FACULTY OF MANAGEMENT, COMMERCE & LAW

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BASEL III REGULATORY REQUIREMENTS AND THE PERFORMANCE, EFFICIENCY AND CAPITAL STRUCTURE OF SELECTED LISTED AFRICAN BANKS

BY

OBADIRE AYODEJI MICHAEL

Student No: 16003735

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Promoter: Prof V Moyo

Co-Promoter: Prof NF Munzhelele

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DEDICATION

This thesis is dedicated to my parents, siblings, future wife and future kids. Thank you for the amazing support that you gave me throughout my studies. Thanks for always believing in me through thick and thin.

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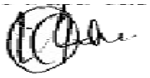
DECLARATION

I, Obadire Ayodeji Michael (16003735), do hereby declare that this thesis for the Doctor of Philosophy (PhD in Accounting and Finance) at the University of Venda has not been previously submitted in part or in full, for a degree at this institution or any other except where due acknowledgement has been made. It is a product of my own investigation and all reference material contained therein has been fully acknowledged and a list of references is given.

Signature  Date 29th June 2022

Obadire Ayodeji Michael (16003735)

ABSTRACT

This study examined the impact of Basel III regulatory requirements on the financial performance, stability, efficiency, capital structure and risk-taking behaviour of selected listed African banks. The research hypotheses were formulated and tested using the Blundell and Bond system of Generalised Methods of Moment (GMM), pooled Ordinary Least Squares (OLS), Random Effects (RE), and Fixed Effects (FE) estimators. The study further used a panel data of 45 listed banks from six African countries that had adopted the Basel III Accord for the period 2010 to 2019.

The system GMM estimator was used to estimate the impact of the Basel III regulatory requirements on the capital structure decisions of the selected African banks. Robustness tests were performed by using the two-step Blundell and Bond system GMM procedure. The robust results showed that the selected African banks were highly leveraged with a positive relationship between the Basel III minimum capital requirement, capital adequacy ratio, capital buffer premium and the bank leverage measured by the ratio of Tier 1 capital to total exposure. Furthermore, the study revealed that the bank specific capital structure determinant such as the bank size, asset tangibility and profitability had a significant and positive impact on African banks' observed leverage and were important determinants of the discretionary capital. The trade-off, pecking order and agency cost theories were the three underpinning capital structure theories that complimentarily explained the financing behaviours of the selected African banks.

Furthermore, the study used the pooled OLS, FE and RE estimators where appropriate to fit the models testing the impact of Basel III regulatory requirements on the financial performance, stability, efficiency and risk-taking behaviour of the selected African banks. Robustness tests were performed by conducting diagnostics tests such as the F- test, Breusch and Pagan test and the Hausman specification test. These tests were conducted to select the appropriate estimator amongst the pooled OLS, FE and RE estimators. To test the banks' financial performance, the RE and FE estimators were used to fit the ROE and ROA models respectively whilst the pooled OLS estimator was used to fit the banks stability model. Moreover, to test the banks' efficiency,

the pooled OLS and RE estimators were used to fit the NIMR and OETA models respectively, whilst the RE estimator was used to fit the banks' risk-taking behaviour models. Furthermore, the study showed that the capital adequacy ratio had a significant positive effect on the financial performance of the selected African banks, whilst the liquidity requirement was positively correlated to bank stability. In addition, the capital buffer premium had a significant positive impact on both measures of bank efficiency, whilst the liquidity requirements showed a more significant impact, and was consistent across all the three measures of the risk-taking behaviour of the selected African bank.

The current study contributes to the body of knowledge in eight significant ways and most importantly proposes an optimum model and mix of regulatory capital requirements that can maximise the financial performance, stability and efficiency of the selected African banks.

Keywords: African Bank Stability, Basel III Liquidity Requirements, Capital Buffer Premium, Capital Structure, Risk-taking Behaviour, Trade-off Theory, Pecking Order Theory

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LIST OF ACRONYMS AND ABBREVIATIONS

ASF	Available Stable Funding
AT	Asset Tangibility
BCBS	Basel Committee on Banking Supervision
BIS	Bank for International Settlements,
BS	Bank Size
C/S	Capital Structure
CAR	Capital Adequacy Ratios
CBP	Capital Buffer Premium
CET	Common Equity Tier
DW	Durbin-Watson
EFF	Efficiency
FCF	Free Cash Flows
FE	Fixed Effect
FP	Financial Performance
GDP	Gross Domestic Product
GFC	Global Financial Crisis
GLS	Generalised Least Square

GMM	Generalised Methods of Moment
GR	Growth Rate
HQLA	High-Quality Liquid Assets
IMF	International Monetary Fund
IRB	Internal Rating Based
LCR	Liquidity Coverage Ratio
LR	Liquidity Requirements
LSDV	Least Square Dummy Variables
MCR	Minimum Capital Requirements
MM	Modigliani and Miller
NIMR	Net Interest Margin Ratios
NPLTL	Non-Performing Loans to Total Loans
NPV	Net Present Value
NSFR	Net Stable Funding Ratio
OETA	Operating Expenses to Total Assets
OLS	Ordinary Least Square
RE	Random Effect
ROA	Return on Assets

ROE	Return on Equity
RSF	Required Stable Funding
RTB	Risk Taking Behaviour
RWA	Risk-Weighted Assets
RWATA	Risk Weighted Asset to Total Asset
SFTs	Securities Finance Transactions
STAB	Stability
TCTE	Tier 1 Capital to Total Exposure
TDCE	Total Debt to Capital Employed
VIF	Variance Inflation Factor

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

The financing decisions of firms have been a predominant issue of discourse in corporate finance for decades. This decision has received an enormous amount of research attention in the academic and corporate worlds due to its significant importance on the firms' profitability and growth (Kayo & Kimura, 2011). Banks and other financial service firms are not excluded from the challenges faced with regard to choosing between various financing options such as debt and equity financing, amongst others. According to Nikoo (2015), making the most appropriate capital structure decision amongst alternatives is vital for a bank's financial performance, stability and risk profile.

According to the Bank for International Settlements (2013), banks are financial institutions that provide intermediary functions in an economy through channelling surplus financial resources from depositors to borrowers of funds who are in deficit. Banks play a pivotal role in the economy and thus, problems within them affect the financial services system and the economy more severely than problems in non-banking and non-financial services sectors. King (2010) argues that the banking firms are inherently unstable and vulnerable as their liabilities, such as demand deposits, are usually short term and can be withdrawn at any time, while their assets such as mortgages and business loans are long term and normally illiquid in nature.

To reduce the likelihood of failures and distress in banking firms, and to promote the economic health of countries and international markets, it is necessary for regimes across the world to regulate bank capital structure and financing decisions. In light of the necessity to regulate bank capital structure, the Basel Committee on Banking Supervision (BCBS) established a series of international standards for bank regulations known as the Basel I, Basel II and the most recently

Basel III Accord. These Basel Accords are globally acceptable standards of bank capital regulations because the BCBS is the primary global standard-setter for banks' prudential regulation and provides a forum for regular cooperation on banking supervisory matters (Bank for International Settlements, 2013). Furthermore, the Basel committee comprises 45 members spanning from 28 jurisdictions. These are Argentina, Australia, Belgium, Brazil, Canada, China, European Union, France, Germany, Hong Kong, India, Indonesia, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Turkey, United Kingdom, and the United States. The 45 members consist of central banks and authorities with formal responsibility for the supervision of banking activities (Bank for International Settlements, 2013).

Gropp and Heider (2010) argue that the Basel Accords have been influential and instrumental in centralising banking regulation, supervision and capital adequacy standards. Furthermore, due to the globalisation, interdependency of banking operations, and the interconnectedness of banks and businesses amongst countries, the Basel Accords' global acceptance was inevitable. Moreover, due to the several crises of the 1980s and the increasing internationalisation of the financial systems, an imminent need for a worldwide banking regulation that could provide a uniform platform for banking regulations and operations onshore and offshore with all market participants arises (Nikoo, 2015).

The Basel III Accord aim to bring stability and resilience to the banking sector by improving global banking regulation and supervision (Bank for International Settlements, 2013). Although these Basel regulations may not be forcefully and legally binding in any country as such, they serve an advisory purpose. Furthermore, they serve as a baseline for individual countries to formulate their bank capital regulations and requirements. The majority of the countries ultimately adopted the Basel regulations while other countries made few adjustments or improvements to the accord to suit their specific needs (Bilal & Salim, 2016). Moreover, Bilal and Salim (2016) argue that the decision on how to phase in, adopt, and implement the Basel regulatory guidelines rests on each country's central bank and legislative arm.

Given the need for global banking regulation and for bringing stability to the banking sector, the Bank for International Settlements (BIS) instituted a common regulatory framework in the 1980's called the Basel I Accord to regulate banking operations globally and to combat banking failures (Schooner & Taylor, 2010). The Basel I Accord focused mainly on credit risk, which was the industry's main risk in the 1980s.

Owing to the fact that Basel I had primarily focused on credit risk and omitted other important risks such as operational risk, and market risk amongst others, the Basel I Accord was criticised alongside other weaknesses. In an attempt to address the weaknesses of the Basel I Accord, the BCBS released Basel II in 1999. The new Accord, which was approved in 2004, was more risk sensitive in order to make up for the weaknesses of the Basel I Accord (Barth, Caprino & Levine, 2006). Basel II addressed operational and market risks alongside the credit risk of banks (Bank for International Settlements, 2001). Basel II, unlike its predecessor, Basel I, was built on three pillars, which are the amended minimum capital requirements; the supervisory review; and the market discipline.

However, despite its improvements, the Basel II Accord contained some weaknesses which were revealed during the 2007 Global Financial Crisis (GFC) (De Haan & Van Den End, 2013). The GFC revealed that Basel II regulatory requirements were insufficient to protect the banks against failures. This led to a further modification of the regulatory requirements in 2010, and the BCBS publication of an improved regulatory requirement named Basel III which became effective in2010. Basel III did not replace the existing standards of I and II, but built upon them with some important adjustments in order to rectify the weakness identified by the GFC (Gual, 2011). The aim of Basel III was to improve the banking sectors' ability to absorb financial and economic shocks, improve risk management, supervision and governance, and to strengthen banks transparency and disclosures (BCBS, 2010)

According to BCBS (2010, 2013), the major changes introduced by Basel III regulatory requirements are summarised into three major principles. First, the minimum capital requirement as highlighted in Basel II was amended and increased in order for banks to maintain a buffer of

capital that could be used to absorb losses during periods of financial and economic stress. Second, the leverage requirements were improved to include a non-risk-based leverage ratio in order for the banks to prevent banking crisis that could cause a lowered leverage which could result in a downward trend of asset prices and bank capital. Finally, the liquidity requirement was amended to include two new liquidity ratios; the liquidity coverage ratio (LCR), and the net stable funding ratio (NSFR). The LCR requires banks to hold sufficient high-liquid assets that can withstand a 30-day stressed funding scenario as specified by the bank supervisor; and the NSFR require banks to maintain stable funding above the required amount for a period of one year of extended stress. The NSFR is primarily designed to address liquidity mismatch in banks and to reduce liquidity crisis in case of shocks.

Several researchers such as Bilal and Salim (2016), Ahmed, Ahaed, Islam and Ullah (2015), Hoening (2013), Parcon, Eufrocinio and Bernabe (2012), Abdel-Baki (2012), Santos and Elliott (2012) and Moosa (2011) have identified the effects and implications of Basel III on the performance and stability of banks, especially from the developed countries. These studies, however, document contradicting and inconclusive findings regarding the impact of Basel III Accord on the performance, efficiency, stability and risk-taking behaviours of banks.

Chiaramonte and Casu (2017), Dietrich et al. (2014) and Hong et al. (2014) argue that implementing Basel III regulatory requirements with its tighter capital requirements has a negative impact on the performance of banks as they invest less in order to meet the minimum capital requirements. This implies that with the bank putting more capital aside and not investing it, hoping to reach and exceed the minimum capital target and capital buffer requirements, consequential effect falls on the banks' return. This causes a lower return on capital and a reduction in the availability of funds to be lent out to businesses.

Bilal and Salim (2016) reported that the initial adoption of Basel III by banks in the developed economies over a five-year implementation period adversely affected the banks' performance, which consequentially impacted the country's economy and its gross domestic product (GDP).

They argue that the stringent requirements in the capital base of the bank reduce the amount available for the bank to invest, resulting in a lower return and declining profitability.

Santos and Elliott (2012), using the case of the United States, Europe and Japan banks, also found that Basel III implementation did not significantly reduce lending rates nor affect the risk-taking behaviours of the banks in the regions under their study. They further add that, despite the stringent requirements of Basel III, the financial performances of the banks were not negatively affected due to the banks' ability to adapt to the regulatory changes within their level of risk capacity.

Contrary to the findings of Santos and Elliott (2012), the study by Sútorová and Teplý (2013), which focused on the risk, capital and efficiency of European banks found that there was an inverse relationship between higher regulatory capital and bank efficiency. These results imply that inefficient European banks held more capital with a lower appetite for risk while the European efficient banks held lesser capital with higher responsiveness in their risk behaviours, resulting in better financial performance. On the one hand, Banerjee and Mio (2017) conducted research on the U.K banks and concluded that the new Basel III liquidity requirements adversely affected the British banks' profitability because the stricter liquidity requirements coerced them to shift towards a low interest-earning liquid asset with lesser returns.

On the other hand, Mashamba (2018) conducted similar research on the emerging markets and found a contrary result. He argued that the stricter Basel III liquidity standards were less effective in emerging economies because banks in emerging economies already had elevated liquid assets holdings or large liquidity buffers before Basel III came into effect. Hence, Basel III liquidity requirements adoption in emerging markets did not have adverse effects on banks profitability but rather increased their financial performance. Similarly, Ahmed et al. (2015) added that the new capital adequacy requirements enhanced the financial stability and the profitability of the commercial banks in Bangladesh.

Furthermore, Parcon et al. (2012) argue that the new Basel regulatory requirements seek to increase the quality and level of banks' capital. Hence, it is expected to strengthen banks' capacity to absorb economic shocks and reduce the probability of future banking crises. Nevertheless, different strategies adopted by banks to meet the new regulatory guidelines such as increasing lending rates consequentially impact their performance negatively. Abdel-Baki (2012), focusing on the effect of Basel III implementation in emerging nations including Egypt and Tunisia banking firm performance, found that Egypt banks' performance was much less negatively impacted by Basel III implementation compared to Tunisia since its banking sector was adequately prepared to meet the new capital adequacy requirements. However, Egyptian banks were slower to recover from the stringent requirement of the Basel III than Tunisian banks largely due to the higher borrowing costs in the former.

Moreover, Kombo (2014) reported in his research on the impact of Basel III on Kenyan banks stability that the new regulatory requirements led to an improved financial stability which also influenced their risk-taking behaviour. Ernst and Young (2013b) recorded their findings on how the Basel III requirements influenced the risk behaviour of banks in the emerging economies among which was the South African banks. They argued that South African banks repriced their loans in response to the stricter regulatory requirements and increased funding cost and also engaged in active portfolio management by switching from low yield assets such as mortgages to high yield assets like unsecured lending and auto loans. This implies that the stringent regulatory requirements increased the risk appetite of South African banks and thus affected their risk behaviour.

Overall, with the prescribed minimum capital requirements as stated in the Basel III requirements, banks from the developed economies and emerging economies always set aside capital in excess of the Basel III required capital minimum at their own discretion, which is largely referred to as the discretionary capital (Chiaramonte & Casu, 2017, Kombo, 2014 & Hong et al., 2014).

This discretionary capital is expected to have an impact on the overall capital structure, performance, efficiency, and risk taking and financial behaviour of banks globally. This is because, the excess capital held by banks affords them the opportunity to take advantage of profitable opportunities which could enhance their performance and help them guard against unexpected losses in order to mitigate financial and liquidity risk (Carvallo, Kasman & Kontbay-Busun, 2015). Huang and Xiong (2015) indicate that, banks hold excess capital above the required minimum in order to be attractive to both local and international investors, and to remain competitive in withstanding market forces such as threats from competitors and/or major customers.

It can be deduced from the aforementioned arguments that past researchers have not been able to arrive at a uniform conclusion concerning the effect of the Basel III regulatory requirements on the banks' capital structure and financing behaviour, performance, and risk-taking behaviour. This is based on the evidence that, in some countries, Basel III implementation has a positive effect on banks performance (Sútorová & Teplý, 2013; Santos & Elliott, 2012) while in others it has a negative effect (Banerjee & Mio, 2017, Chiaramonte & Casu, 2017; Dietrich et al., 2014).

1.2 Problem Statement

Although prior studies such as those of Chiaramonte and Casu (2017), Salim, Arjomandi and Seufert (2016), Fu, Lin and Molyneux (2014), Dietrich, Hess and Wanzenried (2014), Hong, Huang and Wu (2014), King (2013), Joeveer (2013), Ongore (2012), Gungoraydinoglu and Oztekin (2011), Kayo and Kimura (2011) and Mathuva (2009) investigated the effects of Basel III regulatory requirements on the performance and capital structure of banks. These studies have however been inconclusive in their findings. The evidence presented in these studies is contradictory. For example, studies such as Chiaramonte and Casu (2017), Ahmed et al. (2015), Fu et al. (2014), Dietrich et al. (2014), King (2013) and Joeveer (2013), found that the importance of the impact of Basel III on the performance, stability and risk-taking behaviours of the banks cannot be overemphasised as their studies revealed a positive relationship. Sútorová and Teplý (2013) and Santos and Elliott (2012), revealed that the adoption of Basel III has a positive impact

on banks' performance and their financing behaviour whilst, Banerjee and Mio (2017), Chiaramonte and Casu (2017) and Dietrich et al. (2014)'s study revealed that the adoption of Basel III has a negative impact on banks performance, stability, and financing behaviour.

Also, most of the studies on the Basel III Accord's impact on the performance, efficiency, risk-taking behaviour and capital structure of banks have used data from the developed countries. According to Beck, Jones and Knaack (2019), Chiaramonte and Casu (2017), and Salim et al. (2016), the findings as regards to the impact of Basel III in the developed countries may not apply to African countries because of the differences in the unique country fundamentals such as the political influence in the banking regulations and supervision, central bank legislation and independence, country size, GDP and risk rating, economic factors and local institutional factors such as bank size, and operational jurisdiction amongst others in the African countries. Beck et al. (2019) added that the level of political influence on the reserve banks on how the Basel Accord should be adopted was high in some African countries such as Ethiopia and lower in other African countries as South Africa. These unique institutional differences between the developed and the emerging countries justify a separate investigation of the impact of Basel III regulatory requirements within the African context.

While a limited number of studies have examined the potential effect of Basel III requirements in Africa, their focus has been on the impact of the Basel III liquidity regulation on the banks' profitability (Mashamba, 2018; Abdel-Baki, 2012). Thus, these studies excluded the study of the impact of the Basel III liquidity regulations on African banks' stability, efficiency, capital structure and risk-taking behaviour. Other studies such as those of Kombo (2014) relied solely on small scale survey data and qualitative content analysis in investigating the effect of Basel III on the performance of Kenyan banks. This methodological approach is limited in its ability to afford result generalisation, implying that the results may not be representative of what is obtainable in other African countries at large. There is, therefore, a need for a comprehensive investigation using a more robust generalised method of moment (GMM) quantitative methodological technique to investigate the impact of the Basel III Accord on African banks'

performance, efficiency, capital structure and risk-taking behaviours. These factors determine the success and stability of banks in any economy.

Furthermore, some studies such as those of Ozili (2019), Brief (2015), and Kombo (2014) conducted in Africa identified some practical challenges facing African banks regarding their risk-taking behaviour, performance and stability pre and post-Basel III Accord. Before the implementation of Basel III in Africa, African banks predominantly from the leading countries such as South Africa, Kenya, Morocco, Ghana and Nigeria amongst others are faced with the challenges of excessive build-up of debt, poor quality of capital reinforcement and poor credit risk management practices leading to higher liquidity shocks, and operational inefficiencies (Brief, 2015; Kombo, 2014). More so, African banks are faced with the challenge of volatile risk-taking behaviour with a higher cost of risk, liquidity crisis and non-performing loans leading to ill-financial performance and instability. Ozili (2019) argued that despite the implementation of the Basel III Accord, African banks still faced several challenges. First, while Basel III focuses on strengthening the bank capital base, a consequential effect of the banks raising more capital to meet the requirements significantly impairs their profitability with the prospect of sacrificing their lending capacity to maintain stability (Brief, 2015). Second, the quest of the banks to curtail the excessive build-up of leverage led to reduced profitable operational lending activities which could incentivise banks to focus on high risk/high return lending only (Sharma & Baráybar, 2013). Lastly, strengthening the liquidity framework that guides the bank against liquidity crisis, requires them to hold significantly more liquid yet low yielding assets which negatively impact their profitability and poses a challenge to their performance and stability (Ozili, 2019; Sharma & Baráybar, 2013).

A study focusing on African banks thus helps to explore the reasons why African banking sectors are affected differently and the challenges faced upon the implementation of Basel III as compared to other banks in the developed countries. This provides an in-depth understanding of the impact of Basel III within the African context and how it should be tailored and modified to suit or meet the needs of African banks in particular. Thus, the regulatory changes in the liquidity and capital requirements of Basel III are an important area to investigate in Africa due to the

significant impact they have on banks in developed nations. Therefore, with the financial data availability of the listed African banks on the Bankscope and IRESS database, the current research provides a window of opportunity to add the African perspective to the scholarship of Basel III regulatory requirements and the banking sector at large.

1.3 Research aim

This study sought to investigate the impact of Basel III regulatory requirements on the financial performance, stability, efficiency, capital structure and risk-taking behaviour of selected listed African banks.

1.4 Research objectives

To achieve the research aim, the following specific objectives were central to the study:

1. To examine the relationship between the Basel III regulatory requirements and the capital structure of selected listed African banks;
2. To determine the relationship between the Basel III capital adequacy ratio and the financial performance of selected listed African banks;
3. To determine the relationship between the capital buffer premium and the stability of selected listed African banks;
4. To assess the relationship between the Basel III liquidity requirements and the efficiency of selected listed African banks; and
5. To investigate the relationship between the Basel III regulatory requirements and the risk-taking behaviour of selected listed African banks.

1.5 Research questions

To achieve the aforesaid objectives, the following research questions were set:

1. What is the relationship between the Basel III regulatory requirements and the capital structure of selected listed African banks?

2. What is the relationship between the Basel III capital adequacy ratio and the financial performance of selected listed African banks?

3. What is the relationship between the capital buffer premium and the stability of selected listed African banks?

4. What is the relationship between the Basel III liquidity requirements and the efficiency of selected listed African banks?

5. What is the relationship between the Basel III regulatory requirements and the risk-taking behaviour of selected listed African banks?

1.6 Significance of the study

The significance of the current study to the body of knowledge is observed in four distinct ways. First, prior studies that sought to investigate the determinants of capital structure and the firms' financing behaviour focused exhaustively on non-financial firms. The justifiable reason given mainly for the exclusion of financial service firms in prior studies was that they were heavily regulated by the reserve and central banks guided by the BCBS and the capital structure determinants were not usually firm-specific. Thus, this study explored the intervening effect of the capital adequacy requirement of the Basel III Accord in regard to the financing decision and capital structure of African banks.

Second, the study is expected to add value to the ongoing debate of the Basel III effects on banks from the African perspective. Owing to the fact that the current study focused on a number of African banks, it allowed for easy generalisability of the results and happenings in Africa as a whole and cross-country comparison with the developed countries. Moreover, the study explored reasons why the African banking sectors were affected differently in comparison to the banking

sectors in the developed nations which fosters a platform to tailor and modify the Basel III accord to suit the African banks' needs.

Third, this study was conducted based on the banks' financial data recorded after the 2007 GFC. This presented a platform for investigating the impact of the latest Basel framework which is Basel III regulatory requirements on financial firms' capital structure, performance, stability and efficiency. As such, this study adds to the body of knowledge and makes results available for banks' performance after the GFC. Thus, a better comparative analysis can be conducted with studies that investigated the impact of the Basel Accords prior to the GFC.

Lastly, the study is expected to contribute to the emerging strands of the literature on the impact of the new liquidity measure which is the liquidity coverage ratio (LCR). It also investigates how this measure impacts banks' stability, efficiency and performance. This, therefore, adds value to the ongoing debate on the Basel III regulatory requirements on liquidity requirements and bank performance. Moreover, the study is expected to provide current evidence as regards the use of the systemic Basel III measure of bank efficiency, risk-taking behaviours and stability in listed banks in Africa.

1.7 Delimitations of the study

This study focused on the financial services sector within the context of the developing countries. The segment of the financial services sector under consideration was limited to the banking sector in selected African countries. Thus, the words 'financial sector' bear reference solely to the banking sector. To achieve the aim of the study, data were drawn from banks belonging to six African countries that had adopted the Basel III regulatory requirements. These African countries included South Africa, Nigeria, Kenya, Tanzania, Uganda and Malawi. The study excluded banks from other leading African countries such as Egypt and Morocco amongst others because they largely adopted the Islamic banking regulations which were in contrast with the conventional banking regulations of the Basel III Accord. Furthermore, banks from other African countries were excluded from the study because they had yet to adopt the Basel III Accord. The

period of the current study was limited to 10 years from 2010 to 2019 because the Basel III regulatory requirement was released in 2010 after the GFC.

1.8 Organisation of the study

The structure of this thesis comprises:

Chapter Two: Literature review

The Literature review chapter highlights the findings of a number of researchers whose works were significant to the study of banks and the Basel III Accord. It also discusses bank capital structure and financing behaviour, and the evolution of bank regulatory issues including the GFC. Furthermore, the chapter discusses relevant theories of capital structure such as the following theories: The traditional perspective of capital Structure, the Modigliani and Miller theory, trade-off theory, the pecking order theory, agency cost theory, and the signalling theory of capital structure. Lastly, the chapter discusses the bank-specific determining factors of capital structure and reviews relevant empirical findings in this area. It concludes with the chapter summary as well as the introduction of Chapter Three

Chapter Three: Research methodology

This chapter presents the methodology, empirical model, and data analysis procedures employed in the current study. All variables in the model used in the study are clearly defined in the chapter. Furthermore, the chapter highlights the statistical errors associated with panel data estimators as well as how they were handled and concludes with the presentation of the hypotheses of the current study, ethics consideration as well as the introduction of Chapter Four

Chapter Four: Presentation and interpretation of empirical results

Chapter Four presents the findings that include the basic statistical and normality test results. It also presents the results of the five empirical specification models enunciated in Chapter Three. Chapter Four presents a summary table for the hypotheses and concludes with a summary of the chapter as well as the introduction of Chapter Five.

Chapter Five: Conclusion and recommendations

The aim, objectives, and conclusions of this study are presented in this chapter. Also presented is a summary of its theoretical and methodological insights. Furthermore, the chapter highlights the main contribution of this study to the body of knowledge under which it falls. The chapter then concludes by stating the limitations of the study and recommending directions for future studies.

1.9 Summary of the chapter

This chapter has introduced the topic covered by the current study as well as its background. It has also highlighted the problem statement, research objectives, research questions and the delimitations and assumptions of this study. Also provided in this chapter are the reasons and the need to conduct the study as well as its organisation. The next chapter provides a review of the literature as well as the significance of this study. It also highlights current advances in research on the subject of Basel III regulatory requirements within the African context.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter elaborately discusses the capital structure, performances, and risk-taking behaviour of banks, as well as the evolution of bank regulatory issues including the Basel Accords and the Global Financial Crisis (GFC). Furthermore, the chapter reviews relevant literature, provides empirical and theoretical frameworks, and concludes with the firms' specific determinants of capital structure.

2.2 The nature of banks' capital structure

The understanding of the financing and capital structure decision of banks is an important decision and a crucial concept in corporate finance. Acharya and Thakor (2016) and Kalemly-Ozcanetal (2012) argue that banks' capital structures are not determined by the same factors as those of non-financial firms. Owing to the importance and the peculiarity of banks' financing behaviour as compared to the non-financial firms, an enormous research attention has been given to the study of banks' capital structure and its determinants.

According to Kalemli-Ozcan, Sorensen and Yesiltas (2012), the funding of banks is unique because they are obliged to follow the regulations set out by the country's delegated regulatory body, such as the prudential regulatory authority which assesses their capital structures. The Central or reserve banks fully or partially adopt the guidelines set out by the Basel Committee on banking regulation in regulating the capital structure of local banks (Al-Najjar & Hussainey, 2011). Acharya and Thakor (2016) and Kalemly-Ozcanetal (2012) concede that the bank capital structure consists of the minimum regulatory capital, capital buffers, and the discretionary capital. According to the guidelines set out by the Basel Committee (2010), banks are expected to retain a minimum capital base and capital buffers to foster banks stability, safeguard against

unexpected shocks, and to maintain their financial resilience. Furthermore, banks are free to hold capital in excess of the minimum that is set by the Basel Accord (Delimatsis, 2012).

Aboura and Lépinette (2015) and Gropp and Heider (2010) define bank capital as the difference between a bank's assets and its liabilities, which represents the net worth of the bank or its equity value. The asset portion of a bank's capital includes cash, government securities, and interest-earning loans such as mortgages, letters of credit, and inter-bank loans, while the liability portion includes the short term and long-term deposits amongst others, such as the equity and regulatory equity capital (Lim, 2016). Aboura and Lépinette (2015) further argue that for banks to maximise their capacity to absorb losses, they should move from the composition of 100% equity towards a composition that includes debt capital to benefit from lower costs of financing and reduce the level of taxable income. Beltratti and Stulz (2012) argue that banks, like any other firm, enjoy tax shield when they use debt funding up to a certain point where the present value of tax shields on extra debt is offset by an increase in the present value of financial distress costs and agency costs. This implies that banks are able to benefit from an optimal mix of financing in their capital structure.

According to the Bank for International Settlements (2013), banks are financial institutions that provide intermediary functions in an economy through channelling surplus financial resources from depositors to borrowers of economic units that are in deficit. Banks like any other firm need to raise funds to finance and sustain their operations. According to Lim (2016), bank operations are financed predominantly through equity and debt capital. On one hand, banks funding through equity capital consists of the owners' equity, minimum regulatory capital, reserves arising from revaluations of non-current assets, and long-term securities. On the other hand, the debt capital consists of unsecured, fully paid debt instruments, and other subordinate debts with a minimum fixed maturity date of five years (Basel, 2010). Pistor (2013) further indicates that banks finance their operations through depositors' funds which include the customers' deposit and savings accounts.

Along with the customers' deposits and savings accounts, banks are also involved in a lot of other profitable activities such as investment in safe government securities in order to raise additional funding. Furthermore, banks provide loans and other credit facilities to their customers and charge interest on the loans advanced. Nonetheless, banks face the risk of loan default from their customers and this type of risk is known as credit risk. Other risks that banks face which arise from their trading activities include market, counterparty, credit risk, liquidity and operational risks (Beltratti & Stulz, 2012, Abor & Biekpe, 2007).

Affinito and Tagliaferri (2010) argue that despite all the sources of finance available to them, banks largely rely on debt capital to meet their financial and operational needs. In support of this finding, Acharya and Thakor (2016) argue that the cost of debt funding is lower as compared to the cost of other sources, especially the equity capital, and with debt funding firms enjoy debt interest tax shields. The heavy reliance of banks on debt capital often explains the reason why banks have high leverage (Berger & Bouwman, 2013, Raheman, Zulfiqar & Mustafa, 2007). Nonetheless, Lim (2016) argues that the choice and mix of bank funding and its capital structure has a direct influence on its earnings, operational efficiency, stability and the risk of bank failure.

Berger and Bouwman (2013) posit that one of the major risks arising from the capital structure of a bank relates to the high proportion of short-term funding, such as customers' deposit and savings accounts, which is used to finance long term loans, which could lead to a liquidity crisis. Furthermore, Adrian and Shin (2010) posit that depositors and other creditors can demand payment on their deposit or savings accounts anytime without a proper prior notice which contributes to increased liquidity risk. However, Al-Najjar and Hussainey (2011) indicate that many countries insure deposits as a safeguard to mitigate the risk of customers' unannounced notice of withdrawals of funds leading to bank operational failure.

The safety, efficiency and stability of banks have been questioned by the public and the economy. As a result of the credit and liquidity risks which are in relation to the sources of bank funding, the need for bank regulations arises. These regulations such as the Basel Accords are

designed to limit banks' exposures to credit, market, solvency and liquidity risk (Gropp & Heider, 2010).

Owing to the aforementioned arguments, banks' capital structure is influenced and differentiated from those of non-financial service firms. The uniqueness in bank capital structure is a result of their subscription to the banks' prudential regulatory guidelines as of the Basel III Accord (Acharya & Thakor, 2016). The bank capital consists of the minimum regulatory capital, capital buffers, and discretionary capital (Kalemly-Ozcanetal, 2012). Lim (2016) added that banks' equity capital consists of owners' equity, minimum regulatory capital, reserves arising from revaluations of non-current assets, and long-term securities whist the debt capital constitutes unsecured, fully paid debt instruments, and other subordinate debts with a minimum fixed maturity date of five years (Basel, 2010). Due to the nature of the banking operations, the confidence it provides its depositors and its intermediation function in an economy, its regulation is of utmost importance. The evolution of bank regulations is discussed in the next section.

2.3 Evolution of Bank Regulations

According to Berger and Bouwman (2013), banks hold capital in order to be able to finance their operational activities and to maintain their entity as a going concern. Banks are also expected to hold a minimum regulatory capital to withstand financial and economic shocks and to absorb risks such as credit and liquidity risks.

Most importantly, private banks with a small capital base need to hold more capital because they tend to face more negative shocks from their economy due to restricted operation capped within their local domain as compared to internationally active banks that are medium, and large capital based with access to financial markets in the events of needs (Lim, 2016).

Banks are more susceptible to risk, shocks, insolvency and illiquidity that can increase their runs. Failure of the banking sector has an impact on the whole financial system and the economy at large. According to Kashyap, Rajan and Stein (2008), the high degree of interconnectedness

among financial institutions and the system-wide consequences that result from a failure of a bank distinguish the importance of capital banks from non-financial firms. A typical example of this contagion effect is the 2007/2008 GFC which was sparked by the mortgage crisis in the US, which affected globally all bank operations, performance, and stability because of the wide interconnectedness of banks and other non-financial firms.

Kashyap et al. (2008) highlights that bank regulations are instituted to protect the deposit insurer and the society from losses that could arise from bank failures, and to monitor the risk level and appetite of the banks and prevent them from taking excessive risk or value-degrading actions. Furthermore, bank regulations serve as a guide in the choice of capital mix of banks' equity and debt funding and ensure market discipline on banks in order for them to stay within the capital requirement framework (Pistor, 2013).

As bank failures are severely bad for the economy, it is significantly important for regulations to be in place to ensure that banks hold adequate capital and use optimal capital mix in order to avoid failures (Kashyap et al., 2008). With regards to this, the Basel Committee which was headquartered in the Bank for International Settlements (BIS) in Basel, Switzerland developed a framework known as the Basel Accords. Basel accords are set of standards created by the Basel Committee to establish a uniform banking regulation which is grounded on best practices among the world's financial systems. It was created in 1974 starting with the Basel I Accord, and the committee has since then improved the regulation which led to the Basel II and the Basel III Accord.

2.3.1 Basel I

Amid the credit crisis in the US in the early 1980s, the interest arose amongst the Basel Committee to find a way out of the prevailing global rise in credit risks. The credit risk affected the capital ratio and weakened the activeness of banks globally. Furthermore, the objective of the Basel Committee in the 1980s was to remove the competitive inequality due to the difference in capital requirements from one country to the other.

The 1988 Basel Accord brought about a convergence in international bank capital regulation with the sole intention of improving the stability of international banking by increasing its capital holdings (BCBS, 1988).

The Basel I Accord placed explicit emphasis on reducing credit risk. It required the banks to hold a minimum total capital equal to risk-adjusted assets of 8% and at least 4% of Tier 1 (core) capital. The Accord split capital into two classes based on its quality: Tier 1 and Tier 2. Tier 1 consists mainly of equity and Tier 2 consists mainly of debt instruments, and the Accord specified that Tier 2 capital could not exceed Tier 1 capital. To determine risk-weighted assets for credit risk, exposure on a bank's balance sheet is assigned a given risk weight ranging from 0 to 100 percent (BCBS, 1988).

The Basel Committee created Basel I Accord with a focus on enhancing the banking regulation within the member states of the Basel Committee. Nonetheless, many other nations of the world adopted and applied the Basel I Accord in a way that suites their banking needs. The committee provided a common definition of capital for banks. See Table 2.1.

