is a plan of action to deal with them as and when they occur.

It is also important to determine information about the person/firm, the market, and the economy as credit enables acquisition of items one would otherwise not afford (Aunon-nerin, 2002). Consumers at times need protection from themselves not to buy more that they can afford through use of credit. In this sense, banks have an enormous social responsibility to deny credit to borrowers with a high probability of default (Ljubić,

Pavlović, & Milančić, 2015). The NCR also helps to ensure enforcement of compliance with the National Credit Act on the extent of credit awarded. The debt must not be left to accumulate beyond the ability of the borrower to repay.

The value of creditworthiness has not been given the emphasis it deserves, considering how unsecured loans are transforming the market and impacting the level of indebtedness in South Africa (Compliance and Risk Resources, 2012). In good economic times, the prospect that borrowers will honour the promise to repay debt increases and the global crisis has not made this any easier (Berlin, 2009). It has made it necessary for banks to be better prepared, and to make provisions in good financial times.

The consumer credit policy and protection of consumer credit rights minimises the consequences of bad credit management, and assists in highlighting the importance of credit management education. Credit management is crucial, as failure to have quality loans and credit-worthy customers leads to an increase of default risk, which will strongly affect the performance, growth and survival of banks (Mirach, 2010).

2.3.2 Interest rates

Munyai (2010) states that the biggest problem – even after the introduction of the National Credit Act during recession in South Africa – is high interest rates, which causes over-indebtedness, and which ultimately leads to default. When high interest rates are charged, this results in higher costs to the consumer for the borrowed amount. Current legislation neglects the financial needs of most South Africans, but

instead focuses on protecting the market of established and registered institutions (Coetzee, 1997). This is mostly evidenced by favourable interest rates offered to people in better positions, and exorbitant interest rates to lower class citizens who can only access funds from microfinance institutions. Access to credit is difficult for the poor, as well as small and medium enterprises, and if interest rates are changed and become highly regulated, they will be heavily impacted (National Treasury, 2011).

The fact that consumers have a right to search for the best interest rates for them makes the sector highly competitive in trying to capture the target market. Other authors note by way of contrast that there is a positive relationship between the level of interest and default rate (Karuri, 2014). Vigilance on policy is required, specifically with regards to interest rates, since an increase in the level of interest results in an increase in the default rate. Wambui and Ngacha (2013) agree that an increase in interest rates makes repayment tough for borrowers, which in turn increases the rate of default. South African households are facing financial hardships due to high interest rates when they have taken more debt than they can handle (Bosman, 2007).

Section 103 (4) and section 104 (1) (b) of the NCA leaves room for interest rates to vary, and to be increased, as long as the credit provider charges similar interest on the same products to all its clients. Section 105 (1) (a) protects borrowers to some extent, since whatever interest rate will be used may not exceed that which the Minister after consulting with the NCR sets as the maximum rate of interest. The consumer also has to be given a written notice of at least five days to be informed of a change in the rate of interest to comply with section 104 (2) (a) of the Act.

Interest rate variations have financial stability implications, due to the fact that banks tend to accept higher risk exposure and have an increased risk appetite when interest rates are low, which in turn fuels inflation (González-Aguado, 2014). As a result of low interest rates, credit providers end up with even more relaxed lending standards, increased lending volumes, and ultimately as a consequence have high default rates. Exploration of the relation between interest rates and credit risk is new, however, and empirical evidence lacking.

2.3.3 Inflation

It is important to note that inflation and interest rates are interlinked, since interest rates are set through the monetary policy, which is used to control inflation (Wambui, 2013). The monetary policy has to be correct, since it affects all prices in the economy, and it is formulated through use of the consumer price index to estimate the rate of inflation by the SARB (Andersson, 2014). The changes in prices of individual goods and services are devised to have a measure of general price change, and that process is referred to as inflation measurement (Lebow & Rudd, 2006). For consumers with variable interest rates, if inflation goes up and interest rates are high, this means harsh debt to pay, and might cause default due to the increased repayment costs. Borrowing costs increase as a result of both the probability of default and inflation (Hur & Perri, 2013). Mishkin (1997) mentions that high inflation increases uncertainty and raises the cost of capital.

The effect of inflation on default can either be positive or negative (Nkusu, 2011). In other cases, increase in inflation makes the burden to settle debt much more difficult,

as everything becomes more expensive. On the other hand, since the principal amount remains the same, it becomes cheaper to service the debt. There is evidence from previous research showing a positive relationship between inflation rate and default rate (Khemraj & Pasha, 2013). Employees tend to require salary increases whenever the rate of inflation goes up. Inflation is a macroeconomic factor that greatly influences interest rates (Karuri, 2014). The challenges of inflation are real in world economy even after the global financial crisis. Disposable income become less and less valuable, increasing financial strain in South African households when inflation is rampant (Bosman, 2007).

The purchasing power of money is forever changing, and as a result, we either see inflation or deflation, and a degree of subjectivity in meaning of inflation and deflation makes the terms complex to accurately define for economic analysis (Giustozzi, 2005). Having changes in relative prices and a decrease in the purchasing power of money does occur in times of inflation, but not necessarily because they are the same concept. According to Statistics South Africa, the consumer inflation rate in the country rose to 4.5% in April 2018 after reaching a seven year low of 3.8% in March 2018 (U.S. Bureau of Labor Statistics, 2018).

The rise in prices that reduces the purchasing power of the Rand in South Africa is what we refer to as inflation (Duncan, 2011). The amount of goods one can acquire with the same value of money is reduced. Money supply through the process of lending and borrowing in the banking system drives inflation, as well as how it links to interest rates, since these represent the costs of borrowing. People find it difficult to borrow when interest rates are high, such that money supply grows slowly, which then assists

to control inflation. On the other hand, it is easier to borrow in times when interest rates are low, so money supply grows quickly, which ultimately raises inflation.

Interest charged on money given as credit to South African banks (repo rate), is set by the SARB and when it is high, it will eventually affect the consumer. When the SARB raises the repo rate, other banks then raise their lending rates, which obviously affects the credit environment, because consumers take on less credit (South African Reserve Bank, 2007). The strategy used to control inflation in South Africa as stated by the Reserve Bank is inflation targeting, which came into effect in February 2000. Inflation targeting is a monetary policy framework where an inflation target is explicitly announced for transparency and accountability and the SARB implements the policy to achieve the target directly and the Bank Supervision Department (BSD) executes its regulatory objectives through representing the masses.

The government controls the economy through the monetary policy, which deals with money supply, interest rates and inflation. Reserve bank, which influences interest rates and prints new money is important in the flow of credit which is key in any economy. If money supply grows too fast, the rate of inflation increases. The higher the inflation rate the higher the incidence of non-performing loans (credit risk). Credit leads to debt which becomes an asset to the lender and a liability to the borrower. Credit is important since it increases the borrower's spending which drives the economy. This is because interest rates will increase as the Reserve bank increase the REPO rate to curtail inflation. Banks will in turn increase interest rates and consumers will find it difficult to repay loans hence the higher incidence of NPL. Low interest rates more borrowing, high interests less borrowing. To the converse if

inflation is too low way below the target range, monetary authorities might lower the REPO rate. This will lower the prime lending rate and more people take credit and increases potential default rate.

2.3.4 Lending policy

The risk profile of the borrower involves investigation of repayment history supported by necessary collateral and its sensitivity to market risk, integrity, and reputation (The Basel Committee, 2006). In addition, lack of thorough study on credit records, not following up after banks give credit, and instability of governance are contributors of increased credit risk in banks (Noomen & Abbes, 2018). The question this study needs to address is as to whether the information received is sufficient to make proper credit granting decisions, as determining the creditworthiness of a borrower is a formidable task, which requires careful examination. The objective is to assist in making the credible methodologies effective to reduce the credit risks that exist and determine how much the risks affect the financial performance.

All credit applications require a vigilant analysis by a qualified credit analyst with experience and necessary knowledge, who will be accountable for decisions taken and justify the conclusions made from credit risk models (The Basel Committee, 2006). Human resource capacity building will be explored if the role credit analysts' play is pivotal to receive the necessary training and how responsibilities can be best allocated. This involves equipping analysts to monitor the risks frequently on a timely basis taking note of emerging risks and working out new strategies to limit the damage they cause

on financial performance. Financial literacy is needed in the process of financial inclusion.

Credit granting is fundamental and has more to do with financing of industrial, agricultural and commercial activities of a country. Credit granting is also referred to as lending in other research and it involves better understanding of allocation of scarce resources (*OECD Economic Surveys*, 2013). It is the primary function of banks, which brings with it the challenges of uncertainty.

Granting credit is a business whereby a return is expected for accepting a certain level of risk (Chisasa, 2014). The credit granting function must be satisfactorily governed to ensure high risk yields high returns, as high risks also present a challenge of a possibility of greater losses. Bank policies must be steered towards instigating enhanced performance of the sector (Mahathanaseth & Tauer, 2014). At the same time, the credit risk policy ought to be reviewed regularly, and levels of risk appetite maintained to meet certain thresholds to reduce defaulting (Mirach, 2010). Pro-active credit risk management, which involves implementing credit risk assessment policies to address the quality of loans ensures default is managed.

Risks should be measured to enable management to better structure debts and manage them. The goal of credit risk measurement is to mitigate and limit the credit risk exposure. It is important to measure credit risk as it covers the following components, which are related to each other in intricate ways:

Probability of Default (PD) – current and future ability to fulfil obligations, measuring probability of default over a specific time. This shows borrower’s credit worthiness as it guides the bank’s internal credit rating, based on historical information.

Loss Given Default (LGD) – collateral for debt equating to estimate of the loss given that default occurs. It is based on the amount in arrears at the time of default, that is, the fraction that would be lost of the loan amount. It is also known as the severity rate.

Exposure at Default (EAD) – looks at the amount owed, as the value at default

Maturity (M) – and is needed to calculate the required capital.

The internal ratings-based (IRB) approach as an example, implemented by the Basel Committee on Banking Supervision (BCBS), makes use of, among other things, loss given default (LGD) and probability of default (PD) to ascertain the credit risk capital required (Stoffberg & Van Vuuren, 2016). A quantitative approach calibrates risks in numerical terms.

In lending, good credit management is necessary, as poor allocation of credit through lenient credit standards results in raised costs to successful borrowers. Lending involves investing in a customer, and when the client fails to pay, all the costs are incurred by the company (Mirach, 2010). Hence, banks ought to avoid giving credit to those who cannot afford it. The process is productive when income is flowing into banks, and caution, together with discretion, is exercised in the credit approach.

It is crucial to establish the accuracy of credit scores by the leading credit bureaus, for instance, Compuscan, Experian, TransUnion, and Xpert Decision Systems (XDS), where the implications of wrong assessments can be detrimental (Karlan, 2009). The

rating systems require oversight to confirm legitimacy and accuracy of the rating and monitoring functions they conduct. A number from statistical analysis used to illustrate the creditworthiness of a borrower based on data collected about them is referred to as the credit score (Abayomi & Oyedijo, 2012). The credit scores assists banks to set credit limits, to know who to grant a loan to, and at which interest rate.

High scores reflect customers more likely to honour their financial obligations, yet those with low scores have a high probability of default risk. Credit scoring acts as a judgemental tool for appraisal on ability to repay and honour loan agreements (Shen, Nguyen, & Ojiako, 2013). Therefore, credit scoring has been the tool for balance between high levels of credit granted and high exposure to default for banks (Shi & Xu, 2016). It helps in the process of awarding credit to thoroughly deserving customers with a greater chance of settling what they owe and in so doing reduce the default rate.

The greater the credit, the higher the risk associated with it (Batra, 2014). Therefore, to a greater extent, lenders must be observant with credit assessments, since the process of making a credit evaluation is both complex, and unstructured (Mirach, 2010). If a casual approach is adopted, it simply results in loan defaults, which reduce the credit granting capacity of lenders, and negatively affects the vision of expanding access to credit for new applicants. The need for a proper and thorough credit risk management process to evaluate and qualify those asking for credit cannot be over-emphasised (The Basel Committe, 2006). Risk intelligence should be incorporated in the internal credit process as well, to help banks which are in the business of risk taking decide on risks to avoid and those to pursue to be unique when chasing opportunities (Mashingaidze, 2015).

2.3.5 Size as a determinant of credit risk

Bank size has an effect on credit risk (Garr, 2013). At the micro-level, the impact on non-performing loans is notable. The size of a bank is a huge factor when measuring the credit risk and a direct relationship exists between the two variables (Abdullah, Khan, & Nazir, 2012). What is interesting to note is the fact that the direct relationship is significant in domestic banks, and yet insignificant in foreign banks.

Bank size negatively affects the level of credit risk (Zribi & Boujelbène, 2011). For this reason, control over the size of banks is necessary to reduce credit risk. Other authors share a similar view, and consider size to be a remarkable determinant of non-performing loans (Kusi & Agbloyor, 2016). However, results remain mixed on the nexus between bank size and credit risk.

Bank size is a specific internal variable, which affects profitability differently among banks (Ongore & Kusa, 2013). It is easier for big banks, which are not restricted by capital regulation, to award any type of loan and that comes with more risks (Polodoo et al, 2015). Ownership features stretching to how much of equity capital a bank can get is dependent on bank size (Dreca, 2013). Bank size has an impact on capital. An increase in the amount of capital requirements when deposits go up is suggested to safeguard the interests of both the depositors and the bank.

2.3.6 Growth

Growth to increase market share through attractive business opportunities is an objective pursued by many banks (Compliance and Risk Resources, 2012). Once established, the next goal is to grow and expand operations. The lending growth strategy, if not carefully assessed, has a negative effect on profitability (Ntiamoah, Oteng, Opoku, & Siaw, 2014). Accepting more risk to gain market share must be approached after correct assessment as a business strategy and objective.

Banks tend to become risk aggressive in efforts to attain more market share (Mishi et al., 2016). The strategy requires a fresh perspective, as it has led to greater financial turmoil in the past. Growth at the expense of appropriate credit assessment puts in jeopardy the ability to pay loans when they are due of even adequately capitalised banks. The overall robustness of risk management practices is to improve financial performance (Oluwagbemiga, Ogungbade, & Esiemogie, 2016). Some risks can be taken, yet some must be avoided as the banks seek to achieve the growth objective. The greater the number of loans, the greater the credit risk.

The banking sector is a tremendously competitive environment. Competition for market share leads banks to offer unsecured loans with a high level of credit risk (Compliance and Risk Resources, 2012). This is because banks have lax credit standards to achieve the growth objective and stay competitive. Gaining a competitive advantage over rivals is what leads to reckless lending in most instances (Dang, 2011). As a result, the bad loans increase, which then erodes profitability.

It is, therefore, much better to give emphasis to profitable activities rather than giving risky credit (Witowski & Raluca, 2012), pursuing the most profitable transaction involving minimal risk when extending credit. On the other hand, there is a distinct possibility that less competition will lead banks to charge much higher interest rates on loans, and that this in turn increases the probability of default (Mishi et al., 2016). The regulatory and banking policies introduced need to improve the competitive environment so as to make it fair and levelled.

Growth, which yields positive results, requires the right financial strategies (Chisasa, 2014b). The right balance is needed between growth and development to ensure overall success in the long run is very rare, and it is important to develop banks accordingly as they grow to limit risks. When the economy is performing well, the banking industry grows (Haque, 2014). On the other hand, fast credit growth not supported by economic growth can result in undesirable effects of both macro-economic and financial volatility (Peric & Konjusak, 2017). In some cases, banks need to raise more capital to sustain the growth strategy, and this presents the challenge of affecting shareholders returns.

2.3.7 Profitability

The reason why banks are in business is to make a profit, and improve shareholder's wealth (Amsi, Ngare, Imo, & Gachie, 2017). Profits are a reward for the initiative taken and help guide just how well a bank is performing. This goal is accomplished when resources are managed well, and properly allocated (Ally, 2013). A business plan that addresses issues of viability helps with resource allocation of scarce resources. A

bank has to be efficient and assess the rewards against the risks taken in order to be profitable (Nduku, 2013). Profitability requires a bank to get enough compensation for the risk undertaken. Banks require revenue and need to earn good profit margins on the loans they issue. This helps avoid chasing after portfolios, which is futile, and which drains the financial resources of banks.