Table 2.1: Common definition of capital for banks

Capital element	Classification of Capital elements	Definition of capital elements
Tier 1 (Core capital)	Paid up share capital/common stock Disclosed reserves (retained profits, legal reserves, share premiums and other surplus)	The Tier 1 capital which is also regarded as core capital consists of permanent shareholders' equity which could either be issued or fully paid ordinary shares divided by common stock and perpetual non-cumulative preference shares and disclosed reserves.
Tier 2 (Supplementary Capital) Consists of less permanent forms of capital.	Asset revaluation reserves	Reserves arise from revaluation of banks fixed assets (premises), or long-term holdings of equity securities.
	General provisions / general loan loss reserves	Reserves created against future, unidentified losses and not identified impaired assets.
	Hybrid instruments (must be unsecured, fully paid-up)	Instruments which combine characteristics of equity capital and of debt
	Subordinated debt (max. 50% Tier 1, min. 5 years – discount factor for shorter maturities)	Instruments have fixed maturity, with minimum maturity of five years. During the last five years to maturity, a cumulative discount of 20% per year will be applied to reflect the diminishing of its value.
Deductions	Goodwill (from Tier 1) Investments in unconsolidated subsidiaries of other banks' capital (from Tier 1 and Tier 2)	

Source: BCBS (1988) and Balthazar (2006)

According to the BIS (1999), Basel I effectively revolutionised global banking regulations and measure the banks' best practices in the area of capital requirements. It also facilitated the reduction of the credit risk and consequently increased the capital ratio threshold. Despite the above strengths, the 1988 Basel 1 Accord, framework focused only on credit risk and ignored others such as market risk, operational risk and strategic risk, among others (Balthazar, 2006). Furthermore, the Base 1's inability to differentiate levels of credit risk within the same asset class was a major limitation because each asset has a specific peculiarity within the group. It also focused more on existing assets rather than the future composition of bank's portfolio which made the Accord back-ward looking (BIS, 2006). Finally, the Basel I set out a fixed percentage to meet the minimum capital requirements of 8%. This percentage remained unchanged despite the fact that risk is not constant, and that banks sometimes have to hold more than this percentage to meet high risk (Tarullo, 2008).

In sum, the Basel I Accord focused predominantly on alleviating credit risk among member countries. In order to meet the shortcomings of the Basel 1, the committee, developed a more sophisticated framework Basel II Accord to deal with other risks apart from credit risk.

2.3.2 Basel II

The Basel II Accord was completed in June 2004 and fully published in 2006 The Basel II was not instituted to completely replace Basel I, but to improve on the global banking regulations and to enhance the stability and soundness of banks.

The aim of the new Accord was to ensure that the regulatory capital held by banks better reflected the actual risks that they were facing. The Basel II was built on some basic parameters of Basel I, such as the definitions of eligible capital and the 8% minimum capital adequacy requirements. It dramatically changed the system for risk-weighting of the banks' assets. The Basel II Accord moved away from relatively simple compliance-based supervision to more complex risk-based supervision, and assigned a central role to market actors, that is, banks and external credit rating agencies in risk assessment (Raman, 2015).

Furthermore, the Basel II was founded on three pillars with each focusing on a particular segment of the banking system. The overarching focus of the Basel II was to promote financial stability, improve risk management and reduce the gap of the competitive imbalance amongst international banks. The Basel II Accord pillars are presented in Table 2.2.

Table 2.2: Basel II Pillars

Pillars		**Focus**
Pillar 1		Minimum Capital Requirements
Pillar 2		Supervisory Review
Pillar 3		Market Discipline

Source: (BCBS, 2005)

Pillar 1 dealt with Minimum Capital Requirements associated with credit risk, market risk, and operational risk respectively. This aligned the minimum capital requirements more closely to the banks' actual underlying risks (Balthazar, 2006). Firstly, the credit risk in the Basel II Accord was calculated using either the standardised approach, internal rating approach and/or advanced internal rating approach. Secondly, the market risk, which is the risk of losses on and off-balance-sheet positions arising from movement in market prices (interest rate risk and foreign exchange risk), was calculated using a standardised approach or internal value at risk model approach. Finally, the operational risk, which is the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events, was calculated using either a basic indicator approach or method, a standardised approach, or an advanced measurement approach also called internal forecasting (BIS-Basel II, 2006).

Pillar 2 dealt with Supervisory Review and ensured that banks developed sound risk management and internal control practices. This allowed supervisors to assess the reasonableness of the banks' assessments of their own risks and to monitor their effective compliance with pillar one regulations (Balin, 2008). This created a strong risk management culture within the bank and

allowed lenders to model and assess their own capital requirement levels using the Internal Rating Based (IRB) approach, and further created internal processes and strategies for maintaining their capital. Pillar two also focused on market risk, an area which was previously unregulated by Basel I. In Basel II the supervisors reviewed and evaluated the bank's internal assessment and its ability to monitor risk, and to further take appropriate measures if the bank's results were not satisfactory (Danila, 2012).

Pillar 3 established core and detailed disclosure of the activities, risk profile and risk management of banks in order to maintain transparency to stakeholders and improve market discipline. This third pillar thus encouraged prudent management and provided a mechanism whereby the market could reward well managed banks and penalise poorly managed banks (Balthazar, 2006). According to Danila (2012), Basel II was more risk sensitive as it provided a strong correlation between the calculation rules for capital adequacy standards, market supervision and market discipline.

The impact of the improvements of Basel II on Basel I cannot be over emphasised as it overwhelmingly outran the Basel I Accord. In sum, Basel II offered a forward-looking risk sensitive approach to the calculation of capital by inculcating the risk weighted approach with an improved definition of what constitute capital. It also made a provision for other risks not mentioned in Basel I, and it offered a wider scope of flexibility for individual banks as some of the capital requirements are left within the capacity of national regulators. Furthermore, Basel II enhanced oversight and governance of the banking sector with mandatory detailed disclosures on risk appetite, risk policies, risk exposures and risk calculation techniques (Blundell-Wignall & Atkinson, 2010).

Despite the enormous theoretical and practical strengths of Basel II, its weaknesses were brought to notice as a result of the 2007-2009 GFC. According to Danila (2012), some of its weaknesses included the reputational risk, systemic risk and liquidity risk which was not adequately captured and addressed. Moreover, the Accord placed excessive reliance on external ratings and incorrect

internal rating models which allowed for artificial reduction of capital requirements and decrease of banks' capacity to withstand economic crises.

2.3.3 Basel II and the Global Financial Crisis

Kahn (2010) and Taylor (2009) attributed the GFC to the mortgage crisis in the US. The crisis resulted from excessive credit default on mortgages from customers and was termed the sub-prime mortgage crisis. Furthermore, this crisis had a contagion effect on banks within and outside the US and led to a persistent imbalance amongst firms and banks on a global scale.

The global imbalance or inequalities according to Mohan (2007) were manifested by the enormous increase of the US current account shortfall, which was further reflected by the excess in Asia, especially in China, as well as in other oil exporting countries in the Middle East and Russia. These inequalities in the current account are often seen as the consequence of the relative rigidity of the currency regimes in China and in some other nations. Portes (2009) further posits that global macroeconomic variables such as interest rate, inflation rate and exchange rate amongst others play a part in the cause of the crisis. The huge saving investment imbalances and consequent cross-border financial flows and interconnectedness exert immense pressure on the financial intermediation process in the banking sectors (Danila, 2012).

Haldane (2009) posits that the effect of the increase in inflation in the US in the early 2004 caused the US Federal Reserve to withdraw monetary accommodation. This caused a consequential increase in the interest rate as mortgage payments started rising. With higher interest rates, borrowers had no incentives or alternatives that could prevent them from defaulting. Defaults by such borrowers led to losses by financial institutions and investors alike, and these losses were ultimately borne by the banks and the financial institutions and led to the wiping off of a significant fraction of their capital.

Claessens and Kodres (2014) further indicates that the theory and expectation of the practice of securitisation and use of derivatives was the associated dispersal of risk to those who could best

bear them. Consequently, the risk was parcelled out increasingly among banks and financial institutions and got effectively even more concentrated. It is interesting to note that the various stress tests conducted by the major banks and financial institutions prior to the crisis period had revealed that the banks were well-capitalised to deal with any shocks. Such stress tests, as it appears, were based on the very benign data of the period of the great moderation and did not properly capture and reflect the reality (Haldane, 2009).

As a result of the excess loss and wiping-off of capital, the increasing leverage of the banks and declining net worth of major banks led to a loss of trust and confidence in banks giving rise to bank runs and investors run. Also, owing to the growing financial globalisation and interconnectedness, banks in other developed countries such as Europe and Asia were equally and adversely affected (Claessens & Kodres, 2014).

Furthermore, Dermirguc-Kunt, Detragiache and Merrouche (2013) noticed that many of the banks from the developed countries had to be bailed out from the financial crisis with public funds. The crisis exposed shortcomings in the management of market liquidity and banks' funding, with significant consequences for system-wide financial stability (Gobat, Yanase & Maloney, 2014). The system wide financial stability was a focus of the Basel I and II Accord. The GFC thus manifested that the failure in financial market demonstrated the failure in supervisory and regulatory guidelines.

The GFC was coincidental with the implementation period of the Basel II, which raised massive questions and doubts about the global regulatory and supervisory guidelines. With the failure of many banks and financial institutions in this period, Basel Accords, and in particular Basel II took some of the hits (Calomiris, 2009).

The shortcomings identified above necessitated the need for a regulatory reform and improvement on the Basel Accords in order to strengthen the bank's capital base against financial risk, shocks, distress and crisis as such of the GFC came to bear (BCBS, 2010, Blundell-Wignall & Atkinson, 2010). The need for this policy reform and improvement gave birth to Basel III, a

new accord that constitutes an improved minimum capital requirement, liquidity framework and the inclusion of macro-prudential measures.

2.3.4 Basel III

In the run-up to the GFC and the failure of banks, the Basel Committee were forced to rethink Basel II and move on to Basel III in 2010. According to Basel (2010), one of the major causes of the bank failures during the 2007/2008 GFC was the unstable balance sheet leverage, weak capital ratios, insufficient liquidity, and mispricing of credit risk which reduced the capacity of the banks to absorb credit losses and systematic risk.

The necessity to change the bank capital structure and bank regulatory capital requirements came to bear as it became evident that the banks in the developed economies were under-capitalised, over-leveraged and heavily relied on short term funding. Thus, the main objective of Basel Committee was to promote a more resilient banking system with a better focus on capital, leverage, funding and liquidity position (Lyngen, 2012). The Basel III Accord addressed a tighter definition of capital, specifically the common equity, and introduced capital buffers and new liquidity standards.

According to Romano (2014), the Basel III Accord has promoted the financial soundness and stability of banking institutions, enhanced the risk coverage, and increased liquidity and counter-cyclical risks. It is also forward-looking as it has addressed bank specific risk associated with portfolios and macro-economic environment. The Accord has also ensured strict governance of bank operational activities, detailed reporting and compliance and reduced the dependency on rating agencies. The key elements of the Basel III Accord discussed below are improved capital requirements, capital buffers, leverage and gearing ratio, and the new liquidity requirements.

2.3.4.1 Improved capital requirement

Basel III retained the 8% risk-weighted assets (RWA) stipulated in Basel II but significantly improved on the quality of the capital or the numerator of the ratio. Basel III requirements

represent a stricter definition of capital and place more emphasis on Common Equity Tier (CET) 1 and Additional Tier 1 (Delimatsis, 2012).

The new definition of capital now places a strict emphasis on CET1 to include ordinary shares and retained earnings, which are viewed as a high-quality capital base, specifically required during financial crises. The Basel III has introduced stricter requirements for determining Additional Tier 1 capital to ensure that these instruments can absorb losses. Tier 2 capital continues to provide loss absorption on a "gone concern" basis, and mostly consists of subordinated debt. It has, however, been reduced from 3.5% of RWA in Basel II to 2% of RWA in Basel III. Tier 3 capital is eliminated under the new definition of improved capital requirements.

The Basel III has placed a restriction on instruments that qualify as Tier 1 and Tier 2 capital, and has also abolished the breakdown of Tier 2 capital into upper and lower tiers. CET1 now consists of ordinary shares issued by banks (that meet certain criteria), share premium, retained earnings, other comprehensive income and disclosed reserves, minority interests in the common shares of consolidated subsidiaries, and certain regulatory adjustments. Furthermore, CET 1 capital is equity capital less goodwill and intangible assets (Jul-Larsen, 2014; BIS, 2015).

The following are deducted from CET1: goodwill and intangibles; increase in equity capital resulting from securitisation transactions, pension and deferred tax assets; cash flow hedge reserve that relates to the hedging of items that are not fair valued; bank's investment in its own shares; and cumulative gains and losses to changes in own credit risk on fair valued financial liabilities (Delimatsis, 2012).

Additional Tier 1 capital elements include: instruments meeting the criteria for inclusion in additional Tier 1 capital but not included in CET 1; share premium from the issue of instruments included in additional Tier 1 capital; instruments issued by consolidated subsidiaries and held by third parties that meet the criteria for inclusion in additional Tier 1 capital but not included in CET 1; and regulatory adjustments applied in the calculation of additional Tier 1 Capital. In

summary, the difference between additional Tier 1 capital and common equity Tier 1 capital comprises roughly speaking hybrid capital (FSAN, 2012).

Tier 2 capital is defined as: instruments that meet the criteria for inclusion in Tier 2 capital, but are not included in Tier 1 Capital; share premium from the issue of instruments included in additional Tier 2 capital; instruments issued by consolidated subsidiaries and held by third parties that meet the criteria for inclusion in Tier 2 capital, but are not included in Tier 1 capital; and certain loan loss provisions and regulatory adjustments applied in the calculation of Tier 2 capital (Basel, 2010).

With respect to the denominator of the capital ratio, Basel III has improved the risk coverage by tightening the criteria requirements of the instruments that qualifies as RWA. New rules as well as modifications to previous ones have been made to determine capital charges. This is specifically intended to correct the underestimation of risks, which has significantly contributed to the GFC. According to the Reserve Bank of New Zealand (2012), the Basel III Accord's enhanced risk coverage constitutes:

- A charge for mark-to-market CVA called credit valuation adjustment;
- An asset value correlation multiplier for exposures to unregulated and large financial institutions;
- The strengthening of margining and collateral management requirements and more conservative regulatory haircuts for securitisation collateral;
- A requirement to include stressed market data when calculating the probability of default of highly leveraged counterparties;
- Identification and management of wrong way risk; and
- A two percent weight for exposures to central counterparties

In sum, the Basel III total capital which contains the Tier 1 and Tier 2 capital must be at least 8% of risk-weighted assets at all times. Banks are required to hold more reserves with CET 1 increased to 4.5% from 2% and the mandatory reserve known as Tier 1 capital increased to 6% from 4%. The equations 1 to 3 below represents the Basel III Accord improved capital requirements.

$$CET\ 1\ Ratio = \frac{(Common\ Equity\ Tier\ 1)}{Risk\ Weigthed\ Assets} > 4.5\%$$ ---------- Equation 1

$$Tier\ 1\ Capital\ Ratio = \frac{Common\ Equity\ Tier\ 1 + Additional\ Tier\ 1\ Capital}{Risk\ Weighted\ Assets} > 6.0\%$$ ------- Equation 2

$$Total\ Capital\ Ratio = \frac{Tier\ 1 + Tier\ 2\ Capital}{Risk\ Weighted\ Assets} > 8.0\%$$ ---------- Equation 3

Furthermore, a capital conservation buffer which does not exist under Basel II has been introduced and is expected to be 2.5% of CET 1 capital. The capital conservation buffer is an additional reserve buffer to withstand the expected future periods of stress which is in place to strengthen the resilience of banking sector. This implies that banks will need to maintain a minimum CET1 ratio of 7% (BIS, 2015).

Furthermore, with the flexibility in the supervision and adoption included in Basel III, local regulators are not only responsible for monitoring banks compliance with Basel requirements, but are also expected to regulate the credit levels of banks and other macroeconomic factors of their respective economies. This implies that if credit is increasing rapidly as compared to the GPD, local bank regulators can increase their capital requirements using the countercyclical buffers which ranges from 0% - 2.5% in order to manage the economies from excess credit expansion. (BIS, 2011). The countercyclical buffers are meant to preserve national economies from excess credit growth. Table 2.3 presents the minimum capital requirements and capital buffer under the Basel II and III Accords.

Table 2.3: Minimum capital requirements and capital buffer under Basel II and Basel III

	Basel II	Basel III
CET 1	2%	4.5%
Tier 1	4%	6%
Capital Conservation Buffer	Nil	2.5%

Source: BCBS (2011)

2.3.4.2 Capital buffer premium

According to the Basel III requirements, banks are required to hold a certain minimum level of capital to safeguard them against financial distress and failure. However, banks often hold capital above the required regulatory minimum in order to protect them against unexpected shocks which may result in bank failure. This excess capital is referred to as the capital buffer premium. Banks are also obliged to hold a capital conservation buffer of 2.5% of their total risk exposure. The minimum capital requirement is defined as the level of capital which a bank should mandatorily maintain in any situation while the capital buffer premium is the surplus amount of capital after deducting the minimum required capital. García-Suaza, Gómez-González, Pabón, and Tenjo-Galarza (2012) defines capital buffer premium as the difference between actual capital (core capital plus supplementary capital) and minimum regulatory capital ratio.

2.3.4.3 Leverage ratio

FSB (2009) indicates that banks suffered from the GFC due to, among other things, excessive leverage of the banks. In an attempt to address the problem of excessive leverage, the Basel III framework has introduced a non-risk-based leverage ratio to supplement the capital minimum requirements. The BIS (2011) argues that the leverage ratio requirement will help manage the build-up of excessive leverage in the banking system.

With regard the new Basel III requirements (BCBS, 2010; 2013), the leverage ratio can be mathematically calculated as:

$$Leverage\ Ratio = \frac{Tier\ 1\ Capital}{Total\ Exposure} > 3\%$$ ----------Equation 4

The BIS (2014) defines a bank's total exposure as the sum of on-balance sheet exposures, derivative exposures, securities finance transactions (SFTs), including repurchase agreements, reverse repurchase agreements and margin lending transactions, and off-balance sheet exposures, such as commitments, guarantees and standby letters of credit.

Off-balance sheet exposures are often a source of significant leverage, and as a result, the BCBS has instructed banks to include them in the denominator of the leverage ratio. According to D'Hulster (2009), one of the leverage ratio's benefits is its simplicity in calculation and its ability to guide the banks not to fall below the leverage threshold of 3%. He further states that the leverage ratio can be adopted quickly, and neither does it have a huge cost implication nor does it require significant expertise from banks or their supervisors. Furthermore, the leverage ratio can be applied regardless of the capital adequacy regime in a jurisdiction (Mateev, Poutziouris & Ivanov, 2013).

2.3.4.4 Liquidity requirements

One of the most important improvements made by the Basel III Accord is that it has also introduced liquidity measures which require banks to maintain liquidity buffers. The liquidity requirement is aimed at reducing the chances of future banking crisis and associated losses of economic output. According to the global liquidity standards and supervisory monitoring of the new Basel III requirements (BCBS, 2010; 2013), there are two quantitative measures developed to measure liquidity, and these include the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR).

The LCR aims to ensure that banks have enough liquid assets to withstand liquidity stress in the short term (30-days stressed funding), whilst the NSFR aims to encourage the banks to hold more stable and longer-term funding sources against their liquid assets in order to maintain operational efficiency (Jul-Larsen, 2014). Both ratios are required to be above 100% from 2019 onwards. The LCR is the ratio between the high-quality liquid assets (HQLA) and the expected Net cash outflows of the next 30 day, whilst the NSFR is the ratio between the amounts of Available Stable Funding (ASF) to the amount of Required Stable Funding (RSF). The LCR and the NSFR are mathematically expressed in the equations below.

$$LCR = \frac{Stock\ of\ high\ quality\ liquid\ assets}{Expected\ total\ cash\ outflows\ over\ the\ next\ 30\ days} > 100\% \text{ ----------Equation 5}$$

$$NSFR = \frac{Available\ amount\ of stable\ funding}{Required\ amount\ of\ stable\ funding} > 100\% \text{ ----------Equation 6}$$

2.4 Evolution of financial regulation in selected African Countries

Due to the 2008 GFC, the financial regulation of a few African countries has evolved and taken a different turn. Countries such as South Africa have evolved in these past years from the traditional approach of regulating banking activities to adopting the global macro-prudential guidelines of the Basel III Accord. Emphatically, the financial regulations of countries such as South Africa, Nigeria, Uganda, Malawi, Kenya and Tanzania have mirrored largely the global best practices of the Basel III Accord. Despite the widespread impact of the GFC on the global economies, the majority of African banks are yet to adopt the Basel III regulatory requirements that were proposed and issued mainly to curtail such global crisis. However, the reserve banks of South Africa, Nigeria, Uganda, Malawi, Kenya and Tanzania have painstakingly taken steps to adopt the Basel III Accord framework with the aim of promoting the efficiency, stability, financial performance and resilience of the African banking sector. In regard to this, the evolution of each selected African Country financial regulations are discussed in turn.

2.4.1 Banking regulations in South Africa

Prior to the introduction of Basel III, South Africa had a well-established financial regulatory framework based on their early adoption and implementation of Basel I and Basel II Accords. The effects of the global financial crisis in 2008 triggered the emergence of Basel III Accords by the BCBS, which led to the subsequent adoption of Basel III by the South African financial regulatory authorities (SARB, 2010)

The Basel III Accord, however was not a mandatory requirement for the domestic banks in South Africa. This country is a well-established economy and was strongly placed to start the implementation of the phase 1 requirement of the Basel III Accord early ahead of other African nations (IMF, 2010). Prior to this, the South Africa banks were already well-capitalised before the introduction of the Basel III Accord, although their existing leverage ratio was more conservative compared to the new Basel III requirements (SARB, 2010).

Emphatically, the BCBS committee recommendations were implemented in line with South African Banking laws. The prescribed capital and liquidity requirement are discussed in the section of the Banking Act. According to the Bank Act and in line with the Basel III Accord, the CET 1 requirement for banks was raised from 2% to 4.5% of common equity as a percentage of bank's risk weighted assets. There is also an additional 2.5% which is classified as capital conservation buffer. The aim of the buffer capital is to cushion banks during period of financial distress (BIS, 2010).

Moreover, meeting the new global liquidity requirement requires a full compliance with the Basel III liquidity requirement which will involve some structural adjustment to South Africa financial system. This will enable domestic banks to increase the maturity of their funding (IMF, 2014). It was expected that the utmost steps in this process was the amendment to regulation 28 of the bank's regulations to the Pension Fund Act 1956 which allow banks access to more long-term financing. Section 72 of the Bank Act 1990 established that a Bank is to hold liquid asset in South Africa to a value which is at least 20% of its prescribed liabilities (SARB, 2013).

Under the Basel III requirements, the South Africa Reserve Bank introduced a leverage ratio in the bank regulations to act as support to the risk-based capital requirement, and to prevent an excessive leverage in the financial system. The regulation 38(15) in the Bank Act (1990) stipulates that every bank and controlling company must calculate a leverage ratio in line with the relevant requirement as contained in the sub-regulation (15) to supplement banks or controlling company's relevant risk-based capital requirement. According to the regulation 38(17) of the Banking Act (1990), the average of the relevant month-end leverage ratio for the reporting month and the two months preceding the reporting month must be calculated and reported.

The regulation 38(15) provides the leverage ratio formula to apply while regulation 38(15) (d) and (e) set out the formulae that need to be used and to determine the relevant amount (Bank Act, 1990). The Banking Act specifies that the bank or controlling company shall use the ratio of qualifying capital and reserve fund to non-risk-sensitive exposure as a measure of its leverage. Furthermore, the capital adequacy, as applied to South Africa banks and contained in the Bank Act (1990), requires that the board of directors and its controlling company must appoint at least 3 of her members (with minimum of two being non-executive directors) to a risk and capital management committee.

The Banking Act also sets out the prudential requirement for banks. The Act differentiates between banks whose business activities do not include the trading of financial instruments (section 70(2)); consist solely of the trading of financial instruments (section 70(2A)); and includes the trading of financial instruments (section 70(2B)).

Furthermore, the Bank Act specifies certain minimum requirement for the capital and reserve funds of a controlling company. It further explains that any regulated entity included in the banking group and structured under a controlling company should comply with the minimum requirement of the capital and reserve standard set by the regulators.

The Act specifies that any bank that fails to comply with section 70 (minimum share capital and unimpaired reserve funds) or section 72 (minimum liquid assets), must report reasons for her inability or failure to comply (SARB, 2013). Non–compliance attracts a penalty deemed fit by the regulator.

The Bank must provide an annual written return to the banking regulatory authorities to enable them to determine its compliance with section 70 and 72 of the Bank Act and section 10 of the SARB Act. The return is expected to contain the minimum aggregate amount of qualifying CET1 capital and reserve funds, additional tier 1 capital, tier 2 capital and reserve funds relating to market risk, as well as the minimum liquid assets held. The South African regulators have embraced the Basel III capital requirements faster than any other African country partly because it is a member country of the Basel Committee.

2.4.2 Banking regulations in Nigeria

Following the GFC, the Central Bank of Nigeria (CBN) issued a circular to all the Deposit Money Banks (DMBs) in Nigeria to implement the voluntary Basel III Accord (CBN, 2011). The circular informed the DMBs about the issuance of the guideline for the implementation of the Basel III Accord. The guidelines were expected to include the regulatory capital, leverage ratio, liquidity monitory tools, large exposures and the liquidity risk management and internal liquidity adequacy assessment process.

The guidelines issued by CBN were implemented in phases beginning in the latter part of 2013 for a six-month period and closely supervised to ascertain if expectations from the supervisions were met. Prior to the emergence of Basel III, the Basel II had always been implemented by Nigeria banks with a focus on risk management regulatory procedure as issued by the Basel regulatory committee. The CBN guidelines mentioned that the Basel III would run concurrently with the Basel II already in place until it gained ground. Some of the changes made in Basel II included a 3% leverage ratio threshold, a minimum capital requirement of 4.5% of common

equity capital, as well as an additional 2.5% buffer capital requirement. They also included the liquidity coverage ratio and the net stable funding ratio.

According to the statement issued by the CBN the guidelines mandated the minimum liquidity coverage ratio of banks operating in the Nigeria banking sector should be standardised in order to control liquidity and make the DMBs stronger and resilient to financial distress circumstances that the economy might face (CBN, 2011). Under the Basel III the CBN expects greater stability of the financial industry in order to boost investor confidence and to reduce or eliminate anxiety about financial institutional risk and concerns about financial collapse. Furthermore, to fulfil and satisfy the liquidity coverage ratio (LCR) introduced under the Basel III guidelines, banks were expected to hold more liquid assets and increase their ratio of long-term debt (BCBS, 2013).

Some of the provisions adopted by the CBN as introduced by the Basel III guidelines include a proper disclosure of material difference between their total balance sheet assets as reported in the audited financial statement and their on – balance sheet exposure. They also indicate that the leverage ratio exposure which should be based on gross accounting value, and the calculation of the leverage ratio should be in accordance with relevant requirements specified to supplement risk-based capital requirement.

The CBN statement further indicates that the reporting entities should comply with the minimum daily liquidity ratio coverage to monitor, control and mitigate risk. It further required that the reporting entities should submit their LCR returns to CBN for regulatory compliance on regular intervals. The Table 2.4 below shows the reporting details on solo and consolidated basis of the DMB as documented by CBN.

Table 2.4: Reporting periods of the Nigerian DMBs as documented by CBN

Reporting Details	**Solo Basis**	**Consolidated Basis**
Reporting Frequency	Monthly	Quarterly
Reporting Coverage	30 calendar days from reporting date	30 calendar days from reporting date
Reporting Date	Month End	Quarter End
Submission Deadline	5 days after the last day of each month	5 days after the last day of each month

Source: CBN (2011)

2.4.3 Banking regulations in Kenya

The Kenya banking sector is well-developed with over 40 registered banks licensed to operate in it (IMF, 2014). The key regulator of Kenya Financial industry is the Central Bank of Kenya (CBK), which is the primary regulator of the financial industry in the country and is responsible for both prudential supervisions of all banking institutions and consumer protection.

Moreover, the CBK does not operate in isolation but is guided by international guidelines and regulations to ensure an effective and smooth regulation and stabilisation of its financial system. In order to ensure that stability, the CBK adopted the Basel III standards on capital adequacy and liquidity management standards set up by the Bank of International Settlements (BIS), a global standard setting body for Central Banks, under the guidance of the Basel Committee on Bank Supervision.

The BIS is an international standard setter for prudential regulation of banks and for global banking supervision (BIS 2010). It developed the Basel III Accord following the financial crisis in 2008 and thereafter was rolled out to international banks to adopt. Many international financial regulators have implemented the Basel III in their home countries, especially in the

developed world. In particular, Kenya has an existing capital requirement in her Banking Act second schedule which specifies the minimum capital required for banks to be issued a banking license**.** Kenya Prudential guidelines on capital adequacy require 1billion KES and 200 million KES as a minimum core capital for mortgage finance companies and KES200 million for financial institutions.

It is important to note that the implementation of the Basel III Accord has not been widely applied in African countries. Despite that, Kenya has set itself apart as an early adopter of the Basel standard relative to other African countries. The adoption of the Basel implementation has come from the CBK, a highly independent banking regulator in Kenya. The minimum capital adequacy ratios as set for Kenya financial institutions in line with the Basel III Accord includes a core capital with minimum of 8% of total risk weighted asset (RWA) plus risk weighted off balance sheet items, a core capital not less than 8% of its total deposit liabilities and a total capital of not less than 12% of its total risk – weighted assets plus risk weighted off – balance sheet items.

Institutions licensed by the CBK are required to hold a capital conservation buffer of 2.5% above the minimum ratio to enable them to withstand future period of financial distress. The total minimum core capital of RWA and total RWA requirement are 10.5% and 14.5% respectively (CBK, 2010).

In a nutshell, Kenya's compliance with the Basel III core principles has increased significantly over time. The major influence of Kenya's implementation of the Basel III Accord has been the CBK. Furthermore, implementation of the Basel III Accord was easy for the CBK because of the fragility of the banking sector in the early time of 2000's coupled with an understanding that improved regulation is needed to foster growth within the financial service sector.

2.4.4 Banking regulations in Uganda

Like other Africa countries Uganda was expected to implement the Basel III Accord. The major regulator of banking and financial services in Uganda is primarily the Bank of Uganda (BoU)

which serves as the major central bank for the country and gives regulatory guidelines on the operations of Banks (IMF, 2010). A major part of the BoU's mission is to foster price stability and a sound financial system within its economy. This has therefore, been a foundation to set a process for the implementation of Basel III Accord for the country's commercial bank to adopt in other to ensure financial stability in the economy.

The BoU further specifies her role in order to aid the smooth running of the financial system of the country. The roles are to formulate the macro-prudential policies aimed at mitigating systemic risks to the Ugandan financial system. The BoU's role is also to ensure financial sector surveillance to identify systemic risks, and perform stress tests for plausible shocks and disruption in the financial system. Furthermore, the roles are to engineer systems in place to manage financial crises and to enhance the efficiency of financial market within the Uganda economy.

The Basel III as previously mentioned is a capital buffer and liquidity requirement regulatory framework that was issued by the BIS to act as a safeguard under the condition of shocks in times of crises (BIS, 2010). In East Africa, BoU was the first regulator to comprehensively adopt the Basel III guidelines on capital conservation (BoU, 2013). Although, the Basel III is a voluntary requirement for nations' Central Banks to adopt, there is a huge outpour of its implementation in the western world with few adoptions from the African nations. However, major leading African countries have adopted the framework while some are in the process of adopting it.

The BoU is part of the Africa countries who adopted the Basel III Accord with a circular issued to all chief executives of commercial banks, credit institutions and other financial institutions to rise paid up capital requirement of commercial banks from the current Shs25bn to Shs150bn, credit institutions from Shs1bn to Shs25bn and MDIs from Shs500milion to Shs10bn. This was done with the passing of the Financial Institutions (Revision of Minimum Capital Requirements) Instrument No. 43 of 2010 in accordance with section 26(5) of the Financial Institutions Act 2004.

In order to restore public confidence, in December 2016, BoU further raised the minimum statutory capital adequacy ratios to 10% of the risk-weighted assets of the bank on top of holding a capital conservation buffer of 2.5% of their risk weighted assets. Moreover, additional capital surcharge of 2.5% was advised to keep as buffer by big banks in the country (BoU, 2013). The BoU believes that strong and powerful capital buffer will promote sound banking operation.

The BoU implementation of the Basel III Accord plays a significant role in the capital requirement and liquidity risk management compliance of the commercial banks. Firstly, in line with the BoU implementation, the core capital and total capital to total risk weighted assets (RWAs) ratios should be at least 8% and 12%, respectively. However, above the Basel III requirement of 6% and 8%, the BoU require additional buffer to safeguard the economy from financial instability and the future uncertainty it might bring. Secondly, the threshold should be set to a minimum core, and total capital ratios (TCR) of 10% and 12% respectively should also set the capital conservation buffer to 2.5% over and above the capital ratios in alliance with Basel III accord in order to achieve minimum capital ratios of 12.5% and 14.5% respectively. Thirdly, the countercyclical buffer should range between 0 – 2.5% whilst the level of buffer should be varied depending on the risk from credit growth change. Finally, a compliance report should be submitted by banks to the BoU on a monthly to annual basis (BoU, 2013).

The BoU expect a rough conservative estimate of at least Shs650 billion in liquidity in order to help banks to be more resilient to any shocks the financial system might face in the future. However, there are many other banks that are still small in financial capability to meet up with the requirement specified by BoU. Such banks may suffer in the case of financial crisis. Listed commercial banks such as Stanbic, Standard Chartered and DFCU bank do not have problems with the capital threshold requirement as their capital reserves are higher than the requirement as specified by Basel III (BoU, 2013). Moreover, the BoU keep an eye on other banks to ensure compliance across banks and other financial institutions.

2.4.5 Banking regulations in Malawi

Malawi Banks are being regulated by the Reserve Bank of Malawi (RBM). The RBM issues regulatory guidelines for banks to comply with. The bank is saddled with the responsibility to ensure financial stability in the country by issuing guidelines and regulations for banks and supervises full compliance by commercial banks.

The RBM safeguarded banks from financial distress following the global financial crisis in 2007 – 2008; and enforced some guidelines and regulations on capital requirement. The guidelines, which are issued by the Bank of International Settlement, are practically on capital adequacy and liquidity risk management (BIS, 2010)

The Implementation of Basel III Accord in Malawi followed the new regulatory requirement for financial institutions issued by BIS. As previously indicated, the aim of the Basel III is to strengthen the transparency of banks through the regulated liquidity and leverage disclosures, and to mandate banks to provide the Reserve Bank with regular annual updates on their liquidity and leverage.

There has been an outpour of banks in Malawi to consider the implementation of the Basel III Accord; prior to the introduction of Basel III, the RBM had adopted the Basel I and Basel II Accord in her banking sector, but due to the gaps in Basel II Accord to safeguard the global economy from financial crisis that occurred in 2008, the RBM ensured full compliance with Basel III even though the implementation is a voluntary requirement for banks (RBM, 2012). The RBM monitors how banks manage their businesses and capital so as to survive a recession or market disruption while meeting minimum regulatory standards.

Basel III changed the structure of the capital framework of the Malawian Banks by creating three independent minimum capital ratios and supplementing them with buffers that can be drawn down in periods of stress. Banks are required to meet different ratios of common equity, Tier 1,

and total capital. These include the capital conservation buffer, the countercyclical capital buffer, and the systemically important banks buffer (BCBS, 2013).

According to the BCBS (2013), the capital conservation buffer requirement is based on expected capital buffer for all banks to keep a certain amount of funds to remain liquid in the event of financial crises. The capital buffer required ratio is not expected to change overtime. The regulations when fully implemented limit dividend distribution, share buy-back and bonus payment, and this facilitates the conservation of capital. The simplicity of the rule will help Malawian banks and other financial institutions when faced with the cash flow or liquidity challenges in the future. It is also important that the RBM consider the appropriate target level of capital, including capital buffers to ensure appropriate capitalisation without hindering the proper functioning and operational efficiency of the banking system (RBM, 2012).

The countercyclical capital buffer protects the financial system from periods of excessive credit growth that have been associated with the systemic risk. The primary objective of this buffer is to ensure that the Malawian banking sector has enough capital to maintain the flow of credit after a systemic shock. With the implementation of the Basel III, the RBM has some level of confidence that the banking sector and financial companies will survive any financial crisis that might occur in the future (RBM, 2012).

The Malawian financial service Act 44 (5) also specifies capital adequacy for banks with the following objectives: to ensure that banks have adequate cushion of capital to absorb losses; to protect the stake and interest of depositors, creditors and the general public; to ensure that banks maintain internationally recognised prudent capital requirements; and to promote self-discipline in the management of banks.

There is also a board of directors whose responsibility is to ensure that the Basel III implementation of capital adequacy is met. According to the Act, the responsibilities of the board are to ensure that banks are well capitalised and meet the regulatory requirement as prescribed in the Act. Furthermore, the responsibility of the board is to adopt a capital plan that outlines,

among other things, the bank's dividend policy, bonus and incentives policy, source of capital augmentation, capital allocation and expansion strategy, and to develop a comprehensive internal capital adequacy assessment process commensurate with the risk profile of the bank.

Furthermore, the capital requirement for Malawi bank as specified in the financial service Act (2018) indicates that a bank shall maintain a minimum core capital of Malawi Kwacha equivalent of five million United States Dollars (USD5,000,000.00) or such higher amount as the Registrar may determine. The Act also indicates that a leasing company or a discount house shall maintain a minimum core capital of Malawi Kwacha equivalent of one million five hundred thousand United States Dollars (USDI,500,000.00) or such higher amount as the Registrar may determine and for the purpose of transactionary capital computation. Finally, it indicates that the applicable exchange rate shall be the Reserve Bank of Malawi ruling middle exchange rate on the commencement date of the directive or an exchange rate as the registrar may prescribe in writing to a bank.