A bank's risk appetite and tolerance levels must be clearly stated as they are both linked to performance over time. It is necessary to determine the tolerance of the bank for potential losses of exposure, which may arise directly or indirectly. Risk tolerance and appetite will differ according to the risk attitude of the different banks, as well as the opportunity being looked for by the banks (Mikes & Kaplan, 2013). Risk attitude works together with credit risk assessment, as it assists banks in deciding on acceptable levels of credit risk. The risk and return is aligned to expected performance. Empirical evidence reveals a positive correlation between non-performing loans and the profitability of banks (Alshatti, 2015).

Banks' internal processes also need to be monitored, due to their effect on profitability (Murerwa, 2015). The monitoring of well-crafted internal processes ensures everything linked to issuing of credit goes according to plan. Banks profitability does not respond well to financial regulation, where the information on credit risk has an effect on decisions made by banks with regards to loans, which ultimately affects profitability (Cao et al., 2016). Profitability conversely then determines decisions on risk limits. Profitability is an instrument used to assess the effectiveness of corporate strategies implemented (du Toit, Hall, & Pradhan, 2017). Good decisions taken are reflected through high profitability. However, it is important to acknowledge that there are

external sector and country factors that banks cannot control, which affect profitability (Githaiga, 2015).

Profitability is assessed as positive when the net amount of money coming in from interest from loans is greater compared to payments for interest on deposits (Godspower-Akpomiemie & Ojah, 2017). The bank will be getting more returns than the money it is paying out. Favourable returns are a result of exposure to risk (Bhattarai, 2015). Banks take risks, and are rewarded when borrowers do not default. When the level of non-performing loans is reduced, profitability is raised.

Profitability ratios refer to the calculations that expose a bank's ability to earn a profit. In order for a bank to remain profitable, it must be liquid (Musah, 2017). When profitability and liquidity ratios remain in decline, the bank will be going in the wrong direction. Profitability is directly proportional to liquidity, in the sense that profits resultantly produce cash flow (Dima, 2011).

2.4 Determinants of Financial Performance of Banks

Banks seek to maximise profits through the services they offer to customers. Bank-internal, or variables specific to macro variables, are a premise of bank performance (Marozva, 2015). Financial performance is a measure of one-year state of finances, that is, net income and cash from operations, in comparison to other years and other similar companies (Musyoki & Kadubo, 2012). Performance ratios will provide the link between the income statement and statement of financial position items.

This set of financial statements, through the use of ratio analysis, which includes financial ratios such as efficiency, performance, leverage, profitability ratios and cash flow analyses, act as a measure of banks performance. The performance of banks speaks to reducing costs to a minimum and maximising profit. When the financial performance of a bank is great, it stands as a testimony to the high standard return on investment, which helps the economy to prosper (Jasevičienė, Povilaitis & Vidzbelytė, 2013).

Risk management has been found to improve bank performance. A bank's value is determined by growth and profitability, among other things (Du Toit, Hall & Pradhan, 2017). The results of financial performance are shown through the bank's profitability, leverage, or liquidity (Ally, 2013). Shareholder wealth is improved when the bank performs well, and credit controls are in place. The total benefit from the investment is boosted. Banking financial performance has to be good, in order to avoid bank failure, which can also hinder economic growth (Ongore & Kusa, 2013). Good performance translates to better return for shareholders for the risks taken. Non-performing loans have been researched to contribute immensely towards credit risk that has an adverse effect on the performance of banks (Mushtaq et al., 2013).

Many means can be used to measure performance, but for the purposes of this study, Return on Equity (ROE) and Return on Assets (ROA) will be used as objective accounting measures and for financial ratio analysis. ROE refers to profit earned compared to total investment by shareholders, and ROA reflects the banks' financial performance (Amsi et al., 2017).

Bank size, operating well, and good asset management, constitute factors that can improve financial performance (Tarawneh, 2006). Financial and operational self-sustenance shows how well a bank is performing (Noomen & Abbas, 2018). In order to remain competitive and still perform well, banks have re-structured, re-engineered, benchmarked, implemented quality management programmes, and offered better staff packages (Coetzee, 2007). Having a competitive advantage makes one bank stand out from the next, and makes it a bank of choice.

It is also important for a bank to be liquid in order to remain profitable (Musah, 2017). Hence, liquidity procedures must be effective and efficient. According to Murerwa (2015), banks tend to perform poorly in times when gross domestic product (GDP) growth is low, where financial performance is good when GDP growth is high. There is a great demand for loans in favourable times, since the standard of living improves. The banking sector contributes above 20% of the GDP in South Africa (Ifeacho & Ngalawa, 2014a), where economic growth stabilises the ability of borrowers to repay debts.

2.4.1 Default risk

In lending services, default is the failure to pay back a loan. Default is the enemy of progress to financial liberalisation. Banks are sceptical, and less willing to assist borrowers when the default rate is on the rise. The use of credit, poor money management skills, and lack of credit education is linked to a greater extent of default (Wambui, 2013). Having good debt literacy reduces the over-indebtedness of

borrowers (Schicks, 2014). The common cause of loan default is where loans are unsecured (Warue, 2013). A strategy to promptly collect loans proves just as important, where there is a concrete process in place to pursue remittance of debts. It is essential for any bank as a lender to continuously monitor the borrower's ability to repay the debt (Addae-Korankye, 2014).

The causes of loan default include, among many other things: varying interest rates; insufficient loan sizes; poor loan approval processes; and no monitoring (Ntiamoah et al., 2014). Mirach (2010) adds to the reasons for default to include problems in the environment and market, lack of follow-up, and poor credit policies. Another cause or basis of the problem is the unwillingness of borrowers to pay; or borrowers who will be unable to pay debt emanating from improper appraisals from lenders; and unskilled loan personnel, who provide deficient analysis of project viability.

The expertise of those issuing credit has a direct relationship with non-performing bank loans (Masood, Bellalah, Mansour & Teulon, 2010). Remuneration of loan personnel ought to be incentivised so as to encourage them to be thorough in their performance (Kessy, 2011). Unrealistic terms and schedule of repayment, which is too hectic, as well as follow up measures, which are absent, for instance, on those with poor business practices, which might require constant keeping records, and checking of business performance, constitute some reasons for default (Berger & Deyoung, 1997). Frequent visits to ensure the correct use of funds and reminding borrowers of the next repayment dates helps to keep situations contained, and act as an effective loan management system.

An aggressive approach by lenders to gain a competitive advantage over rivals has led to some compromise on standards when assessing customer risk. Laxity in granting of loans is epitomised by the high incidence of credit risk as proxied by either the Non-Performing Loans to Equity or Non-Performing Loans to Total Gross Loans ratio. The information received is, in some cases, not verified, and in extreme circumstances, is manipulated and falsified. Neglecting to pay attention to every detail might prove very costly, therefore, it is salient to base assessment on future and the past to establish the ability to utilise the loan effectively. Having policies and implementing them are two different things, and both must be prioritised as the level of credit risk is heavily dependent on the credit quality. Good, distinctly formulated policies yield lower levels of non-performing loans, and increases profitability.

A strategy of financial incentive for on-time payments can be part of a solution, which has to be carefully considered on the pricing and design of loan contracts (Berlin, 2009). Financial incentives will motivate loan officers to eliminate the causes of arrears and to make more careful client selections when aware of the benefits of operating with the required level of vigilance. This will lead lenders to make good credit decisions. This involves eliminating all the credit risks, and in so doing reduce the extent of risk exposure, before awarding credit to a potential borrower.

The setback prompted by non-payment of loans is that it disrupts the credit system (Mirach, 2010). When borrowers fail to honour their obligations, this affects how they feel towards credit and reduces the resource base for further lending. Borrowers who are not credit worthy also present a risk that leads to default in the credit environment, hence the need for credit risk management. The reality banks have to face is to expect

loss of money in business operations. Default affects cash inflow negatively, which reduces earnings, and is unfavourable to shareholders wealth (Vosloo & Styger, 2009).

2.4.2 Capital adequacy

Capital is a specific variable which defines the financial health of banks and affects its profitability (Ongore & Kusa, 2013). Capital adequacy is a measure of how well banks are performing despite the risks faced (Aspal & Nazneen, 2014), safeguarding depositor funds from losses (Fredrick, 2012). Banks are liquid when the minimum capital requirements enable them to pay debts and depositors. Unforeseen need for funds, such as anomalous withdrawals, require a certain level of capital to manage liquidity risk (Jacobs & Styger, 2012). It is important to mitigate and stabilise this manner of risk. There are ways to help banks to become profitable, which include business diversification (Rachael, Tamale & Ndegwa, 2017). Additionally, when a bank is capitalised well, it seems to be more profitable (Dietrich & Wanzenried, 2009). Shareholders provide capital to a bank with ability to earn a profit, making it a worthwhile investment.

Securitisation through the offer of attractive banking security is directly linked to capital adequacy, as the process hedges banks and reduces credit risk (Mokatsanyane, 2016). Lending is tightened by banks when capital is limited (Berlin, 2009). Banks take less risk when not liquid. Adequate capital instils confidence to all stakeholders and establishes a strong reputation (Oyinpreye, 2016). Nyoka (2017) found a direct correlation between bank capital and profitability. Well capitalised banks with the ability to settle obligations and reduced NPLs are efficient, and financially stable

(Mahathanaseth & Tauer, 2014). The assessment of capital adequacy depending on a bank's risk profile is an integral part of bank supervision (Burns, 2005).

Previous studies show a negative relationship of capital adequacy with Return on Assets, while positive with Return on Equity (Ifeacho & Ngalawa, 2014). On the other hand, Lipunga (2014) states that capital adequacy had no significant impact on ROA. When measured by ROA, research by Alshatti (2015) has also revealed no effect of capital adequacy ratio on the financial performance of banks. Under Basel III, banks are encouraged to have capital of at least 8% of its risk weighted assets according to the Basel framework to be in line with the minimum statutory requirements (BCBS-BIS, 2015). The Basel III regulatory framework mandate exists to make global capital and liquidity regulation stronger (Mirchandani & Rathore, 2013). The Basel Accords (agreements) seek to advise banks to have a sufficient level of capital available to be able to manage risks (Hasan, 2014). The role banking risk capital computation and management plays in worldwide financial stability is significant (W. Smit, Van Vuuren & Styger, 2008).

The Capital Adequacy Ratio (CAR) will be used in this research as a measure of the adequacy of capital (Dang, 2011). Capital adequacy and non-performing loans have been identified as appropriate credit risk management indicators to help give clarity on these studies. Capital adequacy has been chosen, since banks require capital to generate profits. In terms of profitability, a lower CAR is advisable. Capital must be enough to cover any form of risks encountered, both expected and unexpected losses (Githaiga, 2015). In most cases, expected losses form part of the transaction price

because we anticipate them, yet unexpected events bring with them unexpected losses.

Equity, solvency ratio, and internal capital are important components to examine when evaluating capital adequacy, which is mostly favourable for profitable banks with low leverage (Klepczarek, 2015). A negative relationship has been found between credit risk and capital adequacy (Abdullah et al., 2012). Small capitalisation levels result in greater risk for loans, and a rise in probability of default. A higher level of credit risk affects profits negatively and ultimately increases the level of capital required (Gustafson, Pederson & Gloy, 2005).

2.4.3 Leverage

Equity, customer savings, and foreign funds are the three main sources of how banks finance granting credit (Cichorska, 2014). The Basel Committee advises banks, which intend to expand lending operations to accordingly increase the capital base to make the business more secure. The balance sheet section of a bank's financial statements usually has a greater amount of debt compared to equity, where being highly leveraged means more risk (Maré & Sanderson, 2017). Having more debt on the capital structure, the bank is also referred to as being heavily geared. This is deleterious insofar as long-term solvency is concerned, not having the ability to settle cash obligations when required (Dima, 2011). A situation where there is an increase in pressure of legal obligations to make payments, which if not settled can lead to bankruptcy, is not ideal.

Leverage refers to the ratio of total debt to total assets, that is, establishing whether the composition of total assets is substantially more debt than equity (Saeed & Zahid, 2016). The debt is incurred as a strategy to conduct business and to gain a return on investments. The ratio is used to assess the finance risk the bank is likely to face in its operations. Stockholders can influence the leverage position of the banks through the provision of capital (Zamore, Ohene Djan, Alon & Hobdari, 2018).

Increasing shareholders equity lowers the leverage ratio. A banks' ability to earn returns above the cost of capital is of great importance in attempts to maximise shareholders wealth (De Wet & Hall, 2004). Therefore, an optimal capital structure according to the trade-off theory is desirable, namely one that will reduce the weighted average cost of capital (WACC) of the bank and improve profits (Vries & Erasmus, 2012). An alternative use of the 'pecking order theory' is also presented, which examines at all the options of financial sources, and considers first those that are the least expensive.

Big banks, in most cases, take more debt in comparison to smaller ones, giving a positive correlation between size and leverage (Chipeta, Wolmarans & Vermaak, 2012). Large banks are considered less risky, with better conditions and terms, to the extent of being offered lower interest rates for debt granted. Low leverage ratios constituted one of the reasons why banks performed well in South Africa during recession (Maredza, 2013). High leverage ratios may lead banks to perform poorly since volatility of earnings are greater (Alshatti, 2015a). Contrary to this view, when Capitec Bank entered the market, due to low financial leverage, its growth and

profitability was hindered, as it could not access debt financing (Makhaya & Nhundu, 2016).

A negative nexus between leverage ratio and profitability is reported in some studies (Shah & Khan, 2017). Leverage ratio in other studies reveals an indirect relationship with ROA, yet conversely, a direct connection with ROE (Ifeacho & Ngalawa, 2014). Tan (2016) mentions that a high ROA with low ROE is usually due to low leverage in banks. Murcia and Contreras (2018) share a similar view, emphasising the dependence of shocks on profitability and leverage. Value creation is low for banks that are highly leveraged, with more debt in the capital structure (Kumar, 2014). The debt reduces the leeway for losses. The regulatory capital requirements for lending are outlined in the Basel III framework. Noomen and Abbes (2018) are of the view that leverage does not influence credit risk. However, Samuels (2014) mentions solvency as contributing greatly towards bank failure. Loan losses are rare in a solvent bank (Xiang, Shamsuddin & Worthington, 2015).

2.4.4 Size as a determinant of financial performance

Lipunga (2014) found that bank size has an impact on return on assets (ROA), which measures financial performance. Bank size has been found to be an independent variable with a positive relationship with profitability (Flamini, McDonald, & Schumacher, 2009). As the bank size increases, so does the ability to earn more money. The bigger the bank size, the greater the profits, and the higher its performance (Ferrouhi, 2017). Size is a factor to consider, as bigger, adequately capitalised banks are more profitable (Paleckova, 2016).

There is a favourable impact on profitability as a consequence of bank size (Chin'anga, 2015). Kusi, Gyeke-Dako and Agbloyor (2017) are also of the same view, and support that the correlation between bank size and bank profitability is positive. On the contrary, other researchers found a negative impact of bank size on the ROA (Ally, 2013). Hence, this study will allow for independent conclusions to be drawn on the matter.

Researchers have different views on whether or not bank size affects the banks' performance (Murerwa, 2015). Similarly, Mehrjardi (2012) mentions that the relationship between the two variables is not clear. No conclusive results have been found from previous research on the correlation between bank size and profitability, except for the fact that economies or diseconomies of scale is a huge factor (Kusi et al., 2017).

Moreover, economies of scale can be exploited by big banks. Unit costs go down, as costs are absorbed by increasing output, thereby showing an increase in returns to scale (Mehrjardi, 2012). A bank is efficient if it enlarges the total of output while reducing the amount of input (Xiang et al., 2015). Contrary to this, diseconomies of scale start when unit costs begin to increase with output when the bank is huge, that is, show a decrease in returns to scale. There is an optimum size, whereby, if not exceeded, a bank enjoys economies of scale; if a bank grows beyond this, it experiences diseconomies of scale (Sufian & Habibullah, 2012).

2.5 Empirical Literature Review

This literature review gives an overview of existing studies that have been done on the nexus between credit risk and financial performance from both developed as well as developing countries. Studies on South African banking will also be discussed. Data collected from the NCR in 2011 revealed a total of 19.10 million credit active consumers with a loan book value of R1.1 trillion. Of the 19.10 million, 10.27 million were in good standing yet 8.8 million had impaired records. The guidelines for credit providers outlined by the NCR seek to ensure compliance through supervision. Regulation 63 of the National Credit Act, 34 of 2005 confirms operations are conducted as per the requirements for compliance. The Credit Bureau registered with the NCR to keep and provide data to the credit providers and the consumers is used to assess credit profile when applying for credit facilities.

Table 2.1: Empirical studies

Study	Unit of Analysis	Period studied	Findings
(Kithinji, 2010)	Kenya	2004 - 2008	The findings revealed non-performing loans to have no effect on profitability which suggest that other variables are responsible
(Kargi, 2011)	Nigeria	2004 - 2008	Non-performing loans negatively affect profitability
(Githaiga, 2015)	Kenya	2010 - 2014	Credit risk has a negative relationship with financial performance

(Chimkono et al., 2016)	Malawi	2008 - 2014	Non-performing loans negatively affect profitability
(Kaaya & Pastory, 2013)	Tanzania	2005 - 2011	Increase in credit risk lowers firm performance
(Al-shakrchy, 2017)	Sweden	2000 - 2013	Non-performing loans negatively affect bank performance and profitability

2.5.1 Empirical evidence on the relationship between credit risk and financial performance from the developed countries

Both emerging markets and developed countries such as the USA have experienced default as a result of the quality of loans (Nkusu, 2011). Macroeconomic factors, financial factors and banks themselves influence NPL. Defaults are lower in good financial times in comparison to times of recession. This was evidenced during the global financial crisis, which did not discriminate between developing and developed economies and affected all countries. In good financial times, income is improved, and customers have money to settle debts, creating credit risk, as banks are lenient in awarding credit, which only backfires in recession (Gila-Gourgoura & Nikolaidou, 2017).

International economic growth was at 4.3% in the first quarter of 2018 (SARB Quarterly Bulletin, 2018). This created room for credit extension and required alertness going forward on how to address credit risks. The implementation of International Financial Reporting Standards (IFRS) 9 from January 2018 to address some shortcomings of

International Accounting Standards (IAS) 39, has impacted growth in credit extension which influences outstanding credit balances (SARB Quarterly Bulletin, 2018). However, it has brought guidance and clarity on inconsistencies as to how risks are managed by banks, and is much simpler. Good economic times are needed for credit extension to avoid financial vulnerability (Peric & Konjusak, 2017). A positive correlation was demonstrated between growth in credit and non-performing loans. Moreover, results disclosed an antagonistic relationship between ROA and NPLs.

Credit risk is worthy of attention in the lending process of the banking environment (Ljubić et al., 2015). It is a vital risk, which stands out due to the role loans play in the performance of banks. Credit risk affects financial contracts (Zamore et al., 2018). Credit risk evaluation is important, as it helps put measures in place to anticipate, avoid, and prevent defaults from occurring (Bruni, Beraldi, & Lazzolino, 2014). Both qualitative and quantitative models are to be considered when evaluating credit and drafting the credit contracts.

The risk taken must equate to what banks want to achieve. Measures in the form of capital adequacy must be in place to safeguard banks from the risk exposure. Sbârcea (2017) researched banking risk of credit to be tolerable only where performance is acceptable. The studies revealed an inverse relationship between non-performing loans and profitability. Seemule, Sinha and Ndlovu (2017) share a similar view that an increase in non-performing loans affects bank performance negatively. Hence, credit risks have to be monitored in banking institutions to be successful (Havrylchyk, 2010). The plethora of non-performing loans determine the level of credit risk (Jović, 2017).

Credit risk, if not managed and monitored, leads to bank failure (Makri & Papadatos, 2013).

Nataraja, Chilale and Ganesh (2018) discovered a direct correlation between ROA and bank size, and an indirect connectedness with credit risk. Furthermore, the relationship between bank size and credit risk with ROE was found to be negative. On the contrary, other studies showed a positive relationship between financial performance with credit risk and bank size (Paleckova, 2016). Belligerent granting of credit was found to be the main driver of loan default (Rahman & Hai, 2017). NPLs were described as either an obligation failed to be fulfilled or a loan close to not being repaid. Importantly, the studies exhibited NPL as a pivotal component to how banks perform as well as the economy at large, where banks constitute a key part of any economy (Kumar, 2017). Banks conduct a credit risk assessment and focus on creditworthy clients to reduce borrowers who will default (Mileris, 2015). Risk assessments are performed on a continual basis. Resource allocation of loan portfolios is critical to attaining maximum profitability.

2.5.2 Empirical evidence on the relationship between credit risk and financial performance in developing countries

The South African Banks operate under a complicated system (Mishi et al., 2016). The banking system demands efficiency in operations so as to maintain a competitive advantage and not fail, but to ensure stability instead. Apartheid in South Africa does have an effect on the credit given by banks to borrowers (Okeahalam, 2012). The era

oppressed and restricted people of colour with systems in place which denied them access to funds.

Regulations assist with the effort towards objectivity when assessing creditworthiness, and at the same time correct inequalities of the past. To be in a position to break the barrier of the previously disadvantaged, banks ought to form partnerships with the government in an efforts to manage and abate the impact of credit risk on profitability (Karley, 2006). This effort exists to improve access to credit by banks helps create jobs and income. This is especially important to keep returns for risks taken to acceptable levels, and not exploit desperate borrowers when charging interests, which are tough to repay. Banks seek compensation, which justifies the risk taken. Enterprise Risk Management Theory, which works as a strategic management control system, has helped immensely in this regard (Mikes & Kaplan, 2013).

Economic growth in developing countries has been declining, and this in turn reduces a borrower's ability to pay back loans (Ifeacho & Ngalawa, 2014). Quality of loans has also affected banks performance (Kumbirai & Webb, 2010). Lending risk is high if borrower is not vetted well, and treated accordingly. High unemployment rates in developing countries contribute to inability to settle debts. Credit risk is a bank specific factor, which affects how banks perform in South Africa (Kana, 2017). This type of banking risk needs to be controlled and monitored so as to remain profitable.

Diversification of loan portfolios is important to reduce exposure as part of credit risk management (Meyer, 2005). Credit risks are diminished when banks have options if other types of loans are not performing well to cover the gap. Viceroy research

opposed fiercely the transparency of Capitec, mentioning that the level of default in the bank had been understated (O'Neill, 2018). These allegations had been based on unsecured debts they offer which increase credit risk. The complexities faced by banks nowadays requires an extensive credit risk management approach in order not to fail (Milner, 2012). To be effective, banks ought to be aware that risks also present opportunities, which can be capitalised to their advantage, as is outlined in ISO 31000:2018.

A clear strategy of credit quality, earnings, growth and continuity in approach is vital (Mirach, 2010). This includes having policies of a framework for lending and development of procedures to identify problem credits, which will help create a formidable credit risk environment. The bank procedures which make it easy to approve and recover loans need to be formulated. Banks are credit providers which are responsible institutions in terms of the Financial Intelligence Centre Act (FICA) 38 of 2001, but they do not get involved in transactions they consider to be too risky and costly. The profitability of banks will be measured by financial ratios (Kumbirai & Webb, 2010).

A sound, unambiguous credit granting system with policies clear on the target market, purpose and structure of credit, gathering background information of the borrower, and setting of accurate credit limits, helping to manage credit risk (Basel Committee on Banking Supervision, 2000). A culture of adherence to risk management policies as a bank is equally important. The tightening of lending standards needs to be established, whereby the source of repayment as well as the purpose of credit is correctly assessed so as to determine how much to give a borrower, and to consider realistic terms of

credit, where the Treasury allows access to financial services and the inclusion of previously secluded citizens (Berlin, 2009). The nature of credit policies applied by banks has an effect on how they perform to avoid bank failure (Ackermann & Meyer, 2007).

2.5.3 An overview of South African banking

The banking and financial services sector is sophisticated, and is subject to many regulatory requirements (National Treasury, 2011). South African banks are underpinned by solid regulatory and legal framework, and operate in a highly competitive environment, which increases costs (Kumbirai & Webb, 2010). Increased costs affect performance through reduced profitability. Saambou Bank, African Bank, Prima Bank, Islamic Bank, Community Bank and New Republic Bank have all failed in South Africa, and the topic under discussion of credit risk affecting performance is highly relevant.

Banks play a major role in the supply of high demand for credit across the country (Compliance and Risk Resources, 2012). The financial sector in South Africa is driven by credit. Efforts to have a balance of good regulation and financial inclusion remains a challenge as risky credit seem to be synonymous with the majority of poor black South Africans. At the same time, good governance requires the regulators to be autonomous and the independence of the banks no to be compromised. The debate then becomes whether or not banks ought to be nationalised in South Africa.

Huge capital is required when there is no collateral to deal with the high risk (Olatunbosun, 2012). The problem then becomes the required capital. This has been a hurdle for poor people in rural areas, who end up only keeping their savings in banks, and who enjoy limited services, which extend to deposit facilities, and no other financial products (Coetzee, 1997). The loans banks offer are formally secured and have complex structures (Greuning et al., 1998). Banks have an obligation to ensure that they grant loans to borrowers who can repay them (Wambui, 2013).

Intense competition for customers in South Africa in financial services in the banking industry has an effect on performance (Coetzee, 2007). Competition is beneficial to reduce the credit risk of borrowers as interest rates charged on clients are regulated with an invisible hand so as to remain competitive in efforts to gain market share (Mishi et al., 2016). This serves to explain why some studies document an indirect relationship between ROA and NPLR (Bhattarai, 2015).

2.6 Summary of Literature Review

This chapter reviewed both the theoretical and empirical literature on financial performance and bank credit risk. The key findings were that banks in developing countries are useful in economic growth, and when they perform poorly, can result in crippling the economy of any country. In the next chapter, focus is placed on discussing the research methodology used to execute this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research design, population and sample size, data sources and data analysis that forms the basis for this research. The research design is explained and the population and sample defined. Econometric methods are applied to study the impact of credit risks on financial performance. A comprehensive literature study presented a case to employ a quantitative approach, namely, panel data methods and specifically a dynamic panel data model. Moreover, the empirical framework provides guidance on any limitations to examine when employing estimation methods in this study.

The rest of the chapter is organised as follows: Section 3.2 discusses the research design of this study. Section 3.3 outlines the population and sample of the research and 3.4 provides the data sources. Section 3.5 describes the estimation methods employed in this study. Section 3.6 explains the dynamic model and section 3.7 outlines the model specification for panel data to be employed in this study. Section 3.8 deals with tests for robustness of results and Section 3.9 concludes the chapter.

3.2 Research design

Research in this field can be undertaken using quantitative, qualitative and mixed methods. Qualitative research design involves interviews, whereby the researcher is intimately involved in observing and interpreting the data. Findings are subjective, and utilise content analysis. Sample sizes are small, and questions are open-ended. This study will, however, not make use of the qualitative research type, as it is not ideal for what is hoped to be achieved.

A mixed-methods research approach combines a mixture of quantitative and qualitative research methods to triangulate findings. Research problems are tackled from different angles, through the strengths of quantitative and qualitative research combined (Creswell & Garrett, 2008). This method will also not be used for this study.

The approach used to establish the relationship between two variables is called correlation research design. It determines if there is a correlation between variables. This non-experimental descriptive design is chosen as it provides how two or more variables are related to one another, what they share or have in common, while at the same time, predicting a particular outcome based on certain information provided (Salkind, 2012). The use of a numerical index called the correlation coefficient will measure the strength of the relationship between the variables. The aim is to have few errors from the analysis of data and provide adequate accurate and reliable information.

Conclusions were based on deductive arguments since data was analysed with apriori expectations which started with theories and ended with conclusions. Approach is aimed to test if theories are correct. Numerical research or data was collected and was converted into useable statistics.

3.2.1 Quantitative research

A quantitative method with numerical data is chosen here. The approach ensures results are similar regardless of who conducts the research as it is independent of the researcher. The benefits of quantitative research, according to Rilstone (2002), is to make findings predictive, explanatory, and confirming of the independent and dependent variables.

This method makes the results more reliable and objective. The use of statistics assists to generalise results. This approach is relevant, as it analyses relationships between variables (Salkind, 2012).

Quantitative data for correlational research, which is statistics-based, will be used. Large quantities of data will be collected to have a clear and quantitative measure which gives results that can be generalised. Statistical analysis will be used to summarise and describe the quantitative data, which, as mentioned, is numerical (Petzer, 2016).

This form of research design involves closed ended questions and surveys. Researchers are not involved and results which are measured and tested are objective. Sample size is large and utilises statistical analysis, questionnaires and

surveys and focus on numbers. The response rate is low. The approach used to find the relationship between two variables is called correlation research design, it determines if there is a correlation between variables.

This non-experimental descriptive research design is chosen as it provides how two or more variables are related to one another, what they share or have in common and at the same time predicting a particular outcome based on certain information provided (Salkind, 2012). The use of a numerical index called the correlation coefficient will measure the strength of the relationship between the variables. Correlation coefficient index means the strength or weakness of the relationship describing how two variables relate to or predict one another.

Quantitative research results can be generalised. Data analysis takes less time in comparison to other methods. Limitations to quantitative research do however exist. In some cases, it may involve a superficial dataset. Results also give numerical descriptions and not a detailed narrative (Rahman, 2016).

3.3 Population and sample description

The target population for this study is made up of all South African banks and the sample consists of eighteen (18) banks with full financial statements operating between the periods from 2008 to 2017.

Table 3.1: South African Banks to be considered for research

Banks considered for research and areas of specialisation		
1	ABSA	Financial services group offering personal and business banking, credit cards, corporate and investment banking, wealth and investment management.
2	AFRICAN BANK	Retail bank that offers financial products and services
3	ALBARAKA	A world leader in Islamic banking
4	BIDVEST	Market leaders in foreign exchange and offer a full suite of banking and financial services to individuals and businesses
5	CAPITEC	Financing retail bank
6	DEVELOPMENT BANK OF SOUTH AFRICA	Development finance institution owned by the government
7	FIRST RAND	Financial services provider
8	GBS MUTUAL BANK	Financial services provider and a registered credit provider
9	GRINDROD	Commercial financial institution
10	GROBANK	Business, Agribusiness and Alliance banking
11	HABIB OVERSEAS BANK	Commercial bank
12	HBZ BANK	Business, personal, Islamic, trade finance and services
13	INVESTEC	Specialist banking and asset management group
14	MERCANTILE	Provides products and services in retail banking, corporate finance, asset management, equity brokerage and security
15	NEDBANK	Wholesale and retail banking, insurance, asset management and wealth management
16	SASFIN	Financial products and services focus on the needs of entrepreneurs, corporates, institutions, and high-net worth individuals.
17	STANDARD BANK	A universal bank and full-service financial group offering transactional banking, saving, borrowing, lending, investment, insurance, risk management, wealth management and advisory services.
18	VBS MUTUAL BANK	A specialist corporate finance and retail bank

3.4 Data sources and description of data

The study will use secondary data extracted from the Bureau van Dijk Orbis: Bank Focus database. The data of banks for the period running from 2008 to 2017 will be considered for this study. The data extracted will be the full financial statements of the sample under consideration, that is, through the non-probability purposive sampling technique (Etikan, Musa & Alkassim, 2016). Econometric models will be employed to analyse the data. Specifically, a static model will be employed to test the hypotheses.