Moreover, the minimum core capital after conversion as prescribed shall remain the same until reviewed by the Registrar A bank shall maintain a minimum core capital ratio of ten percent (10%) of the capital requirement basis and a minimum total capital of fifteen percent (15 %) of the capital requirement basis. All deductions in unconsolidated financial institutions shall be fifty percent (50%) from core capital (Tier 1) and fifty percent (50%) from supplementary capital (Tier 2), and the bank is required to make deductions from Tier 2 capital. But if it does not have sufficient Tier 2 capital to make that deduction, the bank shall deduct the shortfall from Tier 1 capital.

The amount of supplementary capital (Tier 2) shall not exceed hundred percent (100%) of the bank's core (Tier 1) capital. Whilst the aggregate amount of subordinated debt that may be eligible and recognised by the Registrar as supplementary or Tier 2, capital shall be limited to fifty (50) percent of core capital. This will be on the condition that such subordinated debt shall be discounted by cumulative factor of twenty (20) percent per year during the last five years to maturity; be unsecured, uninsured and not be a deposit; have an original maturity of not less than

five years; be subordinated to claims of all depositors and general creditors of the bank; not be redeemable at the option of the holder prior to maturity, except with prior approval of the Registrar; and not require payment of principal or interest unless the bank is solvent and shall remain solvent immediately thereafter.

The Act further expressed that for a bank to have met all the capital requirements elicited, it must be in compliance with all the requirements of the Financial Services (Financial Asset Classification of Banks) Directive. The Registrar shall require a bank to hold capital against credit, market and operational risks, the basis of which are prescribed in respective guidelines. The Registrar may raise capital requirements for any specific bank where the supervisory review process reveals existing risks in the bank warrants the increase. Furthermore, the Registrar shall prescribe higher capital requirements for domestic systemically important banks; and the criteria for determining systemically important banks shall be prescribed by the Registrar through a directive.

In conclusion, the Act provides some enforcement which shall apply where banks fail to comply with the capital requirement. The enforcement includes a situation where the capital ratios of a bank fall below the ones prescribed in this directive. In that situation, shareholders shall inject additional capital in the amount prescribed by the Registrar within the prescribed timeframe. Furthermore, a bank that fails to comply with the capital requirements prescribed in this Directive shall be subjected to directions, administrative penalties and enforcement action as provided for under the Prompt Corrective Action Directive (PCAD).

2.4.6 Banking regulations in Tanzania

The main regulator of banking services in Tanzania is the Bank of Tanzania (BOT). The bank has the statutory authority to issue licenses and provide guidelines for commercial banks on their operations. As stated in the BOT (2012) schedule the regulations firstly ensure that banks and financial institutions maintain a level of capital adequate to protect them against the risk of loss that may arise from their business activities. Secondly, they ensure that banks and financial

institutions maintain capital adequacy standards in line with internationally accepted best practices. Finally, they promote and maintain public confidence in the banking sector.

According to the IMF (2014) report, the Bank of Tanzania, in collaboration with the Tanzania Bankers Association Limited developed and launched the Code of Conduct (CoC) to ensure strict adherence to best banking practices and continued commitment to ethical conduct and professional standards by its members and their employees.

The BOT (2012) issued some guidelines on the capital adequacy requirements to be met by Tanzania banks. The requirements as specified in the BOT regulations, states as quoted "A bank or financial institution shall commence operations with and maintain at all times a minimum core capital of not less than the amount indicated in the Schedule to these Regulations or such higher amount as the Bank may determine" (BOT, 2012).

Since the liberation of the banking sector in the 1990s, Tanzania has always been committed to implementing and adopting the Basel standards. It completed the implementation of risk-based supervision in 2009 and opted for selective implementation of Basel III standards shortly after that. This process took some time and as a result made the Tanzanian banking sector a cautious adopter of Basel III Standard. The liberalisation of the Tanzania financial sector came under the influence of IMF and World Bank. Moreover, a huge gap had emerged between the formal commitment to adopting Basel standards and the actual pattern of implementation and enforcement. Hence, the 2009 risk – based supervision led to the prioritisation of the Basel standard and under the leadership of the new internationally oriented Governor at the Bank of Tanzania (BOT, 2012).

The Bank of Tanzania has continued to implement prudential measure to strengthen risk management practise in the financial sector and to direct banks with high non - performing loans to formulate and implement some strategies to bring the capital ratio to at most 5%. It is important to note that compliance with the minimum capital adequacy ratios as set for Tanzania financial institutions in line with the Basel III Accord should include a core capital with

minimum of 8% of total risk weighted asset (RWA) plus risk weighted off balance sheet items; a core capital not less than 8% of its total deposit liabilities; and a total capital of not less than 12% of its total risk – weighted assets plus risk weighted off – balance sheet items.

Consequently, institutions licensed by the BOT are required to hold a capital conservation buffer of 2.5% above the minimum ratio to enable them to withstand a future period of financial distress. The total minimum core capital of RWA and total RWA requirements are 10.5% and 14.5% respectively.

2.4.7 Summary of the banking regulations in the selected African countries

The regulation of banks in South Africa, Nigeria, Kenya Malawi, Uganda, and Tanzania has evolved since the GFC. South African government adopted the global macro-prudential guidelines of the Basel III Accord as the pace setter and first adopter in Africa. They adopted the Basel III Accord in line with the South African Banking laws (SARB, 2013). The South African financial system made some structural adjustments to accommodate the Basel III new global liquidity requirement, such as the amendment to regulation 28 of the bank's regulations to the Pension Fund Act 1956 which allows banks access to more long-term financing (SARB, 2013). Also, the Act specifies that any bank that fails to comply with section 70 (minimum share capital and unimpaired reserve funds) or section 72 (minimum liquid assets), must report reasons for her inability or failure to comply (SARB, 2013), as non–compliance attracts a penalty deemed fit by the regulator.

Nigeria on the one hand adopts the Basel III framework through its central bank. The Central Bank of Nigeria (CBN) issued a circular to all the commercial banks to implement the Basel III Accord with the main focus on the regulatory capital, leverage ratio, liquidity monitory tools, large exposures, liquidity risk management and internal liquidity adequacy assessment process (CBN, 2011). These processes were implemented in phases, unlike the South African swift implementation of Basel III, the CBN run the Basel III concurrently with the Basel II already in place until it fully gained ground.

Kenya on the other hand, adopted the Basel III Accord to strengthen the regulation and stabilisation of its financial system. The CBK adopted the Basel III Accord on capital adequacy and liquidity management standards (IMF, 2014). According to Kenyan Bank Act, its prudential guidelines on capital adequacy require 1billion KES and 200 million KES as a minimum core capital for mortgage finance companies and KES200 million for financial institutions (CBK, 2010). Kenya's compliance with the Basel III core principles has significantly increased over time with its key driver being the CBK.

Also, Uganda adopted the Basel III Accord in alignment with its BoU mission, which is to foster price stability and a sound financial system within its economy (IMF, 2010). BoU played a pivotal role in the implementation of the Basel III Accord by formulating the macro-prudential policies aimed at mitigating systemic risks to the Ugandan financial system and ensuring financial sector surveillance to identify systemic risks, performing stress tests for plausible shocks and disruption in the financial system (BoU, 2013). These are put in place mainly to enhance the efficiency of the financial market within Uganda. BoU was the first regulator in East Africa to comprehensively adopt the Basel III guidelines on capital conservation (BoU, 2013).

Furthermore, Malawi through its reserve bank ensures financial stability in the country by issuing guidelines and regulations for banks and supervises full compliance by commercial banks. The RBM ensured full compliance with Basel III even though the implementation is a voluntary requirement for banks (RBM, 2012). By doing so, they monitored how banks manage their businesses and capital to survive a recession or market disruption while meeting minimum regulatory standards. The Malawian financial service Act 44 (5) also specifies capital adequacy for banks with the following objectives: to ensure that banks have an adequate cushion of capital to absorb losses; to protect the stake and interest of depositors, creditors and the general public; to ensure that banks maintain internationally recognised prudent capital requirements; and to promote self-discipline in the management of banks. Also, the capital requirement for Malawi banks as specified in their financial service Act (2018) indicates that a bank shall maintain a minimum core capital of Malawi Kwacha equivalent of five million United States Dollars

(USD5,000,000.00) or such higher amount as the registrar may determine and for transactional capital computation purpose.

More so, Tanzania through its reserve bank ensures that banks and financial institutions maintain a level of capital adequate to protect them against the risk of loss that may arise from their business activities (BOT, 2012). The Bank of Tanzania has continued to implement prudential measures to strengthen risk management practices in the financial sector and to direct banks with high non - performing loans to formulate and implement some strategies to bring the capital ratio to at most 5%. Also, financial institutions licensed by the BOT are required to hold a capital conservation buffer of 2.5% above the minimum ratio to enable them to withstand future periods of financial distress (IMF, 2014).

2.5 A Review of the impact of the Basel III Accords on banks

The Basel III implementation is an influential factor in the determination of banks' capital structure and performance, which encapsulates their stability, efficiency and risk-taking behaviour (Lee & Hsieh, 2013). According to the European Central Bank (2010), the performance of a bank can be explored through its ability to generate sustainable profitability. The banks' sustainable profits and distribution policies strengthen their capital position and protect them against unexpected losses. Furthermore, the bank's distribution policy enables them to invest their retained earnings to generate and improve future profitability.

Gadanecz and Jayaram (2015) indicate that a bank's performance is driven by five key elements which firstly, include the composition and volatility of its earnings; secondly, its operational efficiency or ability to generate revenue and profits from its assets and the ability to operate at a lower cost; thirdly, its stability or ability to withstand both internal and external shocks and distress; and fourthly, its capital structure or an optimal mix of debt and equity financing. Finally, the risk-taking element considers the adjustments made to the bank's earnings in relation to the risks it takes to generate them (European Central Bank, 2015). The impacts of these five elements on banks are discussed below.

2.5.1 Basel III capital requirements and banks' performance

A study conducted by de Bandt, Camara, Pessarossi and Rose (2014) analysed the effect of the Basel III capitalisation measures on the performance of banks which was measured by return on equity. Their research focused only on a sample of large French banks before and after the GFC. Their research showed that an increase in the capital base, as recommended by the Basel III framework, results in a proportional increase in the banks' ROE. This positive relationship appears to be as a result of the operational efficiency within the large French banks. De Bandt et al. (2014) conclude that the Basel III capital measures have a positive and significant impact on a bank's operational efficiency which consequentially has a positive effect on performance. This is because a bank's minimum regulatory capital enables it to generate and maintain sustainable revenue which is achieved at a reduced cost.

Similarly, Lee and Hsieh (2013) in their study of European banks, concluded that banks which were well-capitalised tend to be more profitable than those that were poorly capitalised. Furthermore, banks with a higher level of capital face lower expected bankruptcy costs for their investors and customers invariably reduce their cost of capital. In other words, well-capitalised banks can have access to funds at lower cost because they are considered as being less risky (deBandt et al., 2014; Lee & Hsieh, 2013).

Furthermore, de Bandt et al. (2014) claims that banks which have more capital make stronger monitoring and supervisory efforts. They make better lending decisions than they would do if they were less capitalised, and they can extract higher payments from the borrowers. Monitoring increases the probability that a company repays its loan, which increases the return to the bank. Hence, increasing the capital ratio is consistent with the maximisation of the profits which is in line with the Basel III capital regulatory framework.

In an investigation of how capital affects bank performance after the financial crises, Berger and Bouwman (2013) found a direct association and considerable impact of capital on bank profitability. They noted that while operating at international level, banking regulators demand

a high level of capital to ensure that the banks are more capable of taking extra risks associated with global trading. Gropp and Heider (2010) indicate there is a positive connection between the core capital and the earnings of the banks. They assert that more capitalised banks are more profitable because they have sufficient financial resources to invest in high return investments which generate higher returns for the banks (Gropp & Heider, 2010).

Al-Hares, AbuGhazaleh, and El-Galfy (2013) analysed the financial performance and compliance of the Gulf Cooperation Council (GCC) region with Basel III capital standard. Their study used bank-level data for 75 banks in Kuwait, United Arab Emirates, Kingdom of Saudi Arabia, Oman, Qatar, and Bahrain as their sample study. They used key financial performance ratio as a measure of financial performance on the sampled bank from the period of 2003 – 2011. Their findings showed that banks appeared to be largely sufficiently capitalised with Basel III. Thus, the GCC banks are well financially positioned to absorb higher provisions and impairment charges given the higher capital adequacy ratios reported by most of them.

A direct association between capital levels and the bank profit were respectively observed in two separate studies of European commercial banks by Lee and Hsieh (2013) and Lipunga (2014). The findings of these studies showed that capital plays a vital role in the performance of a bank because the banks that have higher capitals perform well as compared to undercapitalised ones. Lipunga (2014), further noted that banks are expected to absorb losses from their normal earnings, but due to unforeseen circumstances, there may be some unanticipated losses which cannot be absorbed by normal earnings. The capital buffer premium comes in handy on such abnormal loss situations to cushion off the losses. In this way, the capital buffer premium plays an insurance function (Udom & Onyekachi, 2018, Capgemini, 2014, Aspal & Nazneen, 2014).

Aspal and Nazneen (2014) further elaborate that adequate capital in banking is a confidence booster. It provides the investors, the depositors, the public and the regulatory authority with confidence in the continued financial viability and stability of the bank. Caggiano and Calice (2011) concurs that adequate capital provides confidence to the depositor that his or her money is safe; to the public that the bank will be, or is, in a position to give genuine consideration to

their credit and other banking needs both in bad and good times; and to the regulatory authority and the investors that the bank is, or will remain, in continuous existence.

Nguyen (2020) examined the impact of capital adequacy on bank profitability in the context of Basel III Accord implementation in Vietnam. Bank profitability was measured by return on assets and return on equity. Apart from the capital adequacy, other various potential determinants of profitability were also tested, such as bank-specific variables, (net interest margin, non-performing loans, non-interest income, ownership and regulatory variable which were proxied by the bank's application of Basel III Accords), and macroeconomic indicators (growth rate of gross domestic product, and inflation rate). The study used panel data regression analysis with a sample of 22 Vietnamese commercial banks for the period 2010-2018. Their paper revealed that bank capital adequacy, net interest margin, and non-interest income measures were positively correlated with profitability indicators while non-performing loan indicator and state ownership measure negatively effect on bank profitability. The study found that bank capital adequacy has a positive impact on return on assets for small-sized banks meanwhile it has no significant impact on profitability for large-sized banks in Vietnam.

Furthermore, Ajayi, Ajayi, Enimola and Orugun (2019) examined the effect of CAR on the profitability of Nigeria DMBs. They employed the regression analysis on eight banks using their published annual report. Their study reported a strong positive relationship between CAR and ROA of Nigeria banks. Furthermore, Abdul (2017) examined the impact of capital adequacy on the performance of Nigeria Banks using the Basel Accord Framework. His study employed the use of OLS estimator to analyse data collected from nine banks in Nigeria with foreign operation. Their findings showed that 76% of the variations in profit after tax (PAT) were caused by independent variables such as total assets (TA), loans and advances (LA), customer deposits (CD) and owners' capital (OC). This suggests that the level of bank performance was largely influenced by their capital adequacy proxies. The study, thus, recommended that banks' regulators should focus also on other methods to maintain financial strength and stability amongst Nigeria banks, such as supervisory review and market discipline.

Similarly, Mwai, Jagongo and Fredrick (2017) evaluated the relationship between Basel III capital requirements and financial performance of commercial banks in Kenya, they adopted descriptive and inferential research techniques of correlations and regression analysis to analyse the relationship between the variables. Their study used secondary data with a target population of 45 banks in Kenya. The findings of their study showed that capital requirements had positive linear relationship with financial performance of commercial banks in Kenya. They recommended that CBK should strengthen the capital requirements for commercial banks even more to ensure optimal performance and industry growth.

Ugwuanyi and Ewah (2015) and Zaagha (2016) investigated whether Basel III capital requirement as a regulatory tool in Nigeria enhanced bank performance. The findings of their study similarly showed that an improved capital base had a positive impact on banks performance. Similarly, Ikpefan (2015), Ejoh and Iwara (2014) and Ezike and Oke (2013) assessed the impact of capital adequacy on large commercial banks in Nigerian and found that capital adequacy played an important role in explaining bank returns on assets (ROA), which is a measure of bank performance among other performance variables.

Ayaydin and Karakaya (2014) conducted a similar study on Turkish commercial banks, investigating the impact of regulatory capital on a bank's profitability and risk. The study found that there was a positive relationship between capital and profitability. Furthermore, Ranga (2012) analysed the impact of the minimum capital requirements on the performance of commercial banks in Zimbabwe. Their findings showed that there was a significant and positive relationship between commercial banks capitalisation and its performance.

On the contrary, a number of studies did not find a positive and significant impact of Basel III regulatory framework on the performance of banks. Andaiyani, Hidayat, Djambak and Hamidi (2021) investigated the impact of Basel III buffer capital premium on regional development of bank profitability in Sumatra and Indonesia. Their study employed a time series of major regional development banks in Indonesia, and the methodology used in this study was a panel dynamic model using the Generalized Method of Moment (GMM) techniques. The findings of

their study showed that capital cumulation or increase through the implementation of Basel III counter – cyclical capital buffer policy did not have a significant positive impact on the profitability of the regional development banks in Sumatra and Indonesia.

Guidara, Soumaré, and Tchana (2013) conducted a study using the Canadian banks and concluded that there was no strong evidence that Basel III capital requirements positively impacted the return on equity which is a measure of performance. Moreover, Goddard, Liu, Molyneux, and Wilson (2010) concluded that a negative relationship existed between capital regulation and performance in banking of European Union member countries. Similarly, Taskinsoy (2013) conducted a study on the possible impact of Basel III on the financial performance of Turkish banks. He argues that the Basel III capital requirement had no significant impact on the financial sector of Turkey even though they maintained a very high CAR of 16%.

Furthermore, Lee and Chih (2013) and Agoraki, Delis and Pasiouras (2011) found that the capital adequacy ratio was relevant for small banks but irrelevant for large banks with market power in the Asian market. Similarly, the study of Kosmidou, Tanna and Pasiouras (2012) on European banks found that regulatory requirements had a negative impact on the return on equity and the return on assets of banks. Moreover, Onaolapo and Olufemi (2012) examined the effect of capital adequacy on the profitability of the Nigerian banking sector using OLS estimation. Their findings revealed that the capital adequacy framework did not have any significant impact on the performance of the Nigerian banking sector.

Nguyen (2020), Ajayi et al (2019), Abdul (2017), Mwai et al (2017), Udom and Onyekachi (2018), Zaagha (2016), Ikpefan (2015), Ayaydin and Karakaya (2014), de Bandt et al. (2014), Lipunga (2014), Al-Hares et al (2013) and Lee and Hsieh (2013) concur that the Basel III capital requirements have a positive impact on the performance of banks, whilst Andaiyani et al (2021), Guidara et al. (2013), Taskinsoy (2013), Lee and Chih (2013), Onaolapo and Olufemi (2012) and Kosmidou et al. (2012) observe that the Basel III capital requirements have a negative impact on the performance of the banks. In line with the previous findings, and contrary to findings of other studies, the current study expects Basel III capital requirements to have a positive impact

on bank performance. This is justifiable based on the premise that the overarching aim of Basel III Accord is to promote the financial performance of the banks through a higher and tighter capital requirement amongst others.

2.5.2 Basel III regulatory requirements and banks' stability and efficiency

Abbas and Younas (2021) explored the relationship between Basel III regulatory capital buffer and stability and growth of large insured commercial banks of the USA. Their study applied a two-step system Generalized Method of Moment (GMM) framework by taking the unique and comprehensive dataset over the period extending from 2002 to 2018. Their study found a countercyclical relationship between capital buffer and the stability and growth of the large US banks. They established that in the case of well-capitalised banks, this relationship was more critical than that for lowly capitalised banks. They found that counter-cyclicality low-liquid banks was more significant than for high-liquid banks. Their result remained consistent and robust with the use of the tier-1 capital buffer ratio on banks stability and growth.

Vasquez and Federico (2015) conducted a study on the effect of bank regulation on the stability of the British banks and found that an increase in a bank's minimum capital requirements according to Basel III increased the bank's stability. Similarly, Ugwuanyi and Enah (2015) and Ozili (2015) reported that having a higher capital base increased the stability of the Nigerian banks. Furthermore, Ugwuanyi and Enah (2015) and Ozili (2015) reported that the growth and stability of the bank was largely due to having more than 6% risk-weighted assets in reserves to meet unexpected economic uncertainties in accordance with Basel III. Ozili (2015) added that the stable Nigerian banks did not only meet the Tier 1 and Tier 2 capital requirements, nor the local N25 billion capital requirements set by the Central Bank of Nigeria; but they also met the internationally recognised Basel III Accord requirements.

In yet another study, Moudud-Ul-Huq (2019) examined the relationship of banks' Basel III regulatory capital buffers, risk and efficiency adjustments with cyclical movements. The study used dynamic panel data from 461 banks of the BRICS countries for the period 2007–2015. The

findings of this study showed that there was a positive and significant relationship between stability and business cycle for four countries except South Africa. This positive relationship suggests that the banks reported in the study were efficient except the ones in South Africa.

A situation similar to that of South Africa was reported by Vasquez and Federico (2012), Ugwuanyi and Enah (2015), Ozili (2015) and Banerjee and Mio (2018, 2017) who in their studies of the British banks did find an impact of the Basel III Accord on the stability of the banks. Similarly, Giordana and Schumacher (2017) found a negative effect of Basel III liquidity requirements on the stability of the Luxembourg banks. They reported that the Basel III requirements caused the Luxembourg banks to be more vulnerable to failure because of the tighter liquidity requirements that restricted their profitable banking activities and investments, which invariably severed their financial stability.

Applying the Basel III capital regulatory framework to examine the influence of capital requirements on commercial bank operating efficiency in 22 European Union countries, Chortareas and Ventouri (2012) found that increasing capital requirements improved the operating efficiency of the banks. Similarly, in the global study of 72 countries on the influence of bank supervision, regulation and monitoring on operating efficiency, Barth, Caprio and Levine (2013) found that banks from countries with more strict capital requirements and adherence to Basel III were more operationally efficient compared to those banks from countries with flexible bank capital regulations.

Lotto (2018) examined the impact of Basel III capital requirements regulation on bank operating efficiency in Tanzania. The data for the study were collected from the annual accounts of large commercial banks operating in Tanzania between 2009 and 2015. The study used the OLS estimator as a technique to analyse the study variables. The findings of this study showed a positive and significant relationship between Basel III capital ratio and bank operating efficiency. This suggested that the commercial banks in Tanzania with more stringent capital regulations were more operationally efficient. The relationship also showed that capital

adequacy did not only strengthen financial stability by providing a larger capital cushion but also improved the bank's operating efficiency.

Sutorova and Teply (2013) used standard supervisory procedures used by the World Bank to examine the relationship between bank technical efficiency and capital requirement. The findings of this study found a positive relationship between the above two variables. Similarly, Capgemini (2014) found that an increase in the level of capital had a significant impact on the cost-to-income ratio; which indicated that that higher capital regulatory requirements were associated with a more efficient behaviour from the European banks because the operating income increased more than the operating expenses.

In a study conducted on a sample of Kenyan commercial banks Odunga (2016) examined the determinants of bank operating efficiency and found that the Basel III capital adequacy was one of the most significant factors that positively affected a bank's operating efficiency. According to Odunga (2016), banks should increase their capital by managing their operating cost. This suggests that banks with more capital are more operationally stable and can easily survive financial down turns.

On the contrary, using the US bank sample, Berger and Patti (2006) studied the effect of bank regulations on profitability and efficiency and found that lower capital ratios increased the operating efficiency of banks. This suggested that a negative relationship existed between the higher capital regulatory requirements and the banks efficiency. On the basis of this negative effect, they argued that banks holding higher capital in reserve had little capital left to explore future unseen investment opportunities, and that reduced their level of revenue and profits and invariably caused a reduced operating efficiency. Furthermore, Altunbas, Carbo, Gardener and Molyneux (2007) examined the cross section of European banks and found a negative relationship between bank capital requirements and bank operating efficiency.

Similarly, Mashamba (2018) studied the effect of Basel III liquidity regulation on the profitability of banks in the emerging economics. This study used the GMM estimator to analyse

its variables on a sample of 40 banks operating in 11 emerging markets over the period 2011 to 2016. The findings of this study showed that regulatory pressure stemming from the Liquidity Coverage Ratio requirement diminished the profitability of banks in emerging markets, which invariably negatively affected the operational efficiency and stability of the banks in the emerging markets.

Abbas and Younas (2021), Moudud-Ul-Huq (2019), Lotto (2018), Odunga (2016), Vasquez and Federico (2015), Ugwuanyi and Enah (2015), Ozili (2015), Capgemini (2014) and Barth et al. (2013) indicate that the Basel III regulatory requirements have a positive impact on the stability and efficiency of the banks. Contrary to that Banerjee and Mio (2018), Mashamba (2018), Giordana and Schumacher (2017) and Carbo et al. (2007) argue that Basel III regulatory requirements have a negative impact on the stability and efficiency of the banks. In line with the previous findings, and despite the controversial results reported by various authors, the current study expected Basel III regulatory requirements to have a positive impact on the stability and efficiency of the banks. This seems justifiable based on the premise that the overarching aim of Basel III Accord is to promote banks stability and efficiency through a higher and tighter capital requirement amongst other factors.

2.5.3 Basel III regulatory requirements and risk-taking behaviours of banks

The term risk, according to Milkau (2017) has been in existence for decades referring to uncertainty of future outcomes associated with some decision making. Risks and risk-taking are two co-related while relatively independent concepts. The core intention of enterprise decision-making is to maximise the values under the condition of limited internal resources (Francis & Osborne, 2012). However, during that period companies have to face external uncertainties, which may bring either benefits or losses to them. In commercial banks the term risk refers to the uncertainties that they face in terms of gains and losses in their business processes (Tan & Floros, 2013).

The Basel III Accord classifies the main bank risks as credit risk, market risk, liquidity risk and operational risk amongst other risks. In the banks' decision-making process, the attitude and amount of risk taken by the decision makers depends largely on their risk appetite, consideration of other internal and external factors as well as on other prudential regulatory guidelines such as the Basel III Accord (Klomp & Haan, 2012).

Haq and Heaney (2012) define risk as an appetite of selection among variety of alternatives with different levels of uncertainties. They indicate that the risk-taking behaviour of banks refers to their appetite to choose, among varieties of projects, investments or ventures with different levels of uncertainties and expected cash flows. Saldias (2013) argues that the level of risky decisions available to and made by banks as regards investments, projects and or ventures is greatly important as it determines their performance. As a result, banks have to make appropriate risk choices in order to maximise and maintain their performance in the form of profitability, stability and efficiency (Demirguc-Kunt, Detragiache & Merrouche, 2013).

The study of Karim, Hassan, Hassan and Mohamad (2014) showed that there was a significant relationship between the level of bank-capital and risk-taking behaviour of banks. According to Nazir, Daniel and Nawaz (2012), the majority of the studies conducted in Europe and the U.S banking sectors showed a positive relationship between the Basel III capital regulatory requirements and the banks' risk taking. This implies that highly capitalised banks have no excess available capital at their disposal and that protects them from making unnecessary or risky investment and business decisions. The investment decisions are carefully made after an elaborate scrutiny of the risk level and probable returns. Similarly, Jokipii and Milne (2011) used a sample of the US banks and found a positive association between capital and risk-taking behaviour of highly capitalised banks.

Moreover, Kamran, et al. (2016) conducted a study on 26 banks in Pakistan and found that the Basel III capital requirements had a significant and positive effect on the risk-taking behaviour of banks, both in the long-run as well as, in the short-run. Specifically, the results of their study revealed that the capital adequacy ratios (proxy for bank-capital), and the ratio of risk-weighted

assets (proxy for risk-taking) along with the bank-size; interest rate and its profitability ratios were interrelated in the long-run. Their estimated long-run coefficients showed that the effect of capital on risk taking behaviour was positive and significant.

In another study, Klomp and Haan (2012) and Agoraki, et al. (2011) explored the impact of Basel III regulatory requirements on the bank risky assets. By doing an estimation using data from the European banks, they concluded that increases in bank capital requirements reduced the overall risk-taking behaviour of banks. They further explained that the limited capital requirements could strongly restrict the banks to take risk and also, significantly decrease the non-performing loans.

Similarly, Lee and Hseih (2013) used the data of Asian banks to explore a statistical relationship between the level of capital and the risk of banks by using the generalized method of moments (GMM) estimation technique. They concluded that bank capital was significantly and positively related to the risk-taking behaviour of banks. They justified their findings by stating that a higher level of capital would lead to enhanced profits of banks and in turn the banks would take more risk.

By using a sample of banks of the OIC countries, Karim, et al. (2014) confirmed a positive association between the banks' risk- taking behaviours and capital levels. The OIC countries have a mixed banking of large capital-based banks and the small capital-based banks. Karim, et al. (2014) therefore, estimated the model for the two types of banks aforementioned separately. Their results suggested that with increase in bank capital, the small capital-based banks tended to make more investment decisions on risky assets because they had high appetite to grow and to survive in the competing markets.

Ha and Quyen (2018) indicate that banks facing lower funding liquidity risk, based on the Basel III liquidity requirements, take more risk. They further posit that banks with higher deposits do not have liquidity problems in the short-term and will not be under pressure to take risks that could give rise to liquidity crisis, hence, have a lower risk appetite. However, a bank facing

liquidity problem is under pressure and will have a higher risk-taking behaviour in an attempt to respond to the profitable expectations of owners, investors, or related others.

Tabak, Fazio, Cajueiro (2013) focused on how bank size and market concentration affect performance and risk-taking behaviour under the Basel III regulatory guideline of 17 Latin American banks. On one hand, their study found that large size banks have benefitted more from their risk-taking behaviours than small banks. On the other hand, bank size may also be negatively related to banks' risk-taking behaviours. Under the Basel III Accord, banks are allowed to choose based on their actual situation between the standard method and internal rating method in calculating their capital adequacy ratio which is a measure of Basel III regulatory capital. This choice or selection entitles the large based capital banks to enjoy more competitive advantage with overall lower appetite for risk-taking. Similarly, Hakenes and Schnabel (2011) analysed the relationship between bank size and risk-taking under the Basel III Accord with an internal rating based (IRB) method. The findings of their study showed that smaller banks had higher risk-taking behaviour under the framework of the Basel III Accord as compared to the larger banks. They justified their findings by stating that small banks were risk takers with high appetite and zeal to grow and compete within the available market.

On the contrary, Ashraf, Arshad and Hu (2016) and Tan and Floros (2013) found that capital adequacy requirements (CAR) were negatively and significantly related to risk-taking behaviour of Chinese banks. They argued that banks with higher liquidity preferred to maintain higher levels of capital. Furthermore, Bouheni, Ameur, Cheffou and Jawadi (2014) concluded that minimum CAR could decrease the level of risk in banks as it serves as the minimum threshold that banks' capital should not fall below in the usage or holding of their capital. Moreover, they explained that the CAR might increase profitability and boost the performance of European banks because it determined their risk-taking behaviour. Moreover, Jokipii and Milne (2011) used a sample of the U.S. banks and found a negative association between capital and risk-taking for banks with marginal capital adequacy ratios.

Rahman, Chowdhury and Dey (2018) analysed the relationship between risk-taking behaviour, Basel III capital regulations, and performance in the banking sector of Bangladesh. Their study employed a panel data with observation from 38 commercial banks for the period of 2007–2016. They employed the GMM estimation technique. Their findings revealed that there was significant and negative relationship between risk taking and capital regulation. The implication of their findings is that banks might be risk averse in considering the impact of the Basel III regulations on their risk appetite and performance.

In another study, Ning and Lee (2015) studied the impact of minimum capital requirements on risk-taking behaviour of Chinese banks, using bank-level panel data. Specifically, a sample of 171 Chinese banks was used in the study. The study found that capital was significantly and negatively associated with risk-taking activities of the sampled banks. They justified their findings by stating that high capital requirements could constrain banks from taking high risk. Similarly, Selma, Rajhi and Rachdi (2016) analysed the data of 30 commercial banks of the MENA region. They concluded that capital adequacy ratios and investment in risky assets was significantly and negatively associated.

Further research by Milkau (2017), Kamran, et al. (2016) and Karim et al. (2014) found that the Basel III regulatory requirements had a positive impact on the risk-taking behaviour of bank whilst studies of Rahman et al (2018), Ha and Quyen (2018), Ashra et al. (2016), Selma et al. (2016), Bouheni et al. (2014) and Lee and Hseih (2013) concluded that the Basel III regulatory requirements had a negative impact on the risk-taking behaviour of the banks. In line with the previous findings, and despite the controversial results of various authors, the current study expected Basel III regulatory requirements to have a negative impact on the risk-taking behaviour of banks. This is justifiable based on the premise that the overarching aim of the Basel III Accord is to promote risk management and enhance risk coverage within the bank through a higher and tighter capital requirement amongst others.

2.5.4 Basel III regulatory requirements and the banks' capital structure

The impact of the Basel III Accord in determining the financing choices and capital structure of banks cannot be overemphasised. The current Basel III guidelines have been amended in respect of the capital structure, constraining the elements of capital that are eligible for inclusion in the definition of regulatory capital (BIS, 2010). Ramli, Latan and Solovida (2019), and Chadha and Sharma (2015) posit that the capital requirement and the new liquidity framework also have the capacity to influence the choices and decisions made by those charged with the governance of the bank. They further indicate that financing decisions play a vital role on the performance and stability of the financial institution.

Similarly, Lim (2016) observes that a bank can decide to finance its projects with common stock, preferred stock or debt. These elements are components of the bank's capital structure. On the one hand, the financial institution raises equity in the form of common and preferred stock, which is held by the owners of the bank. A long-term relationship exists with these equity holders, who hope that the firm will have high growth in the future and who expect regular dividend payments. On the other hand, debt can be made of loans payable, bonds, notes payable, and debentures amongst others. The debt holders, such as the individual and the institutional investors, do not have any long-term commitment to the bank except in the case of irredeemable debentures. This is because they are mainly interested in the repayment of the principal amount and the interest. Most importantly, for the bank, the depositors' funds are regarded as capital, through short term funds (De Silva, Chinna & Azam, 2019; Aboura & Lépinette, 2015).

The main function of capital is to finance the banks' operational activities and acquisition of assets. Moreover, bank capital is needed to protect the bank from all kinds of unsecured and uninsured risks that may turn into losses. According to Gobat et al (2014), capital has a loss-absorbing function that allows the bank to cover any losses with its own funds, and thus, any loss that occurs decreases the bank's capital. Furthermore, the interest margins and other spreads have sufficient capacity to cover the ordinary expenses that ensue from the normal course of business activities.

The most important risk for which the financial institutions need equity concerns the borrower default, and that makes some assets partly or entirely irrecoverable (Goyal, 2013). Furthermore, capital has a confidence function because it convinces the bank's creditors and the depositors that their deposits and assets are safe. The ability of banks to absorb losses indicates that they are able to use their assets to cover the liabilities, which builds and sustains their credibility (Gobat et al., 2014). Dermirguc-Kunt et al. (2013) indicate that funding through equity places a restrictive capacity, which places some limits on various banking transactions and prevents banks from taking risk that is too high. Thus, the capital structure of banks runs within the scope of the Basel III Accord through the minimum capital requirements, buffer requirements and the leverage requirements.

As previously indicated, the main objective of the Basel III Accord is to increase a bank's stability (BCBS, 2010). Chun, Kim and Ko (2012) suggest that the increase in the capital requirements and a higher proportion of equity funding, as compared to debt funding, restricts a bank's ability to lend, which in turn affects its main operational activities and stability. Conversely, Admati, De Marzo, Hellwig and Pfleiderer (2013) argue that banks can restructure their financing decision and make significant changes to their capital structure without having a negative impact on their performance or ability to lend to the public through asset liquidation, recapitalisation and asset expansion. Firstly, banks can achieve these by scaling back the size of their balance sheet in a significant way by liquidating a certain proportion of their assets and reducing their liabilities by using the proceeds from the assets. They can also recapitalise, by issuing an amount of additional equity, removing the same amount of liability and raising additional equity capital in order to expand the balance sheet and use the proceeds to acquire new assets (Admati et al., 2013).

Gavalas and Syriopoulos (2018) analysed the Basel III accord index on the main banks' leverage. Their study examined nine Brazilian banks for the period of five years from 2012 – 2016 employing both descriptive and inferential statistics to analyse their data. The major estimator used in their study was the ordinary least square estimator. The findings of their study showed that Brazilians banks suffered a direct impact on the capital structure with regard to regulations

and their size. This is because the concentration of the sector produced a structure that sought the efficiency of bank activities. The findings also showed that there was a positive relationship between the Basel III index and the leverage size of the Brazil financial institutions.

Similarly, Klefvenberg and Mannehed (2017) investigated the extent to which the capital structure of Swedish bank was affected by the implementation of Basel III. The methodology of their study focused on the use of OLS multiple regression analysis. Furthermore, their study focused on the relationship between capital structure and the implementation of Basel III Accord. The findings of their study showed that Basel III Accord caused a decrease in the capital structure and that affected some of the determinants of capital structure of the Swedish banks. They concluded that the findings were probably influenced by the current Sweden negative repo rate policy.

Furthermore, Gabriel (2016) analysed the impact of Basel III capital requirement on the capital structure of European banks. The purpose of this study was to empirically test the relationship between the new regulatory capital requirements and the leverage and performance of the European banks. The study selected a sample of European banks, and employed regression analysis to examine the relationship between the Basel III regulatory requirement and the capital structure levels. The findings of this study showed that a positive relationship between the variables existed.