3.5 Estimation methods

This study will employ panel data analysis. Panel data is a statistical method used to analyse two-dimensional data, combining time-series and cross-sectional data, and will be the methodology adopted for this study (Baltagi, 2005). Data is collected at different points in time. It often refers to a data set where the observations are dominated by large number of units relative to time periods. Panel data methods involve econometric tools that will perform valid inference on data analysis (Yaffee, 2005). Panel data, longitudinal data and cross-sectional time-series data will involve observations of multi-dimensional data on the banks measured over a 10-year period to estimate dynamic econometric models (Hsiao, 2007).

Econometric tools will be used to estimate parameters, compute partial effects of interest in non-linear methods, quantify dynamic linkages and perform valid inference when data is available on repeated cross sections (Greene, 2001). A combined cross-sectional analysis and time series with models describing the individual behaviour of

a bank across the 10 years and across all banks. The two dimensions, of a time series from 2008 to 2017 and a cross-sectional analysis of banks will be covered.

A balanced category having data for all cross-sections on all the time periods will be applied. Individual banks will act as their own controls. The observations of multiple phenomena obtained over the 10-year period for the same banks will be useful, since analysis to describe change over time cannot be based only on time-series or cross-sections (Berrington, 2006). Linear models are used in many panel data applications. Panel data analysis helps to describe change over time. Better estimates trends will be achieved over time on the same firms (Hsiao, 2007).

The research will observe banks over a 10-year period. The chosen models will then describe findings on the provided balanced panel, whereby all banks are observed in all the years. Methods of panel data will permit control over variables that cannot be observed or measured.

The advantages of panel data methods can be enumerated as follows:

- by combining both time-series and cross-sectional dimensions, panel data methods confer more degrees of freedom, sample variability and has accurate inference of model parameters which improves efficiency of econometric estimates (Wang, 2009). A much larger data set with more variability and less collinearity among the variables than is typical of cross-section or time series data. Data has to be comparable.

- The capacity to capture complex scenarios which are sophisticated will be improved making the statistical inference concise (Koop, Leon-gonzalez, Strachan, Leon-gonzalez, & Strachan, 2007).
- Models have less restrictive assumptions which have ability to control for individual heterogeneity which can lead to bias in the resulting estimates. Panel data suggest that firms are heterogeneous. Time-series and cross section studies not controlling this heterogeneity run the risk of obtaining biased results (Baltagi, 2005). Panel data are able to control for firm and time invariant variables whereas a time-series study or a cross-section study cannot.
- Panel data is more informative and will identify and estimate effects that are more reliable and cannot be detected only on pure time series or pure cross-sections.
- Panel data are better able to study the dynamics of adjustment.
- Micro panel data gathered on firms may be more accurately measured than similar variables measured at the macro level. Biases resulting from aggregation over firms may be reduced or eliminated (Blundell & Bond, 1998).

The disadvantages of panel data methods can be enumerated as follows:

- distinguishing between the differences between unobserved heterogeneity and dynamics in the underlying process complicates interpreting estimates from panel data models (Hsiao, 2007);
- difficult to develop superior and logical estimator assumptions with good properties under reasonable assumptions, and to guarantee the validity of statistical inference (Hoechle, 2007);
- problems in the design, data collection and data management (Yaffee, 2005);

- distortions due to measurement errors; and
- selectivity problems.

There are three types of models namely:

- a. Pooled Ordinary Least Squares (OLS) Model
- b. The Fixed Effects (FE) Model
- c. Random Effects (RE) Model

a. Pooled Ordinary Least Squares (OLS) Model

Pooled OLS is a multiple linear regression applied to panel data. Classical linear regression assumptions are pursued to achieve reliable estimation of the impact of the varying regressors on the dependent variables (Chin'anga, 2015). However, it ignores time and space, and is very sensitive to outliers.

The Gauss Markov Theorem states that there is minimum variance among the class of linear unbiased estimators, which makes it efficient (Rilstone, 2002). An OLS estimator uses both the between and within variation to estimate the parameters.

Panel data is comprehensive, and eliminates some of the drawbacks of time series, but OLS is the most restrictive panel data model (Abbas et al., 2014). It neglects that it is a panel data, which ends up as a bad fit to the data. The problem with OLS is that over time data is correlated.

If the individual-specific effects are correlated with the explanatory variables, we have fixed effects model. The random effects model refers to when the individual-specific effects are not correlated with the explanatory variables.

b. Fixed Effects Model (Least Squares Dummy Variable Model)

A fixed effects model is a statistical model in which the model parameters are fixed or non-random quantities. An estimation removes the unobserved effects, implying that the unobserved effects can be arbitrarily related to the observed covariates (Bramati & Croux, 2007). A fixed panel is one in which the same set of banks will be observed for the duration of the study. Fixed effects model are mostly used and are equipped to investigate the causes of changes within a bank (Torres-Reyna, 2007).

Fixed effects remove all time constant effects, that is, regressors that do not vary within an individual, controlling for all time-invariant differences between the banks. Greater interest lies in the effects of these separate sources of individual heterogeneity (Ifeacho & Ngalawa, 2014a). It treats the unobserved individual heterogeneity for each bank to be correlated with the explanatory variables. Fixed effect is not a solution for all sources of bias when the explanatory variable is correlated with the error term. It cannot estimate coefficients of time-invariant variables. FE estimation involves a transformation to remove the unobserved effect prior to estimation.

c. Random Effects Model

It is the alternative to the fixed effects model. Unlike the fixed effects model, a random effects model considers the variation across entities to be random and uncorrelated, with the predictor or independent variables included in the model (Torres-Reyna, 2007). A statistical model, where model parameters are random variables used in econometrics in the analysis of panel data when one assumes no fixed effects. It assumes that the individual-specific (unobserved) effects are independent of the explanatory variables. The individual effects are part of the disturbance term, that is, zero-mean random variables, uncorrelated with regressors. The unobserved effects are included as the error term.

Random effects include time invariant variables absorbed by the intercept in the fixed effects model. The reliance on unobserved effects and the history of the variables predictive of the outcome is parametrically modelled in this approach. The random effects approach endeavours to model the individual effects as illustrations from a probability distribution as an alternative to removing them. The model allows generalising the inferences beyond the sample used in the model (Torres-Reyna, 2007). The random effects specification is appropriate if we assume the data are a representative and large sample of individuals drawn at random from a large population.

3.6 Static panel model

The research will employ a static panel data model. Data is multi-dimensional and covers measurements over time for the same banks. Both time series and cross-sectional data are examined at the same time. This model is appropriate as it addresses the problem of endogeneity and variables which are persistent over time. It deals with variables whose current realisation is dependent on the past value (Hurlin, 2018). The current financial performance is linked to that of last year. Fixed effects and random effects models are both useful to study the dynamics of cross-sectional data and control over unobserved time-invariant heterogeneity in cross-sectional models (Arellano & Bonhomme, 2009).

3.6.4 Relevant tests of specification for panel data

Research objectives will be used as a guide on the choice of model to adopt. Furthermore, diagnostic tests will be conducted to decide on the best model (Park, 2011). Estimators are corrected for autocorrelation, spatial dependence, or heteroscedasticity of error terms. A situation in which the variability of a variable is disparate across the range of values of a second variable that predicts it is referred to as heteroscedasticity, or different/unequal dispersion. Heteroscedasticity occurs mainly due to the existence of outliers in the data. Outlier in heteroscedasticity means that anomaly of observations that are either small or large with respect to the other observations are present in the sample. Heteroscedasticity is also caused due to omission of variables from the model (Yaffee, 2005).

In statistics, heteroscedasticity happens when the standard errors of a variable, monitored over a specific amount of time are non-constant. OLS regression gives equal weight to all observations, but when heteroscedasticity is present, the cases with larger disturbances have more “pull” than other observations (de Guevara Cortés & Porras, 2014). Heteroscedasticity also presents another challenge of biased standard errors. However, robust standard errors are consistent even when the error terms are heteroscedastic. The inference based on OLS estimates and robust standard errors will therefore be approximately correct if N is large.

Groupwise heteroscedasticity occurs when variance differs across units even though the error process may be homoscedastic within cross-sectional units (Baum, 2001). The null hypothesis specifies that $\sigma^2_i = \sigma^2$ for $i = 1, \dots, N$, where N is the number of cross-sectional units.

Driscoll and Kray reworked the Newey-West estimator that provides robust inference to serial correlation in addition to heteroscedasticity (Hoechle, 2007). The change not only deals with serial correlation between residuals from the same individual in different time periods, but also cross-serial correlation between different individuals in different times and, within the same period, cross-sectional correlation. A number of diagnostic tests are utilised to underpin the reliability of findings. Furthermore, different specification tests will be conducted for consistency and reliable estimates. The following tests will be considered in this study.

3.6.4.1 F-test to test FE: to compare FE vs OLS

F-test examines if variances of two populations is likely to be different. F-test is a process to contrast a null hypothesis (H_0) when the variances are equal against an alternative hypothesis (H_1) with different variances. Running an F-test results in a high or low P-value. High P-value means variances are likely equal yet likely different for a low P-value. If it is less than 0.05, the rejection is at a 5% significance level. Reject the null hypothesis (H_0) if P-value is low, and there is not enough evidence to reject the null hypothesis (H_0) if P-value is high.

The applied Chow test helps to identify whether there is a significant improvement in fit from running two regressions or to simply have a pooled regression (Park, 2011). It tests the poolability of panel data, and tests for the validity of cross-sectional effects.

3.6.4.2 LM Breusch-Pagan test to examine RE: to compare RE vs OLS

Breusch Pagan Lagrange Multiplier (LM) test is a test for the random effects model based on the OLS residual (Torres-reyna, 2007). The LM test is used to decide between a random effects regression and a simple OLS regression. If the LM test is significant, the implication would be that the random effects model should be employed in estimation instead of the OLS model.

The null hypothesis is that there is no significant difference across cross-sectional units (i.e. no panel effect) implying that RE model is inappropriate. The null hypothesis is that there are no time-invariant effects and as such OLS should be used (Rilstone,

2002). A test for fixed versus random effects still needs to be conducted. The function pF test on the fixed and pooled estimates is useful when choosing between the fixed effects model and the OLS.

3.6.4.3 Hausman or Ahn-Low test: to compare RE vs FE

The test is for specification and is used to decide between the fixed effects and random effects. It is important to note that the random effects is more efficient, so it is necessary to use it if the Hausman test supports it, failing which, the fixed effects model is used. If the Hausman test is insignificant, random effects are used, and if the Hausman test is significant, fixed effects are used.

The Hausman test examines whether there is a significant difference between the fixed and random effects estimators. The Hausman test statistic can be calculated only for the time varying regressors. This can be done using the Panel Hausman Test function. It reflects Chi-square distribution with degrees of freedom equal to the number of parameters for the time-varying regressors.

3.6.4.4 Test for cross sectional dependence: Pesaran (2004) CD test

This test checks if residuals are correlated across entities. The resulting challenge is of contemporaneous correlation. Lack of attention to the possibility of correlation of regression disturbances over time and between subjects can lead to biased statistical inference (Hoechle, 2007).

3.7 Model specification

To test the relationship between credit risk and financial performance, two models are going to be estimated. The following static panel data models are going to be specified:

$$ROA_{i,t} = NPLR_{i,t}\beta_1 + NPLE_{i,t}\beta_2 + Growth_{i,t}\beta_3 + Size_{i,t}\beta_4 + Lev_{i,t}\beta_5 + CAR_{i,t}\beta_6 + \alpha_i + \varepsilon_{i,t} \dots \text{Equation (1)}$$

$$ROE_{i,t} = NPLR_{i,t}\beta_1 + NPLE_{i,t}\beta_2 + Growth_{i,t}\beta_3 + Size_{i,t}\beta_4 + Lev_{i,t}\beta_5 + CAR_{i,t}\beta_6 + \alpha_i + \varepsilon_{i,t} \dots \text{Equation (2)}$$

For:

$$i = 1 \dots, N; t = 1 \dots, T$$

Where:

$ROA_{i,t}$ = Return on Assets for bank i at time t

$ROE_{i,t}$ = Return on Equity for bank i at time t

$NPLR_{i,t}$ = Non-performing Loans Ratio for bank i at time t

$NPLE_{i,t}$ = Non-performing Loans to Equity for bank i at time t

$Growth_{i,t}$ = Growth for bank i at time t

$Size_{i,t}$ = Size for bank i at time t

$Lev_{i,t}$ = Leverage for bank i at time t

$CAR_{i,t}$ = Capital Adequacy Ratio for bank i at time t

β = slope parameter

α_i = group-specific constant term that embodies all the observable effects

$\varepsilon_{i,t}$ = composite error term that also takes care of other explanatory variables that equally determine non-performing loans but were not included in the model.

The above model is going to be estimated using the pooled regression model (Ordinary Least Squares [OLS]), Fixed Effects Model (FEM) and Random Effects Model (REM). Pre-estimation tests will be conducted to establish that the estimated model is stable and not mis-specified. Diagnostic tests will be conducted to decide on the best estimator to run the model.

The model adopted for this study is underpinned to the models of Kargi (2011), Bhattarai (2015) and Kithinji (2010) in their studies which looked at the relationship between credit risk and the performance of banks which measured profitability with Return on Assets (ROA) and the amount of credit was measured by loan and advances to customers divided by total assets, nonperforming loans was measured using nonperforming loans/ total loans. Panel data provides the benefit of controlling for the individual heterogeneity, lower multi-collinearity in variables and tracks trends in data that time series and cross sectional data might not be able to provide (Hamza, 2017).

3.7.1 Variable definition

The following variables have been identified for this study.

3.7.1.1 Dependent variables

Two dependent variables are employed in the literature of this study. Return on equity (ROE) as well as return on assets (ROA) are the key outcome variables being tested and measured.

3.7.1.2 Independent variables

The independent variables consist of non-performing loans ratio (NPLR) and non-performing loans to equity (NPLE). These variables measured to observe the effects they cause on the dependent variables.

3.7.1.3 Control variables

Numerous empirical studies have adopted the control and use of similar variables because they can have an effect on the results. Size, growth, leverage, and capital adequacy ratio have been identified as relevant to this study.

TABLE 3.2: VARIABLES ON PREVIOUS RESEARCH

Variables	Formula	Previous studies with similar approach	Findings	Expected sign
Dependent Variables				
Return on Equity (ROE)	$\frac{\text{Net Income after tax}}{\text{Shareholders Equity}}$	(Ifeacho & Ngalawa, 2014), (Sbârcea, 2017), (Nataraja et al., 2018)	Credit risk has significant impact on ROE	Negative
Return on Assets (ROA)	$\frac{\text{Gross Revenues}}{\text{Average Assets}}$	(Alshatti, 2015), (Saeed & Zahid, 2016), (Ongore & Kusa, 2013)	Positive relationship of NPLR and financial performance	Negative
Independent Variables				
Non-Performing Loans Ratio (NPLR)	$\frac{\text{Non – performing loans}}{\text{Total Gross Loans}}$	(Abbas et al., 2014), (Nduku, 2013), (Chimkono et al., 2016) (Al-shakrchy, 2017)	Non-performing loans affect the bank performance negatively	Negative/Positive
NPLs to total equity (NPLE)	$\frac{\text{NPLs}}{\text{Total equity}}$	(Wanjira, 2010), (Rahman & Hai, 2017)	Non-performing loans adversely affects financial performance	Negative/Positive
Control Variables				
Size	$\text{Logarithm of Total Assets}$	(Boahene et al., 2012), (Petria, Capraru & Ihnatov, 2015) (Shah & Khan, 2017)	Size significantly affects profitability	Positive
Growth	$\text{Growth rate of Total Assets / Sales}$	(Chipeta et al., 2012)	Growth firms increase profitability to the firms	Positive
Leverage	$\text{Total Debt / Total Assets}$	(Jasevičienė et al., 2013), (Klepczarek, 2015)	Highly leveraged firms perform better	Positive
Capital Adequacy Ratio (CAR)	$\frac{\text{Core Capital}}{\text{Risk Weighted Assets}}$	(Dreca, 2013), (Echekoba, Egbunike & Kasie, 2014) (Aspal & Nazneen, 2014)	ROA has a negative effect on CAR, while ROE is positively related with CAR	Positive

Data on non-performing loans, assets and profitability will be obtained from financial statements sourced from Orbis Bank Focus database for the period 2008 to 2017.