In contrast, Okahara (2018) analysed the capital structure and the effect of regulating the banks' capital adequacy ratios, or, the ratio of equity financing to risky assets. Specifically, the study investigated whether bank lending decreased when the banks raised their CAR to satisfy the regulation. The study employed a model in which households had bargaining power with regard to deposits, and in which a bank we compelled to adjust its capital structure indirectly through the households' decision-making. The study further postulated that a bank with bargaining power always chose to use equity financing more, and that as a result there was no probability that the bank lending would decrease. In other words, the findings showed a negative relationship between capital adequacy ratio and the level of bank leverage.

Gavalas and Syriopoulos (2018), Klefvenberg and Mannehed (2017) and Gabriel (2016) conclude that the Basel III regulatory requirements have a positive impact on the leverage of banks. On the other hand, Okahara (2018) and Chun et al (2012) hold contradicting views to the above conclusion. In line with the previous findings, and despite the inconclusive results of some studies, the current study expected the Basel III regulatory requirements to have a positive impact on the capital structure of banks. This is justifiable based on the premise that the overarching aim of the Basel III Accord is to strengthen the capital base of banks in order to promote their resilience and stability through redefining what constitutes their capital structure component.

2.6 Theoretical perspective of banks' capital structure

An understanding of the capital structure theory provides useful insight into the financing behaviours and choices made by those charged with the governance of a bank. A brief review of the various existing capital structure theories is discussed below.

2.6.1 Traditional theory of capital structure

From the traditionalist perspective, the cost of debt capital is cheaper than the cost of equity finance due to the risk involved and the tax effect. Most importantly, risk is the main determinant of cost and debt is less risky as compared to equity; hence, it has a lower expected rate of return.

Assuming perfect capital markets, it would be best for a firm to increase its debt capital to very high levels (Rajagopal, 2011). However, this is usually not the case, because as the level of borrowing increases so does the financial risk of the firm (Yapa, 2017). Ordinary shareholders become aware of this increase in risk and will require a greater return to compensate them for it. As a result of the increase in risk, the cost of equity would increase as well. Similarly, as debt providers notice the increased financial risk of the firm, they require a greater return for additional levels of debt to compensate them for the risk. Thus, the cost of debt would increase, causing an increase in gearing.

Due to the relationship between risk and return, the overall cost of capital of a firm falls as the debt financing reduces. Furthermore, as the financial risk increases with an increase in debt financing/gearing, the overall cost of capital increases as well. This traditional view of capital structure gave rise to the concept of optimal capital structure which simply states that there exists a mix of debt and equity where the value of the firm is maximised and its cost of capital is minimised (Rajagopal, 2011). Given this argument; firms should therefore strive to achieve this optimum mix as it results in the maximum value of the firm (Atrill, 2009).

It is important to note that Yapa (2017) indicates that the main problem with the traditional view is that it does not clearly show by how much and at what level the cost of equity should increase because of the risk and worries of high gearing. Furthermore, it is not clear as to what level the cost of debt should increase because of the worries of default risk. Moreover, in the traditional view of capital structure, ordinary shareholders are relatively uninterested in the addition of small amounts of debt in terms of increasing financial risk, and as a result the weighted average cost of capital (WACC) falls as a company gears up (Ban & Chen, 2019). However, as gearing increases beyond the optimal capital structure level, the cost of equity increases, and investors demand higher premium on their investment. Menichini (2017) further indicates that the traditional theory remains a purely descriptive theory and less practical in the real world.

2.6.2. Modigliani and Miller Propositions

Moving from the traditional views of capital structure, the modern capital structure theory was founded upon the work of Modigliani and Miller (1958). The MM (1958) theory of capital structure is referred to as the irrelevance proposition. It suggests that a firm's financing decision does not have an effect on its value. This suggests that the value of a firm depends on the income generated by its assets, and not by how the assets are financed (Yapa, 2017). This proposition is held on the perspective of a perfect world, where four assumptions prevail. These assumptions are: no corporate taxes, perfect capital markets, no bankruptcy costs, no information asymmetry and no agency costs (M&M, 1958). According to Menichini (2017), this proposition is flawed when applied to reality which is an imperfect market.

According to the MM proposition (1958), the overall cost of capital remains constant at various levels of gearing. As the firm takes on larger amounts of cheaper debt financing, the financial risk of the firm increases. Ordinary shareholders would now require a greater return to compensate them for this increase in financial risk. The increased return that is required by ordinary shareholders negates the benefit of any cheaper debt financing and results in the average cost of capital staying constant (Atrill, 2009). Based on the premise that the MM proposition of 1958 was without tax involvement amongst other flaws such as the perfect market assumption, they reviewed the proposition in 1963 with the inclusion of corporate taxes and market imperfections.

Unlike the MM (1958), the revised view of MM (1963) proposes that where debt financing increases, the overall cost of capital decreases. The involvement of interest on debt in the MM (1963) lowers tax burden. According to Yapa (2019), interest on debt is an allowable expense when determining a firm's tax liability. Invariably, it has an effect of shielding corporate profits which benefits ordinary shareholders. Furthermore, Vigario (2002) and Asaf (2004) argue that as the level of debt increases so too does the tax benefits which offset some of the risk that the ordinary shareholder would require as per the first proposition of MM (1958). As the increases in the required return by ordinary shareholders is lower than the benefits of debt, the overall cost of capital decreases as the level of borrowing increases.

In the absence of bankruptcy costs and financial distress implications the MM (1963) promotes high levels of debt financing due to the after-tax cost of debt being lower that the cost of equity and its resultant decreasing of the overall cost of capital to the firm. To continue in this manner, the optimal level draws towards a 100% level of gearing since the WACC decreases with the increase of debt financing (Atrill, 2009). The revised proposition of MM (1963) is a closer gauge to the traditional theory as it also recognises the relationship between the firm value and its level of debt financing. This recognition supports the existence of an optimal level of capital structure (Brigham & Ehrhardt, 2005).

2.6.3. The Trade-off theory

After the MM (1958, 1963) propositions of capital structure had been criticised in numerous ways the Trade-off theory emerged. The Trade-off theory, which is a modern theory of capital structure, was proposed by Kraus and Litzenberger (1973) to negate the very restrictive set of assumptions of MM (1963), which was basically their omission of the financial distress and agency cost by advocating for a 100% gearing to benefit from the interest tax shield. Kraus and Litzenberger (1973) posit that firms have an optimal financing mix when firm values are maximised. According to Myers (2001), the optimal mix occurs at a point where the marginal benefits of tax shields are equal to the marginal agency and financial distress costs to determine the optimum level of debts that a firm ought to issue to maximise its market value.

According to the trade-off theory, a firm must decide on a target debt ratio which maximises its value and then slowly move towards that target debt ratio. Myers (2003) posits that the optimum capital structure occurs in a debt-equity mix where the present value of benefits, including the tax shield from debt financing, is just offset by the present values of bankruptcy costs, agency costs and asymmetric information. This suggests that at optimal capital structure, WACC is minimised whilst the value of the firm is maximised. In other words, the Trade-off theory incorporates the costs of financial distress, tax, bankruptcy costs, agency cost and asymmetric information into the capital structure decision.

In general, Trade-off theory recognises that firms have different capital structures and it does not promote a one-size-fits-all approach. The theory predicts that firms with fairly high-profit levels and safe fixed assets may have high target debt/equity ratios as they have larger profits to benefit from the interest tax shield, as well as from the cash flow to service interest payments without incurring adverse financial distress costs. Chipeta and McClelland (2018) added that profitable firms with sufficient taxable income to shield increases their leverage. This assertion is based on the tax deductibility of interest payments on debt. On the other hand, firms that are experiencing losses in their earnings and risky assets may choose to rely more heavily on equity funding (Myers, 2003). This suggests that the capital structure decisions are tied up to individual firm-

specific factors such as size, asset tangibility, and profitability (Effendi, 2017, Rasiah & Kim, 2011).

The Trade-off theory consists of the static trade-off theory and the dynamic trade-off theory (Shahsavaripour & Heydarbeygi, 2022; Susilo, Wahyudi & Demi Pangestuti, 2020; Effendi, 2017; Hovakimian, Opler & Titman, 2002). The static trade-off theory postulates that firms set a target debt-to-value ratio and gradually move towards it, the same way that firms adjust dividends to move towards a target dividend payout ratio (Shahsavaripour & Heydarbeygi, 2022). According to Frank and Goyal (2008), the static trade-off theory is premised on firms choosing a financial policy that predicates upon comparing the costs and benefits of debt, and that are derived from the optimal capital structure, such as the tax advantage of debt, the alleviation of free cash flow agency costs, the costs of financial distress as well as the agency costs of stakeholders. Also, Rasiah and Kim (2011) indicate that with the static trade-off theory, the firm's leverage follows a one-period trade-off between bankruptcy costs and tax benefit of debt.

However, Myers (2001) observes a weakness in the static trade-off theory which is its immediate limitation on the tax front. He explains that the static trade-off theory seems to rule out conservative debt ratios by taxpaying firms. If the theory is right, a value-maximising firm should never pass up interest shields when the probability of financial distress is remotely low. Yet there are many established profitable firms with superior credit ratings operating for years at low debt ratios. Furthermore, Frank and Goyal (2008) indicate that the static trade-off theory is difficult to empirically test since its elements are not directly observable.

The static trade-off theory predicts that firm leverage is positively associated with profitability, effective tax rate, and firm size. It further predicts a negative association between leverage and growth without debt tax shields such as investment tax credits and depreciation (Mvita, 2020, Leary & Roberts, 2005; Rasiah & Kim, 2011).

Hovakimian, Opler and Titman (2002) point out that the static trade off theory was replaced with a more relevant dynamic trade-off theory, which contends that target leverage ratios in firms are rarely static. Furthermore, Fischer, Heinkel and Zechner (1989) indicate that with the dynamic trade-off theory, the capital structure decision is a continuous one, and different firms allow the actual leverage ratio to deviate from the target ratio by different amounts. Ju, Parrino, Poteshman and Weisbach (2005) further indicates that the cost of deviating from the target is very small and is less than 0.5% of the firm value, and thus, the observed leverage ratios fluctuate around the target within an acceptable range

Furthermore, the dynamic version of the trade-off theory implies that firms passively accumulate earnings and losses, letting their debt ratios deviate from the target as long as the costs of adjusting the debt ratio exceed the costs of having a suboptimal capital structure (Shahsavaripour & Heydarbeygi, 2022; Frank & Goyal, 2009). According to Elsas and Florysiak (2011), the rate at which the target deviation spreads is measured by the firms' speed of adjustment. Nonetheless, the adjustment to the target deviation spread cannot be immediate because of the firm specific adjustment costs, such as the information asymmetry cost, transaction costs and the opportunity costs of deviating from the target leverage (Hovakimian & Li, 2011). According to Drakos (2012), the adjustment speed of a bank is determined by its capital base, size, amount of liquid assets, and level assets volatilities.

In contrast to the static trade-off, a dynamic capital structure strategy initially uses much less debt (Dangl & Zechner, 2004). Furthermore, Dangl and Zechner (2004) propounds that a dynamic recapitalisation strategy anticipates the fact that debt will be increased if the firm value increases by a sufficient amount. According to Hovakimian et al. (2004), firms that were highly profitable in the past are likely to be underleveraged, while firms that experienced losses are likely to be overleveraged. Furthermore, this suggests that profitability will have a positive effect on the probability of debt versus equity issuance. In a nutshell, the dynamic perspective of the trade-off theory expresses that the optimal financial choice today depends on what the optimal choice tomorrow is expected to be (Frank & Goyal, 2009). A fundamental argument against the dynamic trade-off theory is that corporate income tax is only about a century old, whereas debt

financing has been around for much longer than that as the only benefit of it would be tax deductions (Chakrabarti & Chakrabarti, 2019; Frank & Goyal 2008).

The dynamic trade off theory predicts that in the absence of adjustment costs, firms continuously adjust their capital structures to maintain the value-maximising leverage ratio (Leary & Roberts, 2005). In essence, this suggests that firms have an optimal capital structure and will always gravitate towards this target capital structure. Moreover, the dynamic trade-off theory predicts that firm leverage is positively associated with profitability (Frank & Goyal, 2009; Hovakimian et al., 2004; Lemma & Negash, 2014).

As businesses with distinctly high leverage ratios banks are expected to have a higher probability of bankruptcy (Rasiah & Kim, 2011). However, they are closely regulated with regard to their minimum capital requirements in line with the Basel III Accord which helps them to lower the chance of insolvency. In relation to the dynamism of the trade-off theory and the continuous changes and possibilities in debt-to-equity ratios, the banks can only adjust their discretionary capital and abide by the minimum capital prescribed by the Basel III Accord (Baker & Wurgler, 2002).

In short, on the basis of the prior empirical studies (Leary & Roberts, 2005; Rasiah & Kim, 2011; Lemma & Negash, 2014), it appears that it could be argued that the trade-off theory is better positioned to explain the financing behaviour of banks. Its predictions relating to the relationship between leverage and profitability, leverage, and asset tangibility or leverage and size are highly supported by empirical evidence.

2.6.4. The Pecking order theory

Myers and Majluf (1984) developed the pecking order theory of capital structure which rejects the idea of target leverage and optimal capital structure (Hovakimian, Opler & Titman, 2002). According to the pecking order theory, firms minimise their time-varying adverse selection costs by relying more on internal finance. Chipeta and McClelland (2018), Leary and Roberts (2010)

and Moyo (2015) argue that in a situation where the firms are faced with an internal funds' deficit, they follow a hierarchy in raising external finance and issue security with the least informational costs.

According to Tong and Green (2005) and Chirinko and Singha (2000), this financing hierarchy descends from internal funds (retained earnings) to low-risk debt, as well as to hybrid instruments and external equity. Yapa (2019) posits that management gives preference to internal funding because it is a cheaper way of raising finance as compared to equity which has a resultant decrease effect on the overall cost of capital of the firm.

The pecking order theory of Myers and Majluf (1984) is based on the existence of information asymmetry between managers and investors. Unlike the trade-off theory discussed earlier, the pecking order theory assumes that managers or insiders have more information regarding the firm's potential future earnings than investors or outsiders. This information is referred to as information asymmetry (Rasiah & Kim, 2011). The information asymmetry in business, according to Yapa (2019) is a situation where the managers, who are the insiders, have more information about the firm's future earnings than the investors (outsiders). This implies that, the manager who is a party and an insider possesses more information than the investor or shareholder who is also a party but an outsider. Thus, the pecking order minimises the firm's financing and information asymmetry costs and thereby maximising its value.

The pecking order theory takes a different view as regards the idea of optimal capital structure that was proposed by both the dynamic and static trade-off theories of capital structure. According to the pecking order theory, the capital structure decision is driven by the cost and size of a firm's internal funds deficiencies. Shyam-Sunder and Myers (1999) posit that the internal funds deficiency is a function of the firm's profitability, capital expenditure, changes in working capital, dividends paid, current portion of long-term debt and cash flow from operations. Thus, to minimise external financing costs, firms finance their internal funds deficiencies through sticky dividend policies which increase the levels of retained earnings and thus minimise the internal funds deficiency gaps. Tong and Green (2005) further indicate that firms issue

securities in a pecking order starting with a low-risk debt and followed by the hybrid instruments and lastly the high-risk equity instruments.

Bartoloni (2013) assert that the pecking order theory has the following implications: Firstly, firms do not have target capital structures. Their capital structures result from a series of short-term financing choices viewed over the long-term. Secondly, highly profitable firms make less use of debt, and their need for external financing is limited or minimal (Chakrabarti & Chakrabarti, 2019; Moyo, Wolmarans & Brümmer, 2013; Leary & Roberts, 2010; Ross, Westerfield, Jaffe & Jordan, 2008; Shivdasani & Zenner, 2005). Finally, the marginal costs of financing new projects are not a priority for the firms because their financial capacity allows them to fund future projects in advance. Profitable firms use available funds to pursue opportunities when they arise rather than waste time and cost in approaching the capital markets (Baker & Wurgler, 2002). However, it should be cautioned that excess availability of cash might increase management's risk appetite and temptation to invest in projects that do not add value to the firm (Assfaw, 2019; Myers, 2001).

The pecking order theory predicts a negative relationship between leverage and profitability (Elsas, Flannery & Garfinkel, 2014: Bartoloni, 2013; Antoniou et al., 2008). This implies that profitable firms are more inclined to tap into retained earnings to fund their investment and project requirements than to use debt or seek alternative external capital markets.

According to Krugman (2009), the pecking order theory relates to the moral hazard hypothesis as it addresses the special case of information asymmetry. The moral hazard hypothesis is a situation in which one person decides how much risk to take, while someone else bears the cost if the situation backfires. In the banking sector, the moral hazard problem is closely related to deposit insurance. McCoy (2007) identifies two types of deposit insurance, namely implicit and explicit insurance. Most governments are reluctant to allow bank insolvency without some compensation to depositors. Thus, they extend depositors some kind of financial safety net, signal implicit guarantees by bailing out failed banks, and as a result send the message that other bailouts would be available in case of future bankruptcy (Ahmed et al., 2010). The explicit

deposit insurance, as suggested by its name, is a more formal commitment to guarantee deposits, usually through legislation. Insured deposits do not require much risk premium, and hence reduce borrowing costs for banks. To mitigate the moral hazard of such insurance, banks are required according to Basel III Accord to hold a minimum amount of capital, limiting their capital mix flexibility and monitoring their risk-taking behaviours (Ahmed & Shabbir, 2014).

In a nutshell, the pecking order theory is one of the most plausible information asymmetry theories that have been put forth to explain the financing decisions of firms; and there is strong empirical support for its predictions relating to leverage, profitability, firm growth and size (Assfaw, 2019; Lemma & Negash, 2014; Ahmed & Shabbir, 2014; Ahmed et al., 2010; Frank and Goyal, 2009). The pecking order theory derives much of its influence from a view that it fits naturally within the firms' financing hierarchy (Frank & Goyal, 2003). Just like any other firm, and within the scope of the Basel III Accord and the minimum capital requirements, the pecking order theory is plausible in explaining the financing behaviour of banks as banks also consider the benefits and costs accrued to each of the available funding sources, and thus, adopt the cost-efficient source within their capital structure.

2.6.5. The Signalling theory

Similar to the pecking order theory, the signalling theory also resulted from the concept of asymmetric information and was brought to the limelight through the work of Ross (1977). According to Ross (1977), the signalling theory states that financing choices signal management's confidence about the prospects of the firm. This implies that investors view the actions of management as a signal regarding the future of the firm earnings and transfer of information.

Besley, Brigham and Sibindi (2015) define signalling as an action taken by a firm to provide clues to investors about how management views the future of the firm. Therefore, managers, in exercising their choice of capital structure, will send out a signal to the market. Furthermore, Ross (1977) posits that the value of a firm will increase with the addition of leverage as the

increased leverage sends a signal to the market and improves the market's perception of the firm's value. However, Tsai (2008) opines that the increase in leverage can be a costly signal for a firm.

Ross (1977) further states that the increase of leverage can be a credible signal for a firm with an expectation of higher future cash flows. A good firm would adopt a higher debt ratio than a poor firm as the manager of a good firm would be confident of the future prospects of the good firm due to insider information of the good firm's future prospects and its ability to safely service higher debt payments (Ikpesu, 2019; Ahmed & Shabbir, 2014). It should be noted, however, that the signalling theory was criticised by Tsai (2008) who pointed out that it has the potential to make the firm's values undervalued many times. This particularly arises when the market's valuation of future prospects is lower than its true value (Ross, 1977). Interestingly, Ghosh (2017) argues that it is difficult to ascertain the authenticity of managers' information, and the choices they make and their information may be misleading and unreliable.

In short, the signalling theory is however a poor predictor of actual behaviour. It suggests that firms with increased leverage will realise an increase in value (Yousef, 2019; Guney & Paudyal, 2008, Barclay & Smith, 2005). Based on the premise that banks are high leveraged firms, the signalling theory is probable option in explaining their capital structure decision.

2.6.6. Agency cost theory

The agency cost theory was originally proposed in 1975 by Stephen Ross and Barry Mitnick, and was further elaborated by the work of Jensen and Meckling in 1976. They observed that conflicts exist between the parties to a company. In public quoted companies, there is a separation of ownership and control where most firms are managed by managers who act as agents of shareholders. The interests of both parties, that is the agent or managers and the owners or shareholders, are always in conflict (Ferdous, 2019; Rasiah & Kim, 2011). Managers do not necessarily own shares in the firm, and as such, this relationship is fraught with agency problems. The shareholders and managers, consciously or unconsciously, serve their interests at the

expense of their principals who are the shareholders. While shareholders would want to see the maximisation of firm value, the management may want to maximise their own interests. Such interests may include investment choices or short-term benefits or profits that inflate their year-end bonuses (Rasiah & Kim, 2011).

The owners of a firm are aware of the managers' self-interests and thus consider it when valuing the firm's shares. Hence, agency costs are borne by a firm to align the interests of the agents to those of their owners. Jensen and Meckling (1976) posit that agency costs are the sum of the monitoring expenditures by the owner, the bonding expenditures by the agent, and the residual loss. Agency costs represent important problems in corporate governance in both financial and non-financial industries. The separation of ownership and control in a professionally managed firm may result in managers exerting insufficient work effort, indulging in perquisites, choosing inputs or outputs that suit their own interest, as well as failing to maximise firm value (Berger & Di Patti, 2006).

In order to put the agents in check and align their interests with those of the owners', debt financing is the appropriate medium to caution the agents. Debt serves as a disciplining device because by default it allows creditors the option to force the firm into liquidation. Agents lose their opportunities and benefits when the firm liquidates, and for that reason, they are compelled to make wise decisions as regards the governance of the business. Moreover, debt generates information that can be used by shareholders to evaluate major operating decisions made by the agents, including liquidation (Ferdous, 2019; Harris & Raviv, 1990).

According to Baker and Wurgler (2002), agency problems can call for more or less debt. On the one hand, too much equity can lead to free cash flow and conflicts of interest between managers and shareholders, and on the other hand, too much debt can lead to asset substitution and conflicts of interest between managers and bondholders. Guney and Paudyal (2008) indicate that greater financial leverage may affect managers and reduce agency costs through the threat of liquidation (Assfaw, 2019; Guney & Paudyal, 2008)

The agency costs theory of capital structure according to Rasiah and Kim (2011), states that an optimal capital structure will be determined by minimising the costs arising from conflicts between the parties involved. Under the agency costs hypothesis, high leverage or a low equity-asset ratio reduces the agency costs of outside equity and increases firm value by constraining or encouraging managers to act more in the interests of shareholders (Berger & Di Patti, 2006). Although this only works in solving the agency costs of over investments, it results in excess cash flow. It does not work in a financially constrained firm, as excessive debts result in increased agency costs of underinvestment or debt overhang.

In a nutshell, the agency cost theory predicts an optimal capital structure through matching the agency cost of debt against the benefits of debt. Furthermore, it predicts that leverage is positively related to profitability and efficiency because more profitable and efficient firms tend to use more debt due to the disciplining role that debts have on managers (Ferdous, 2019; De Jonghe & Öztekin, 2015, Teixeira, Silva, Fernandes & Alves, 2014).

To advance the agency theory, Jensen (1986) established the free cash flow theory of debt. He based this hypothesis on the premise that debt can be beneficial in motivating managers to make good decisions in order for the organisation to be more efficient and profitable. The agency cost of overinvestment or free cash flow is solved by the increase in leverage, and the underinvestment is solved by reducing leverage. Free cash flow is the cash flow in excess of that required to fund all projects that have positive net present values (NPVs) when discounted at the relevant cost of capital.

Rasiah and Kim (2011) indicate that managers might be motivated to take on excessive risk and misuse the free cash flow on NPV-negative projects which destroy values. Debt financing reduces the free cash flow available to managers. Therefore, debt can be utilised in reducing agency costs of free cash flows. The threat caused by failure to make debt service payments serves as an effective motivating force to make such organisations more efficient (Jensen, 1986).

Free cash flow theory predicts a positive relationship between leverage and profitability (Bogale, 2020; Teixeira, Silva, Fernandes & Alves, 2014). This suggests that profitable firms are likely to utilise more debt in their financing because they have a high propensity to generate free cash flows which increases the agency cost of FCF. Thus, substituting internal equity with debt increases leverage which in turn disciplines management to only invest in NPV-positive projects in order for them to service debt.

All in all, the agency theory and the free cash flow theory are entwined, and both support an optimum mix of capital structure. These theories emphasise that agents or managers of firms with excess free cash flow are more likely to undertake low benefit or negative NPV projects and vice versa.

2.7 Firm-specific determinants of capital structure

It is important to note that there are a number of firm-specific factors, alongside the Basel Accords, that determine the financing behaviours of banks. Authors such as Yitayaw (2021), Afinindy, Salim and Ratnawati (2021), Mvita (2020), Bilen and Kalash (2020) Neves, Serrasqueiro, Dias and Hermano (2020), Bogale (2020), Assfaw (2019), Baker and Wurgler (2002), Bruinshoofd and De Haan (2012), De Bie and De Haan (2007), Mahajan and Tartaroglu (2008) and Xu (2009) identified a few firm-specific factors including firm size, asset tangibility, profitability, growth rate, taxation, risk, dividend policies, industry, nature of assets, and macroeconomic variables. Moreover, Doan (2020), Assfaw (2019) and Frank and Goyal (2009) identified firm size, profitability, growth rate, risk, and asset tangibility as the key determinants of bank capital structure, and these are discussed and tested in the current study in the context of selected African banks.

2.7.1 Firm size

Afinindy et al (2021) observe that as a firm grows, its financing behaviour tends to change towards the direction of debt funding. Furthermore, Diantimala, Syahnur, Mulyany, and Faisal (2021) posit that larger firms can negotiate for debt funding on more favourable terms compared

to smaller firms, and enjoy a lower interest rate on a high debt commitment. The agency cost theory predicts a positive relationship between capital structure and the size of a firm. Similarly, the expectation from the trade-off theory is that large firms should be highly leveraged as compared to small firms and because of the debt interest tax shields they stand to enjoy (Bruinshoofd & De Haan, 2012)

Contrary to the positive relationship between firm size and capital structure predicted by the agency theory, it has been observed by Sibindi (2016) that as firms grow in size, they proportionately become more profitable and as a result, they have enormous retained earnings and access to internal funding. This suggests that large firms have a considerable amount of free cash flow. The a priori expectation from a pecking order theory perspective is that as firms grow in size; they generate more profits and hence can make use of internally generated funding which shields them against debt funding and high gearing (Doan, 2020; Li & Islam, 2019).

Nonetheless, the empirical and theoretical evidence as regard firm size determining capital structure are mixed. A number of researchers such as Bogale (2020), Assfaw (2019) and Nunkoo and Boateng (2010) used different proxies such as total assets and total revenue to measure the firm size in relation to financing behaviour and arrived at mixed results. As regards the financial service firm, the studies of Yitayaw (2021), Bilen and Kalash (2020) and Aremu, Ekpo, Mustapha and Adedoyin (2013), on the determinants of banks' capital structure, showed a positive relationship between bank size and capital structure. Their findings were attributed to the fact that banks can diversify more with easy access to the capital market, receive higher credit ratings for debt issues, and pay a lower interest rate on debt capital. Based on the above empirical and theoretical evidence, the current study predicted a positive relationship between bank size and capital structure.

2.7.2 Profitability

Ikpesu (2019) associate the availability of internal fund with profitability and predict that a negative relationship should exist between firm profitability and leverage. They contend that

firms that are more profitable prefer to use retained earnings, and thus have lower gearing which is associated with the pecking order theory. Empirical evidence in support of the inverse relationship between profitability and gearing is found in the studies of Kumar, Sureka and Colombage (2020), Chakrabarti and Chakrabarti (2019), Bartoloni (2013) and Lemma and Negash (2014). On the contrary, the trade-off theory posits that in order to take advantage of the interest tax shields associated with higher leverage, more profitable firms will have higher debt ratios. Similarly, the free cash flow theory hypothesises that profitable firms should issue more debt. This measure is taken to bond the future cash flows and to discipline managers by paying out cash to bondholders instead of wasting the funds on negative NPV projects. Hovakimian, Hovakimian and Tehranian (2004) opine that the positive relationship between profitability and leverage could be as a result of potentially higher tax savings from debt and lower probability of bankruptcy. This implies that profitable firms can service more debt without increasing the risk of financial distress as a result of more taxable income (Assfaw, 2019; Aremu, Ekpo & Mustapha, 2013).

Despite the admissible argument from both theoretical and empirical stand-view as regards the relationship between profitability and capital structure, it is reasonable to conclude that the pecking order theory predicts a negative association between capital structure and bank profitability, while the trade-off theory and free cash flow theories predict a positive association between capital structure and bank profitability.

Ikpesu (2019) and Aremu et al (2013) indicate that bank profitability has a negative relationship with its capital structure which is in line with the prediction of the pecking order theory. This is because banks with higher profitability prioritise the use of internal financing for their investment with less reliance on other sources of external funding. Based on the empirical and theoretical evidence, a negative relationship between bank profitability and capital structure is therefore predicted.

2.7.3 Firm growth rate

Capital structure theories such as the trade-off theory predict that growth reduces leverage because it increases costs of financial distress, and reduces the agency costs of free cash flow in firms that generate excess free cash flows, which exacerbates the agency costs of underinvestment in financially constrained firms (Frank & Goyal, 2009). Furthermore, Neves, Serrasqueiro, Dias and Hermano (2020) and Antoniou et al (2008) observe that based on the trade-off theory prediction, a negative relationship is expected between growth opportunity and leverage. According to the trade-off theory, the cost of financial distress increases with expected growth, forcing managers to reduce the debt in their capital structure. Furthermore, in the presence of information asymmetries, firms issue equity instead of debt when overvaluation leads to higher expected growth (Bilen & Kalash, 2020; Barclay & Smith, 2005).

By contrast, the pecking order theory propounds that firms with more investments holding, and profitability should accumulate more debt over time. This is based on the reasoning that a higher growth rate implies a higher demand for funds, and all things being equal, a greater reliance on external financing through the preferred source of debt is expected (Sinha 1992). Thus, growth opportunities and leverage are positively related under the pecking order theory (Adam & Goyal, 2008).

All in all, the empirical and theoretical evidence provided about the growth prospects determining the financing behaviour are varied. A number of researchers such as Nerves et al (2020), Ngugi (2008) and Al Najjar (2011) used different proxies, such as percentage change in total assets and market to book ratio of total assets, to measure firm growth in relation to financing behaviour. Their conclusions tilt towards a negative relationship between firm growth rate and capital structure.

The studies of Afinindy et al (2021) and Aremu et al. (2013) claim that bank growth rate has a negative relationship with the capital structure which is in line with the prediction of the trade-off theory. This is because banks with higher growth rates are more equity-controlled and have

a tendency to invest sub-optimally to expropriate wealth from the banks' bondholders. Based on the empirical and theoretical evidence, a negative relationship between bank growth rate and capital structure is therefore predicted.

2.7.4 Firm risk

In banking business, one of the most important determinants of capital is related to the risk that banks have taken. Al-Najjar and Hussainey (2011) posit that a financial service firm is a high risk-based firm with volatile earnings due to the nature of its operations. This means that risk plays a significant role in determining a bank's financing behaviour.

From the perspective of trade-off theory, a negative relationship is predicted between a firm's leverage and risk (Vijayakumaran, 2019). In corporate finance, the risk is the probability of a loss occurring that negatively affects earnings and profitability (Frank & Goyal, 2009). Risk measures the volatility of cash flows or a firm's earnings prospect. According to trade-off theory, a firm with highly volatile cash flows should avoid debt financing and have a low debt capital (Ferdous, 2019). Yitayaw (2021) posit that firms with more volatile cash flows face higher expected costs of financial distress and should use less debt. More volatile cash flows reduce the probability that tax shields will be fully utilised.

Conversely, the pecking order theory predicts a positive association between firm leverage and risk. This is hypothesised on the basis that the volatility of cash flows is directly related to the volatility of earnings. Thus, firms become constrained to finance from their retained earnings and therefore have to seek funding from external sources. The pecking order theory, therefore, predicts that riskier firms have higher leverage (Al-Najjar & Hussainey, 2011).

As for business risk, the findings of Assfaw (2019) and Aremu et al. (2013) show that banks are a highly risky business with a greater chance of business failure and greater weight of bankruptcy. Risk plays a tangible role in determining its financing behaviour. Therefore, risk is positively associated with capital structure and is in line with the prediction of pecking order

theory. Based on the empirical and theoretical evidence, a negative relationship between bank risk and capital structure is therefore predicted.

2.7.5 Asset tangibility

Mvita, Brümmer and Wolmarans (2020) and Li and Islam (2019) assert that as firms grow, they accrue a large proportion of tangible assets. Tangible assets are easier to value for outsiders such as creditors or investors compared to intangibles such as the value of goodwill from an acquisition. Thus, the ease of valuing tangible assets lowers expected distress costs (Mvita et al., 2020).

In the natural business settings of banks just like any other firm, assets influence capital structure. According to Mvita, (2020) and Bessler, Drobetz and Grüninger (2011), asset tangibility is a direct measure of the collateral that the firm can offer to financiers. This suggests that firms with high tangible assets face reduced bankruptcy costs, which in turn increases the net benefits of debt to the firm. Furthermore, Trong and Nguyen (2020) assert that tangible assets are less subject to information asymmetries and ordinarily have a more noteworthy quality than intangible resources in the occasion of liquidation.

In relation to trade-off theory, there is a positive relationship between the firm's leverage and tangible asset (Aviral & Raveesh, 2015). This view is espoused by Aviral and Raveesh (2015), who contend that increased collateral reduces the firms' borrowing costs while increased debt capacities make borrowing more attractive to the firms and result in high leverage. Antoniou et al. (2008) argue that in the case of bankruptcy, tangible assets are more likely to have a market value, while intangible assets lose their value. In contrast, the pecking order theory makes an inverse prediction between firm leverage and asset tangibility. According to Frank and Goyal (2009), the inverse prediction of the pecking order theory can be traced to the effect of low information asymmetry associated with tangible assets, which makes equity issuances less costly. Thus, leverage ratios should be lower for firms with higher tangibility.

Despite the admissible argument from both theoretical and empirical standpoint, as regards the relationship between asset tangibility and capital structure, it can be deduced that the pecking order theory predicts a negative association between capital structure and asset tangibility while the trade-off theory predicts a positive association between capital structure and asset tangibility. The differing views and predictions of asset tangibility and capital structure might be explained by the intervention of many other factors affecting capital structure that are not necessarily mutually exclusive.

Mvita, (2020) and Aremu et al. (2013) observe that the tangibility of the bank's assets has a positive relationship with its capital structure, which is in line with the prediction of the trade-off theory. This is because banks with more tangible assets have an increased debt capacity leading to high leverage and the benefit of the interest tax shield. Based on the empirical and theoretical evidence above, a positive relationship between assets tangibility and capital structure was therefore predicted in the current study.

2.8 Summary of the chapter

This chapter has presented a review of previous literature on the subject of banks and their regulations. It has discussed the capital structure of African banks, as well as the banks' risk-taking behaviour, stability and efficiency. The chapter has also presented a review of the Basel Accord starting from Basel I to Basel III. It has also presented a detailed overview of the Basel III Accord and its new requirements as stated in the Basel III regulatory framework. The chapter concludes with the firms' specific determinants of capital structure. The next chapter discusses the methodology, statistical tests and models that were used to collect and analyse data for this study in an effort to achieve its research objectives.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the research methodology and the testable hypotheses of this study. According to Mouton (2012), research methodology encompasses the entire strategy of the study from the identification and assessment of the problem to the final phase of data analysis, interpretation, conclusion and recommendations. He further argues that research methodologies are the principles underpinning the researcher's choice of a broad approach to conduct research. A description of the research design is discussed in this chapter as well as the data sources, empirical model and data analysis procedure for this study.

3.2. Research design

Neuman (2011) describes a research design as the overarching plan for obtaining answers to questions being studied and handling various challenges encountered during the research process. According to Collins (2010), a research design is the blueprint that classifies a study into types and subtypes. These types basically include descriptive, exploratory and explanatory studies each of which can be further classified into different sub-types viz. correlational, experimental, review, meta-analytic and case studies.

Collins (2010), indicates that a descriptive research design provides answers to the questions who, what, when, where, and how associated with a particular research problem but cannot conclusively ascertain answers to why. Descriptive research is used to obtain information about the current status of the phenomena and to describe "what exists" with respect to variables or conditions in a situation. The objective of a descriptive study is to represent an accurate profile of persons, events or situations (Zikmund, 2003). In descriptive research the research problem is structured and well understood (Hair, Black, Babin, Anderson & Tatham, 2006).

An exploratory design is conducted when there are a few or no earlier studies to refer to. It focuses on gaining insights into phenomena for later investigation, particularly when problems are in a preliminary stage of investigation (Sekaran & Bougie, 2009). An exploratory design, according to Zikmund (2003), can lead to new and useful theories or insights. However, it lacks rigorous standards applied in methods of data gathering and analysis, and is also at the risk of producing false theories or results.

The last category of research is the explanatory design which is sometimes called a causal research design (Hair et al., 2006). This type of design measures the impact of a specific change on existing norms and assumptions. It also explains the causal effect relationship between an independent variable and the dependent variables (Sekaran & Bougie, 2009).

Based on the three research designs discussed above and on the aim of the current study, the explanatory design was deemed suitable. Even though the Basel III regulatory requirements and the performance, risk taking behaviour and capital structure of African banks were extensively described, the ultimate goal of this study was to test the relationship between dependent and independent variables identified in it.

A research design can further be explained in terms of the plan and procedure of the data collection, analysis and interpretation of a study, which can further be categorised into the qualitative, quantitative or mixed study approaches (Collins, 2010). The causal research design of this study adopted the quantitative research approach which was based on the procedure of data collection and analysis follows it. De Vos, Delport, Fouché and Strydom (2011) indicate that the purpose of quantitative research is to describe phenomena and explore the relationship or causal effects between variables. In that case, historical data can be collected, measured and analysed in order to reach a quantifiable conclusion. This approach was found suitable for the current study because the researcher's role was limited to data collection, analysis and interpretation through an objective perspective (Collins, 2010; Zikmund, 2003). According to Sekaran and Bougie (2009), a quantitative approach uses structured tools to generate numerical

data and uses both descriptive and inferential statistics to interpret, organise and represent the collected data.

3.2.1 Research philosophy

A research philosophy, according to Saunders, Lewis and Thornhill (2015), refers to a system of beliefs and assumptions about the development of knowledge, in a particular field. The knowledge development can span from answering a specific question to developing a new theory or knowledge. For every research process, viable assumptions are made in order to achieve the research aim. Burrell and Morgan (2017) identify assumptions about human knowledge (epistemological assumptions), as well as about the realities encountered during the research (ontological assumptions), and the extent to which the researchers' own values influence the research process (axiological assumptions). These assumptions inevitably shape the way the researcher understands the research questions, the method used, as well as the interpretation of the findings (Crotty, 1988).

In the field of finance and management, there is no one size fit all or perfect fit for the research philosophy, and as a result, different philosophies speak for or influence the researcher differently (Starbuck, 2003). The five major philosophies adopted in finance and management research include the positivism, critical realism, interpretivism, postmodernism and pragmatism as summarised in the Table 3.1 below.

Table 3.1: Comparison of five research philosophies in finance and management research

Ontology (Nature of reality or being)	**Epistemology** (What constitutes acceptable knowledge)	**Axiology** (Role of values)	**Typical methods**
Positivism			
Real, external, independent One true reality (universalism) Granular (things) Ordered	Scientific method Observable and measurable facts Law-like generalisations Numbers Causal explanation and prediction as contribution	Value-free research Researcher is detached, neutral and independent of what is researched Researcher maintains objective stance	Typically deductive, highly structured, large samples, measurement, typically, quantitative methods of analysis, but a range of data can be analysed
Critical realism			
Stratified/layered (the empirical, the actual and the real) External, independent Intransient Objective structures Causal mechanisms	Epistemological relativism Knowledge historically situated and transient Facts are social constructions Historical causal explanation as contribution	Value-laden research Researcher acknowledges bias by world views, cultural experience and upbringing Researcher tries to minimise bias and errors Researcher is as objective as possible	Retrodictive, in-depth historically situated analysis of pre-existing structures and emerging agency. Range of methods and data types to fit subject matter
Interpretivism			
Complex, rich Socially constructed through culture and language Multiple meanings, interpretations, realities Flux of processes, experiences, practices	Theories and concepts too simplistic Focus on narratives, stories, perceptions and interpretations New understandings and worldviews as contribution	Value-bound research Researchers are part of what is researched, subjective Researcher interpretations key to contribution Researcher reflexive	Typically, inductive. Small samples, in-depth investigations, qualitative methods of analysis, but a range of data can be interpreted
Postmodernism			
Nominal Complex, rich Socially constructed through power relations Some meanings, interpretations, realities are dominated and silenced by others Flux of processes, experiences, practices	What counts as 'truth' and 'knowledge' is decided by dominant ideologies Focus on absences, silences and oppressed/ repressed meanings, interpretations and voices Exposure of power relations and challenge of dominant views as contribution	Value-constituted research Researcher and research embedded in power relations Some research narratives are repressed and silenced at the expense of others Researcher radically Reflexive	Typically, deconstructive – reading texts and realities against themselves In-depth investigations of anomalies, silences and absences Range of data types, typically, qualitative methods of analysis
Pragmatism			
Complex, rich, external 'Reality' is the practical	Practical meaning of knowledge in specific contexts 'True' theories and	Value-driven research Research initiated and sustained by researcher's doubts and beliefs	Following research problem and research question Range of methods:

consequences of ideas Flux of processes, experiences and practices	knowledge are those that enable successful action Focus on problems, practices and relevance Problem solving and informed future practice as contribution	Researcher reflexive	mixed, multiple, qualitative, quantitative, action research Emphasis on practical solutions and outcomes

Adapted from Saunders et al (2015)

Based on the five research philosophies discussed in Table 3.1 and the type of structured data and a large sample of the African bank data that was used in this study, the positivism philosophy was deemed suitable for the current study. Positivism philosophy is a highly structured methodology that evaluates results with the help of statistical methods (McNabb, 2008). This philosophy was found suitable because the current research was context based with a casual effect design aligned with the research problem. It was also found suitable because the researchers' role is limited to data collection, analysis and interpretation through an independent perspective.

3.3 Population of the study

A research population is generally a large collection of individuals or objects with similar characteristics that constitute the focus of a scientific investigation (Patton, 2007). The population of the study consisted of commercial, investment, development, merchant, corporative, and microfinance banks in selected African countries that had adopted the Basel III Accord at the time of the study. These countries included South Africa, Nigeria, Kenya, Tanzania, Uganda and Malawi. There are currently 145 registered banks in these selected African countries of which 45 are listed in the African stock market.

3.4 Sampling strategy

Sampling is a plan adopted in obtaining a suitable sample that represents a total population (Dawson, 2002). Sampling is further defined by Saunders, Lewis and Thornhill (2009) as the process of selecting a number of individuals for a study in such a way that the individuals

represent the group from which they were selected. During the sampling process, only a few items from the entire population are selected. Sampling methods can be broadly classified into non-probability sampling and probability sampling. According to Zikmund (2003), non-probability sampling is a technique in which units of the sample are selected based on their availability, as well as on the personal judgement or convenience for the researcher. Leedy and Omrod (2005) state that in the probability sampling technique each member of the population has an equal chance of being selected.

Given the nature of the population of the current study, the non-probability sampling technique was used to select a sample of listed banks. Purposive non-probability sampling was found to be the most applicable method in the current study because the researcher focused specifically on the listed bank that had adopted the Basel III regulatory requirements. Patton (2007) asserts that purposive sampling is widely used in research to identify and select information related to the phenomenon of interest. Here, the phenomenon of interest would be the listed banks that have adopted the Basel III regulatory requirements.

It should be noted, however, that Bordens and Abbott (2005) argue that determining an economical sample size is a major bottleneck in research because there is no standard or one-size-fits-all approach for the determination of sample size as both large and small samples have their limitations. A sample that is too large might become unmanageable, and that which is too small might be unrepresentative (Saunders et al., 2009). However, what matters in the determination of sample size is its ability to represent the entire population in relation to the main aim of the study (Leedy & Omrod, 2005).

With a view to the aforementioned, the sample of the current study was drawn from the target population comprising the listed banks in South Africa, Nigeria, Kenya, Tanzania, Uganda and Malawi. Furthermore, based on the purposive sampling technique; the study covered the period 2010 to 2019, that is, during the implementation period of the Basel III Accord, which is the focal point of the study. The final sample for this study consisted of 45 listed banks, meaning that there were 450 observations for the banking sample.

Specifically, all the data for this study was obtained from the standardised audited financial statements from IRESS and Bankscope database. The standardisation process involved the consistent analysis and categorisation of items in the balance sheet, income statement, cash flow statement and other quantitative information obtained from published financial statements. This ensured a meaningful extraction and sorting of data for the years under study. A comprehensive list of the sampled of the listed banks is provided in appendix B. The summarised details of the final sample are shown in Table 3.2 below.

Table 3.2: Summarised details of the final sample

Country wise distribution and bank year observations from 2010 to 2019			
Country	Population	Number of listed bank(sample)	Bank year observation
Kenya	43	11	110
Nigeria	22	13	130
South Africa	16	6	60
Tanzania	29	7	70
Uganda	25	5	50
Malawi	10	3	30
Total	**145**	**45**	**450**

Authors' development (2020) and Africa Stock Markets (2020)

3.4.1 Justification for selected sampled countries

Many countries in Africa are yet to adopt the Basel III regulatory Accord. However, leading African countries such as South Africa, Nigeria, Kenya, Tanzania, Uganda and Malawi have adopted it (Ozili, 2019, Financial Stability Institute Survey, 2019). It is interesting to note that South Africa has the most developed banking sector; best regulated and well capitalised in Africa, and it is also the only member of the G20 in Africa. On the other hand, Kenya has a leading innovative and digital banking system in East Africa with the largest economy in East Africa, while Nigeria has the largest economy in Africa and leading banking sector in West Africa (Beck et al., 2019). The adoption of Basel III regulatory requirements by the above

leading African countries therefore justifiably influences the purposive selection in the sample of the current selection.

3.4.2 Data collection and analysis

The data for this study were collected from the historical financial statements of the sampled banks. These financial statements were obtained from the IRESS and Bankscope database which has a comprehensive database that contains detailed financial information for over 29,000 public and private global banks from 2004 to date. The financial statements were downloaded in both standardised and published format, or specifically in Microsoft Excel, Word format and Portable Document File (pdf) formats. Thus, the data was sorted and extracted from the standardised audited financial statements. However, due to the cross-sectional and time series nature of financial data, the study used the panel data estimation techniques to analyse and unravel the data. The dynamic and static panel data models were then used to test the impact of the Basel III regulatory requirements on the banks' capital structure, financial performance, stability, efficiency and risk-taking behaviour. Furthermore, this study used the STATA 15 econometric software to analyse the data and fit the models.

3.5 Definition and measure of variables

Based on the empirical and theoretical justifications presented in the previous section, the broad measurement of Basel III regulatory requirements, capital structure, performance, efficiency, stability and other firm specific factors are clearly described in turns.

3.5.1 Basel III regulatory requirements

The Basel III regulatory requirements are the main and independent variables of the current study. The definition and measure of the Basel III regulatory requirements is fairly straight forward as it has been set out by the BCBS. For the purpose of this study, with a focus on African banks, the following were used as a proxy to measure the Basel III regulatory requirements.

3.5.1.1 Capital adequacy ratio

According to BCBS, the capital adequacy ratio (CAR) is a better measure of bank capital because it considers the risk factor of a bank operation. It is predominantly known as the regulatory capital ratio. In addition, the CAR is a widely used measure of a bank's soundness. The CAR ratio measures the ability of a bank to meet its funding liabilities and shows the strength of a bank against the vagaries of economic and financial environment. A high CAR ratio indicates that a bank can withstand sudden deposit withdrawals and absorb losses (Aggarwal & Jacques, 2001). Studies such as those of Shawk (2008), Jokipii and Milne (2011), and Lotto (2016) measure the CAR as the ratio of the quotient of total bank capital to the total assets. For the purpose of the current study, the CAR was measured as the ratio of Tier1 and Tier 2 capital to the total risk weighted assets (BIS, 2010).

3.5.1.2 Minimum capital requirements

The minimum capital requirement is defined as the level of capital which a bank should mandatorily maintain in any situation (BCBS, 2010). According to Basel III requirements, the minimum regulatory ratio expected of a bank is 8%, which includes both Tier 1 and Tier 2 minimum requirements. Romdhane (2012) and Carvallo et al (2015) measured the minimum capital requirement as the minimum ratio of both Tier 1 and Tier 2 capital alongside the Basel III Accord. For the purpose of the current study, the minimum capital requirement was measured by the sum of the minimum ratios of the Tier 1 and Tier 2 capital.

3.5.1.3 Capital buffer premium

The capital buffer premium is the surplus amount of capital that remains after deducting the minimum required capital (Babic, 2011). The capital buffer premium is also defined by García-Suaza et al. (2012) as the difference between actual capital (core capital plus supplementary capital) and minimum regulatory capital. Studies such as those of Jokipii and Milne (2011), Shim (2012) and Carvallo, Kasman and Kontbay-Busun (2015) measureed the capital buffer premium as the difference between the observed change in the amount of capital the bank holds in excess

of that required by the regulator. For the purpose of the current study, the capital buffer premium was measured by the difference of the actual capital held by the bank and the minimum regulatory capital prescribed by the regulator.

3.5.1.4 Liquidity requirements

One of the crucial additions to the Basel III Accord is the liquidity requirements. The bank's liquidity ratio demonstrates its ability to meet its short-term financial obligations in an effective manner. The bank's liquidity ratio can also be used to predict the likelihood of a bank's failure. Furthermore, Goddard et al. (2013) posit that bank liquidity can be measured by using the ratio of total loans to total assets. A large liquidity ratio indicates a lower level of bank liquidity. Thus, a large amount of loans given to the customers indicates more interest revenue from them.

According to the Basel III regulatory requirements, the liquidity coverage ratio (LCR) is a new measure of liquidity which is aimed at ensuring that banks have enough liquid assets to withstand liquidity stress in the short term, usually within 30-days as previously indicated. The LCR ratio is required to be above 100%. LCR is mathematically expressed as the ratio between the high-quality liquid assets (HQLA) and the expected net cash outflows (ENCO) of the next 30 day (BCBS, 2010; Truman, 2010). This simply means that a bank should maintain an amount of HQLA that is at least equal to the ENCO in a stressful situation.

According to the BCBS (2010), the HQLA refers to assets that are readily available and can be easily converted to cash immediately at little or no cost despite the financial situation or market conditions. HQLA assets are divided into two levels: levels 1 and 2 assets with level 1 assets being those of higher quality than those of level 2. Level 1 assets are primarily cash and reserves in the central bank in addition to government bonds. On the other hand, Level 2 assets are of lower quality when compared to level 1 assets, and are primarily covered bonds that are not issued by the financial institutions which have a good credit rating of at least AA. Covered bonds are corporate bonds that act as an additional credit cover with the sole aim of providing an alternative to the pool of assets that secure or cover the bond if the issuer becomes insolvent

(Hartlage, 2012). Moreover, the BCBS (2010) defines ENCO as the total expected cash outflows minus the total expected cash inflow in a stressed market or financial condition within the 30 calendar days. In the computation of ENCO, the total cash inflow can only be a maximum of 75% of total cash outflows.

Recent studies such as those of Sadien (2017) and Mashamba (2018) measured the liquidity ratio in line with the Basel III Accord as the difference between the bank's LCR and Basel minimum threshold of 100%. For the purpose of the current study, the liquidity requirements were measured by the ratio of high-quality liquid assets to the expected net cash outflows and the ratio of total loan to total asset.

3.5.2 Dependent variables

These variables include the capital structure, financial performance, stability, efficiency and risk-taking behaviours of banks.

3.5.2.1 Capital structure

It is important to note that for the purpose of this study, the measure and proxy of capital structure will be the leverage ratio. According to Bartoloni (2013) and Mateev, Poutziouris and Ivanov (2013), leverage is popularly measured by the ratio of debt to equity. On the one hand, a lower level of leverage ratio indicates a higher dependency on equity capital, funding of a bulk of the assets, and consequently lower bank risk. On the other hand, a higher level of leverage ratio indicates a higher dependency on debt other than equity, which often causes higher bank risk. This indicates higher interest payment and thus creates pressure on the bank's income (Zhang & Liu, 2017).

With regards to the new Basel III requirements (BCBS, 2010; 2013), the committee introduced a non-risk-based leverage ratio to supplement the capital minimum requirements. The non-risk-based leverage ratio is the ratio of Tier 1 capital to the total bank exposure. Where the total bank exposure is the sum of on-balance sheet exposures, derivative exposures, securities finance

transactions (SFTs), including repurchase agreements, reverse repurchase agreements and margin lending transactions, and off-balance sheet exposures, such as commitments, guarantees and standby letters of credit. The off-balance sheet exposures often are a source of significant leverage and therefore the BCBS has instructed banks to include them in the denominator of the leverage ratio. Studies such as those of D'Hulster (2009), Turkson (2011), Mateev et al (2013), Bartoloni (2013) an Carvallo et al (2015) measured leverage using the ratio of total debt to total assets; ratio of debt to equity; and ratio of Tier 1 capital to adjusted assets as proxies. For the purpose of this study, leverage was measured by the ratio of Tier 1 capital to the total bank exposure; and the ratio of total debt to the capital employed.

3.5.2.2 Financial performance

The financial performance of a bank is predominantly measured by its profitability and returns to its stakeholders. Previous studies such as those of Turkson (2011), Gungoraydinoglu and Oztekin (2011) and Kayo and Kimura (2011) measured bank financial performance using return on equity (ROE) and return on assets (ROA). The ROE is an indication of the profit generated by the bank with the money invested by the shareholders, and the ROA indicates how efficient management uses the assets to generate earnings. For the purpose of the current study, the proxy measure for the financial performance of a bank is the return on equity and return on assets.

3.5.2.3 Bank stability

Rajhi and Hassairi (2013) define bank stability as the ability of a bank to withstand both internal and external shocks and economic and financial distress. Olalekan and Adeyinka (2013), Rajhi and Hassairi (2013), and Gadanecz and Jayaram (2015) measured bank stability in a number of ways, such as by calculating the Z-score of banks or using other parameters such as bank leverage and liquidity ratio. According to Rajhi and Hassairi (2013) and Fiordelisi and Mare (2014), the important parameters needed when calculating the Z-score of a bank includes the ROA, Equity/Assets ratio, and the standard deviation of ROA. Rajhi and Hassairi (2013) and Fiordelisi and Mare (2014) found that the higher the Z-score the more stable the bank became. For the purpose of the current study, bank stability was measured using the Z-score computation.

3.5.2.4 Bank efficiency

Gadanecz and Jayaram (2015) define bank efficiency as the ability of a bank to operate at a lower cost in order to maximise its returns. The measure of bank efficiency shows how effectively a bank has been operated and how proficient the bank is utilising its overhead expenses in generating profits. Bank efficiency is measured in various ways that include technical efficiency, cost efficiency, and revenue efficiency. Fiordelisi and Mare (2014) argue that the cost containment strategy is the better way to keep a bank efficient. Some of the factors that influence bank efficiency include internal factors such as type of technology, size of assets, amount of capital invested, management style, as well as external factors that are not within the control of the bank such as legislation, market share, price and availability of resources (Andries, 2011).

Miah and Sharmeen (2015), Dietrich and Wanzenried (2011), Liu and Wilson (2010), Gungoraydinoglu and Oztekin (2011) and Kosmidou and Zopounidis (2008) measured bank efficiency in two popular ways. Firstly, they measured the ratio of overhead operating expenses to the total assets of the bank, and secondly, they used the net interest margin ratios (NIMRs). The NIMRs shows the bank's ability to pay out interest to its depositors in relation to the amount of interest they earned on their assets. A high net interest margin indicates cheaper funding or high margins which shows efficiency. The NIMRs is the ratio of net interest revenue to the total earnings. A higher ratio means the bank is losing a larger percentage of its income to expenses; and conversely, a lower ratio indicates a good cost containment strategy, which is good for the bank and its shareholders (Miah & Sharmeen, 2015). The current study used the ratio of operating expenses to total assets and the ratio of net interest revenue to total earnings as a measure for bank efficiency.

3.5.2.5 Risk-taking behaviour of banks

Different factors such as size, board risk appetite, and regulatory framework determine or influence the risk-taking behaviours of banks (Rime, 2001; Ayuso, Pérez & Saurina, 2004; Jokipii & Milne, 2008). According to Jokipii and Milne (2011) and Zhang and Liu (2012), risk-taking behaviour can be measured by the ratio of risk-weighted assets to total assets. On the other

hand, Zhang and Liu (2012) and Shim (2013) measured risk as the ratio of non-performing loans to gross loans, while Berger et al. (2010) measured risk-taking as the natural logarithm of Z-score. The current study used the ratio of risk-weighted asset to total asset; natural log of Z-score; and the ratio of non-performing loans to total loan as measures of the risk-taking behaviours of banks as adopted by previous researchers (Berger et al., 2010; Zhang and Liu, 2012; Shim, 2013).

3.5.3 Firm-specific factors determining bank capital structure

Apart from the Basel III regulatory requirements, other bank-specific factors such as bank size, growth rate, profitability, asset tangibility and risk determine the capital structure of a bank. The measures of bank profitability and risk were mentioned in earlier paragraphs; and hence, only the measure of bank growth rate, size and asset tangibility will be explained below.

3.5.3.1 Bank Size

Zheng, Moudud-Ul-Huq, Rahman and Ashraf (2017) indicate that size is a significant determining factor of the structure of bank capital. For example, large banks are determined as ‘too big to fail’ because they are well diversified, highly levered, securitised and more volatile in return (Drakos & Kouretas, 2014; Hussain & Hassan 2005). Furthermore, large banks have a lower capital buffer while small banks tend to accumulate more capital ratio over the regulatory requirement period in order to remain sustainable during crisis (Zheng et al., 2017). Hussainey and Al-Najjar (2012) argue that there is a direct relationship between size and the value of assets because larger banks are expected to have more assets. For the purpose of the current study, bank size was measured by the natural logarithm of total assets as adopted by previous researchers (Frank & Goyal, 2009, Mukherjee & Mahakud, 2010, Öztekin & Flannery, 2011). According to Aboura and Lépinette (2015) and Gropp and Heider (2010), bank assets consist of cash, government securities, as well as interest-earning loans such as mortgages, letters of credit, and inter-bank loans amongst many others.

3.5.3.2 Growth rate

A reliable proxy for a firm's growth is the ratio of the market value of equity to the book value of equity (Anarfor, 2015). It follows that the higher the market value relative to the book value of equity, the higher the growth prospects for the firm. Corporate finance theory predicts that high growth firms are exposed to potential costs of financial distress. This prohibits them from acquiring more debt in their capital structure (Frank & Goyal, 2009, Mukherjee & Mahakud, 2010). Conversely, firms with low growth prospects are faced with a potential overinvestment problem and are expected to have higher debt ratios which help them to reduce their agency costs of high free cash flows (Zheng et al., 2017). For the current study, the growth rate was measured by the ratio of the market value of equity to the book value of equity as adopted by previous researchers (Öztekin & Flannery, 2011; Anarfor, 2015).

3.5.3.3 Asset tangibility

In the current study, the reliable proxy for asset tangibility was the ratio of fixed assets to total assets. According to banks' financials, the component of a bank's fixed asset is inclusive of the transfers from loans and advances to customers, loans and advances to banks, other assets, transfer from investment securities, reinsurance assets and transfers from property and equipment. This amongst other investment securities from debt and equity, undrawn liquidity facilities, financial guarantees, derivatives from trading, cash and other tangible assets constitute the banks' total assets. Scholars such as Rajan and Zingales (1995), Frank and Goyal (2009), Mukherjee and Mahakud (2010), Öztekin and Flannery (2011) and De Jonghe and Öztekin (2015) employed the same proxy in measuring asset tangibility. According to Öztekin and Flannery (2011), a high proportion of fixed assets in the firms' balance sheet can serve as collateral for lenders of finance. Moreover, in the event of bankruptcy, a higher proportion of tangible assets could enhance the salvage value of the firms' assets. Lenders of finance are thus willing to lend money to banks with a high proportion of tangible assets.

3.6 Empirical model specifications

This section describes the empirical analysis overview, empirical model and the data analysis procedure in general.

3.6.1 Empirical analysis overview

Previous studies such as those of Tseganesh (2012), Malik and Rafique (2013), Nigist (2015) and Shumet (2016) used a panel regression model to analyse financial data and to investigate the determinants of capital structure, and the relationship between leverage, liquidity, regulatory capital and bank performance, efficiency and stability. According to Baltagi, Song and Kwon (2009), panel data refers to the pooling of observations on a cross-section of subjects over a particular period of time, which makes each variable to be repeatedly studied over a period of time. The panel is constructed by observing a large number of variables over a minimum time period of two years. These panels can either be balanced or unbalanced. The balanced panel has a complete observation set whilst the unbalanced panel has missing observations. In line with the above, the sample of the current study consist of a total of 45 listed banks in selected African countries and was observed over a time period of ten years.

It should be noted however that the data of the current study were predominantly financial panel data, and that financial panel data exhibits some complexities that can make it challenging to analyse because the variables are more fractional in nature. Elsas and Florysiak (2011) argue that financial data are predominantly unbalanced and dynamic and have dependent variables that take time to adjust. However, it has been argued that panel data estimation techniques are stronger due to their ability to combine the cross-sectional and time series nature of data, and enhance the quality of the data being analysed (Shumet, 2016). Tseganesh (2012) indicate that since panel data incorporates a cross-section of firms over a period and allows for an increased sample size, there is bound to be heterogeneity in the observed firms. This allows the researcher to take account of the unobserved heterogeneity among the variables and to provide less collinearity between variables and more degrees of freedom (Baltagi et al., 2009). Panel data also allows the researcher to differentiate within-group correlations from between-group correlations.

Moreover, panel data improves the estimation efficiency of the data set and widens the scope of drawing conclusions. The other benefit is that panel data is more informative than pure time series or cross-sectional data and its analysis is well suited to detect the dynamics of change. Finally, panel data allows for the usage of diverse suitable estimators which can be categorised under the static and dynamic type estimators.

It is interesting however to note that, the major drawbacks of panel data are heterogeneity, sample selectivity biases, and short time-series dimension problems (Baltagi et al., 2009). Panel data also suffers misspecification errors from autocorrelation and multi-collinearity. In the current study these limitations were addressed by running suitable statistical tests such as the autocorrelation test, multi-collinearity test and outliers, and by using a suitable estimator to fit the panel data.

Due to its nature, the current study adopted the panel data technique to analyse the data and to unravel the effects of Basel III regulatory requirements on the financing and risk-taking behaviour, financial performance, stability and efficiency of the sampled African banks. The panel data technique is suitable for the current study because, as already indicated, it combines the cross-sectional and time-series data obtained from different listed African banks over a period of ten years, and allows the researcher to control for data individual heterogeneity in order to avoid the risk of obtaining biased results and inferences. The empirical models were estimated using the STATA 15 econometric software.

3.6.2 Specification of the empirical model

This section specifies the panel regression model equations that were used in this study. The following dependent variables used in the current study include capital structure, financial performance, stability, efficiency and risk-taking behaviour. On the other hand, the independent variables include the Basel III regulatory requirements and the bank-specific determinants of capital structure. The Basel III variables are the minimum capital requirements, capital adequacy

ratios, and capital buffer premium and liquidity requirements. The bank specific capital structure determinants include the bank size, growth rate, profitability, asset tangibility and risk.

Zheng et al (2017), Tan and Floros (2013), Vollmer and Wiese (2013), Francis and Osbome (2012), Lee and Hsieh (2013), Nier and Baumann (2006), and Hussain and Hassan (2005), used both dynamic and static panel data models to investigate the impact of the Basel III regulatory requirements on a bank's capital structure, financial performance, stability, efficiency and risk-taking behaviour. Comparatively, the current study used the dynamic panel data model to test the determinants of banks capital structure; as well as the static panel data model to estimate the effect of Basel III regulatory requirements on the financial performance, stability, efficiency, and risk-taking behaviours of banks.

3.6.2.1 The dynamic panel data model

The current study also used the dynamic panel data model to test the determinants of the capital structure of the banks.

3.6.2.1.1 The capital structure (leverage) specification model

The parameters of the leverage model can only be estimated by using dynamic panel estimators, as these can automatically include the lagged dependent variables as an additional explanatory variable. On the contrary, the static panel estimators were not found suitable in the current study as they assumed a static leverage for the bank; whereas the present value of the leverage was affected by the value of the previous years. For this reason, the dynamic model was found to be more suitable for explaining the capital structure of banks, and the lagged dependent variable was included on the right-hand side of the equation. Furthermore, in the current study leverage was defined in terms of both the ratio of Tier 1capital to total exposure (TCTE) and ratio of total debt to capital employed (TDCE). The current study also used the Basel III regulatory requirements and the bank specific factors as the determinants of banks capital structure as previously indicated. The Basel III regulatory requirements variables include the minimum capital requirements (MCR), capital adequacy ratios (CAR), and capital buffer premium (CBP)

and liquidity requirements (LR). The bank specific capital structure determinants are the profitability (P), bank size (BS), growth rate (GR), risk (R) and asset tangibility (AT).

The dynamic models are represented in the equations below:

Model Equation 1.1

$$TCTEijt = \beta_0 TCTEijt - 1 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \beta_6 Pijt + \beta_7 BSijt + \beta_8 GRijt + \beta_9 Rijt + \beta_{10} ATijt + \varepsilon ijt$$

Model Equation 1.2

$$TDCEijt = \beta_0 TDCEijt - 1 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \beta_6 Pijt + \beta_7 BSijt + \beta_8 GRijt + \beta_9 Rijt + \beta_{10} ATijt + \varepsilon ijt$$

In the above model equations 1.1 and 1.2, the ijt-1 represents the lagged dependent variable capturing the firm, country and time dimensions, while $\beta_{1\text{-}10}$ represents the coefficient of the variables and ε_{ijt} represents the error term. The aim of the model equation 1.1 was to test whether the capital structure of banks which is represented by the ratio of Tier 1capital to total exposure (TCTE), was affected by the Basel III regulatory requirements and other bank-specific determinants. On the other hand, the aim of the model equation 1.2 was to test whether the capital structure of banks, which is represented by the ratio of total debt to capital employed (TDCE), was affected by the Basel III regulatory requirements and other bank-specific determinants. To fully understand the abbreviations and acronyms used in the model equations, see Table 3.3.

3.6.2.2 The static panel data model

The current study used the static panel data model in four instances. First, the model was used to test the relationship between banks' financial performance and the Basel III regulatory requirements. Second, the model was employed to test the effect of Basel III regulatory requirements on the stability of the banks. Third, the model was employed to test the effect of Basel III regulatory requirements on the banks' efficiency. Finally, the static panel model was

used to test the effect of the Basel III regulatory requirements and the effects of the banks' profitability on their risk-taking behaviours. The static panel data model is suitable in the aforementioned four instances because the present value of the variables (financial performance, stability, efficiency and risk-taking behaviour) is not affected by its previous year's values

3.6.2.2.1 The financial performance specification model

In the current study, financial performance was defined in terms of both the ratio of profit after taxes to equity (ROE) and the ratio of profit after taxes to total assets (ROA). The study tested the relationship between the financial performance of banks and the Basel III regulatory requirement variables that include the minimum capital requirements (MCR), capital adequacy ratios (CAR), and capital buffer premium (CBP) and liquidity requirements (LR).

The static models are represented in the equations below:

Model Equation 2.1

$$ROEijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \varepsilon ijt$$

Model Equation 2.2

$$ROAijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \varepsilon ijt$$

In the above model equations 2.1 and 2.2, the β_0 represents the intercept/slope parameters, while $\beta_{1\text{-}5}$ represents the coefficient of the variables and ε_{ijt} represents the error term. The aim of the model equation 2.1 was to test the extent to which the financial performance of banks, which is represented by the ratio of profit after taxes to equity (ROE), was affected by the Basel III regulatory requirements. The aim of the model equation 2.2 was to test the extent to which the financial performance of banks, which is represented by the ratio of profit after taxes to total assets (ROA), was affected by the Basel III regulatory requirements. To fully understand the abbreviations and acronyms used in the model equations, see Table 3.3.

3.6.2.2.2 The stability specification model

The current study defined bank stability in terms of its Z-score, which is usually computed by the ratio of the sum of ROA to the ratio of equity to total asset and to the standard deviation of the ROA. The current study tested the relationship between the stability of banks and the Basel III regulatory requirement variables that include the minimum capital requirements (MCR), capital adequacy ratios (CAR), and capital buffer premium (CBP) and liquidity requirements (LR).

The static model is represented in the equation below:

Model Equation 3.1

$$Z - scoreijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \varepsilon ijt\varepsilon$$

In the above model equation 3.1 the β_0 represents the intercept/slope parameters, while $\beta_{1\text{-}5}$ represents the coefficient of the variables and ε_{ijt} represents the error term. The aim of model equation 3.1 was to test the extent to which the stability of banks, which is represented by its Z-score computation, was affected by the Basel III regulatory requirements. To fully understand the abbreviations and acronyms used in the model equations see Table 3.3.

3.6.2.2.3 The efficiency specification model

In the current study, bank efficiency was defined in terms of both the ratio of operating expenses to total assets (OETA), and the ratio of net interest revenue to total earnings (NIMR). The current study tested the relationship between bank efficiency and the Basel III regulatory requirement variables that include the minimum capital requirements (MCR), capital adequacy ratios (CAR), and capital buffer premium (CBP) and liquidity requirements (LR).

The static models are represented in the equations below:

Model Equation 4.1

$$OETAijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \varepsilon ijt\varepsilon$$

Model Equation 4.2

$$NIMRijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \varepsilon ijt\varepsilon$$

In the above model equations 4.1 and 4.2, the β_0 represents the intercept/slope parameters, while $\beta_{1\text{-}5}$ represents the coefficient of the variables and ε_{ijt} represents the error term. The aim of the model equation 4.1 was to test the extent to which the efficiency of banks, which is represented by the ratio of operating expenses to total assets (OETA), was affected by the Basel III regulatory requirements. The aim of the model equation 4.2 was to test the extent to which the efficiency of banks, which is represented by the ratio of net interest revenue to total earnings (NIMR), was affected by the Basel III regulatory requirements. To fully understand the abbreviations and acronyms used in the model equations see Table 3.3 below.

3.6.2.2.5 The risk-taking behaviour specification model

The current study measured the risk-taking of banks in three ways. First, it did so by using the ratio of risk weighted asset to total asset (RWATA). Second, by calculating the ratio of non-performing loans to total loans (NPLTL); and finally, by using the natural log of the banks Z-score (LNZ-score). The current study tested the effect of Basel III regulatory requirements, as well as the effects of bank profitability, on the risk-taking behaviour of banks. The Basel III regulatory requirement variables include the minimum capital requirements (MCR), capital adequacy ratios (CAR), capital buffer premium (CBP), the liquidity requirements (LR), and the bank profitability as represented by the ROA.

The static models are represented in the equations below:

Model Equation 5.1

$$RWATAijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \beta_6 Pijt + \varepsilon ijt$$

Model Equation 5.2

$$NPLTLijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \beta_6 Pijt + \varepsilon ijt$$

Model Equation 5.3

$$LNZ - scoreijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \beta_6 Pijt + \varepsilon ijt$$

In the above model equation 5.1, 5.2 and 5.3 the β_0 represents the intercept/slope parameters, while $\beta_{1\text{-}6}$ represents the coefficient of the variables and ε_{ijt} represents the error term. The aim of the model equation 5.1 was to test the extent to which the risk-taking behaviour of banks, which is represented by the ratio of risk-weighted asset to total asset (RWATA), was affected by its profitability and the Basel III regulatory requirements. The aim of the model equation 5.2 was to test the extent to which the risk-taking behaviour of banks which, is represented by the ratio of non-performing loans to total loans (NPLTL), was affected by its profitability and the Basel III regulatory requirements. The aim of the model equation 5.3 was to test the extent to which the risk-taking behaviour of banks, which is represented by the natural log of the banks' Z-score (LNZ-score), was affected by its profitability and the Basel III regulatory requirements. To fully understand the abbreviations and acronyms used in the model equations, see Table 3.3 below.

Table 3.3: Summary description of the variables used in the model equations

S/N	Variables	Acronym	Measurement/ Proxies
Basel III regulatory requirements: Independent Variables			
1	Minimum Capital Requirement	MCR	*Minimum ratio of Tier 1+ Tier 2
2	Capital Adequacy Ratio	CAR	*Tier 1 + Tier 2 / Risk Weighted Asset
3	Capital Buffer Premium	CBP	*Actual capital (core capital plus supplementary capital) less minimum regulatory capital.
4	Liquidity Requirements	LCR LR	* HQLA/ ENCO; * Total Loan/Total Asset
Dependent Variables			
5	Capital Structure	C/S	*Tier 1 capital / Total Exposure; *Total Debt / Capital Employed
6	Financial Performance	FP	*ROE = ratio of profit after taxes to equity; *ROA = ratio of profit after taxes to total assets.
7	Stability	STAB	*Z-score = (ROA + ratio of equity to total asset) / standard deviation of ROA
8	Efficiency	EFF	*OETA = ratio of operating expenses to total assets. *NIMR = ratio of net interest revenue to total earnings
9	Risk Taking Behaviour	RTB	*RWATA = Risk Weighted Asset/Total Asset. *NPLTL = ratio of non-performing loan to total loan. *LNZ-score = Natural Log of Z-Score
Bank specific determinants of capital structure			
10	Profitability	P	*ROA = ratio profit after taxes to total assets.
11	Bank Size	BS	* Natural Log of Total Asset
12	Growth Rate	GR	*Market value of equity / book value of equity
13	Risk	R	*Natural Log of Z-Score (LNZ-score);
14	Asset Tangibility	AT	*Fixed Asset / Total Asset

Source: Authors compilation (2021).

3.6.3 Empirical model estimators

This section shows the various panel data model estimators that were adopted in the current study. The model estimators are discussed under the dynamic panel data model and the static panel data model.

3.6.3.1 Dynamic panel data model estimators

Several estimators that can be adopted in the dynamic panel data model include the ordinary least square (OLS), generalised least square (GLS) and the generalised methods of moment (GMM) (Francis & Osbome, 2012; Lee & Hsieh, 2013; Nier & Baumann, 2006). However, Francis and Osbome (2012) argue that the dynamic panel data is fraught with two sources of persistence over time. These fraught are the autocorrelations arising from the lagged dependent variables among the regressors; and the presence of individual effects characterising the heterogeneity among the individual variables. Thus, this renders estimations with either OLS or GLS biased or inefficient. Francis and Osbome (2012) further argues that the use of GMM is more efficient as compared to other dynamic panel data estimators.