3.7 Robustness

To test the robustness of the results, alternative proxies will be employed for the key variables. The primary dependent variable employed to proxy financial performance for this study shall be ROA. For robustness, the ROE variable will be employed. These financial ratios of banks are similar if a bank carries no debt, however banks with higher equity ratios have higher ROA compared to ROE (Kohlscheen et al., 2018). Similarly, for the credit risk variable, the proxies used to perform robustness checks for loan quality, will involve, the analysis of non-performing loans as a ratio of either total gross loans or as a ratio of total equity. All this will be done to improve reliability of results.

3.8 Chapter Summary

This chapter began by outlining the empirical framework for this study. Thereafter, the research design choice for the study was discussed. The population and sample description was given as well as the data sources. Panel data econometric models were described. Appropriate diagnostic tests were conducted to test the problem of heteroscedasticity and executed to ascertain suitability of either Pooled OLS, random effects (RE) or fixed effects (FE) model. Methodological choices were presented which led to definitions of the proxies for the dependent, independent and control variables. The chapter concludes by how analysis of the robustness of results will be conducted. The next chapter presents and discusses the research findings.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 INTRODUCTION

This chapter presents the five main hypotheses tested. The first hypothesis tested if credit risk has any impact on financial performance of South African banks. The second sought to establish the effect of growth on financial performance. The third concerned whether any relationship exists between financial performance and capital adequacy. The fourth hypothesis asks whether South African bank performance varies with size. The fifth and final hypothesis asks whether bank leverage and financial performance are related.

The analysis is conducted through use of panel data econometric techniques. Diagnostic tests are performed for robustness. The rest of the chapter is organised as follows: Section 4.2 presents the descriptive statistics and discusses the trends in variables. Section 4.3 presents the correlational analysis of the variables employed in the study. Section 4.4 presents and discusses the empirical findings of the study, and section concludes the chapter.

4.2 DESCRIPTIVE STATISTICS

This section presents the descriptive statistics of the variables employed in the study. Key trends are also examined and analysed.

4.2.1 Summary statistics

The summary statistics that present the measures of central tendency and normality are presented in Table 4.1. To deal with skewness we make use of median for ROA. It addresses the problem of skewness with regards to the ROA metric when presenting the average statistic in the dissertation. The results documented that the sample median bank financial performance of South African banks proxied by ROA was 1.23 percent for the period under review. The worst performing bank recorded a minimum ROA of roughly minus 1400%, whilst the highest performing bank recorded a ROA of as high as 44 percent. The median (standard deviation) performance of banks based on ROE in the sample was 0.1268 (0.3819). This depicts that equity shareholders were able to generate a return of 10.26 percent. The minimum recorded ROE was as low as roughly minus 390%, while the best performing South African bank recorded a return on equity of about 224% for its shareholders. The results showed that most of the South African banks have a higher ROE more than ROA.

The mean non-performing loan ratio (NPLR) of all banks over the test period was 0.0546. This suggests that banks could not collect 5.46 percent of every loan advanced. The standard deviation recorded based on non-performing loan ratio (NPLR) was 0.1014. The highest non-performing loan ratio (NPLR) was 0.9891 and

the lowest -0.0176. The mean non-performing loans to total equity (NPLE) of all the banks under the study was 0.1512. That translates to failure to collect 15.12 percent of every loan in relation to total equity. The standard deviation recorded based on non-performing loans to total equity (NPLE) was 1.1580. The highest non-performing loans to equity (NPLE) was 3.993 and the lowest -11.5666.

The results also documented that size variable had a mean logarithmic value of 10.0208, which equates to R10 490 592 078 in assets. The largest bank had a logarithmic value of 14.67, which equates to R467 735 141 287 199 in assets, and the smallest bank had an asset base of a logarithmic value of lowest 5.44 which translates to R275 423 in assets.

Furthermore bank growth rate measured using total assets ranged from negative 57.75% to 151.89%, with an average value of 14.81 percent. The mean leverage rate was 85.51%, with the lowest recording at 52.54% and a highest of 113.48 percent. The standard deviation for leverage was 11.05 percent.

Kurtosis and Skewness were examined to describe and check normality of the distribution of data. Kurtosis measured the peakness or flatness of the distribution of the series. Skewness measured the degree of asymmetry of the series. Return on Assets (ROA) and Return on Equity (ROE) exhibited the greatest excess kurtosis and the highest negative skewness. Variables with distributions that are negatively skewed imply that it has a fat/long left tail and mean is less than the median. The large kurtosis exhibit tail data exceeding the tails of the normal distribution and imply erratic extreme returns, which can either be favourable or unfavourable.

Table 4.1: Summary Statistics

Variable	Mean	Median	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Observations
NPLR	0.0546	0.0312	0.1014	-0.0176	0.9891	5.8331	46.1616	198
NPLE	0.1512	0.1367	1.1580	-11.5666	3.993	-6.6115	66.1007	198
CAR	0.1842	0.1468	0.0982	-0.2000	0.5637	0.9592	5.1809	198
ROA	-0.0455	0.0123	1.0273	-14.4000	0.4373	-13.8812	194.4825	198
ROE	0.1026	0.1268	0.3819	-3.8754	2.2384	-6.1926	73.2919	198
SIZE	10.0208	9.1650	2.6642	5.4400	14.6700	0.2472	1.7126	198
GROWTH	0.1481	0.0999	0.2351	-0.5775	1.5189	2.5075	13.2837	198
LEV	0.8551	0.9019	0.1105	0.5254	1.1348	-1.0389	3.5693	198

4.2.2 Trend Analysis of the Main Variables employed in the Study

The trends in non-performing loans ratio is depicted Figure 4.1. The lowest non-performing loans ratio (NPLR) was recorded in the year 2008, with a slight increase in 2009 and 2011, yet the highest was recorded in the year 2012. Between 2009 and 2011, the year 2010 had a small dip. In the year 2012, the house prices bottomed out, and South African banks experienced a drop in the value of their assets, better explained as the effect when banks repossessed homes as a result of default. The results fluctuate, where year 2015 had the second highest ratio, and 2018 was in third place over the years under review.

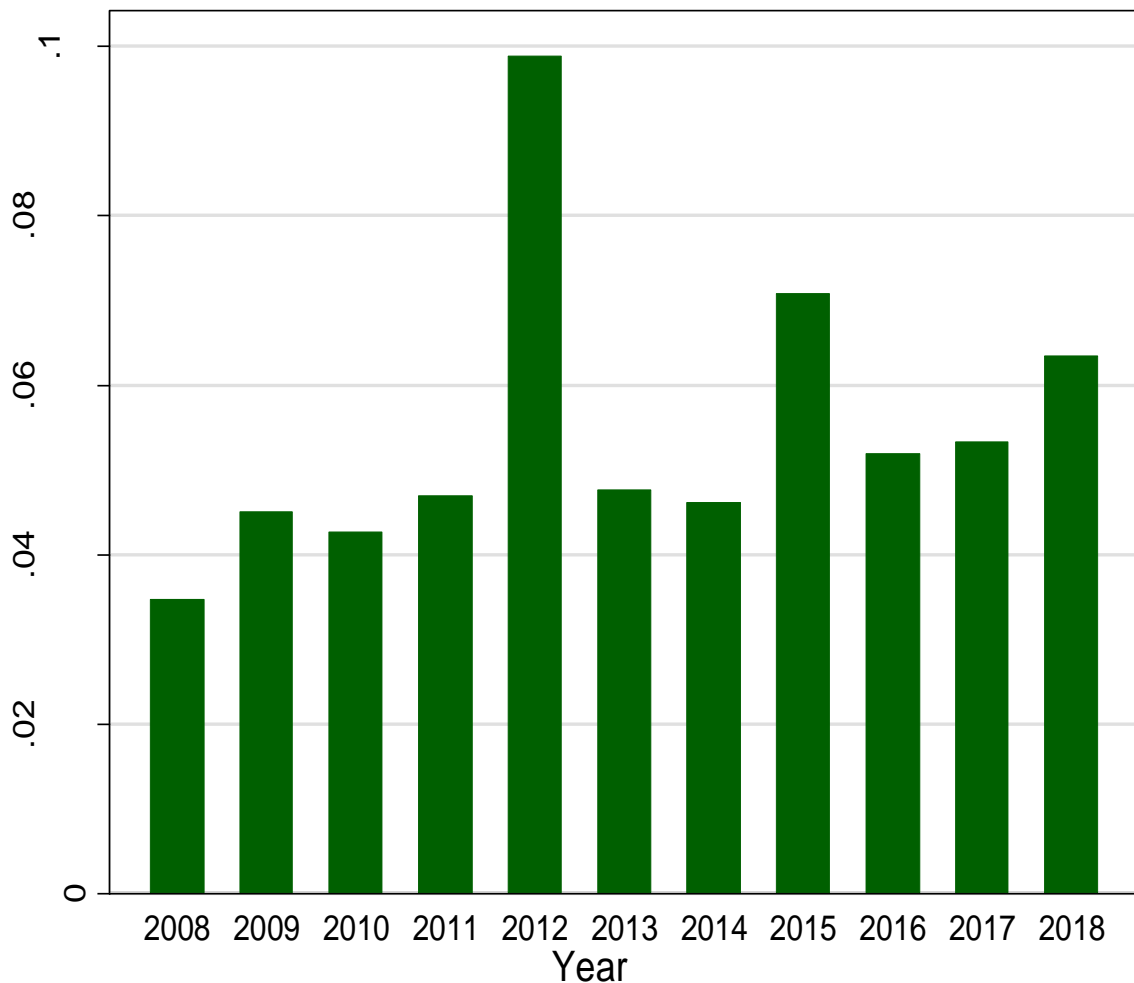


Figure 4.1: Trends in Non-Performing Loan Ratio

Trends in non-performing loans to equity ratio are presented in Figure 4.2. A similar trend to non-performing loans ratio (NPLR) was observed in non-performing loans to equity (NPLE), with the lowest ratio being recorded in 2008 and the highest in 2012. However, the difference is that non-performing loans to equity was negative in 2008 and 2009, a period when there was a recession as a result of the global financial crisis. There was almost a consistent decline in the ratio from 2012 until 2017, which only started going up in 2018.

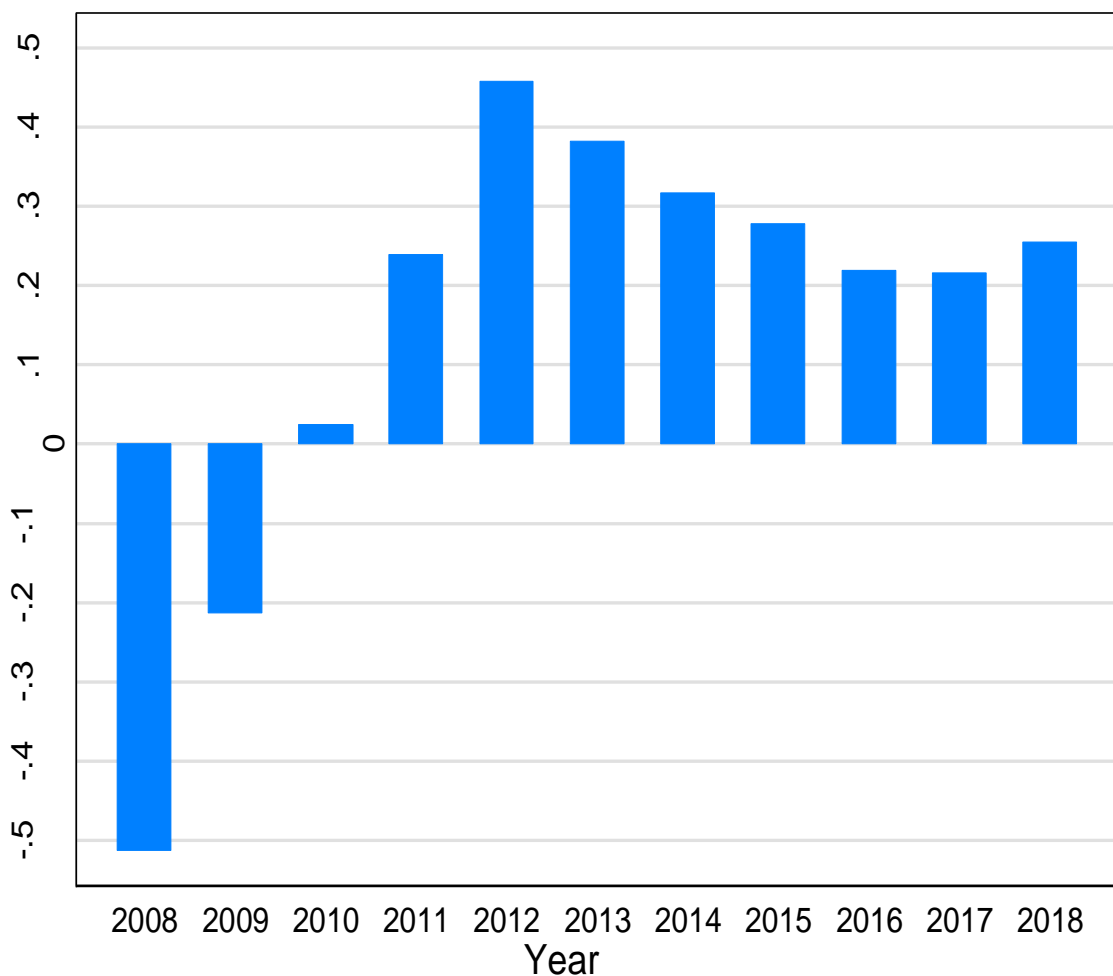


Figure 4.2: Non-Performing Loans to Equity Ratio

The mean capital adequacy of the sample of banks under the study was 18.42% and the median was 14.68%, as is depicted in Figure 4.3. Trends in capital adequacy ratios

used as a control variable for all the banks in this study are illustrated for the period starting in 2008 and ending in 2018. Minor variations are observed over the period under investigation as capital adequacy ratio (CAR) is relatively constant. There is a positive steady trend throughout the period of the study. The range was from 0.160 to 0.215, with the minimum recorded in 2015 and the maximum in 2010.