To be more specific, the GMM consists of two variants: differenced GMM estimator and system GMM estimator. The differenced GMM is the work of Arellano and Bond (1991) and the system GMM is the work of Blundell and Bond (1998). Arellano and Bover (1995) and Blundell and Bond (1998) demonstrate that the correlation between the lagged dependant variable and the error term makes ordinary least squares (OLS) estimates biased and inconsistent, even when the error terms are not serially correlated. Elsas and Florysiak (2013) and Qian, Zhou, Kong and Zhu (2009) contend that the system GMM is the most efficient estimator amongst the current estimators. The estimator is designed for data sets with many panels and few periods. It can handle unbalanced data sets. It assumes that there is no autocorrelation in the idiosyncratic errors and requires the initial condition that the panel-level effects be uncorrelated with the first difference of the first observation of the dependent variable.

Bond and Windmeijer (2002) argue that the system GMM has been considered superior to other estimators of the panel model because it provides estimates of fixed effects and OLS. Furthermore, Lee and Hsieh (2013) indicate that the system GMM estimator provides more precise results than difference GMM by solving the critical issues, and allows for the control of fixed effects and taking into account heteroscedasticity and auto correlation errors. The system GMM estimation technique is suitable for the research instrument which is the audited bank-

level financial data of the sampled African banks. The audited banks' financial statements provide reliable and relevant data needed to quantify and measure the impact of the Basel III Accord implementation on African banks. This also allows for robust financial modelling and generalisable quantitative result. Based on the nature of the current study and the research instrument used as well elicited in section 3.4.2 above, the system GMM estimation technique was adopted to fit the dynamic panel data represented in model equations 1.1 and 1.2 and are implemented in the STATA 15 econometric software. STATA 15 is deemed suitable for the analysis of the panel data because it allows for the use of various model estimators as compared to other econometric software.

3.6.3.2 Static panel data model estimators

A number of estimators used in fitting the static panel data model include the pooled OLS, fixed effect (FE), and the random effect (RE) (Francis & Osbome, 2012; Lee & Hsieh, 2013; Nier & Baumann, 2006). The pooled OLS estimator on the one hand, uses a constant intercept across all cross-sectional units and assumes equal slope and intercepts for all observations (Torres-Reyna (2007). Thus, the estimator suffers from the problem of unobserved heterogeneity among the units of analysis. However, this problem can be easily resolved by differencing the data set. The FE estimator on the other hand, assumes that the sample is non-random, and that the variables have constant slopes but different cross-sectional intercepts and can handle unbalanced panel data. The major challenge with the FE estimator is the time-constant heterogeneity which can be overcome by introducing dummy variables, which is usually referred to as the least square dummy variables (LSDV) estimators (Arellano, 2003). However, the LSDV has drawback of large loss of degrees of freedom and also does not estimate time-variant variables. The RE estimator is used to address the assumption that the error term follows the classical assumptions, and thus the individual differences in the variable intercepts are captured by the error term. Hence, the RE estimator is the most appropriate for a random drawing from a larger sample (Gujarati, 2003). The main advantage of the RE estimator is that it retains both the observed individual heterogeneity and the n-degree of freedom in the regression model, while the FE

estimators drop and lose the individual heterogeneity and the n-degree of freedom (Dougherty, 2006).

In order to select the appropriate estimator amongst the Pooled OLS, FE and RE to fit the static model equations 2.1, 2.2, 3.1, 4.1, 4.2, 5.1, 5.2 and 5.3, the F-test, Hausman-Wu and Breusch and Pagan tests were used in the current study. These models, estimators and statistical tests were implemented in the STATA 15 econometric software.

3.7 Statistical and heteroskedasticity tests

The nature of the model may result in possible misspecification errors; and therefore, the following statistical tests were performed to eliminate these errors in the current study.

3.7.1 The Multicollinearity test

The existence of multicollinearity in multiple linear regression leads to higher standard errors for individual estimates which leads to wrong understanding of coefficient's statistical significance (Koop, 2005). The effect of multicollinearity in this study was tested by Variance Inflation Factor (VIF) which determines how much the standard error of estimated parameters is influenced by the existence of multicollinearity. As a general rule, the VIF of a variable that exceeds 10 (VIF>10) indicates that the variables are multicollinear. However, the tolerance measure can also be used which is the reciprocal of VIF. The tolerance less than 0.10 (1/VIF<0.10) indicates that the variables are multicollinear and must be removed from the model to avoid misspecification (Mugumisi & Mawanza, 2014).

3.7.2 Hausman specification test

The choice between the fixed (within) and random effects models depends on a formal test of significance formalised by Hausman (1978: 1251). The null hypothesis of this test is that the residuals in the random effects model are uncorrelated with the regressors. Therefore, if the null

hypothesis is true, the random effects model is suitable. If the null hypothesis is rejected, the fixed (within) effects model may be more suitable than the random effects model.

3.7.3 Sargan Test

The sargan test is a test of over identifying restrictions. It is used to test for instrumental variable validity. In the current study the null hypothesis indicated that the residuals were not correlated with the exogenous variables, under the assumption that these variables were truly exogenous. The acceptance of the null hypothesis would statistically mean that the instruments were valid. In other words, a higher p-value indicates better instrument validity.

3.7.4 First and second order autocorrelation test

Panel historical data are prone to misspecification errors arising from the autocorrelation of the right-hand side variables (Nijam, Ismail, Musthafa, 2015). To avoid the misspecification of the model, the current study tested for the first and second order autocorrelation using the Blundell and Bond test of zero autocorrelation in the residuals. The acceptance of the null hypothesis of zero suggested that autocorrelation should not be rejected in favour of the alternative hypothesis residuals (Nijam et al., 2015 & Olweny & Omondi, 2011).

3.7.5 Outliers

Outliers may also lead to the misspecification of the panel data. They are defined as any value greater than a certain percentile of all the observed data points (Kothari & Gaurav, 2014). Outliers are mainly handled through winsorisation, which refers to the trimming of data in order to remove extreme values that do not help in the study (Baltagi et al., 2009). Winsorising is not equivalent to simply excluding data, which is a simpler procedure, called trimming or truncation. In a trimmed estimator, the extreme values are discarded but in a winsorised estimator, the extreme values are instead replaced by certain percentiles specified by option. The response biasness is reduced when extreme values are discarded. The current study winsorised data to the 99^{th} percentile level.

3.8 Hypotheses development

To determine the significant or non-significant statistical relationship between the Basel III Accord, capital structure, performance, efficiency, stability and risk-taking behaviours of African banks, a number of testable hypotheses were postulated in collaboration with prior empirical evidence and theoretical framework elicited in the literature review. These hypotheses were expressed in two parts

The first part of the testable hypotheses relates to the impact of Basel III regulatory requirements on banks' performance, stability, efficiency and capital structure. Here, the hypotheses are drawn from two key elements of the Basel III Accord which are the regulatory capital requirements and the liquidity requirements in relation to the banks' performance, stability, efficiency and capital structure.

Hypothesis 1: There is a significant and positive relationship between the Basel III minimum capital requirements and African bank capital structure.

Lim (2016) argues that common stock instruments, preferred stock, debt securities, borrowed funds, trading and hedging portfolios and derivatives are elements of banks' capital structure amongst others. These elements constitute the minimum capital requirement established in the Basel III Accord. Chadha and Sharma (2015) in their rights opined that banks rely heavily on debt funding due to the nature of their lending operational activities. The current Basel III guidelines have influenced the components of banks' capital structure, which in one way has redefined the capital that is eligible for inclusion in the definition of bank regulatory capital (BIS, 2010). Ramli et al (2019) posit that capital requirements can influence the financing choices and decisions made by those charged with the governance of the bank.

In light of this, an increase in Basel III minimum capital requirements will cause a proportionate increase in debt funding because banks use more debt capital to finance their main operational activities to stay financially stable. Thus, leverage ratios are expected to increase in line with the minimum capital requirements. This argument is supported by Gavalas and Syriopoulos (2018)

and Klefvenberg and Mannehed (2017) who argue that despite all sources of funding available, profitable banks with a tighter minimum capital requirement largely rely on debt capital to meet their investments and operational funding activities and enjoy the debt interest tax shields from heavy reliance on debt funding. Therefore, based on the argument above, a positive relationship between Basel III minimum capital requirements and African banks' capital structure was predicted.

Hypothesis 2: There is a significant and positive relationship between the Basel III capital adequacy ratio and African bank financial performance.

Capital adequacy is another determining factor of banks' financial performance and profitability. This is because a well-capitalised bank tends to be more profitable than those that are poorly capitalised (Lee & Hsieh, 2013). Mwai, Jagongo and Fredrick (2017) argued that banks with a higher level of capital face lower expected bankruptcy costs with access to funds at a lower cost because they are considered as being less risky. The Basel III capital regulatory framework aims to increase banks' resilience by tightening their capital base and reducing their excessive leverage (BIS, 2010), this consequentially increases the profit maximisation of banks. In line with this, Nguyen (2020) argues that banks that are sufficiently capitalised as highlighted by Basel III are well financially positioned to absorb higher provisions and impairment charges without leaving their financial base negatively impacted.

Gropp and Heider (2010) indicate there is a positive connection between the core capital and the earnings of the banks. They assert that more capitalised banks are more profitable because they have sufficient financial resources to invest in high return investments which generate higher returns for the banks. This argument is supported by Nguyen (2020), Ajayi et al (2019), Udom and Onyekachi (2018), Zaagha (2016), and Lee and Hsieh (2013) who argue that an increased and stricter capital requirement promotes the financial performance of the banks. This is premised on the argument that banks can carry out their lending operations smoothly and confidently undertake profitable and high yielding investments, which invariably leads to an increase in the probability of a bank and returns to its shareholders. Therefore, based on the

argument above, a positive relationship between the Basel III capital adequacy ratio and African bank financial performance was predicted.

Hypothesis 3: There is a significant and positive relationship between the Basel III capital buffer premium and African bank stability.

It is argued that banks globally hold capital above the required regulatory minimum (Banerjee & Mio, 2017). The excess of the minimum capital requirement is the buffer premium which is expected to promote the stability of banks and protect them against any sudden economic or financial shocks (Capgemini, 2014). According to the Basel III regulatory framework, the capital buffer serves as a cushion to absorb the loss and provide extra protection for the stake and interest of depositors, creditors and the general public (Udom & Onyekachi, 2018; BIS, 2010).

Abbas and Younas (2021) found that Basel III regulatory capital buffer offers stability and growth for large insured commercial banks in the USA. Similarly, Moudud-Ul-Huq (2019)'s study on the BRICS banks showed a positive relationship between capital buffer and their stability. The positive relationship between capital buffer and bank stability is supported by the result of other authors such as Lotto (2018), Vasquez and Federico (2015) and Barth et al (2013), who assert that buffer premiums keep the bank stable and against the market and economic shocks. Therefore, based on the argument above, a positive relationship between the Basel III capital buffer premium and African bank stability was predicted.

Hypothesis 4: There is a significant and positive relationship between the Basel III minimum capital requirements and African bank operating efficiency.

According to the BCBS (2010), the minimum capital requirement is the level of capital that a bank should mandatorily maintain in any situation. De Bandt et al (2014) argue that maintaining the mandatory minimum capital required by the Basel III results in the operational efficiency of large French banks. This is because a bank's minimum regulatory capital enables it to generate and maintain sustainable revenue which is achieved at a reduced cost. Similarly, to the French

banks, Chortareas and Ventouri (2012) conclude that with mandatory minimum capital along with the improved Basel III supervisory framework, the commercial bank from 22 European Union countries are highly efficient.

Similarly, Nguyen (2020), Ajayi et al (2019) and Lotto (2018) found that banks from countries with more strict capital requirements and adherence to Basel III were more operationally efficient compared to those banks from countries with flexible bank capital regulations. Thus, banks are expected to be efficient subsequent to the increase in the Basel III minimum capital requirements. In line with the arguments above, a positive relationship between the Basel III minimum capital requirements and African bank operating efficiency was therefore predicted.

Hypothesis 5: There is a significant and positive relationship between the Basel III liquidity requirements and African bank stability.

One of the crucial additions to the Basel III Accord is the liquidity requirements, which indicates its ability to meet its short-term financial obligations in an effective manner (BCBS, 2010). The improvements made to the liquidity requirements by the Basel III accord aimed at the stability of banks' operations and avoiding probable banking crises (BCBS, 2013). As such, the stability of banks is expected to increase due to the subsequent increase in the liquidity requirements. Banerjee and Mio (2018) corroborated that the liquidity coverage ratio is purposed to ensure that banks have enough liquid assets to withstand liquidity stress in the short term, usually within 30-days to promote their stability.

Studies such as those of Ha and Quyen (2018) and Sadien (2017) indicate that banks from countries with more strict requirements and adherence to the Basel III liquidity requirements are more stable. This is mainly because stricter liquidity requirements create a liquidity buffer giving banks from countries with structured requirements not just cushion confidence but the ability to meet their operational obligation leading to stability (Abbas & Younas, 2021; Vasquez & Federico, 2015). In line with the arguments above, a positive relationship between the Basel III liquidity requirements and African bank stability was therefore predicted.

Hypothesis 6: There is a significant and positive relationship between the Basel III liquidity requirements and African bank financial performance.

It is argued that banks with a good liquidity ratio perform well financially because they are able to meet their short-term financial obligations (Aspal & Nazneen, 2014). The study of Zaagha (2016) asserts that banks that adhere to the new liquidity requirements of the Basel III Accord are more profitable compared to banks that do not adopt such strict liquidity requirements.

Similarly, Nguyen (2020), Ajayi et al (2019), Mwai et al (2017), Capgemini (2014) suggest that an increased and stricter liquidity requirement promotes the financial performance of the banks. This is because banks can carry out their lending operations smoothly and confidently undertake profitable and high yielding investments, which invariably leads to an increase in the probability of a bank. Therefore, based on the argument above, a positive relationship between the Basel III liquidity requirements and African bank financial performance was predicted.

In sum, the above six hypotheses are posited based on the premise that the Basel III Accord is an overarching determining factor of performance of banks, as well as their stability, efficiency and capital structure (Chadha & Sharma, 2015). Similarly, due to the GFC of the 2007/2008, the Basel III Accord aims at promoting banks stability, financial performance, operational efficiency, risk coverage and capital structure through tighter and higher capital requirements (BIS, 2010, Romano, 2014).

The above hypotheses have been corroborated by Nguyen (2020), Banerjee and Mio (2018), Lim (2016), Vasquez and Federico (2015), Capgemini (2014), DeBandt et al. (2014), Lee and Hsieh (2013), Berger and Bouwman (2013), who observe that there is a probable relationship between the Basel III Accord and the banks' stability, financial performance, operational efficiency, risk coverage and capital structure, especially in developed countries.

It is interesting to note that the adoption of Basel III Accord, in view of its aim and scope, is premised on its positive impact on the entire operations, risk capacity, and bank governance.

However, the impact of the Basel III Accord on African banks is still yet to be fully established. In view of the above, the selected testable hypotheses in the current study are interrelated and are worthy of consideration in the context of African banks. Africa is unique in terms of its market development, political influence in the banking regulations and supervision, economy prowess, country size, GDP and risk rating amongst others.

The second part of the testable hypotheses focused on probing the relationship existing between the key specific determinants of risk-taking behaviour of the banks and capital structure in relation to the Basel III capital requirements.

Hypothesis 7: There is a significant and positive relationship between the Basel III capital adequacy ratio and African bank risk-taking behaviour.

This is premised on the theoretical arguments discussed in the literature review chapter that a higher capital requirement increases the overall risk-taking behaviour of a bank while a lower capital requirement strongly restricts banks from taking more risk (Agoraki et al., 2011; Klomp & Haan, 2012). Karim et al. (2014) posit that a higher level of capital will enhance profitability and in turn lead banks to take excess risk. The a priori expectation is that the Basel III requirements have a positive impact on the performance of a bank because it advocated for higher and tighter capital requirements.

Furthermore, according to Basel III Accord, banks have the liberty to choose the standard method of calculating the capital adequacy ratio or to use the internal rating method on the premise of their actual and current situation. This suggests that an individual bank determines its risk-taking behaviour based on the method it chose in calculating its capital adequacy ratio and the result of the capital adequacy ratio influences the overall risk-taking behaviour of banks (Ha & Quyen, 2018, Tabaket al., 2013). Based on the above arguments a positive relationship between Basel III capital adequacy ratio and African bank risk-taking behaviour was therefore predicted in the current study.

Hypothesis 8: There is a significant and positive relationship between risk-taking behaviour and African bank capital structure.

This hypothesis was formulated on the presupposition that the risk appetite of the managers, which is motivated by their interest in the bank, would determine their tilt towards either debt or equity financing. From the agency cost theory perspective, the interests of the managers are always different from those of the owners. According to Berger and Di Patti (2006), in order to align the interest of both parties, the owners of the firm would choose the debt financing over equity financing. This is because, through debt financing, agents are disciplined to make less risky decisions because debtholders can exercise their option and force the bank into liquidation, which consequentially causes the managers to lose their benefits (Rasiah & Kim, 2011). Thus, agency theory explains why banks often have high leverage, because banks prefer debt to discipline its manager and mitigate agency cost (Berger & Bouwman, 2013).

It is worth noting that the uniqueness of the risk-taking behaviour and capital structure of banks is embedded within the Basel III Accord. The monitoring and supervisory arm of the Basel III Accord guides the bank managers in their decision towards capital structure. One way through which the Basel III Accord influences the risk-taking decision and exposure of the bank is through insurance deposits (Beltratti & Stulz, 2012). They explain further that if care is not taken; the insurance deposit which was meant to reduce managers' risky behaviours will motivate them to make risky and unnecessary investment decisions bearing in mind the cushion and safety net effect of the insurance deposit.

All in all, the relationship between risk-taking behaviour and a bank's capital structure is capped under the umbrella of Basel III regulatory framework. Therefore, based on the above theoretical evidence, a positive relationship between risk-taking behaviour and African bank capital structure was predicted in the current study.

Hypothesis 9: There is a significant and positive relationship between African banks' financial performance and risk-taking behaviour.

This hypothesis was formulated on the premise that a well performing firm with high profitability, free cash flow and retained earnings takes more risk and or is likely to invest in unprofitable projects. This notion is supported by the agency theory. Rasiah and Kim (2011) argue that managers of financial firms can be motivated to take on excessive risk and misuse the free cash flow by investing the large free cash flow in value destroying investments such as unnecessary mergers or acquisitions. Thus, excessive free cash flow increases the risk appetite of those charged with the governance of the firm.

Furthermore, the agency theory proposes that in a well performing firm, a structure aimed at reducing the costs arising from conflicts between the mangers and the owners involved is put in place. In this situation, the value of the firm is prioritised over the interest of the managers; and this implies that risk taking decisions are only made to increase the value of the firm by constraining or encouraging managers to act more in the interests of shareholders. Consequentially, this reduces the excessive risk and value crunching investments taken by the managers, and in turn maintains good financial performance and maximises the owners' wealth (De Jonghe & Öztekin, 2015, Teixeira et al., 2014).

Furthermore, the evidence from the studies of Ha and Quyen (2018), Milkau (2017) and Karim et al (2014) shows that banks facing lower liquidity risk, that is, those that are highly profitable, take on more risks as counter banks with poor performance or liquidity problem. These would dread taking on more risk as they fear liquidation. It is also important to note that the relationship that is supposed to exist between bank performance and its risk-taking behaviour is capped under the umbrella of Basel III regulatory framework. Therefore, based on the theoretical evidence above, a positive relationship between African banks' financial performance and risk-taking behaviour was predicted in the current study.

Hypothesis 10: There is a significant and positive relationship between African banks' financial performance and capital structure.

This hypothesis was premised on the notion that highly profitable firms generate more retained earnings. In relation to the pecking order theory, firms are motivated to fund any positive NPV generating projects or investments with retained earnings before considering any other form or source of finance. Therefore, the pecking order theory predicts a negative relationship between a firm's performance and its capital structure.

On the contrary, applying the trade-off theory to the financing behaviour and capital structure of banks, the trade-off theory suggests a positive relationship between a firm's performance and capital structure. The trade-off theory proposes that a well-performing firm with high profitability, size and growth rate would be more interested in debt funding to maintain and sustain its performance. It could be argued that a profitable and large firm would be in less danger of liquidation (liquidity risk) and would rely more on debt financing in order to take advantage of tax benefits (Leary & Roberts, 2005). Moreover, other theories that propose a positive relationship between firm performance and financing behaviour (capital structure and firm leverage) are the agency theory and the free cash flow theory.

It is worth noting that the relationship between bank performance and its financing behaviour is capped under the umbrella of Basel III regulatory framework. Therefore, based on the aforementioned theoretical evidence and a number of other studies such as those of Udom and Onyekachi (2018) and DeBandt et al. (2014) a positive relationship between African banks' financial performance and capital structure was predicted in the current study.

3.9 Ethical consideration

De Vos et al. (2011) define ethics as a set of moral principles and values that are concerned with the degree to which research procedures adhere to professional, legal and social obligations. Furthermore, Collins (2010) and Patton (2002) define research ethics as a system of moral conduct observed during a research process where behavioural rules and expectations about the most acceptable concern towards experimental subjects, respondents, employees, employers and sponsors are morally put into consideration. As the current research did not directly deal with

interaction with experimental subjects, human or any confidential information, the ethical consideration was limited to the validity and reliability of the data obtained from the IRESS database and Bankscope database. These databases are publicly available for any interested individual for research or information purposes. Data sources are clearly indicated within the document and where data modification was essential; the same was clearly indicated.

3.10 Summary of the chapter

This chapter briefly discussed the research design and philosophy of the current study, as well as its sources of data. It also discussed the two broad sampling techniques named probability and non-probability sampling. It was specifically indicated that the purposeful non-probability sampling technique was used in the current study for the reasons stated in the chapter. Furthermore, the chapter reviewed the panel data sets and identified the empirical models used in the current study. It proceeded to give the estimator used in the study as well as possible statistical tests that were performed to avoid misspecification. The chapter concluded with the development of hypotheses and the study's ethical consideration. The next chapter presents the analysis and discussion of the empirical results of this study.

CHAPTER FOUR

PRESENTATION AND INTERPRETATION OF EMPIRICAL RESULTS

4.1 Introduction

The preceding chapter developed the econometric approach used to resolve the identifiable research aim, questions and objectives of the current study. The current chapter presents the empirical results of the models and hypotheses developed in this study pertaining to the adoption of African banks to the Basel III Accord. Specifically, this chapter presents answers to the five main questions asked by this study viz. 1) Is there a significant relationship between the Basel III regulatory requirements and the capital structure of the banks in Africa? 2) Does the Basel III capital adequacy ratio influence the financial performance of African banks? 3) Is there a relationship between the capital buffer premium and the stability of African banks? 4) Is there a significant relationship between Basel III liquidity requirements and the efficiency of African banks? 5) Does the risk-taking behaviour of African banks depend on the Basel III regulatory requirements?

This study employed the panel data econometric techniques to analyse the results. On the one hand, it used a dynamic panel data model estimator to estimate the Basel III regulatory requirements and the bank capital structure, which aided in providing answer to the first research question. On the other hand, a static panel data model estimator was employed to estimate the relationship between the Basel III regulatory requirements and the banks' financial performance, efficiency, stability and risk-taking behaviour. In each instance, the study selected the most robust estimation techniques by applying an array of panel data estimation diagnostic tests.

The rest of the chapter is structured as follows: Section 4.2 shows the basic statistical and normality tests on the data and reports the summary statistics. Section 4.3 reports the five empirical specification models enunciated in the previous chapter. Section 4.4 presents table of the results of the hypotheses and original findings of the current study. Section 4.5 summarises and concludes the chapter.

4.2 Basic descriptive summary statistics and normality tests

The descriptive and normality statistics are an important first step in the analysis of the panel data as well as understanding the integrity of the data sample. The summary statistics of the current study are presented in Table 4.1.

Table 4.1: Summary statistics of the variables

Table 4.1 below shows that the panel data variables were constructed from the data drawn from the annual financial statements which were obtained from the IRESS database. To eliminate outlier observations and the most extremely misreported data, all variables were winsorised to the 99th percentile. The independent variables in the Table are defined as follows: $\boldsymbol{MCR}$ denotes the minimum capital requirement; $\boldsymbol{CAR}$ denotes the capital adequacy ratio; $\boldsymbol{CBP}$ denotes the capital buffer premium; $\boldsymbol{LR}$ denotes liquidity ratio and $\boldsymbol{LCR}$ denotes the liquidity coverage ratio. The dependent variables are defined as follows: $\boldsymbol{TCTE}$ denotes the ratio of Tier 1 capital to total exposure; $\boldsymbol{TDCE}$ denotes the ratio of total debt to capital employed; $\boldsymbol{ROE}$ denotes the ratio of profit after tax to equity; $\boldsymbol{ROA}$ denotes the ratio of profit after tax to total assets; $\boldsymbol{Z-score}$ denotes the ratio of return on asset and equity to asset to the standard deviation of return on asset; $\boldsymbol{OETA}$ denotes the ratio of operating expenses to total assets; $\boldsymbol{NIMR}$ denotes the ratio of net interest revenue to total earnings; $\boldsymbol{RWATA}$ denotes the ratio of risk weighted asset to total assets; $\boldsymbol{NPLTL}$ denotes the ratio non-performing loan to total loan; $\boldsymbol{LNZ-score}$denotes the natural log of Z-score computation. The $\boldsymbol{TCTE}$ and $\boldsymbol{TDCE}$ measure the bank capital structure; $\boldsymbol{ROE}$ and $\boldsymbol{ROA}$ measure the bank financial performance; $\boldsymbol{Z-score}$ measure the bank stability; $\boldsymbol{OETA}$ and $\boldsymbol{NIMR}$ measure the bank efficiency; and $\boldsymbol{RWATA, NPLTL}$ and $\boldsymbol{LNZ-score}$ measure the risk-taking behaviours of banks. The bank specific determinants of capital structure are defined as follows: $\boldsymbol{P}$ denotes profitability; $\boldsymbol{BS}$ denotes bank size; $\boldsymbol{GR}$ denotes growth rate; $\boldsymbol{R}$ denotes risk and $\boldsymbol{AT}$ denotes asset tangibility. All the variables are well defined in appendix A.

Variables	Mean	Standard deviation	Minimum	Maximum	Skewness	Kurtosis
MCR	0.1359	0.0620	0.0628	0.2090	0.0054	0.0204
CAR	0.2937	0.1851	0.1056	0.4818	0.0156	0.0518
CBP	0.1578	0.1231	0.0428	0.2728	0.0950	6.0737
LR	0.5177	0.4143	0.0491	1.8171	0.0210	0.1229
LCR	1.8172	1.1984	0.7053	2.6991	0.0251	0.1170
TCTE	0.0894	0.0429	0.0440	0.2070	0.0107	0.0320
TDCE	0.8574	0.1292	0.0726	2.5475	0.0716	0.9681
ROE	0.1934	0.2135	0.0033	3.9432	0.1286	2.1687
ROA	0.0279	0.0185	0.0004	0.1793	0.0284	0.2153
Z-score	3.2652	15.5347	0.0013	165.1770	0.0886	0.8650
OETA	0.0082	0.0065	0.0011	0.0855	0.0591	0.6061
NIMR	4.3030	22.8573	-26.8340	211.3770	-0.0360	0.7454
RWATA	0.7233	2.0019	0.0021	23.6127	0.0769	0.7698
NPLTL	1.0744	3.7446	0.0027	43.3967	0.0713	0.6418
LNZ-score	0.0420	0.0147	0.0016	0.0971	0.0049	0.0432
P	0.0279	0.0185	0.0004	0.1793	0.0284	0.2153
BS	0.0861	0.0066	0.0655	0.0985	-0.0040	0.0294
GR	0.4361	1.6136	-0.1167	13.9493	0.0631	3.0031
R	0.0420	0.0147	0.0016	0.0971	0.0049	0.0432
AT	0.0360	0.0316	0.0051	0.1493	0.0215	0.0742

The summary statistics for the panel data in Table 4.1 indicates that the mean MCR for the African banks understudy was 13.59% with a standard deviation of 6.2%. This suggests that on average, African banks in this study kept a minimum of Tier 1 and Tier 2 capital of 13.59%, which is higher than the minimum capital requirements indicated in the improved capital regulatory framework of Basel III (BIS, 2015). According to the BCBS (2010), the total capital adequacy ratio must exceed 8% of the CET 1 ratio and Tier 1 capital ratio. The summary statistics in Table 4.1 show a mean value of 29.37% with a standard deviation of 18.51% for CAR which indicates that African banks held on average a capital adequacy ratio of 29.37% for the period under study.

Banks are expected to hold a certain minimum level of capital to safeguard them against financial distress and failure. However, banks often hold capital above the required regulatory minimum in order to protect themselves against unexpected shocks which may result in bank failure. This excess capital is referred to as the capital buffer premium (García-Suaza et al., 2012). The summary statistics in Table 4.1 shows that the mean CBP was 15.78% with a standard deviation of 12.30%. This statistic means that on average, African banks held 15.78% excess of the minimum capital requirement as a buffer to safeguard against unexpected shocks.

As previously indicated one of the important improvements made to the Basel III Accord was the introduction of liquidity measures, which requires banks to maintain liquidity buffers (BCBS, 2010; 2013). The LCR quantitative measure is required to be above a 100%. The result in Table 4.1 shows that the mean LCR was 181.72% with a standard deviation of 119.84%. This suggests that, for the period under study, the African banks held enough liquid assets to withstand liquidity stress, which reduced the chances of future banking crisis and associated losses of economic output in the short term. Similarly, the LR statistic mean of 51.77% and a standard deviation of 41.43% indicate that on average, African banks were well liquefied as the liquidity ratio exceeded 50% with the capacity to cover their current obligations on a slightly above ratio level of 1:1 (Ha & Quyen, 2018).

Gropp and Heider (2010) indicate that African banks are highly leveraged in comparison with other well-established banks from the developed Nations. Table 4.1 shows that the mean TDCE is 85.74%, and this indicates that on average, the banks debt funding to equity financing is 85.74% is highly geared. Furthermore, the Basel III framework introduced a non-risk-based leverage ratio to supplement the capital minimum requirements which is measured by the ratio of Tier 1 capital to total exposure. The bank is expected not to fall below a leverage threshold of 3% to its total exposure, with the aim that the leverage ratio requirement will help to manage the build-up of excess leverage in the banking system (BIS, 2014). Similarly, the mean TCTE which is a proxy of the non-risk-based leverage ratio is 8.94% with a standard deviation of 4.29%. This indicates that on average, the non-risk-based leverage ratio of African bank was 8.94% which is well greater than the 3% stated in the Basel III framework.

Table 4.1 shows that the mean value of ROE and ROA are 19.34% and 2.79% respectively. This suggests that on average, the financial performance of African banks was not as high as compared to other well-established banks from the developed Nations (De Bandt et al., 2014; Lee & Hsieh, 2013). Furthermore, the mean value of Z-score is 326.52%, and according to Rajhi and Hassairi (2013) and Fiordelisi and Mare (2014), the higher the Z-score the more stable the bank is. This suggests that on average the African banks in this study were relatively stable.

Table 4.1 further shows that the mean value of OETA and NIMR are 0.82% and 430.03% respectively. The OETA and NIMR are a measure of bank operational efficiency. According to Miah and Sharmeen (2015), a higher OETA ratio means the bank is losing a larger percentage of its income to expenses. Conversely, a lower efficiency ratio is good for the bank and its shareholders because it indicates a good cost containment strategy (Miah &Sharmeen, 2015). Moreover, the NIMRs show the bank's ability to pay out interest to its depositors in relation to the amount of interest they earned on their assets. A high NIMR indicates cheaper funding or high margins which shows efficiency. This suggests that, on average, the African banks in this study were highly efficient.

Furthermore, the mean value of RWATA, NPLTL and Lnz-score are 72.33%, 107.44% and 4.20% respectively according to the results in Table 4.1. These are measures of the risk-taking behaviours of banks. This suggests that on average, the risk-taking behaviours of the African banks in this study was low. This is because the banks had a higher percentage of total asset and total loan compared to the risk weighted asset and non-performing loans respectively and a lower mean percentage of Lnz-score (Rajhi & Hassairi, 2013; Fiordelisi & Mare, 2014).

Bank size is measured by the natural logarithm of total assets, and asset tangibility is measured by the ratio of fixed asset to total asset. According to Zheng et al (2017) and Drakos and Kouretas (2014), bank size is expected to have low mean value for smaller banks and higher mean values for larger banks. The summary statistics in Table 4.1 shows that the mean values of BS and AT are 8.61% and 3.60% respectively, and these are relatively low. This suggests that on average, the majority of the African banks in this study were small with a small amount of asset value (Mukherjee & Mahakud, 2010, Öztekin & Flannery, 2011).

Statistically, a negative coefficient is skewed to the left and a positive one to the right. The skewness normality test of data integrity used in the current study shows that all variables are evenly distributed with skewness coefficients close to zero. All variables are skewed to the right with the exception of NIMR (a measure of bank efficiency) and the BS (a measure of bank size) which are skewed to the left. This suggests that the variables are asymmetrically distributed where the mean, median and mode do not occur at a regular frequency or at the same point (Joanes & Gill, 1998).

Furthermore, kurtosis is a measure of the heaviness of the tails of a distribution (Joanes & Gill, 1998). A normal distribution curve has a kurtosis of 3, a heavy tailed distribution curve has a kurtosis greater than 3, and light tailed distribution curve have a kurtosis less than 3. In the current study the kurtosis coefficients for most variables have values less than 3 which does not indicate positive excess kurtosis following a light tailed distribution known as a platykurtic distribution. In the current study, with exception of this general light tailed distribution, the GR with a kurtosis coefficient of 3.0031 follows mesokurtic distribution or normally distributed;

whilst the CBP with a kurtosis coefficient of 6.0737 follows a heavy-tailed distribution, thereby exhibiting one of the important characteristics of financial and economic cross sectional and time series data, namely that of leptokurtosis (Sigauke et al., 2014; Wesonga, 2016). Hence, the current study transformed the CBP variable by differencing it to its 1st order level remove positive excess kurtosis, and a normal distribution which is suitable to fit the panel data regression model. This also minimised the loss of information and removed the existence of multicollinearity that exists between the right-hand independent variables, which could lead to higher standard errors for individual estimates, leading to wrong understanding of coefficient's statistical significance.

4.3 Presentation of empirical specification models

This section presents the model specification results. The current study employed both the dynamic and the static model to achieve its aim and objectives. First, the study used the dynamic panel data model to test the determinants of banks capital structure and second, it used the static panel data model to estimate the effect of Basel III regulatory requirements on the financial performance, stability, efficiency and risk-taking behaviours of African banks. Specifically, the five specification models used in this study included the capital structure (leverage) specification model, the financial performance specification model, the stability specification model, the efficiency specification model, and the risk-taking behaviour specification model. The results of each of this specification models are presented in the next section.

4.3.1 The capital structure specification model

The capital structure specification model was used to test the determinants of banks' leverage by employing the dynamic panel data model. The result of the model provided an answer to the first question and achieved the first research objective. The first research objective was to examine the relationship between the Basel III regulatory requirements and the capital structure of selected listed African banks.

The study used the following variables to measure the Basel III regulatory requirements: minimum capital requirements (MCR), capital adequacy ratios (CAR), and capital buffer premium (CBP) and liquidity ratio (LR) and liquidity coverage ratio (LCR). Moreover, it used ratio of Tier 1 capital to total exposure (TCTE) and ratio of total debt to capital employed (TDCE) to measure the capital structure of banks.

Furthermore, a panel data regression model was proposed in this study as shown in Chapter 3 of this thesis to test these variables. The regression model was classified as equation 1.1 and 1.2 with TCTE as equation1.1 and TDCE as equation 1.2. As far as the bank leverage is concerned, the current study concluded that the panel data regression model was best fitted with the dynamic panel data estimators over its counterpart static estimators. Hence, this section presents the dynamic model regression result.

4.3.1.1 Dynamic model regression result

This section specifically presents the result of the dynamic regression model output. The regression model was fitted using the Blundell and Bond's (1998) system generalized method of moments (BB system GMM) estimator. This section starts with the discussion of the result of the multicollinearity test and correlation analysis of the independent and lagged variables.

4.3.1.1.1 Multicollinearity test

Multicollinearity was tested in this study using the variance inflation factors (VIF) to avoid possible misspecification that could arise from the existence of multicolleration in the predictor variables which could lead to wrong understanding of the coefficient's statistical significance. As a general rule, the VIF that exceeds 10 (VIF>10) indicates that the variables are multicollinear. However, the tolerance measure can also be used which is the reciprocal of VIF. The tolerance of less than 0.10 (1/VIF<0.10) indicates that the variable is multicollinear and such variable should be eliminated (Haitovsky, 1969). The results of these tests are shown in Table 4.2.

Table 4.2: Multicollinearity test results for the TCTE and TDCE model

Table 4.2 presents the results of the multicollinearity test for the ***TCTE*** and ***TDCE*** dynamic models. The test was done by calculating the variance inflation factors for the variables in model equation 1.1 and 1.2. In model equation 1.1, the leverage ratio was measured by the ratio of Tier 1capital to total exposure **(*TCTE*),** and in model equation 1.2, the leverage ratio was measured by the ratio of total debt to capital employed **(*TDCE*).** The Table shows the independent variables under investigation in one column and the corresponding VIFs for each in another column. The independent variables in the table are defined as follows: ***MCR*** denotes the minimum capital requirement; ***CAR*** denotes the capital adequacy ratio; ***DCBP*** denotes the capital buffer premium; ***LR*** denotes liquidity ratio and ***LCR*** denotes the liquidity coverage ratio; ***P*** denotes profitability; ***BS*** denotes bank size; ***GR*** denotes growth rate; ***R*** denotes risk and ***AT*** denotes asset tangibility. All the variables are well defined in appendix A.

Variables	**TCTE**		**TDCE**	
	VIF	**1/VIF**	**VIF**	**1/VIF**
MCR	3.30	0.3031	3.30	0.3031
LCR	2.02	0.4959	2.02	0.4959
CAR	1.66	0.6026	1.66	0.6026
LR	1.57	0.6369	1.57	0.6369
AT	1.43	0.7014	1.43	0.7014
BS	1.31	0.7644	1.31	0.7644
GR	1.24	0.8072	1.24	0.8072
P	1.21	0.8249	1.21	0.8249
R	1.13	0.8841	1.13	0.8841
DCBP	1.04	0.9628	1.04	0.9628
Mean VIF	**1.59**		**1.59**	

The multicollinearity test results shown in Table 4.2 show that there is no multicollinearity among the variables used in both regression models, since all the associated values of the VIF are less than 10. It is evident that there is no existence of multicollinearity in the independent variables associated with the models.

4.3.1.1.2 Correlation matrix of the main variables with lagged TCTE and TDCE included

The correlation matrix of the main variables TCTE and TDCE which are measures of bank capital structure used in this study are shown in Table 4.3. The purpose of the correlation analysis was to show the inter-relationship between the independent variables.

Table 4.3: Correlation matrix of the main variables with lagged TCTE and TDCE included

Table 4.3 presents the result of the correlation matrix of the main variables used for the capital structure specification model. The variables in the matrix are defined as follows: $TCTE_{t-1}$ denotes the lagged ratio of Tier1 capital to total exposure; $TDCE_{t-1}$ denotes the lagged ratio of total debt to capital employed; $\boldsymbol{MCR}$ denotes the minimum capital requirement; $\boldsymbol{CAR}$ denotes the capital adequacy ratio; $\boldsymbol{DCBP}$ denotes the capital buffer premium differenced on the 1st order level; $\boldsymbol{LR}$ denotes liquidity ratio and $\boldsymbol{LCR}$ denotes the liquidity coverage ratio $\boldsymbol{P}$ denotes profitability; $\boldsymbol{BS}$ denotes bank size; $\boldsymbol{GR}$ denotes growth rate; $\boldsymbol{R}$ denotes risk and $\boldsymbol{AT}$ denotes asset tangibility. The p-values are presented in parentheses. The markings ***, **, and * indicate significance levels at 1, 5 and 10 % respectively. All the variables are defined in appendix A.

	TCTE	TCTEt-1	TDCE	TDCEt-1	MCR	CAR	DCBP	LR	LCR	P	BS	GR	R	AT
TCTE	1.0000													
TCTEt-1	0.9862***	1.0000												
	(0.0000)													
TDCE	-0.0981**	0.0886	1.0000											
	(0.0485)	(0.0750)												
TDCEt-1	-0.1338***	-0.1248**	0.8178***	1.0000										
	(0.0070)	(0.0120)	(0.0000)											
MCR	0.2208***	0.2156***	-0.1158**	-0.0837**	1.0000									
	(0.0070)	(0.0000)	(0.0197)	(0.0927)										
CAR	0.2706***	0.2738***	-0.0095	0.0097	0.3967***	1.0000								
	(0.0000)	(0.0000)	(0.8482)	(0.8456)	(0.0000)									
DCBP	-0.0538	-0.0416	0.0006	0.0198	-0.1148**	0.0253	1.0000							
	(0.2804)	(0.4040)	(0.9904)	(0.6916)	(0.0208)	(0.6116)								
LR	0.0315	0.0341	-0.0768	-0.0156	0.2250***	0.2048***	-0.0738	1.0000						
	(0.5276)	(0.4942)	(0.1227)	(0.7542)	(0.0000)	(0.0000)	(0.1379)							
LCR	0.4906***	0.4944***	-0.1532***	-0.1438***	0.3215***	0.3132***	0.0065	0.2404***	1.0000					
	(0.0000)	(0.0000)	(0.0020)	(0.0037)	(0.0000)	(0.0000)	(0.8969)	(0.0000)						
P	-0.0256	-0.0229	0.5285***	0.4151***	0.0781	0.1032***	0.0258	0.1295***	0.0977**	1.0000				
	(0.6079)	(0.6461)	(0.0000)	(0.000)	(0.1164)	(0.0000)	(0.6045)	(0.0091)	(0.0494)					
BS	-0.0175	-0.0259	0.2647***	0.2845***	0.0835*	-0.0807	-0.0382	-0.0382	0.0382	-0.1459***	1.0000			
	(0.7250)	(0.6026)	(0.0000)	(0.000)	(0.0932)	(0.1047)	(0.4437)	(0.1275)	(0.4439)	(0.0033)				
GR	-0.0657	-0.0653	0.4466***	0.4325***	-0.1517**	0.0258	-0.0321	-0.1117**	-0.1638***	-0.2529***	0.1076**	1.0000		
	(0.1870)	(0.1899)	(0.0000)	(0.000)	(0.0022)	(0.6053)	(0.5189)	(0.0246)	(0.0009)	(0.0000)	(0.0304)			
R	-0.0258	-0.0205	0.0311**	0.0118**	-0.0331	-0.1190**	-0.0353	0.1029**	-0.0787	0.0283	0.1611***	0.0737	1.0000	
	(0.6046)	(0.6804)	(0.5329)	(0.8130)	(0.5069)	(0.0166)	(0.4788)	(0.0384)	(0.1138)	(0.5705)	(0.0011)	(0.1389)		
AT	-0.3350	-0.0425	-0.1287***	-0.1127**	0.1932***	0.2562***	0.0726	0.0121	0.2239***	0.1521***	-0.1483***	-0.1313***	-0.2989***	1.0000
	(0.3350)	(0.3934)	(0.0095)	(0.0233)	(0.0001)	(0.0000)	(0.1446)	(0.8086)	(0.0000)	(0.0021)	(0.0028)	(0.0081)	(0.0000)	

Table 4.3 presents the correlation matrix of bank capital structure, bank specific determinants of capital structure and the Basel III regulatory requirements with the inclusion of the lagged TCTE and TDCE. First, the lagged TCTE is highly positively correlated with the TCTE. This correlation is significant at the 1% level and demonstrates that the bank leverage is largely influenced by the levels of lagged leverage, which are the historical level of bank leverage. The bank specific determinants were not significantly correlated with the $TCTE_{t-1}$ in the same manner as they were not significantly correlated with the TCTE, though they all showed negative relationship. However, the Table 4.3 shows evidently that the MCR, CAR and LCR are significantly correlated with the lagged TCTE in the same manner as they were significantly correlated with the TCTE. As such, this section does not delve much into the discussion of these correlations. These will be discussed in detail in the next section. It is paramount to note that a positive correlation existed between the lagged TCTE and the MCR, CAR and LCR.

Second, the lagged TDCE is highly positively correlated with the TDCE. This correlation is significant at the 1% level and demonstrates that the bank leverage is largely influenced by the levels of lagged leverage which are the historical level of bank leverage. In this instance, the bank specific determinants were significantly correlated with the $TDCE_{t-1}$ in the same manner as they were significantly correlated with the TDCE, except for R which is not significantly correlated. Furthermore, Table 4.3 shows evidently that only MCR and LCR are significantly correlated with the lagged TDCE in the same manner as they were significantly correlated with the TDCE. As such, this section does not delve much into the discussion of these correlations. These will be discussed in detail in the next section. It is important to note that a negative correlation existed between the lagged TDCE and the MCR, LCR, P and AT whilst a positive relationship existed between the lagged TDCE and the BS and GR.

According to the correlation matrix in Table 4.3, the MCR and CAR have the highest correlation coefficient of 39.67%, followed by the MCR and LCR with a correlation coefficient of 32.15%. Many of the correlation coefficients are fairly small, suggesting that multicollinearity is not a problem.

Furthermore, most of the correlations presented in Table 4.3 confirm the predictions of some of the major capital structure theories which provide useful insight into understanding the capital structure and financing choices made by those charged with the bank governance.

Profitability is positively correlated to leverage, a confirmation of the trade-off theory. This relationship is statistically significant for the total debt to capital employed ratios. This finding corroborates the observations by Ahmad and Abbas (2011), Al-Najjar and Hussainey (2011) Bartoloni (2013) and Lemma and Negash (2014) that a positive relationship should exist between firm profitability and leverage. In particular, Lindquist (2004) and Lim (2012) investigated the financial service firms asserts and found that a positive relationship exists between bank leverage and profitability. They contend that highly profitable firms prefer to use debt capital over equity capital. This is because profitable banks have sufficient free cash flow to service debt and enough security for debt capital and, thus, enjoy the debt interest tax shields from heavy reliance on debt funding. However, though not significant, a negative association is observed between profitability and the ratio of Tier 1 capital to total exposure, a measure of bank leverage and thus suggesting that highly profitable banks have sufficient retained earnings and use less external funding. This is in line with the pecking order hypothesis.

The bank size variable in the current study is significantly positively correlated to leverage which was measured by the total debt to capital employed ratio. This suggests that as a firm increases in size, its financing behaviour tends to change towards the direction of debt funding. In general, this finding is in line with the conclusions of Eriotis, et al. (2007) and Lemma and Negash (2014) that larger firms can negotiate for debt funding on more favourable terms compared to smaller firms, and that they also enjoy a lower interest rate on a high debt commitment. This confirms the agency cost theory and the expectation of the trade-off theory which predict large firms should be highly leveraged as compared to small firms because of the debt interest tax shields they stand to enjoy. However, although not significant, a negative association is observed between bank size and the ratio of Tier 1 capital to total exposure, a measure of bank leverage suggesting low information asymmetries associated with large firms, which is in line with the pecking order hypothesis.

The findings of the current study show that the growth rate variable is significantly positively correlated to leverage which was measured by the ratio of total debt to capital employed. This suggests that with an increased growth rate, firms' financing behaviour tends to tilt towards debt funding. This corroborates the agency costs theory which proposes that substituting debt for equity is an effective solution to curbing the natural inclination of corporate managers in using excess cash to sustain growth rate at the expense of profitability (Barclay & Smith, 2005). Heavy debt financing has been observed by De Jonghe and Oztekin (2015) to have a disciplining role on managers with a solution to over investment, which contractually an obligated payment of interest is enforced and the principal performs the role of dividend payments in squeezing out excess capital. Thus, debt financing can add value simply by forcing managers to be more critical in evaluating capital spending plans (Barclay & Smith, 2005, Rasiah & Kim, 2011). Similarly, Teixeria et al (2014) contend that debt financing reduces the free cash flow available to managers as profitable firms have high propensity to generate free cash flow which increases agency cost. In other words, internal funding is substituted with debt funding to discipline the management and monitor the firms' growth rate by investing in positive NPV related projects in order to be able to service their debt. Thus, growth rate opportunities and leverage are positively related under the agency costs theory. However, it is interesting to note that although not significant, a negative association is observed between growth rate and the ratio of Tier 1 capital to total exposure, a measure of bank leverage. This suggests that banks with higher growth rate are more equity-controlled and have a tendency to invest sub-optimally to expropriate wealth from the banks' bondholders. This is in line with the trade-off hypothesis.

The findings of this study further show that the firm risk variable is positively correlated to leverage which was measured by the total debt to capital employed ratio, a confirmation of the pecking order theory. This is hypothesised on the basis that the volatility of cash flows is directly related to earnings volatility. Thus, firms become constrained to finance from their retained earnings and therefore, have to seek funding from external sources. The pecking order theory therefore predicts that riskier firms have higher leverage (Al-Najjar & Hussainey, 2011). However, in the current study, although not significant, a negative association is observed between the firm risk and the ratio of Tier 1 capital to total exposure; a measure of bank leverage.

This suggests that firms with highly volatile cash flows or riskier firms avoid debt financing and have a low debt capital because more volatile cash flows reduce the probability that tax shields provide (Aremu et al., 2013). This is in line with the trade-off theory of capital structure.

The findings further show that the asset tangibility is negatively correlated to leverage, a confirmation of the pecking order theory. This relationship is statistically significant for the total debt to capital ratios. This finding supports the conclusion of Lim (2012), Lemma and Negash (2014) and Moyo (2016) that an inverse relationship between asset tangibility and bank leverage exists. They contend that because of low information asymmetry associated with tangible assets, equity issuances become less costly in this instance thus, leverage ratios become lower for firms with higher tangibility.

4.3.1.1.3 The Blundell and Bond system dynamic regression output

This section specifically shows the results of the two-step dynamic panel regression model. It also shows the results of the Wald Chi^2, $Prob>Chi^2$, AR (1), AR (2) and the sargan test statistics which affirm that the model was well fitted across the regression models. The Wald test for joint significance for both regression models are satisfied at the 1% level of significance. The Wald test for the significance of the time effects is significant for both regression models TCTE and TDCE. Also, for both models, the AR (1) test statistic suggests the existence of negative first order autocorrelation for residuals. According to Roadman (2006) and Ramjee and Gwatidzo (2012), this result is expected and uninformative. They assert that to ascertain the correlation, the second order autocorrelation AR (2) results should be relied upon. The AR (2) revealed that the estimates are consistent as there is no second order autocorrelation of residuals suggesting that the models used were correctly specified. The sargan test confirms the validity of the over-identifying restrictions implying that all the instrumental variables are valid for the BB system GMM estimator. Overall, this shows that results are robust to panel-specific heteroscedasticity and autocorrelation.

Table 4.4: Dynamic panel regression results for the capital structure specification model

Table 4.4 shows the regression results of the capital structure specification model. This dynamic panel regression model was fitted with the Blundell and Bond (1998) system GMM estimator. Leverage was measured by ***TCTE*** and ***TDCE***. All the coefficients were estimated at 99% confidence level. $TCTE_{t-1}$ denotes the lagged ratio of Tier1 capital to total exposure; $TDCE_{t-1}$denotes the lagged ratio of total debt to capital employed; ***MCR*** denotes the minimum capital requirement; ***CAR*** denotes the capital adequacy ratio; ***DCBP*** denotes the capital buffer premium differenced on the 1st order level; ***LR*** denotes liquidity ratio and ***LCR*** denotes the liquidity coverage ratio ***P*** denotes profitability; ***BS*** denotes bank size; ***GR*** denotes growth rate; ***R*** denotes risk and ***AT*** denotes asset tangibility. The T-statistics are presented in parentheses. The markings ***, **, and * indicate significance levels at 1, 5 and 10 % respectively. All the variables are defined in appendix A. The AR (1), AR (2) and the Sargan test statistics are shown at the bottom of the table.

Variables	**TCTE**	**Variables**	**TDCE**
	Coefficients		**Coefficients**
$TCTE_{t-1}$	0.9819***	$TDCE_{t-1}$	0.5840***
	(323.47)		(303.29)
MCR	0.0205***	**MCR**	0.0680*
	(11.31)		(1.76)
CAR	0.0162***	**CAR**	-0.0399
	(6.25)		(-1.50)
DCBP	0.0052***	**DCBP**	-0.1573***
	(2.82)		(-6.47)
LR	0.0017***	**LR**	-0.0518***
	(6.01)		(-14.68)
LCR	-0.0015***	**LCR**	0.0131***
	(-27.00)		(13.26)
P	-0.0339***	**P**	1.7991***
	(-3.92)		(30.28)
BS	-0.8182***	**BS**	3.7111***
	(-11.63)		(5.96)
GR	-0.0009**	**GR**	0.0017**
	(-2.23)		(2.09)
R	-0.1151***	**R**	0.1180***
	(-2.99)		(2.88)
AT	-0.0257***	**AT**	-2.7431***
	(-5.74)		(-39.45)
Obs.	**450**	**Obs.**	**450**
Wald Chi^2	**574.06**	**Wald Chi^2**	**432.10**
Prob > Chi^2	**0.0000**	**Prob > Chi^2**	**0.0000**
AR (1)	**-5.245*** **	**AR (1)**	**-1.2935*** **
AR (2)	**2.108**	**AR (2)**	**1.302**
Sargan Test	**44.7481****	**Sargan Test**	**35.1038****

Table 4.4 reports the BB sys-GMM estimates for capital structure regression model. The results are presented for the ratio of Tier 1 capital to total exposure (TCTE) variable as well as for the ratio of total debt to capital employed (TDCE) variable.

First, these results show that, for African banks, minimum capital requirements (MCR), capital adequacy ratios (CAR), capital buffer premium (DCBP) and liquidity ratio (LR) have a significant positive relationship with the TCTE. Liquidity coverage ratio (LCR) which is the recent development added to the Basel III regulatory framework, however, has a negative relationship with the TCTE.

The coefficient for the MCR, CAR, DCBP and LR variables are positive and significant at the 1% level for the TCTE. This implies that an increase in these variables resulted in a consequential increase in the African banks' leverage ratios, TCTE. Thus, an increase in MCR, CAR, DCBP and LR tilts the banks towards more debt funding. This is consistent with the general argument from past studies such as those of Gavalas and Syriopoulos (2018), Klefvenberg and Mannehed (2017), Beltratti and Stulz (2012), Berger and Bouwman (2013) and Lim (2016) that, despite all sources of funding available to banks, banks largely rely on debt capital to meet their investments and operational funding requirements. This is because highly profitable banks enjoy the debt interest tax shields from heavy reliance on debt funding. This contrasts with the findings of Chun et al (2012) and Admati et al. (2013) who argue that the increase in Basel III regulatory requirements resulted in proportionate increase in equity funding as compared to debt funding and restrict the bank's ability to lend and thus affects its main operational activities. To ease the restriction on the main operational activities caused by the equity spikes, banks tend to increase their debt capital in order to remain operational and financially stable.

However, the coefficient for the LCR variables is negative and significant at the 1% level for the TCTE. This suggests that an increase in LCR results in a consequential decrease in the African banks' leverage ratios, TCTE. Thus, a decrease in LCR tilts the bank towards more equity funding. In correlation to the BCBS (2010; 2013), a negative relationship is expected. This is because the BCBS introduced a new global liquidity standard. The liquidity standards state that

the LCR must ensure that the banks have enough liquid assets to withstand liquidity stress in the short term (30-days stressed funding). As a result, the capital structure of banks must have less debt capital and more equity capital in order to maintain the minimum level of LCR. This finding is similar to the findings of Sadien (2017) and Chadha and Sharma (2015). Therefore, the findings of the current study suggest that a negative relationship with the bank capital structure exists.

The bank specific determinants P, BS, GR, R, and AT were all significantly correlated with the TCTE, although they all showed a negative relationship at the 1% and 5% levels of significance. As such, this section does not delve into the discussion of these relationship as it has been discussed in the earlier section of this chapter

Second, the results in Table 4.4 show that for African banks, minimum capital requirement (MCR) and the liquidity coverage ratio (LCR) have a significant positive relationship with the TDCE. The capital adequacy ratio (CAR) and capital buffer premium (DCBP) however have a negative relationship with the TDCE. Furthermore, the CAR does not have a significant relationship with the TDCE.

The coefficients for the MCR and LCR variables are positive and significant at the10% and 1% level respectively for the TDCE. This suggests that an increase in MCR and LCR results in a consequential increase in the African banks' leverage ratios. Thus, an increase in MCR and LCR tilts the banks towards more debt funding. This is consistent with the argument of Gabriel (2016), Berger and Bouwman (2013) and Lim (2016), who posit that, despite all sources of funding available to banks, banks largely rely on debt capital to meet their investments and operational funding requirements. This is because highly profitable banks enjoy the debt interest tax shields from heavy reliance on debt funding. They further argue that an increase in the regulatory capital instituted by the Basel Accord propels the banks to increase their share of debt capital proportionately over equity capital in order to remain operationally and financially stable.

Conversely, coefficients for the DCBP and LR variables are negative and significant at the 1% level for the TDCE. This suggests that an increase in DCBP and LR resulted in a consequential decrease in the African banks' leverage ratios. Thus, an increase in DCBP and LR tilts the banks towards more equity funding. This is consistent with the argument of Chortareas and Ventouri (2012) and Barth et al (2013), who posit that as the buffer premium and liquidity ratio increase banks tend to reduce their debt capital in order to maintain the liquidity balance and avoid liquidity and operational crisis. These findings suggest that a negative relationship with the bank capital structure exists.

The findings of this study show that the bank specific determinants P, BS, GR, R, and AT were all significantly correlated with the TDCE, as they all showed a positive relationship at the 1% and 5% levels of significance, except for the AT that showed a negative relationship. As such, this section does not delve into the discussion of these relationships as it has been discussed in the earlier section of this chapter.

Given the above results, the current study, therefore, concludes that there is a relationship between the Basel III regulatory requirements and the capital structure of selected listed African banks, which answers the first research question of this study.

4.3.2 The financial performance specification model

The financial performance specification model was used to test the relationship between the financial performance of African banks and the Basel III capital adequacy ratio. This specification model was fitted using the static panel data estimators. The results of the model were used to provide an answer to the second research question and objective.

Furthermore, the following variables were used to measure the Basel III regulatory requirements: minimum capital requirements (MCR), capital adequacy ratios (CAR), capital buffer premium (CBP), liquidity ratio (LR), and liquidity coverage ratio (LCR). On the other hand, the return on equity (ROE) and return on asset (ROA) were used to measure the financial performance of banks.

The static panel data regression model in Chapter 3 of this thesis was found suitable for the variables. This model was classified under equation 2.1 and 2.2, ROE under equation 2.1, and ROA under equation 2.2. The study conducted some preliminary diagnostic tests between the pooled OLS, random effects and fixed effects estimator to ascertain the most suitable to fit the model. Hence, this section presents the static model regression output.

4.3.2.1 Static model regression output

This section begins with the discussion of the result of the multicollinearity test and proceeds to present the results of the RE and FE estimators used in fitting the ROA and ROE models respectively.

4.3.2.1.1 Multicollinearity test

Table 4.5 reports the variance inflation factors for the relationship between the independent and dependent variables in the current study. All the associated values for both regression models are less than 10. The findings show that there is no existence of multicollinearity in the independent variables associated with the models.

Table 4.5: Multicollinearity test results for the ROE and ROA model

Table 4.5 presents the results of the multicollinearity test for the financial performance model. The test was done by calculating the variance inflation factors for the variables in model equations 2.1 and 2.2 respectively. In model equation 2.1, the financial performance was measured by the ratio of profit after tax to equity **(ROE)** and in model equation 2.2, the financial performance was measured by the ratio of profit after tax to total assets **(ROA).** The Table shows the independent variables under investigation in one column and the corresponding VIFs for each in another column. The independent variables in the table are defined as follows: MCR denotes the minimum capital requirement; CAR denotes the capital adequacy ratio; $DCBP$ denotes the capital buffer premium differenced on the 1st order level; LR denotes liquidity ratio and LCR denotes the liquidity coverage ratio. All the variables are defined in appendix A.

Variables	ROE		ROA	
	VIF	1/VIF	VIF	1/VIF
MCR	2.85	0.3507	2.85	0.3507
LCR	1.91	0.5222	1.91	0.5222
CAR	1.56	0.6393	1.56	0.6393
LR	1.38	0.7258	1.38	0.7258
DCBP	1.03	0.9737	1.03	0.9737
Mean VIF	**1.75**		**1.75**	

4.3.2.1.2 Static panel data regression output

Choosing a suitable estimator was done after calculating the F- test, Breusch and Pagan test and the Hausman specification test. The F-test is used to determine the existence of fixed effects in a regression model. If the $H_0$is rejected and the P-value is statistically significant, then the FE model is suitable. The Breusch and Pagan test is used to determine the existence of random effects in a regression model. If the H_0 is rejected and the P-value is statistically significant, then the RE model is suitable. However, in a situation where there are no fixed or random effects in a regression model, that is, whereby the P-value of both tests is statistically insignificant, the pooled OLS model is favoured.

Furthermore, peradventure there are fixed and random effects in a regression model. That is, in a situation where the P-value of both tests is statistically significant, the Hausman specification test is used to select the most suitable estimator between the FE and RE. A fixed effects model

is chosen if the H_0 of the Hausman test is rejected, that is, when the p-values of the Hausman tests are statistically significant and vice versa.

The findings of this study further show that with regard to the ROE and ROA financial specification models, the results for the F-test and Breusch and Pagan test were statistically significant. This suggests that the fixed and random effects for both ROE and ROA financial specification models exist. Hence, the Pooled OLS estimate was dropped and the Hausman specification test was used to arrive at a suitable estimator between FE and RE.

The p-values of the Hausman specification tests are statistically significant for the ROE financial specification model. Therefore, the null hypothesis was rejected in favour of the fixed effects estimator. On the other hand, the p-values of the Hausman specification tests are statistically insignificant for the ROA financial specification model, which suggests that the null hypothesis was not rejected in favour of the fixed effects estimator. Hence, the fixed effects estimator was favoured and used to report the results for the ROE financial specification model whilst the random effects estimator was favoured and used to report the results for the ROA financial specification model.

Table 4.6: Static panel regression result for the financial performance specification model

Table 4.6 shows the regression results of the financial performance specification model. The Table shows the estimation results for the relationship between the financial performance of African banks and the Basel III regulatory requirements. The regression model was fitted with the RE and the FE estimator for **ROA** and **ROE** model respectively. All the coefficients were estimated at 99% confidence level. The financial performance was measured by both the ***ROE*** and ***ROA***. The independent variable ***MCR*** denotes the minimum capital requirement; ***CAR*** denotes the capital adequacy ratio; ***DCBP*** denotes the capital buffer premium differenced on the 1st order level; ***LR*** denotes liquidity ratio and ***LCR*** denotes the liquidity coverage ratio. The t-statistics for the FE models as well as the z-statistics for the RE model are presented in parentheses. The markings ***, **, and * indicate significance levels at 1, 5 and 10 % respectively. All the variables are defined in appendix A. The static panel data estimate test results are shown at the bottom of the Table.

Variables	**Random Effects Model**	**Fixed Effects Model**
	ROA	**ROE**
MCR	-0.0011	-1.1056***
	(-0.05)	(-2.83)
CAR	0.0109	0.4288**
	(1.17)	(1.84)
DCBP	0.0139	-0.4258
	(0.78)	(1.38)
LR	0.0021	0.0114
	(0.94)	(0.30)
LCR	-0.0016*	0.0007
	(-1.81)	(0.05)
Obs.	450	450
Adjusted R^2	0.2180	0.3130
F statistics		1.51**
BP L-M statistics	357.39***	
Hausman Test:		
Chi^2-value	4.45	10.83**
Prob>chi^2	0.4860	0.0548

The static panel data regression results of the ROA and ROE models are presented in Table 4.6. Based on the preliminary diagnostic tests and the selection criteria previously enunciated, the ROA model was fitted with the RE estimator and the ROE model was fitted with the FE estimator.

Table 4.6 shows that there is a relationship between capital adequacy ratios and the financial performance of African banks. This is evident from the FE estimation results of the ROE measure

of financial performance. The coefficient for the CAR variable is positive and significant at the 5% level for the ROE measure of financial performance. This suggests that an increase in the capital adequacy ratio resulted in a consequential increase in the profitability of African banks.

Previous studies such as Nguyen (2020), Ajayi et al (2019), Mwai et al (2017), Capgemini (2014), Lipunga (2014), and Caggiano and Calice (2011) suggest that an increased and stricter capital requirement promotes the financial performance of the banks (BCBS, 2010). Similarly, an increased CAR gives the African banks some level of confidence, as the CAR serves as a cushion against economic and financial shocks. Hence, banks can carry out their lending operations smoothly and confidently undertake profitable and high yielding investments, which invariably leads to an increase in the probability of a bank and its return to the shareholders. This argument is consistent with the findings of De Bandt et al (2014), who assert that an increase in the capital base as recommended by the Basel III framework results in a proportionate increase in the French banks' ROE. They opine that the positive relationship appears to be as a result of the operational efficiency within the large French banks with a high capital base; which can generate and maintain sustainable revenue which is achieved at a reduced cost. Similarly, Lee and Hsieh (2013) argued in their study of European banks that banks which have more capital make stronger monitoring and supervisory efforts. They make better lending decisions than they would do if they were less capitalised, and they can extract higher payments from the borrowers. This increases the profitability of a bank and its return to the shareholders. Hence, a bank increasing its capital ratio is consistent with the maximisation of the profits which is in line with the Basel III capital regulatory framework.

A further analysis of past studies from the Asian and European banks shows that there is a positive connection between the core capital held and the earnings of the banks. They assert that more capitalised banks are more profitable because they have sufficient financial resources to invest in high return investments which generate higher returns for the banks (Nguyen, 2020; Lipunga, 2014; Capgemini, 2014; Aspal & Nazneen, 2014; Berger & Bouwman, 2013; Caggiano & Calice, 2011; Gropp & Heider, 2010). Conversely, studies such as those of Andaiyani et al (2021) on Asian banks, Guidara et al (2013) on Canadian banks, Kosmidou et al (2012) and

Goddard et al (2010) on some European union member countries argue that there is a negative relationship between the Basel III capital adequacy ratio and bank financial performance.

In conjunction with the above arguments, the current study, therefore argues that there is a relationship between the Basel III capital adequacy ratio and the financial performance of selected listed African banks, which fulfils the second research objective of the study.

4.3.2.1.3 Robustness of the financial specification regression models

In order to assess the effectiveness and impact of the regression results presented in section 4.3.2.1.2, a model variation test was conducted by substituting the actual regulatory capital held by the selected listed African banks with the Basel III prescribed minimums. This test was conducted to ascertain the impact of the Basel III prescribed minimums on the financial performance of the selected listed African bank. From the test results, the study deduced the most viable option between the Basel III prescribed minimums and the actual capital held by the selected African banks.

The regression model used the Basel III prescribed minimum of pMCR, pCAR, pLCR and pDCBP as the independent variables and excluded the LR as it was not a Basel III prescribed minimum. The ROA and ROE used in section 4.3.2.1.2 were maintained.

Following the same procedure, estimator selection tests were conducted, and the suitable selections criteria were followed as enunciated in section 4.3.2.1. The misspecification errors inherent in the regression models, such as the heteroscedasticity, cross-sectional dependence, outliers, and multicollinearity were also adjusted for in line with the previous approach in section 4.3.2.1. The pre-estimation results and specification tests such as the VIF test results, Breusch and Pagan LM test for random effects, and Hausman test results were reported in the Appendices. The VIF for the relationship between the independent and dependent variables are less than 10 with a mean VIF of 3.86 (refer to Appendix E). This provides evidence that there is no existence of multicollinearity in the independent variables associated with the models.

Using the Basel III prescribed minimum as the independent variable in the current study, the regression model was fitted using the RE and FE estimators. The regression results are presented in Table 4.7 below.

Table 4.7: Regression results for the effectiveness of Basel III prescribed minimums

Table 4.7 shows the regression results of the Basel III prescribed minimums. The Table shows the estimation results for the relationship between the financial performance of African banks and the Basel III prescribed minimums. The regression model was fitted with the FE and the RE estimator for **ROA** and **ROE** model respectively. All the coefficients were estimated at 99% confidence level. The financial performance was measured by both the $\boldsymbol{ROE}$ and $\boldsymbol{ROA}$. The independent variable $\mathbf{p}\boldsymbol{MCR}$ denotes the prescribed minimum capital requirement; $\mathbf{p}\boldsymbol{CAR}$ denotes the prescribed capital adequacy ratio; $\mathbf{pD}\boldsymbol{CBP}$ denotes the prescribed capital buffer premium differenced on the 1st order level; and $\mathbf{p}\boldsymbol{LCR}$ denotes the prescribed liquidity coverage ratio. The t-statistics for the FE models as well as the z-statistics for the RE model are presented in parentheses. The markings ***, **, and * indicate significance levels at 1, 5 and 10 % respectively. The static panel data estimate test results are shown at the bottom of the Table.

Variables	**Fixed Effects Model**	**Random Effects Model**
	ROA	**ROE**
pMCR	-0.1353	-1.2078
	(-1.71)	(-0.93)
pCAR	-0.0108	-1.8942*
	(-0.15)	(-1.59)
pDCBP	-0.0024	0.0325
	(-0.05)	(0.04)
pLCR	0.0098	0.1408
	(0.83)	(0.72)
Obs.	450	450
Adjusted R^2	0.8700	0.2840
F statistics	9.76***	
BP L-M statistics		1.74*
Hausman Test:		
Chi^2-value	11.25**	0.00
Prob>chi^2	0.0239	1.0000

Based on the preliminary diagnostic tests and the selection criteria enunciated previously, the ROA model was fitted with the FE estimator and the ROE model was fitted with the RE estimator. The results of the FE and RE estimation are presented in Table 4.7.

The results indicate that there is no positive significant relationship between the Basel III prescribed minimums and the financial performance of the selected African banks. However, at 10% level of significance, a negative relationship exists between the prescribed CAR and the ROE. This suggests that maintaining the prescribed minimum CAR has a consequential negative impact and declining effect on the financial performance of the selected African banks. By

contrast, the expectation of the Basel III regulation is that an increased and stricter capital requirement above the Basel II capital requirements will promote bank financial performance (BCBS, 2010). The Basel III prescribed CAR has however proven inadequate to promote the financial performance of the selected African banks. In relation to the results in Table 4.6, African banks are made financially sound and profitable by keeping a reasonable higher CAR than the prescribed minimum CAR. Keeping a reasonable higher CAR is consistent with the results of Gropp and Heider (2010) who assert that more capitalised banks are more profitable because they have sufficient financial resources to invest in high return investments which generates higher return for the banks and its shareholders. According to the results in Table 4.1, the selected African banks kept an average CAR of 29.37% which consequentially promoted their financial performance. Hence, the current study recommends that African banks should keep a CAR that ranges between 10.56% and 48.18% (See Table 4.1) in order to remain financially sound and profitable.

4.3.3 The stability specification model

The stability specification model was used to test the relationship between the stability of banks and the capital buffer premium of African banks. This specification model was fitted using the static panel data estimators. The results of the model provide an answer to the third research question and objective.

The following variables were used by the current study to measure the Basel III regulatory requirements: Minimum capital requirements (MCR), capital adequacy ratios (CAR), and capital buffer premium (DCBP), liquidity ratio (LR) and liquidity coverage ratio (LCR). Furthermore, the Z-score computation was used to measure the stability of the banks.

This study proposed a static regression model in Chapter 3 of this thesis as suitable for the variables. The regression model was classified as equation 3.1. Some preliminary diagnostic tests between the pooled OLS, random effects and fixed effects estimator were conducted by the current study to ascertain which estimator is more suitable to fit the model. Hence, this section presents the static model regression output.

4.3.3.1 Static model regression output

This section begins with the discussion of the result of the multicollinearity test and proceeds to present the results of the pooled OLS estimator used in fitting the bank stability model.

4.3.3.1.1 Multicollinearity test

Table 4.8 reports the variance inflation factors for the relationship between the independent and dependent variables. All the associated values for both regression models are less than 10. This provides evidence that there is no existence of multicollinearity in the independent variables associated with the models.

Table 4.8: Multicollinearity test results for the Z-score model

Table 4.8 presents the results of the multicollinearity test for the bank stability model. The test was done by calculating the variance inflation factors for the variables in model equation 3.1. The bank stability was measured by the computation of $\boldsymbol{Z-score}$. The Table shows the independent variables under investigation in one column and the corresponding VIFs for each in another column. The independent variables in the table are defined as follows:$\boldsymbol{MCR}$ denotes the minimum capital requirement; $\boldsymbol{CAR}$ denotes the capital adequacy ratio; $\boldsymbol{DCBP}$ denotes the capital buffer premium differenced on the 1st order level; $\boldsymbol{LR}$ denotes liquidity ratio and $\boldsymbol{LCR}$ denotes the liquidity coverage ratio. All the variables are defined in appendice A.

Variables	**Z-score**	
	VIF	**1/VIF**
MCR	2.85	0.3507
LCR	1.91	0.5222
CAR	1.56	0.6393
LR	1.38	0.7258
DCBP	1.03	0.9737
Mean VIF	**1.75**	

4.3.3.1.2 Static panel data regression output

Based on the aforementioned selection criteria for the suitable estimator between the pooled OLS, FE and RE, the diagnostic results for the F-test and Breusch and Pagan test were statistically insignificant. This implies that no existence of fixed or random effects and the pooled OLS estimator was favoured as a good fit to report the results for the bank stability specification model.

Table 4.9: Static panel regression results for the stability specification model

Table 4.9 shows the regression results of the stability specification model. The Table shows the estimation results for the relationship between the stability of African banks and the Basel III regulatory requirements. The regression model was fitted with the pooled OLS estimator, and all the coefficients were estimated at 99% confidence level. The bank stability was measured by the computation of $\boldsymbol{Z-score}$. The independent variable $\boldsymbol{MCR}$ denotes the minimum capital requirement; $\boldsymbol{CAR}$ denotes the capital adequacy ratio; $\boldsymbol{DCBP}$ denotes the capital buffer premium differenced on the 1st order level; $\boldsymbol{LR}$ denotes liquidity ratio and $\boldsymbol{LCR}$ denotes the liquidity coverage ratio. The t-statistics for the pooled OLS model is presented in parentheses. The markings ***, **, and * indicate significance levels at 1, 5 and 10 % respectively. All the variables are defined in appendix A. The static panel data estimate test results are shown at the bottom of the Table.