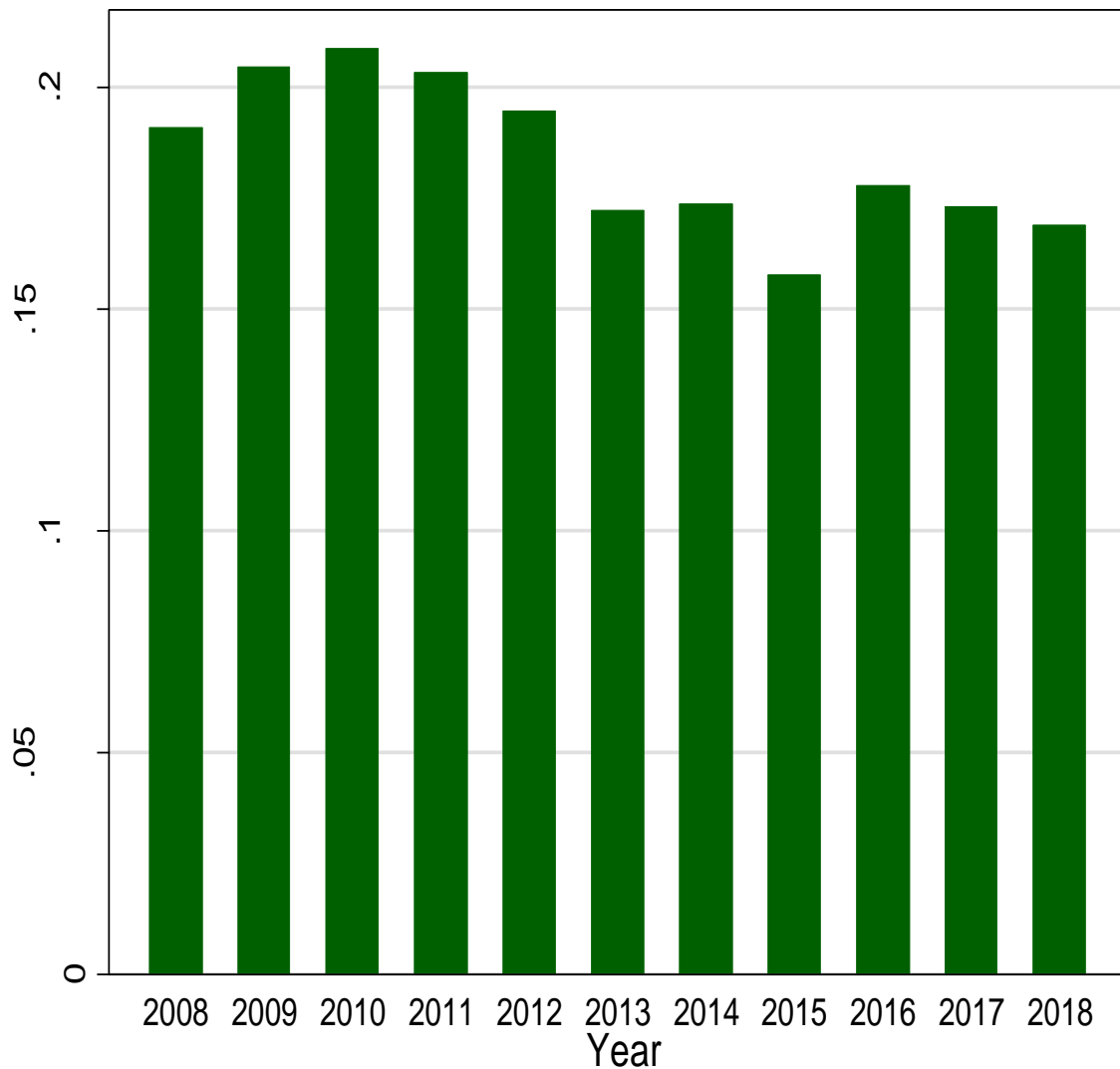


Figure 4.3: Trends in Capital Adequacy Ratio

A very popular proxy of return on assets used to measure performance of banks is used as a dependent variable for this study. The only outlier which was also the only

negative was recorded in 2015 when banks index de-rated, at approximately -0.78, yet the rest were positive and relatively consistent within the same range, with the maximum at about 0.06 (Figure 4.4).

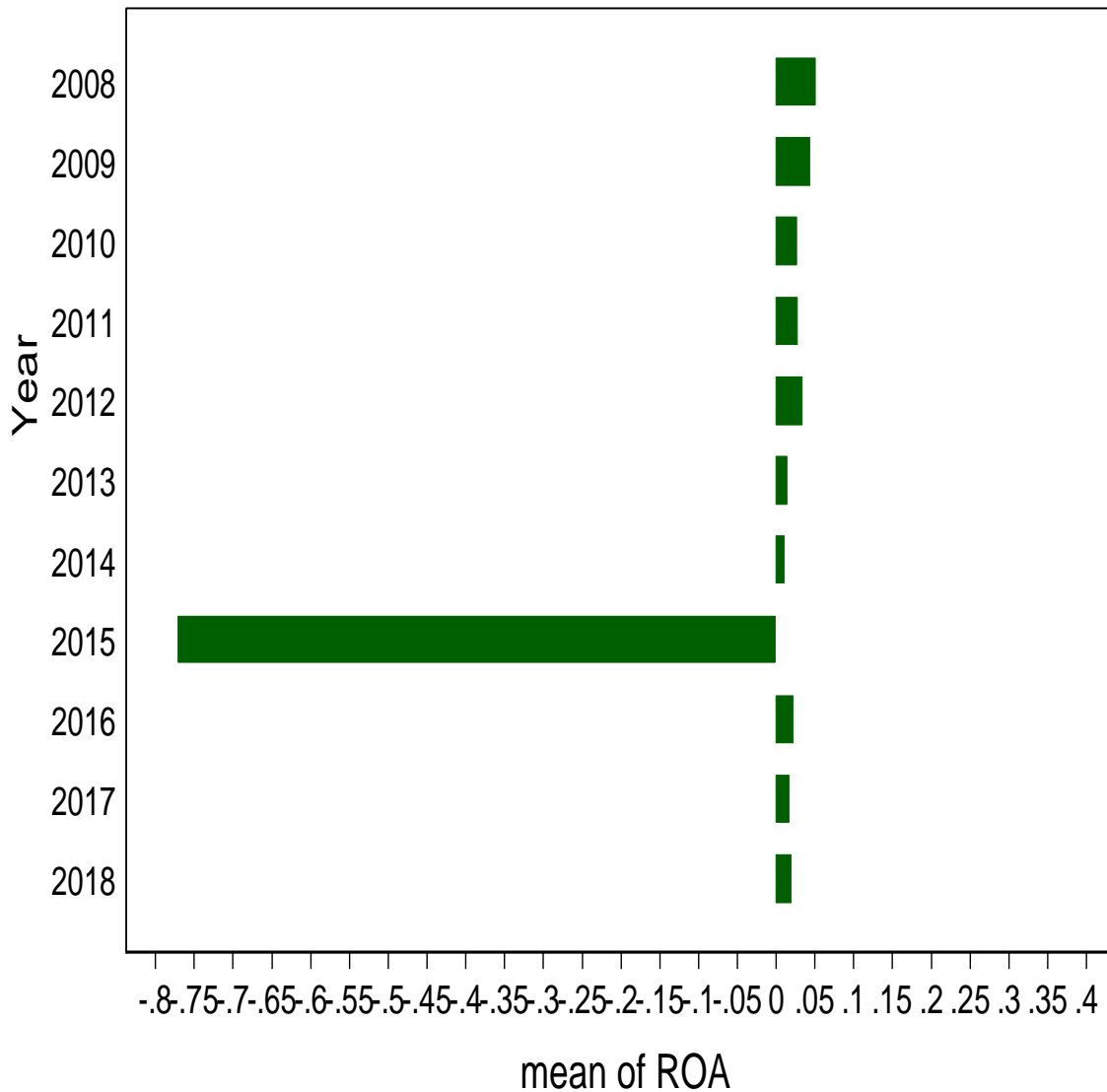


Figure 4.4: Trends in Banks’ Return on Assets

Information on the banks’ return on equity also used as a dependent variable for this study. The year 2014 and 2016 had negative figures, with the lowest being captured in 2014 (Figure 4.5). The highest ROE was given in 2015 followed by 2008. The contrast in direction between ROA and ROE is a notable difference in 2015. ROE

recording its highest ROE in 2015, and at the same time ROA recording its lowest in the same year.

ROE is driven by profitability, activity and leverage which are influenced by management and economic decisions. This is expressed as a percentage and shows the percentage of net income generated with money shareholders have invested. ROA is a ratio which represents profit earned per unit of asset spent, and also exposes the ability of the bank's management to generate profit from its financial and real resources. Increase in leverage of South African banks reduces ROA.

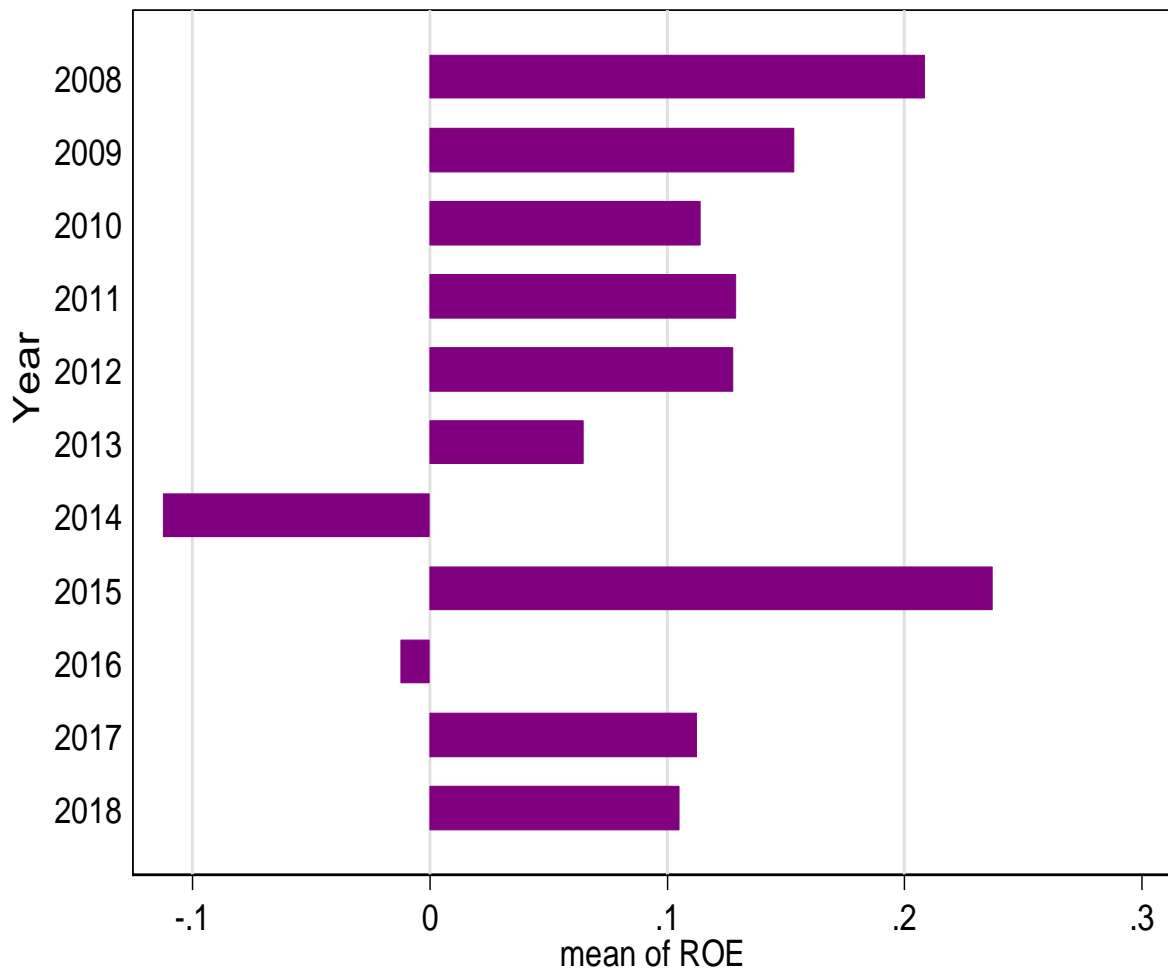


Figure 4.5: Trends in Banks' Return on Equity

This shows banks assets were far larger than shareholder equity. The year 2014 and year 2016, even though small, also moved in a different direction for the two variables.

4.3 CORRELATIONAL ANALYSIS

In this section, focus is placed on analysing the correlations between the variables employed in this study. The correlations of the variables used are reported in Table 4.2.

Objective 1 - To determine the impact of credit risk on financial performance of banks in South Africa

The findings of this study documented that credit risk proxied by the non-performing loans ratio was negatively correlated to ROA and impact was highly significant (1% level of significance), with strength of relationship at 44.2 percent. Similarly, credit risk proxied by the non-performing loans to equity ratio variable was negatively correlated to ROA, though the relationship was statically insignificant.

On the other hand, it was established that credit risk proxied by the non-performing loans ratio was negatively correlated to ROE, though the relationship was statistically insignificant. Furthermore, the results documented that credit risk proxied by the non-performing loans to equity ratio is negatively correlated to ROE. The result was statically significant at the 1% level of significance.

For this reason, results provide evidence of a negative relationship between credit risk and financial performance. The increase in non-performing loans results in increase in impairments and therefore negatively impacts profitability. This is in line with a priori expectations.

Objective 2 - To establish whether financial performance varies with growth of South African banks.

The results of this study report that growth was positively correlated to ROE and impact was significant (10% level of significance) with strength relationship of 13.48 percent. Similarly, a growth variable was positively correlated to ROA, though the relationship was statically insignificant with strength relationship of only 6.06 percent.

Results revealed a positive effect of growth on financial performance. As banks grow they have capacity to issue more loans and improve on their returns. Profitability is improved when a bank embarks on a growth strategy. This is in line with a priori expectations.

Objective 3 - To establish the relationship between financial performance and capital adequacy of South African banks.

The findings of this study established that capital adequacy was positively correlated to ROA and impact was highly significant (1% level of significance) with strength relationship at 30.84 percent. Contrary to this result, when capital adequacy variable

was measured against ROE, a negative correlation was documented. The relationship was statically insignificant at 4.05 percent.

As assets and loans increase, ROA and ROE is expected to reduce if all things remain unchanged. CAR had a positive and highly significant effect on ROA. As bank capital increases, profitability (ROA) also increases. However, a negative but insignificant relationship suggests that setting aside more capital for banks slightly influences how they perform as indicated by ROE.

Therefore, results are inconclusive. Capital structure says when banks are paid more they lend more, and lending more results in improved returns provided borrowers do not default. The interest tax shield that high debt brings is exploited to better financial performance and yields desired result depending on borrowers. This departs from a priori expectations.

Objective 4 - To determine if the financial performance of South African banks varies with bank size.

The findings of this study documented that bank size was negatively correlated to ROA and impact was insignificant with strength of the relationship at 2.92 percent. Similarly, bank size was negatively correlated to ROE with strength of relationship at 1.68 percent.

Therefore, results provide evidence of a negative relationship between bank size and financial performance. The bigger the bank, results in improved bargaining power and

the start of enjoying economies of scale. However, this increases risk appetite and a relaxation of credit standards. This results in increased credit risk which has a negative effect on profitability. Results are contrary to a priori expectations.

Objective 5 - To establish the relationship between bank leverage and financial performance of South African banks.

The findings of this study established that bank leverage was negatively correlated to ROA, and impact was highly significant (1% level of significance) with strength relationship at 19.67 percent. Meanwhile, the bank leverage variable was positively correlated to ROE and strength of relationship statically insignificant at 4.61 percent.

Hence, results are inconclusive. Capital structure says when banks are paid more they lend more, and lending more results in improved returns, provided borrowers do not default. Results different from a priori expectations.

Table 4.2 Correlation Matrix for the main variables used in this study

	ROA	ROE	ROA(-1)	ROE(-1)	NPLR	NPLE	SIZE	GROWTH	LEV	CAR
ROA	1.0000									
ROE	-0.3782***	1.0000								
ROA(-1)	0.0155	0.4590***	1.0000							
ROE(-1)	0.7513***	-0.3069***	-0.3798***	1.0000						
NPLR	-0.4420***	-0.0736	-0.2014***	-0.3692***	1.0000					
NPLE	-0.1081	-0.1888***	-0.0618	-0.1901**	0.3705***	1.0000				
SIZE	-0.0292	-0.0168	-0.0190	-0.0153	0.0645	0.2213***	1.0000			
GROWTH	0.0606	0.1348*	0.0911	0.0766	-0.0541	-0.0878	-0.1878***	1.0000		
LEV	-0.1967***	0.0461	0.0387	-0.1151	0.0675	-0.0362	0.1259*	-0.1263*	1.0000	
CAR	0.3084***	-0.0405	-0.0669	0.2493***	0.0087	-0.0708	-0.1753**	0.1646**	-0.5513***	1.0000

(*) / (**) and (***) indicates the (10%), (5%) and (1%) level of significance respectively.

4.4 EMPIRICAL FINDINGS

This section presents the empirical findings of the study based on the panel regression results. The estimation framework to test the relationship between credit risk and financial performance is hypothesised on a fixed effects model. In the first instance, the diagnostic tests that were implemented in-order to approximate a robust model are reported. Secondly, the panel regression results are presented and discussed.

4.4.1 Initial diagnostic tests

A number of diagnostic tests were implemented in-order to estimate a robust model. Tests were conducted for panel heterogeneity, heteroscedasticity, random effects, fixed effects-versus random effects specification, and lastly cross-sectional dependence.

The diagnostics test results for estimating the relationships between financial performance proxied by ROA and credit risk are reported in Table 4.3. The initial test was for joint validity of cross-sectional individual effects. The test confirmed the significance of individual effects as the F-statistic (2.51) is greater than the test statistic (0.0014). This test validates that banks are heterogeneous and their financing decision is based on bank-specific factors. Therefore, in the presence of fixed effects, the pooled OLS estimation method becomes erratic and inefficient. The Breusch Pagan (1980) LM test confirms the absence of random effects. The Hausman (1978) specification test result favours the use of the fixed effects estimator over the random effects estimator. We also tested for heteroscedasticity of the error term and found that it was present. Lastly, a cross-sectional dependence test is conducted by applying the Pesaran (2004) CD test.

The diagnostics test results for estimating the relationships between financial performance proxied by ROE and credit risk are reported in Table 4.4. Based on the results of the diagnostic test, both models used Driscoll and Kray to deal with heteroscedasticity.

In both estimations, the Fixed Effects with Driscoll and Kray (1998), standard errors estimator controlling for heteroscedasticity and cross-sectional dependence is employed, since it deals with the problem of spatial dependence. The Driscoll-Kray robust estimator ensures valid statistical inference in cases of violations of certain assumptions, when a need arises to rely on standard errors of panel models (Hoechle, 2007). It deals with the issue of heteroscedasticity of residuals when they are independently distributed, since standard errors obtained through the estimator are consistent. It also considers cross-sectional correlation between different individuals in different times within a similar period, over and above serial correlation between residuals from the same individual in different time periods (Millo, 2017). This is vital, since cross-sectional dependence can lead to bias in results produced.

Table 4.3: Diagnostic tests with ROA employed as the dependent variable

Test	Test Statistic	Critical Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \dots \alpha_{N-1} = 0$ $H_A: \alpha_1 \neq \alpha_2 \neq \dots \alpha_{N-1} \neq 0$	F=2.51	p=0.0014	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	LM = 0	p=1.000	There is no significant difference in variance across the entities. Random effects are absent. Pooled OLS model is preferred.
Hausman (1978) specification test $H_0: E(\mu_{it} X_{it}) = 0$ $H_A: E(\mu_{it} X_{it}) \neq 0$	m ₃ = 36.65	p=0.0000	Regressors not exogenous. Hence the Fixed effects specification is valid.
Heteroscedasticity $H_0: \delta_i^2 = \delta \text{ for all } i$ $H_0: \delta_i^2 \neq \delta \text{ for all } i$	LM =1100000	p=0.0000	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-sectional dependence test $H_0: \rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0$ $H_A: \rho_{ij} \neq \rho_{ji} = 0$			
Pesaran (2004) CD test	CD = -1.505 (0.360)	p = 0.1324	Cross sections are independent.

Table 4.4: Diagnostic tests with ROE employed as the dependent variable

	Test Statistic	Critical Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \dots \alpha_{N-1} = 0$ $H_A: \alpha_1 \neq \alpha_2 \neq \dots \alpha_{N-1} \neq 0$	F=1.60	p=0.0677	Cross-sectional individual effects are valid
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	LM = 0	p=1.000	There is no significant difference in variance across the entities. Random effects are absent. Pooled OLS model is preferred.
Hausman (1978) specification test $H_0: E(\mu_{it} X_{it}) = 0$ $H_A: E(\mu_{it} X_{it}) \neq 0$	m ₃ = 19.22	p= 0.0038	Regressors not exogenous. Hence the Fixed effects specification is valid.
Heteroscedasticity $H_0: \delta_i^2 = \delta \text{ for all } i$ $H_0: \delta_i^2 \neq \delta \text{ for all } i$	LM = 1400000	p=0.0000	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-sectional dependence test $H_0: \rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0$ $H_A: \rho_{ij} \neq \rho_{ji} = 0$			
Pesaran (2004) CD test	CD = 1.956 (0.305)	p = 0.6505	Cross-sections are independent.

4.4.2 PANEL REGRESSION RESULTS WITH ROA AS A DEPENDENT VARIABLE

The regression output reported the pooled OLS and random effects (RE) estimation results for comparison. Analysis of the results is based on the fixed effects (FE) with Driscoll and Kray (1998) estimation results. The FE model is of good fit and is well specified. The F-statistic value is 17.87 and is statistically significant at the 1% level of significance. The within R-squared correlation is at 0.2064.

In testing the relationship between financial performance and credit risk, it was established that they are negatively related. The Pooled OLS estimation results documented that a 1% increase in the non-performing loan ratio would lead to a decline of roughly 490% in ROA of South African banks (refer to Table 4.5). The result is highly significant at 1% level of significance. Similarly, based on random effects (RE) model, a 1% increase in the non-performing loan ration would result in a highly significant 486.8% decline in ROA. For inference, the Fixed Effects Driscoll and Kray estimator showed that a 1% increase in non-performing loan ration would result in a highly significant 447.6% decline in ROA.

However, a 1% increase in the non-performing loan to equity would result in a 7.6% increase in ROA. For inference, the Fixed Effects Driscoll and Kray estimator documented that a 1% increase in non-performing loans to equity will result in a highly significant 14.35% increase in ROA. The result is highly significant at the 1% level of significance.

In testing the relationship between growth and financial performance it was established that growth and financial performance of banks are negatively related based on Pooled OLS and random effects (RE) model. The Pooled OLS results documented that a 1% increase in growth would lead to a 1.5% decline in ROA. The strength of the relationship is insignificant. A similar trend and results is shown based on random effects (RE), a 1% increase in growth resulting in a 1.5% decline in ROA. However, for inference, the Fixed Effects Driscoll and Kray estimator highlighted that a 1% increase in growth would result in a 32.1% increase in ROA, which is insignificant. Correlation is a symmetrical measure of linear association describing the direction and strength of association between variables. It showed growth is correlated to profitability as well as ascertain the strength of the relationship. Regression however looks at how much variable “y” changes with any given change of variable “x”. Average value of financial performance as a function of growth. Functional relationship is established to make future projections on events.

In testing the relationship between capital adequacy and financial performance it was documented that they are positively correlated. The Pooled OLS estimation results documented that a 1% increase in capital adequacy would lead to an increase of roughly 352% in ROA of South African banks. The result is highly significant at 1% level of significance. Similarly, based on random effects (RE) model, a 1% increase in capital adequacy ratio would result in a highly significant 351.9% increase in ROA. For inference, the Fixed Effects Driscoll and Kray estimator showed that a 1% increase in capital adequacy ratio would result in a highly significant 630% increase in ROA.

Results being inconclusive mean CAR can be negatively or positively related to profitability. Other studies conducted in Kenya could not find a relationship between CAR and ROA (Kithinji, 2010). ROA and ROE were found to have no impact on CAR in Albanian banking system (Shingjergji & Hyseni, 2015). Previous research found a positive relationship to exist between CAR and profitability (Goddard, Molyneux, & Wilson, 2004). Reasons include anticipated bankruptcy costs which increase as banks maintain CAR beneath its equilibrium value. The resultant increase in CAR raises the profitability by reducing insurance expenses on uninsured debt. Also, the effect of the signalling hypothesis, as an indication of positive future results. Potential impact differs depending on risk banks are facing to signal quality by keeping an elevated CAR. This entails a signalling equilibrium with a positive nexus between CAR and profitability.

In testing the relationship between bank size and financial performance, results revealed that they are positively related. The Pooled OLS estimation results documented that a 1% increase in bank size would lead to an increase of 1.5% in ROA of South African banks. The result is, however, insignificant. Similarly, based on random effects (RE) model, a 1% increase in bank size would result in an insignificant rise in ROA of 1.5 percent. For inference, the Fixed Effects Driscoll and Kray estimator revealed that a 1% increase in bank size would result in a 1.2% increase in ROA.

In testing the relationship between bank leverage and financial performance, the results documented based on Pooled OLS and random effects both showed a positive and insignificant relationship. The Pooled OLS estimation results reported that a 1%

increase in bank leverage would result in a 17.6% increase in ROA. Results were exactly the same based on random effects (RE) model, and showed a 1% increase in bank leverage to result in a 17.6% increase in ROA. However, when using the Fixed Effects Driscoll and Kray estimator, of interest is that a 1% increase in bank leverage would result in a highly significant negative impact at 338.6% to ROA. The result is highly significant at the 1% level of significance.

TABLE 4.5: PANEL REGRESSION RESULTS WITH ROA AS THE DEPENDENT VARIABLE

Dependent Variable	Pooled OLS ROA	Random Effects ROA	Fixed Effects Driscoll and Kray (1981) standard errors ROA
NPLR	-4.868*** (-7.31)	-4.868*** (-7.31)	-4.476*** (-5.03)
NPLE	0.076 (1.27)	0.076 (1.27)	0.143*** (2.28)
Growth	-0.015 (-0.06)	-0.015 (-0.06)	0.321 (1.14)
Size	0.015 (0.61)	0.015 (0.61)	0.012 (0.24)
CAR	3.519*** (4.55)	3.519*** (4.55)	6.300*** (5.65)
LEV	0.176 (0.26)	0.176 (0.26)	-3.386*** (3.15)
Constant	-0.737 (-1.03)	-0.737 (-1.03)	1.735 (1.46)
Number	198	198	198
Adjusted R²	0.2799	0.3018	0.2064
F-statistic			17.87***

(*) / (**) and (***) indicates the (10%), (5%) and (1%) level of significance respectively. Time dummies estimated for the fixed effects and random effects models are not reported here. The t-statistics for the pooled and fixed effects models as well as the z-statistics for the random effects models are reported in parentheses.

4.4.3 PANEL REGRESSION RESULTS WITH ROE AS A DEPENDENT VARIABLE

The regression output reported the pooled OLS and random effects (RE) estimation results for comparison. Analysis of the results is based on the fixed effects (FE) with Driscoll and Kray (1998) estimation results. The FE model is of good fit and is well specified. The F-statistic value is 2.45 and is statistically significant at the 5% level of significance. The within R-squared correlation is at 0.0198.

In testing the relationship between financial performance and non-performing loan ratio, it was established that they are positively related. The Pooled OLS estimation results documented that a 1% increase in the non-performing loan ratio would lead to an increase of 0.2% in ROE of South African banks (refer to Table 4.6). The result is insignificant. Similar results were found based on random effects (RE) model, where a 1% increase in the non-performing loan ratio would result in an insignificant 0.2% increase in ROE. Different results are documented for inference, the Fixed Effects Driscoll and Kray estimator showed that a 1% increase in non-performing loan ratio would result in a highly significant 104% increase in ROE. The result is highly significant at the 1% level of significance.

Li and Zou (2014) found that Non-performing loans/Gross loans has positive effects on the financial performance of firms, as measured by ROA and ROE. Turmoil in the financial environment contribute towards contrary results against the norm. ROE is higher compared to ROA if a bank is highly leveraged. Therefore, the higher ROE demonstrates the increase in risk, which explains the positive and significant relationship with NPLR.

However, the Pooled OLS estimation results showed that a 1% increase in the non-performing loan to equity would result in a 6.2% decline in ROE. The result is moderately significant, with a 5% level of significance. Similar results are recorded based on the random effects model. It documented that a 1% increase in non-performing loans to equity would result in a moderately significant 6.2% decline of ROE at a 5% level of significance. For inference, the Fixed Effects Driscoll and Kray estimator documented that a 1% increase in non-performing loans to equity will result in a highly significant 7.9% decline in ROE. The result is highly significant at the 1% level of significance.

In testing the relationship between growth and financial performance it was documented that growth and financial performance of banks are positively related. The Pooled OLS results documented that a 1% increase in growth would lead to a 22.3% increase in ROE. The strength of the relationship is at a 10% level of significance. A similar trend and results is shown based on random effects (RE), a 1% increase in growth would result in a 22.3% increase in ROE. For inference, the Fixed Effects Driscoll and Kray estimator highlighted that a 1% increase in growth would result in a 22.2% increase in ROE. Results are significant at the 10% level of significance.

In testing the relationship between capital adequacy and financial performance it was documented that these are negatively related. The Pooled OLS estimation results documented that a 1% increase in capital adequacy ratio would lead to a 23.09% decrease in ROE. The result is, however, insignificant. Similarly, based on random effects (RE) model, a 1% increase in capital adequacy ratio would result in a 23.09% decrease in ROE. For inference, the Fixed Effects Driscoll and Kray estimator showed

that a 1% increase in capital adequacy ratio would result in a 48.10% decrease in ROE.

In testing the relationship between bank size and financial performance, results revealed that they are positively related, based on Pooled OLS and random effects (RE) model. The Pooled OLS estimation results documented that a 1% increase in bank size would lead to an increase of 0.5% in ROE, which is insignificant. Similarly, based on random effects (RE) model, a 1% increase in bank size would result in an insignificant rise in ROE of 0.5 percent. However, for inference, the Fixed Effects Driscoll and Kray estimator documented that a 1% increase in bank size would result in a 0.2% insignificant decrease in ROE.

In testing the relationship between bank leverage and financial performance, the results documented a positive relationship based on Pooled OLS and random effects (RE) model. The Pooled OLS estimation results highlighted that a 1% increase in bank leverage would result in a 6.6% increase in ROE. Random effects (RE) model also showed that a 1% increase in bank leverage would result in a 6.6% increase in ROE. However, the Fixed Effects Driscoll and Kray estimator had different results and showed that a 1% increase in bank leverage would result in a 20.4% negative impact to ROE. The result is however insignificant.

TABLE 4.6: PANEL REGRESSION RESULTS WITH ROE AS THE DEPENDENT

Dependent Variable	Pooled OLS	Random Effects	Fixed Effects Driscoll and Kray (1981) standard errors
	ROE	ROE	ROE
NPLR	0.002 (0.01)	0.002 (0.01)	1.040*** (2.61)
NPLE	-0.062** (-2.41)	-0.062** (-2.41)	-0.079 *** (-2.78)
Growth	0.223* (1.90)	0.223* (1.90)	0.222* (1.77)
Size	0.005 (0.51)	0.005 (0.51)	-0.002 (-0.08)
CAR	-0.2309 (-0.69)	-0.2309 (-0.69)	-0.481 (-0.96)
LEV	0.066 (0.22)	0.066 (0.22)	-0.204 (-0.42)
constant	0.010 (0.03)	0.010 (0.03)	0.306 (0.58)
Number	198	198	198
Adjusted R²	0.0272	0.0568	0.0198
F-statistic			2.45**

VARIABLE

(*) / (**) and (***) indicates the (10%), (5%) and (1%) level of significance respectively. Time dummies estimated for the fixed effects and random effects models are not reported here. The t-statistics for the pooled and fixed effects models as well as the z-statistics for the random effects models are reported in parentheses.

4.5 DISCUSSION OF FINDINGS

- **Finding 1**

Credit risk was found to have a negative relationship with profitability (Adewale & Elena, 2019). Similar results of a negative correlation between credit risk and financial

performance was evident in other studies with emphasis placed on management to improve the position of banks (Li & Zou, 2014). The inverse relationship between profitability and non-performing loans presents liquidity challenges (Kargi, 2011). Non-performing loans not only have a negative impact on the profitability of banks, but also affect the economy (Rahman & Hai, 2017).

Important to note in line with motivating factors to pursue this study was reflected in some of the findings, which showed that credit risk is positively correlated to profitability in a significant way (Boahene, Dasah & Agyei, 2012a). The differences were reflected on our findings in Table 4.7. Findings of Noman, Pervin, Chowdhury, & Banna (2015), Abbas et al., (2014), Adewale & Elena (2019), Gizaw, Kebede, & Selvaraj (2015), Kaaya & Pastory (2013), Chimkono et al., (2016), Kithinji (2010) and Nduku (2013) help as a guide to reference from previous studies.

- **Finding 2**

An economy that is doing well is synonymous with improved bank performance and closely linked to growth (Kumar & Kavita, 2017). This is in line with the results of our study, which demonstrated a positive relationship between the two variables. Petria et al. (2015) refer to a similar study, which helps to lend clarity to the relationship between growth and financial performance of banks.

- **Finding 3**

The results on the relationship between financial performance and capital adequacy were inconclusive. A positive relationship was established to exist and was statistically significant when proxied by ROA yet negative and statistically insignificant proxied by ROE.

Other studies have outlined the dilemma that exists on the right levels of CAR to maintain within the bank, arguing that higher CAR symbolises stability, yet on the other hand, a lower CAR to be favourable insofar as profitability is concerned (Dreca, 2013). Previous studies found credit risk measures of non-performing loans and capital adequacy to have a significant impact on the profitability (Gizaw et al., 2015). More evidence suggest that capital adequacy is directly related to profitability and the strength of the relationship is significant (Seemule et al., 2017). These dynamics were also present in previous studies which include Luqman (2015), Ongore & Kusa (2013), Alshatti (2015), Kargi (2011) and Dreca (2013).

- **Finding 4**

The results of the study revealed a negative relationship between size and both ROA and ROE. Studies in the past acknowledge that bank size through economies of scale advantages is positively correlated to profitability (Seemule et al., 2017). However, other studies documented that credit risk and bank size are negatively correlated with ROE (Nataraja et al., 2018). Similar studies were supported by Hamza (2017) and Kioko (2013).

- **Finding 5**

The results were inconclusive between bank leverage and financial performance showing a negative and significant relationship with ROA, yet positive but insignificant with ROE. An important fact to note is that banks with higher equity, therefore, lower leverage tend to have an improved return on asset (ROA), but reduced return on equity (ROE) (Alexiou & Sofoklis, 2009). A list of more studies covering the same topic include Abubakar (2015), Nyamita (2014), Tan (2016), Kohlscheen et al. (2018), Ifeacho and Ngalawa (2014), and (Kioko, 2013).

TABLE 4.7 FURTHER ANALYSIS OF RESULTS

	Driscoll & Kray (ROA)	Driscoll & Kray (ROE)	Result	Meaning
NPLR	-4.476***	1.040***	Different	ROE is higher compared to ROA if a bank is highly leveraged. Therefore, the higher ROE demonstrates the increase in risk, which explains the positive and significant relationship with NPLR. However, ROA against NPLR is negative since an increase in NPLR shows the inefficiency of a banks' management affecting their profitability. A low NPLR implies lower risk (Li & Zou, 2014).
NPLE	0.143***	-0.079***	Different	A significant relationship was observed between NPLE and banks' performance. As loans increase, ROA increases as well. However, when directly linked to ROE, there is a significantly inverse relationship.

Growth	0.321	0.222*	Both positive	A positive correlation exists between ROA/ROE and the growth of banks.
Capital Adequacy	6.300***	-0.481	Different	CAR had a positive and highly significant effect on ROA. As bank capital increases, profitability (ROA) also increases. A negative but insignificant relationship suggests that setting aside more capital for banks slightly influences how they perform as indicated by ROE.
Size	0.012	-0.002	Different	An insignificant relationship was observed between profitability and size. ROA has a positive relationship with the size of banks.
Leverage	-3.386***	-0.204	Both negative	A negative correlation exists between ROA/ROE and the financial leverage of banks in South Africa. As banks become more profitable they tend to use more retained earnings rather than debt as is hypothesised by the pecking order theory (Chipeta et al., 2012).

4.6 Chapter Summary

This chapter began by outlining the five main hypotheses which were tested. Thereafter, descriptive statistics were presented, trends in variables discussed and correlation analysis of the variables used in the study was done. Panel regression analysis followed whereby each and every research objective using ROA and ROE as

dependent variables was analysed in detail. The next chapter presents and discusses the summary of findings and provides conclusions and recommendations.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Credit risk is by far the most significant risk in the banking environment, which as such has to be prioritised if a bank wants to continue operating as a going concern. All banks also want to be profitable and market leaders expect to achieve the best from their efforts in business. Therefore, establishing whether a relationship indeed exists or not between two variables, as well as the nature of that relationship in terms of credit risk and financial performance, has been vital. Furthermore, it is essential to ascertain how significant the relationship is in the event that one variable affects the other variable in the South African banking system.

Extensive extant empirical studies detail the nexus between credit risks and financial performance. These studies have looked at both developed and developing countries to establish if there is a trend based on the economy of the country. Gaps were identified, especially in the country of interest, with an emerging market and made the study important so as to contribute to the body of knowledge. South Africa was chosen as the country of focus.

The main aim of this study was to establish the impact of credit risk on financial performance of South African banks. The research objectives underpinning this study were five-fold. The first assignment was to determine the impact between credit risk and financial performance in South African banks. The second objective was to establish how the growth strategy of a bank can have an effect on financial performance. Thirdly, the study sought to evaluate whether capital adequacy has a bearing on financial performance of banks. Fourthly, the study sought to answer the questions whether financial performance varies with bank size. Lastly, the study sought to establish the relationship between leverage and financial performance of South African banks.

This chapter presents a summary of the key findings, conclusions and recommendations for future research based on findings and gaps identified. Conclusions related to the research objectives of this paper are presented. The rest of the chapter is organised as follows: Section 5.2 discusses the theoretical and empirical findings on the relationship between credit risk and financial performance of South African banks. Section 5.3 summarises the research findings of this study. Lastly, section 5.4 provides recommendations and implication for future research.

5.2 Theoretical and Empirical Findings

5.2.1 Theoretical Findings

Banks accept deposits of money from the public with the motivation to lend the money for a return. Lending then presents challenges of exposure to credit risk. Risk presents

uncertainty, which can have either positive or negative results. Credit risk is very important to assess, and it is necessary to find approaches to mitigation if a bank is to perform well. Loans are the riskiest of all assets in a bank, and a significant source of devastating banking troubles. Various circumstances lead to borrowers not being able to own up to their financial obligations, and fail to meet the terms and conditions as per the initial agreements. Reasons range from low economic growth and the poor state of the economy, unemployment, lack of follow-up in the loan handling process, and loan processing to borrowers just not wanting to pay.

An important element surrounding theories of capital structure was considered. The reason for this is that the correct mix of equity and debt has direct influence in maximising firm value. The composition ought to cut on costs which reduce profits. Hence, motivation should be supported by the balance between benefits and cost of debt. This is the resultant effect of the different cost implication associated with either debt or equity. The capital asset pricing model (CAPM) posits that risk and return are a function of the risk-free rate and a risk-premium. On the other hand, other studies have argued for the relevance of capital structure, stating that in the absence of tax the firm's overall weighted average cost of capital is not affected by changes in capital structure (Modigliani & Miller, 2018). The problem with the Miller-Modigliani theorem is that it also assumes there to be no agency costs, and no default risk, which may be misleading.

The trade-off theory postulates that profitability is improved by higher levels of debt, which take advantage of interest tax shields. This is about balancing costs and benefits on the split between debt and equity (Hari Lall Garbharran, 2014). Cost associated

with debt include interest, financial distress, bankruptcy, insolvency, and agency costs. The benefits are the tax benefit and added discipline, which demands consequence management. The trade-off theory submits that the relationship between leverage and financial performance is positive.

The free cash flow theory explains that dividends paid to shareholders as well as the cost of debt negatively impacts on a banks' free cash flow. This is quite an important concept, since being profitable does not necessarily translate to solid free cash flow. Free cash flow is calculated by taking cash from operating activities less capital expenditure. The cash flow theory hypothesises that leverage is directly related to bank financial performance (Chipeta et al., 2012). However, debt can be argued to improve organisational efficiency.

The pecking order theory posits that banks which have a considerable amount of equity in comparison to others, tend to be more profitable. Debt is recorded to be inversely related to bank performance (Maina & Kodongo, 2013). The pecking order theory suggests that leverage is inversely correlated to financial performance. Retained earnings must be maintained at optimal levels and monitored against capital requirements. Internal sources of finance provide for a cheaper alternative less costly in comparison with funding from outside (Chisasa, 2014). Retained earnings are presumed to increase in highly profitable banks. However, in reference to the pecking order theory, equity is regarded as the more expensive cost of finance in other studies since debt is considered a tax deductible expense (Kusi & Agbloyor, 2016). Credit risk is mentioned to be directly related to capital.

5.2.2 Empirical Findings from Literature Reviewed

The empirical findings in extant research show a positive relation between credit risk indicators of non-performing loans on the financial performance of banks (Boahene et al., 2012). The result in this respect is consistent with studies in Middle Eastern countries, Pakistan, Indonesia, Jordan, and Malaysia within their Islamic banking systems, where a significant positive relationship between non-performing loans with profitability was found to exist (Adewale & Elena, 2019).

However, other research found a negative relationship and witnessed a decrease in bank performance when credit risk goes high (Kaaya & Pastory, 2013). Similar results to support a negative relationship between credit risk and profitability were observed in other studies (Kolapo et al., 2012). An inverse relationship between the two variables in this study was also found in Nigerian banks (Kargi, 2011). Yet other studies even concluded to have a strong negative relationship between credit risk and financial performance (Githaiga, 2015).

It is interesting to note, however, that contrary to the results witnessed above, other studies revealed no relationship between non-performing loans and profitability (Kithinji, 2010). The prevalence of inconclusive studies underscores the need for further study to have an unquestionable actual answer in the South African context.

Kithinji (2010) gathered the data of banks from 2004 to 2008 in Kenya on non-performing loans and profitability. The findings revealed that profitability of the banks were not influenced by non-performing loans, suggesting that there are other variables at play to impact financial performance.

Ahmad and Ariff (2007) have investigated both developing and developed countries with two different kinds of banking systems. Regulation was found to be pivotal for banking systems that offer multi-products and the quality of management crucial for loan-dominant banks in emerging economies. A high loan loss provision had a significantly positive impact on credit risk. Studies documented that, in the comparison between developing and developed countries, credit risk is higher in the former.

Saheb and Reddy (2018), have examined non-performing loans and discovered their negative outlook on performance of banks. In the financial sector, banks have to deal with non-performing loans in order to perform well. The authors mention hindering economic growth and negatively affecting the efficiency of the economy as the resultant effects of failing to deal with non-performing loans.

Rasika and Sampath (2016), researched on the impact credit risk has on financial performance of commercial banks in Sri Lanka. The authors found the presence of a relationship between financial performance (proxied by return on equity) and credit risk (proxied by non-performing loans ratio). Findings showed that return on equity is negatively correlated to non-performing loans in a significant way. Credit risk was found to be a vital predictor of bank's financial performance.

Kargi (2011), investigated the impact of credit risk on the financial performance of Nigerian banks. The findings revealed that banks' profitability is inversely influenced by the levels of loans and advances, non-performing loans and deposits thereby exposing them to great risk of illiquidity and distress. Credit risk management was observed to have a significant impact on the profitability of Nigerian banks. Lending motives of banks to be constantly monitored. In South Africa, the twin peaks model made up of the South African Reserve Bank (SARB) with the Prudential Authority and the Financial Sector Conduct Authority both help in this regard to ensure regulatory compliance.

Alshatti (2015), examined the effect of credit risk management on financial performance of Jordanian commercial banks. The dependent variables representing financial performance were measured by ROA and ROE. Results revealed a positive correlation between non-performing loans and banks' financial performance. The author furthermore concluded that capital adequacy ratio (CAR) had no effect on the profitability of Jordanian commercial banks as measured by ROE. Leverage, however, was found to negatively contribute towards banks' profitability.

5.3 Summary of Methodological Approaches

Panel data techniques were employed over an eleven (11) year period from the selected banks in this study. Panel data deals with both time series and cross-sectional analysis and confers an increased number of degrees of freedom. Panel data method was very useful in our analysis since it controls for heterogeneity due to the different nature, complexity and size of the banks. This study analyses similar

studies on the impact of credit risk on financial performance to ensure that the estimated results were reliable. Diagnostic tests were also conducted on the estimated model to ensure accuracy of results.

The applied Chow test on the pooled OLS model was first to discern whether fixed effects were valid. This test came out positive for both ROA and ROE as a dependent variable. The Breusch Pagan (1980) LM test was the second test conducted to establish whether random effects were present. In the event that random effects were detected, then, the Hausman test was useful to discern the choice of estimator preferable between the RE and FE estimators.

Next, the modified Wald Test was employed to test for group-wise heteroscedasticity. It is an important test to avoid standard errors being biased. The Pesaran (2004) CD test was conducted last for cross sectional dependence. Cross-sectional dependence originated from banks depending on each other for funding through interbank market activities. The impact depends on the size of correlations across banks. Hence, the study employed the Fixed Effects Driscoll and Kray standard errors estimator, which controls for cross-sectional dependence and heteroscedasticity in estimating the models.

5.4 Summary of Empirical Findings

This study examined the impact of credit risk on the financial performance of South African banks. There were five objectives underpinning this study. The empirical findings in respect of testing these objectives are summarised henceforth.

- **Finding 1**

The first finding was to test the relationship between credit risk and financial performance. The results of the study documented that on the one hand, bank financial performance (proxied by ROA) and credit risk (proxied by non-performing loans ratio) are negatively related and the result was highly statistically significant. By way of contrast, the results of the study demonstrated that bank financial performance (proxied by ROA) and credit risk (proxied by non-performing loans to equity ratio) were positively correlated.

Results were found to be exactly the opposite when financial performance was (proxied by ROE) and credit risk was proxied by non-performing loans ratio. Findings showed a positive statistically significant relationship. Furthermore, a negative and statistically significant relationship was documented between bank financial performance (proxied by ROE) and credit risk (proxied by non-performing loans to equity ratio).

Results are different because ROA measures management efficiency and exhibits the profit from a bank's total assets. ROE on the other hand conveys the net return of the capital invested by the shareholders. ROA takes into account the risks derived from the leverage. A disadvantage of ROA is off-balance sheet assets, which represent a fundamental source of profits for banks, but are not examined in calculating this measure.

- **Finding 2**

Secondly, the study sought to establish whether there was a significant relationship between growth and financial performance of South African banks. The results of the study documented that a positive effect of growth on financial performance exists.

- **Finding 3**

Thirdly, this study sought to test the relationship between financial performance and capital adequacy. The results were inconclusive. On the one hand, when financial performance was proxied by ROA, a positive relationship was established to exist and was statistically significant. On the other hand, when financial performance was proxied by ROE, a negative though statistically insignificant relationship was established to exist.

- **Finding 4**

There is a negative but insignificant relationship between size and ROA. Similarly, a negative correlation exists between size and ROE. A bigger bank has greater costs which reduce profits. There is excessive legislation and bureaucracy which negatively affects the decision making process when a bank is big.

- **Finding 5**

The results of the current studies are inconclusive between bank leverage and financial performance. Bank leverage and ROA have a negative and significant relationship, yet positive but insignificant ROE.

5.5 Directions for Future Research

Results of the study covered the entire South African banking sector. This study clears ground for more research on the diverse variables, which can have an effect on banks without limiting it to the South African banking system. The effect of macro-economic factors such as interest rates and inflation on the financial performance of South African banks is an area to discuss in greater detail based on our findings. South Africa and its troubled history demand focus on microfinance institutions, because many people are necessarily low income earners, and have only started to have access to finance in recent years. Further studies can be explored to research on the impact of credit risk on other financial institutions employing various metrics such as impairments and loan loss reserves which affect profitability.

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