Variables	**Pooled OLS Model**
	Z-score
MCR	-3.0662**
	(-0.14)
CAR	4.9584
	(0.95)
DCBP	-4.1247
	(-0.19)
LR	4.5225**
	(2.10)
LCR	1.2244*
	(1.41)
Obs.	450
Adjusted R^2	0.1901

The static panel data regression results for the Z-score model are presented in Table 4.8. Based on the preliminary diagnostic tests and the selection criteria enunciated previously, the Z-score model was fitted with the Pooled OLS estimator

Table 4.9 shows that there is a non-significant negative relationship between capital buffer premium and the stability of African banks. This is evident from the Pooled OLS estimation results of the Z-score measure of banks stability.

The coefficient for the DCBP is negative and rather statistically insignificant at all levels for the measure of bank stability. This suggests that the increase in the capital buffer premium consequentially leads to deterioration in banks' stability. This is because as the holding of the

excess of the minimum regulatory capital requirements by the African banks to have a high buffer premium, severs the profitable bank lending activities and investments, and invariably severs their stability.

The results of the current study contradict popular studies such as those of Moudud-Ul-Huq (2019), Lotto (2018), Sutorova and Teply (2013), Barth et al (2013), and Chortareas and Ventouri (2012), and the proposition of the Basel III Accord, that stricter and higher regulatory requirements and buffer premiums are expected to keep the bank stable and against market and economic shocks (BCBS, 2010). However, the results of the current study are consistent with the findings of Banerjee and Mio (2018, 2017) and Vasquez and Federico (2012) who did not find any impact of the Basel III buffer premiums on the stability of the British banks. Similarly, Giordana and Schumacher (2017) found a negative relationship between the Basel III capital buffers and the stability of the Luxembourg banks.

Given the above findings, the current study therefore argues that there is a non-significant relationship between the Basel III capital buffer premium and the stability of selected listed African banks, which fulfils the third research question and objective of this study.

4.3.3.1.3 Robustness of the bank stability regression model

In order to assess the effectiveness and impact of the regression results presented in section 4.3.3.1.2, a model variation test was conducted by substituting the actual regulatory capital held by the selected listed African banks with the Basel III prescribed minimums. This test was conducted to ascertain the impact of the Basel III prescribed minimums on the stability of the selected listed African bank. From the test results, the study deduced the most viable option between the Basel III prescribed minimums and the actual capital held by the selected African banks.

The regression model used the Basel III prescribed minimum of pMCR, pCAR, pLCR and pDCBP as the independent variables and excluded the LR as it was not a Basel III prescribed minimum. The Z-score in section 4.3.3.1.2 was maintained.

Following the same procedure, estimator selection tests were conducted, and the suitable selections criteria were followed as enunciated in section 4.3.3.1. The misspecification errors inherent in the regression models, such as the heteroscedasticity, cross-sectional dependence, outliers, and multicollinearity, were also adjusted in line with the previous approach in section 4.3.3.1. The pre-estimation results and specification tests, such as the VIF test results, Breusch and Pagan LM test for random effects, and Hausman test results, are reported in the Appendix. The VIF for the relationship between the independent and dependent variables are less than 10 with a mean VIF of 3.86 (refer to Appendix E). This is evident that there is no existence of multicollinearity in the independent variables associated with the models.

The pooled OLS estimator was used to fit the model using the Basel III prescribed minimum as the independent variable in the regression model. The regression results are presented in Table 4.10 below.

Table 4.10: Regression results for the effectiveness of Basel III prescribed minimums

Table 4.10 shows the regression results of the Basel III prescribed minimums. The Table shows the estimation results for the relationship between the stability of African banks and the Basel III prescribed minimums. The regression model was fitted with the pooled OLS estimator, and all the coefficients were estimated at 99% confidence level. The bank stability was measured by the computation of $\boldsymbol{Z-score}$. The independent variable $\mathbf{p}\boldsymbol{MCR}$ denotes the prescribed minimum capital requirement; $\mathbf{p}\boldsymbol{CAR}$ denotes the prescribed capital adequacy ratio; $\mathbf{pD}\boldsymbol{CBP}$ denotes the prescribed capital buffer premium differenced on the 1st order level; and $\mathbf{p}\boldsymbol{LCR}$ denotes the prescribed liquidity coverage ratio. The t-statistics for the pooled OLS model is presented in parentheses. The markings ***, **, and * indicate significance levels at 1, 5 and 10 % respectively. The static panel data estimate test results are shown at the bottom of the Table.

Variables	**Pooled OLS Model**
	Z-score
pMCR	-33.2052*
	(-0.33)
pCAR	-46.7588
	(-1.70)
pDCBP	-7.0818
	(-0.11)
pLCR	0.5819
	(1.04)
Obs.	450
Adjusted R^2	0.2501

Based on the preliminary diagnostic tests t and the selection criteria enunciated previously, the Z-score model was fitted with the pooled OLS estimator. The results of the pooled OLS estimation were documented and presented in Table 4.10.

The results indicate that there was no positive significant relationship between the Basel III prescribed minimums and the stability of the selected African banks. However, at 10% level of significance, a negative relationship exists between the prescribed MCR and bank stability. This implies that maintaining the prescribed MCR has a higher consequential negative impact and declining effect on the stability of the selected African banks.

By contrast, the expectation of the Basel III regulation is that an increased and stricter capital requirement above the Basel II capital requirements will serve as a confidence booster, providing

investors and depositors with the confidence of stability and continued operation (BCBS, 2010, Aspal & Nazneen, 2014). The Basel III prescribed MCR has, however, proven inadequate to promote the expected confidence and stability of the selected African banks. However, the prescribed LCR has a positive yet insignificant relationship with the stability of the selected African banks.

In relation to the results from Table 4.9, keeping a reasonable higher MCR in the current study reduced the declining effect on the bank stability, and in that regard, African banks can keep increasing their MCR to an extent of positive effect. Vasquez and Federico (2015) assert that an increased MCR increased the stability of British banks. This is similar to the findings of Ozili (2015) and Ugwuanyi and Enah (2015) who found that Nigerian banks did not only keep the minimum Tier 1 and Tier 2 capital but exceeded it, and that resulted in growth and stability of the Nigerian banks.

Table 4.1 shows that the selected African banks kept an average MCR of 13.59%, which consequentially reduced the negative effect of the prescribed MCR on the stability of the selected African banks. Hence, the current study recommends that African banks should increase their MCR above the average of 13.59%. The expected stability and bank confidence can therefore be attained if the selected African banks keep a minimum MCR above 6.28% and maximum above 20.90% (See Table 4.1).

4.3.4 The efficiency specification model

The efficiency specification model was used to test the relationship between the efficiency of African banks and the Basel III liquidity requirements. This specification model was fitted using the static panel data estimators. The results of the model were used to provide an answer to the fourth research question and objective.

The following variables were used in the study to measure the Basel III regulatory requirements: Minimum capital requirements (MCR), capital adequacy ratios (CAR), and capital buffer premium (DCBP) and liquidity ratio (LR) and liquidity coverage ratio (LCR) whilst it uses ratio of operating expenses to total assets (OETA) and ratio of net interest revenue to total earnings (NIMR) to measure the efficiency of banks.

The study proposed a static regression model in Chapter 3 of this thesis as suitable for the variables. The regression model was classified as equation 4.1 and 4.2 with OETA as equation 4.1 and NIMR as equation 4.2. The study conducted some preliminary diagnostic tests between the pooled OLS, random effects and fixed effects estimator to ascertain a more suitable fit for the model. Hence, this section presents the static model regression output.

4.3.4.1 Static model regression output

This section begins with the discussion of the result of the multicollinearity test and proceeds to present the results of the pooled OLS and RE estimators used in fitting the NIMR and OETA model respectively.

4.3.4.1.1 Multicollinearity test

Table 4.11 reports the variance inflation factors for the relationship between the independent and dependent variables. All the associated values for both regression models are less than 10. This provides evidence that there is no existence of multicollinearity in the independent variables associated with the models.

Table 4.11: Multicollinearity test results for the OETA and NIMR model

Table 4.11 presents the results of the multicollinearity test for the ***OETA*** and ***NIMR*** model. The test was done by calculating the variance inflation factors for the variables in model equation 4.1 and 4.2. In model equation 4.1, the bank efficiency was measured by the ratio of operating expenses to total assets (***OETA*)** and in model equation 4.2, the bank efficiency was measured by the ratio of net interest revenue to total earnings (***NIMR***). The Table shows the independent variables under investigation in one column and the corresponding VIFs for each in another column. The independent variables in the table are defined as follows: ***MCR*** denotes the minimum capital requirement; ***CAR*** denotes the capital adequacy ratio; ***DCBP*** denotes the capital buffer premium differenced on the 1st order level; ***LR*** denotes liquidity ratio and ***LCR*** denotes the liquidity coverage ratio. All the variables are defined in appendice A.

Variables	**OETA**		**NIMR**	
	VIF	**1/VIF**	**VIF**	**1/VIF**
MCR	2.85	0.3507	2.85	0.3507
LCR	1.91	0.5222	1.91	0.5222
CAR	1.56	0.6393	1.56	0.6393
LR	1.38	0.7258	1.38	0.7258
DCBP	1.03	0.9737	1.03	0.9737
Mean VIF	**1.75**		**1.75**	

4.3.4.1.2 Static panel data regression output

A suitable estimator was chosen between the pooled OLS, FE and RE estimator for the bank efficiency model, the F- test, Breusch and Pagan test and the Hausman specification tests were performed.

For the OETA model, the results for the F-test and Breusch and Pagan test were statistically significant. This suggests that there is existence of fixed and random effects in the regression model. Hence, the pooled OLS estimator was dropped and the Hausman specification test was used to arrive at a suitable estimate between FE and RE. The p-values of the Hausman specification tests were statistically insignificant for the OETA model. Therefore the H_0 was not rejected in favor of the fixed effects. Hence, the random effects estimator was favored and used to report the results for the OETA model.

For the NIMR model, the F-test and Breusch and Pagan test was conducted and the results show that there were no fixed or random effects in the model. This is because the p-values from both the F-test and Breusch and Pagan test were statistically insignificant and therefore the H_0 is not rejected. Based on these results, the pooled OLS estimator was favoured and selected as a good fit to report the results for the NIMR model.

Table 4.12: Static panel regression results for the efficiency specification model

Table 4.12 shows regression results of the efficiency specification model. The Table shows the estimation results for the relationship between the efficiency of African banks and the Basel III regulatory requirements. The bank efficiency was measured by both the ***OETA*** and ***NIMR.*** The regression model was fitted with the pooled OLS and RE estimator for the ***NIMR*** and the ***OETA*** model respectively. All the coefficients were estimated at 99% confidence level. The independent variable ***MCR*** denotes the minimum capital requirement; ***CAR*** denotes the capital adequacy ratio; ***DCBP*** denotes the capital buffer premium differenced on the 1st order level; ***LR*** denotes liquidity ratio and ***LCR*** denotes the liquidity coverage ratio. The t-statistics for the pooled OLS as well as the z-statistics for the RE model are presented in parentheses. The markings ***, **, and * indicate significance levels at 1, 5 and 10 % respectively. All the variables are defined in appendice A. The static panel data estimate test results are shown at the bottom of the table.

Variables	**Pooled OLS Model**	**Random effects Model**
	NIMR	**OETA**
MCR	21.1478	0.0108
	(0.71)	(1.30)
CAR	-7.4288	-0.0045
	(-1.01)	(-1.31)
DCBP	70.5403**	0.0117*
	(2.35)	(1.74)
LR	-2.0525	0.0028***
	(-0.68)	(3.42)
LCR	-0.5361	0.0001*
	(-0.44)	(0.29)
Obs.	450	450
Adjusted R^2	0.1760	0.4630
BP L-M statistics		347.33***
Hausman Test:		
Chi^2-value		6.23
Prob>chi^2		0.2843

The static panel data regression results for the NIMR and OETA model are presented in Table 4.12. Based on the preliminary diagnostic tests and the selection criteria enunciated previously, the NIMR model was fitted with the pooled OLS estimator and the OETA model with the RE estimator.

Table 4.12 shows that there is a relationship between the Basel III liquidity requirements and the efficiency of African banks. This is evident from the RE estimation results of the OETA measure of bank efficiency. The coefficient for the OETA measure of bank efficiency variable is positive and significant at the 1% and 5% levels based on the RE estimation results. This suggests that an increase in the Basel III liquidity requirement in the current study resulted in a consequential increase in the efficiency of banks, which is measured by the ratio of operating expenses to total assets. This suggests that African banks with well performing liquidity ratio are efficient in their operations with the ability to meet their short-term obligations.

Previous studies by Abbas and Younas (2021), Ha and Quyen (2018) and Kamran, et al. (2016) and the expectation of Basel III Accord indicate that banks from countries with more strict requirements and adherence to the Basel III liquidity requirements are more operationally efficient as compared to those banks from countries with flexible and unstructured capital regulations. This is mainly because stricter liquidity requirements create a liquidity buffer giving banks from countries with structured requirements not just cushion confidence but the ability to meet their operational obligation (Abbas & Younas, 2021; Vasquez & Federico, 2015; Capgemini, 2014; Barth et al., 2013). This result is consistent with the findings of Sutorova and Teply (2013) who found that there was a positive relationship between banks' technical and operational efficiency and liquidity requirements. Similarly, the study of Chortareas and Ventouri (2012) on the influence of Basel III capital and liquidity requirements on commercial banks' operating efficiency in 22 European Union countries found that increasing capital and liquidity requirements improves operating efficiency of banks. Hence, banks that increase their liquidity ratio have a consistent positive impact on their operational efficiency which is in line with the Basel III capital and liquidity regulatory framework (BCBS, 2013). On the contrary, the study of Giordana and Schumacher (2017) found a negative effect of Basel III liquidity

requirements on the Luxembourg banks' efficiency. They further found that the Basel III requirements caused the Luxembourg banks to be more vulnerable to failure. They explained that the tighter liquidity requirements restricted profitable banking activities and investments which invariably severed their financial and operational efficiency.

Based on the results above, the current study, therefore, argues that there is a relationship between the Basel III liquidity requirements and the efficiency of selected listed African banks, and therefore the fourth research objective is fulfilled.

4.3.4.1.3 Robustness of the bank efficiency regression model

In order to assess the effectiveness and impact of the regression results presented in section 4.3.4.1.2, a model variation test was conducted by substituting the actual regulatory capital held by the selected listed African banks with the Basel III prescribed minimums. This test was conducted to ascertain the impact of the Basel III prescribed minimums on the efficiency of the selected listed African banks. From the test results, the study deduced the most viable option between the Basel III prescribed minimums and the actual capital held by the selected African banks.

The regression model used the Basel III prescribed minimum of pMCR, pCAR, pLCR and pDCBP as the independent variables, but excluded the LR as it was not a Basel III prescribed minimum. The OETA and NIMR used in section 4.3.4.1.2 were maintained.

Following the same procedure, estimator selection tests were conducted and the suitable selections criteria were followed as enunciated in section 4.3.4.1. The misspecification errors inherent in the regression models, such as the heteroscedasticity, cross-sectional dependence, outliers, and multicollinearity were also adjusted in line with the previous approach in section 4.3.4.1. The pre-estimation results and specification tests, such as the VIF test results, Breusch and Pagan LM test for random effects, and Hausman test results were reported as shown in the Appendix. The VIF for the relationship between the independent and dependent variables are

less than 10 with a mean VIF of 3.86 (refer to Appendix E). This provides evidence that the multicollinearity in the independent variables associated with the models does not exist.

Using the Basel III prescribed minimum in the regression model as the independent variable, the model was fitted using the pooled OLS and RE estimators. The regression results were presented in Table 4.13 below.

Table 4.13: Regression results for the effectiveness of Basel III prescribed minimums

Table 4.13 shows the regression results of the Basel III prescribed minimums. The Table shows the estimation results for the relationship between the efficiency of African banks and the Basel III prescribed minimums. The regression model was fitted with the pooled OLS and RE estimator for the ***NIMR*** and the ***OETA*** model respectively. All the coefficients were estimated at 99% confidence level. The independent variable **p*MCR*** denotes the prescribed minimum capital requirement; **p*CAR*** denotes the prescribed capital adequacy ratio; **pD*CBP*** denotes the prescribed capital buffer premium differenced on the 1st order level; and **p*LCR*** denotes the prescribed liquidity coverage ratio. The t-statistics for the pooled OLS as well as the z-statistics for the RE model are presented in parentheses. The markings ***, **, and * indicate significance levels at 1, 5 and 10 % respectively. The static panel data estimate test results are shown at the bottom of the Table.

Variables	**Pooled OLS Model**	**Random effects Model**
	NIMR	**OETA**
pMCR	-63.8682	0.0438
	(-0.45)	(1.45)
pCAR	88.7360	-0.0336
	(0.68)	(-1.21)
pDCBP	3.7912	0.0422
	(0.04)	(2.25)
pLCR	-0.8018	0.7538**
	(-0.04)	(3.39)
Obs.	450	450
Adjusted R^2	0.7800	0.8500
BP L-M statistics		407.34***
Hausman Test:		
Chi^2-value		0.00
Prob>chi^2		1.0000

Based on the preliminary diagnostic tests and the selection criteria enunciated previously, the NIMR model was fitted with the pooled OLS estimator and the OETA model with the RE estimator. The results of the pooled OLS and RE estimation are presented in Table 4.13.

The results indicate that there is a significant positive relationship between the Basel III prescribed minimum LCR and the efficiency of selected African banks. This suggests that maintaining the prescribed LCR has a higher consequential positive impact on the operational efficiency of the selected African banks. This result corroborates the expectation of the Basel III liquidity requirements and the findings of Ha and Quyen (2018) and Kamran, et al. (2016). The

findings further show that the Basel III prescribed LCR is adequate to promote the expected cushion confidence and operational efficiency of the selected African banks.

According to the results in Table 4.11, keeping a higher LCR above the prescribed minimum has a declining positive effect on the operational efficiency of the selected African banks. This suggests that keeping excess LCR can exert restrictions on the profitable banking activities and therefore reduce its efficiency. Similar results were found by Giordana and Schumacher (2017) who assert that excessive LCR had a severe declining effect on the efficiency of Luxembourg banks.

According to the results in Table 4.1, the selected African banks kept an average LCR of 181.72% which consequentially reduced the increasing effect of the prescribed minimum LCR on the efficiency of the selected African banks. Hence, it is recommended that African banks should rather keep their LCR closely related to the prescribed minimum of 100% and not excessively higher than 100%. This will save the African banks from tying down excess capital that could be used for a profitable investment and for their primary lending activities.

4.3.5 The risk-taking behaviour specification model

The risk-taking behaviour specification model was used to test the relationship between the risk-taking behaviour of African banks and the Basel III regulatory requirements. This specification model was fitted using the static panel data estimators. The results of the model were used to answer the last research question and objective.

The current study used the following variables to measure the Basel III regulatory requirements: Minimum capital requirements (MCR), capital adequacy ratios (CAR), and capital buffer premium (DCBP) and liquidity ratio (LR) and liquidity coverage ratio (LCR). On the other handit used ratio of risk weighted asset to total asset (RWATA), the ratio of non-performing loans to total loans (NPLTL), and the natural log of the banks Z-score computation (LNZ-score) to measure the risk-taking behaviour of African banks.

The study recommended a static regression model in Chapter 3 of this thesis as suitable for the variables. The regression model was classified as equation 5.1, 5.2 and 5.3 with RWATA as equation 5.1, NPLTL as equation 5.2 and LNZ-score as equation 5.3. The study further conducted some preliminary diagnostic tests between the pooled OLS, random effects and fixed effects estimator to ascertain which of them was more suitable to fit the model. Hence, this section presents the static model regression output.

4.3.5.1 Static model regression output

This section begins with the discussion of the results of the multicollinearity test and proceeds to present the results of the RE estimators used in fitting the RWATA, NPLTL and LNZ-score model.

4.3.5.1.1 Multicollinearity test

Table 4.14 reports the variance inflation factors for the relationship between the independent and dependent variables. All the associated values for both regression models are less than 10. This

is evident that there is no existence of multicollinearity in the independent variables associated with the models.

Table 4.14: Multicollinearity test results for the RWATA, NPLTL and LNZ-score model

Table 4.14 presents the results of the multicollinearity test for the $\boldsymbol{RWATA, NPLTL}$ and $\boldsymbol{LNZ - score}$ model. The test was done by calculating the variance inflation factors for the variables in model equation 5.1, 5.2 and 5.3. In model equation 5.1, the risk-taking behaviour was measured by the ratio of risk weighted asset to total assets **($\boldsymbol{RWATA}$),** in model equation 5.2, the risk-taking behaviour was measured by the ratio non-performing loan to total loan **($\boldsymbol{NPLTL}$)** and in model equation 5.3, the risk-taking behaviour was measured by natural log of Z-score computation **($\boldsymbol{LNZ - score}$).** The Table shows the independent variables under investigation in one column and the corresponding VIFs for each in another column. The independent variables in the Table are defined as follows: $\boldsymbol{MCR}$ denotes the minimum capital requirement; $\boldsymbol{CAR}$ denotes the capital adequacy ratio; $\boldsymbol{DCBP}$ denotes the capital buffer premium differenced on the 1st order level; $\boldsymbol{LR}$ denotes liquidity ratio and $\boldsymbol{LCR}$ denotes the liquidity coverage ratio; $\boldsymbol{P}$ denotes profitability. All the variables are defined in appendix A.

Variables	RWATA		NPLTL		LNZ-score	
	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF
MCR	2.87	0.3481	2.87	0.3481	2.87	0.3481
LCR	1.92	0.5211	1.92	0.5211	1.92	0.5211
CAR	1.56	0.6393	1.56	0.6393	1.56	0.6393
LR	1.38	0.7250	1.38	0.7250	1.38	0.7250
DCBP	1.03	0.9714	1.03	0.9714	1.03	0.9714
P	1.02	0.9804	1.02	0.9804	1.02	0.9804
Mean VIF	**1.63**		**1.63**		**1.63**	

4.3.5.1.2 Static panel data regression output

Choosing a suitable estimator between the pooled OLS, FE and RE estimator for the bank efficiency model, the F- test, Breusch and Pagan test and the Hausman specification tests was performed

The results of the F-test and Breusch and Pagan tests conducted on the RWATA, NPLTL and LNZ-score regression model were statistically significant. This suggests that fixed and random effects exist in the regression model. Hence, the pooled OLS estimator was dropped and the

Hausman specification test was used to arrive at a suitable estimator between FE and RE for the regression model.

The p-values of the Hausman specification tests were statistically insignificant for the RWATA, NPLTL and LNZ-score regression model. Therefore, the $H_0$was not rejected in favour of the fixed effects. Hence, the random effects estimator was favoured and used to report the results of the RWATA, NPLTL and LNZ-score regression model.

Table 4.15: Static panel regression results for the risk-taking behaviour specification model

Table 4.15 shows the regression results of the risk-taking behaviour specification model. The Table shows the estimation results for the relationship between the risk-taking behaviour of African banks and the Basel III regulatory requirements. The risk-taking behaviour was measured by $\boldsymbol{RWATA}$, $\boldsymbol{NPLTL}$ and $\boldsymbol{LNZ-score}$. The regression model was fitted with the RE estimator and all the coefficients were estimated at 99% confidence level. The independent variable $\boldsymbol{MCR}$ denotes the minimum capital requirement; $\boldsymbol{CAR}$ denotes the capital adequacy ratio; $\boldsymbol{DCBP}$ denotes the capital buffer premium differenced on the 1st order level; $\boldsymbol{LR}$ denotes liquidity ratio and $\boldsymbol{LCR}$ denotes the liquidity coverage ratio and $\boldsymbol{P}$ denotes profitability. The z-statistics for the RE model are presented in parentheses. The markings ***, **, and * indicate significance levels at 1, 5 and 10 % respectively. All the variables are defined in appendix A. The static panel data estimate test results are shown at the bottom of the Table.

Variables	**Random effects Model**		
	RWATA	**NPLTL**	**LNZ-score**
MCR	2.8541	9.5042**	0.0356*
	(1.41)	(1.75)	(1.74)
CAR	-2.3013**	-2.1419	-0.0115*
	(-2.39)	(-1.09)	(-1.86)
DCBP	3.5336**	1.1483	-0.0028
	(2.18)	(0.25)	(-0.16)
LR	1.2236***	2.5618***	0.0004**
	(6.11)	(4.71)	(2.09)
LCR	0.1035	0.0003	-0.0026***
	(1.26)	(0.00)	(-3.05)
P	39.6564***	11.200	0.0667
	(0.000)	(0.91)	(1.47)
Obs.	450	450	450
Adjusted R^2	0.2608	0.4890	0.4201
BP L-M statistics	606.41***	125.41***	38.81***
Hausman Test:			
Chi^2-value	5.57	4.96	10.44
Prob>chi^2	0.4733	0.5496	0.1073

The static panel data regression results for the RWATA, NPLTL and LNZ-score model are presented in Table 4.15. Based on the preliminary diagnostic tests carried out and the selection criteria enunciated previously, the regression model were fitted with the RE estimator.

Table 4.15 shows that there is a relationship between the Basel III regulatory requirements and the risk-taking behaviours of African banks. On the one hand, the coefficients of minimum

capital requirement (MCR), capital buffer premium (DCBP) and liquidity ratio (LR) are positive and significant at the 1% and 5% levels. This indicates a positive relationship with the risk-taking behaviours of African banks. This suggests that an increase in the MCR, DCBP and LR resulted in a consequential increase in the risk-taking behaviour of banks. This is because African banks tend to make higher risky decisions on probable high yielding investment, knowing they are well cushioned with their high capital base and buffer premiums. This result is similar to the findings of Karim et al (2014), Nazir et al (2012) who found that majority of the studies conducted in Europe and the U.S banking sectors showed a positive relationship between the Basel III regulatory requirements and the banks' risk-taking behaviours. They concluded that highly capitalised banks had some level of confidence to make risky decision as they believed their buffer capital would serve as a cushion against probable loss arising from those risky investment decisions. Similarly, Jokipii and Milne (2011) used a sample of the US banks and found a positive association between capital and risk-taking behaviour of highly capitalised banks. In yet another study on 26 banks in Pakistan Kamran, et al. (2016) found that the Basel III capital and liquidity requirements had a significant and positive effect on the risk-taking behaviour of banks, both in the long-run as well as, in the short-run.

On the other hand, the coefficients of capital adequacy ratio (CAR) and liquidity coverage ratio (LCR) are negative and significant at the 1% and 5% levels. This indicates a negative relationship with the risk-taking behaviours of African banks. This suggests that an increase in the CAR and LCR resulted in a consequential fall in the risk-taking behaviour of banks and vice versa. This result is similar to the findings of Klomp and Haan (2012) and Agoraki, et al. (2011), who explored the impact of Basel III regulatory requirements on the banks' risk behaviours; and concluded that increase in bank capital and liquidity requirements reduce the overall risk-taking behaviour of banks. They further explained that the limited capital requirements could strongly restrict the banks to take risk and, significantly decrease the non-performing loans. On a similar note, Ha and Quyen (2018) argues that banks facing lower funding liquidity risk based on the Basel III liquidity requirements will take more risk. They further explain that banks with higher deposits will not have liquidity problems in the short-term and will not be under pressure to take risks that could give rise to liquidity crisis, hence, have a lower risk appetite. However, banks

facing liquidity problem are under pressure and have higher risk-taking behaviour in an attempt to respond to the profitable expectations of owners, investors, or related others. Furthermore, Ashraf et al (2016) and Tan and Floros (2013) found that capital adequacy ratio (CAR) is negatively and significantly related to risk-taking behaviour of Chinese banks. In the same light, Lee, Ning and Lee (2015) studied the impact of capital adequacy ratio on risk-taking behaviour of Chinese banks, using bank-level panel data. They found that capital was significantly and negatively associated with risk-taking activities of the sampled banks because high capital requirements constrain banks from taking high risk.

With a view to the above findings, the current study, therefore, argues that there is a relationship between the Basel III regulatory requirements and the risk-taking behaviour of selected listed African banks, which fulfils the fifth research objective of this study.

4.4 Results and presentation of hypotheses

This section discusses the results reported for the BB system GMM, FE, RE and pooled OLS models in Table 4.4 to 4.15 above. The results are presented in terms of the formulated hypotheses. The null and alternative hypotheses are either confirmed or rejected by the empirical findings.

4.4.1 Results and presentation of hypothesis one

Hypothesis one is restated as follows:

H_1: There is a significant and positive relationship between Basel III minimum capital requirements and African banks' capital structure.

H_0: There is no significant or positive relationship between Basel III minimum capital requirements and African banks' capital structure.

According to Lim (2016), Berger and Bouwman (2013) and Admati et al. (2013) banks rely heavily on debt funding due to their nature of lending operational activities. They argue that an increase in Basel III minimum capital requirements causes proportionate increase in debt funding because banks need more debt capital to finance their main operational activities and stay financially stable. This being the case, leverage ratios are expected to increase due to subsequent increase in the minimum capital requirements.

The findings of the current study confirmed a direct relationship between minimum capital requirements and bank capital structure. The dynamic panel regression model across the TCTE and TDCE model measuring bank capital structure showed a positive relationship between minimum capital requirements and bank leverage (refer to Table 4.4). The dynamic panel regression model showed that a 1% increase in minimum capital requirements would result in a 2.5% increase in banks leverage using the ratio of Tier 1 capital to total exposure as a measure of capital structure and a 1% increase in minimum capital requirements would result in a 6.8%

increase in banks leverage using the ratio of total debt to capital employed as a measure of capital structure. This is because African banks are more inclined to finance their operational and investment activities through debt because they are highly profitable banks, and tend to enjoy the debt interest tax shields from heavy reliance on debt funding. These results were highly significant at 1% and 10% levels respectively.

Hence, the alternative hypothesis which states that there is a significant positive relationship between Basel III minimum capital requirements and banks' capital structure in Africa is thereby supported in the current study.

4.4.2 Results and presentation of hypothesis two

Hypothesis two is restated as follows:

H_1: There is a significant and positive relationship between Basel III capital adequacy ratio and African banks' financial performance.

H_0: There is no significant or positive relationship between Basel III capital adequacy ratio and African banks' financial performance.

The capital adequacy ratio is expected to strengthen the bank against economic and financial shocks and to keep the profitability of banks on the high (BCBS, 2010). As such, a high capital adequacy ratio is a good indicator of a bank's financial soundness and its ability to withstand harsh economic and environmental factors (Jokipii & Milne, 2011; Lotto, 2016). Thus, profitability is expected to increase due to the subsequent increase in the capital adequacy ratio. The estimation results confirmed a direct relationship between capital adequacy ratio and bank financial performance. The static panel regression model with the FE estimator of ROE measure of financial performance shows a positive relationship between capital adequacy ratio and bank financial performance (refer to Table 4.6).

In the current study, the static panel data model showed that a 1% increase in capital adequacy ratio would result in a 41.88% increase in bank return on equity; a measure of bank financial performance. This is because highly profitable African banks had sufficient funding to invest in high yielding investments and to maintain operational activities of withstanding constant withdrawals or sudden losses. This result is highly significant at 5% level. Among other scholars, Lipunga (2014), Capgemini (2014) and Aspal and Nazneen (2014) also found a positive relationship between capital adequacy ratio and return on equity for their samples of financial firms.

The alternative hypothesis which states that there is a significant positive relationship between Basel III capital adequacy ratio and financial performance of banks in Africa is thereby supported in the current study.

4.4.3 Results and presentation of hypothesis three

Hypothesis three is restated as follows:

H_1: There is a significant and positive relationship between Basel III capital buffer premium and African banks' stability.

H_0: There is no significant or positive relationship between Basel III capital buffer premium and African banks' stability.

It is argued that banks globally hold capital above the required regulatory minimum (Banerjee & Mio, 2017). The excess of the minimum capital requirement is the buffer premium which is expected to promote the stability of banks and protect them against any sudden economic or financial shocks (Capgemini, 2014; Garcia-Suaza et al., 2012). As such, the stability of a bank is expected to be positively correlated with the capital buffer premium. However, the estimation results in the current study confirmed an inverse insignificant relationship between capital buffer premium and bank stability.

In the current study again the static panel regression model for the pooled OLS estimator of Z-score show a negative relationship between capital buffer premium and bank stability (refer to Table 4.9). The negative relationship between capital buffer premium and bank stability is rather against the expected positive relationship between capital buffer premium and bank stability. This is because the excess minimum regulatory capital requirements held by African banks to have a high buffer premium severe the profitable bank lending activities and investments and invariably severe their stability.

Therefore, the alternative hypothesis in the current study, which states that there is a significant positive relationship between capital buffer premium and African bank stability, is therefore rejected.

4.4.4 Results and presentation of hypothesis four

Hypothesis four is restated as follows:

H_1: There is a significant and positive relationship between Basel III minimum capital requirements and African banks' operating efficiency.

H_0: There is no significant or positive relationship between Basel III minimum capital requirements and African banks' operating efficiency.

It is expected that banks that uphold the higher and stricter minimum capital requirements of the Basel III framework should be operationally efficient. Chortareas and Ventouri (2012) and Barth et al (2013) assert that banks that adhere to the strict capital requirements of the Basel III are more operationally efficient compared to other banks who do not adopt such strict capital requirements.

Thus, banks are expected to be efficient subsequent to the increase in the Basel III minimum capital requirements. In the current study the estimation results confirmed a positive relationship between minimum capital requirements and bank efficiency with the Pooled OLS and RE

estimators for NIMR and OETA measures of bank efficiency respectively (refer to Table 4.12). This is because an increased MCR gives the African banks some level of confidence and cushion against financial losses or economic shocks. Thus, with a higher MCR, African banks are able to operate efficiently by generating and maintaining sustainable revenue which is achieved at a reduced cost. The results, however, showed a positive but insignificant relationship at the 1%, 5% or 10% levels.

With a view to the above, the alternative hypothesis in the current study which states that there is a significant positive relationship between Basel III minimum capital requirements and African banks' operating efficiency is rejected or not supported by the study.

4.4.5 Results and presentation of hypothesis five

Hypothesis five is restated as follows:

H_1: There is a significant and positive relationship between Basel III liquidity requirements and African banks' stability.

H_0: There is no significant or positive relationship between Basel III liquidity requirements and African banks' stability.

According to Sadien (2017) and Jul-Larsen (2014), the banks' liquidity ratio demonstrates its ability to meet its short-term obligation. This can also be used to predict the likelihood of bank failure and stability. The improvements made to the liquidity requirements by the Basel III accord aimed at the stability of banks operations and to avoid probable banking crisis (BCBS, 2013). As such, the stability of banks is expected to increase due to the subsequent increase in the liquidity requirements. The estimation results in the current study confirmed a direct relationship between the liquidity requirements and bank stability. The static panel regression model with the pooled OLS estimator of bank stability showed a positive relationship between the liquidity requirements and African bank stability (refer to Table 4.9).

The static panel regression model showed that a 1% increase in liquidity ratio resulted in a consequential increase of 452.25% and a 1% increase in LCR results in a consequential increase of 122.44% of Africans' banks stability. This is because banks with no liquidity crisis or potential for liquidity risk are able to maintain a more stable operation and can withstand sudden customer withdrawers without running the risk of liquidity crisis. This result is highly significant at 5% level. Among other scholars, Vasquez and Federico (2015) and Ozili (2015) also found a positive relationship between liquidity ratio and bank stability for their samples of financial firms.

The above being the case, the alternative hypothesis which states that there is a significant positive relationship between Basel III liquidity requirements and African banks' stability is thereby supported.

4.4.6 Results and presentation of hypothesis six

Hypothesis six is restated as follows:

H_1: There is a significant and positive relationship between Basel III liquidity requirements and African banks' financial performance.

H_0: There is no significant or positive relationship between Basel III liquidity requirements and African banks' financial performance.

It is argued that banks with good liquidity ratio perform well financially because they are able to meet their short-term financial obligations (Aspal & Nazneen, 2014). The study of Zaagha (2016) and Barth et al (2013) assert that banks that adhere to the new liquidity requirements of the Basel III accord are more profitable compared to other banks who do not adopt such strict liquidity requirements.

As such, the financial performance of bank is expected to increase due to the subsequent increase in the liquidity requirements. However, the estimation results of the current study confirmed an inverse relationship between the liquidity requirements and bank financial performance. The

static panel regression model for the RE estimator of the ROA measure of bank financial performance showed a negative relationship between the liquidity requirements and bank financial performance (refer to Table 4.6). This is because an increase in the liquidity requirements put a strain on African bank operational activities as they focused on meeting the minimum liquidity requirements. This restricts the bank's ability to lend and engage in profitable investment activities, which invariably severe their financial performance. The negative relationship between the liquidity requirements and bank financial performance is therefore against the expected positive relationship.

The above being the case, the alternative hypothesis which states that there is a significant positive relationship between Basel III liquidity requirements and African banks' financial performance is therefore rejected.

4.4.7 Results and presentation of hypothesis seven

Hypothesis seven is restated as follows:

H_1: There is a significant and positive relationship between Basel III capital adequacy ratio and African banks' risk-taking behaviour.

H_0: There is no significant or positive relationship between Basel III capital adequacy ratio and African banks' risk-taking behaviour.

As banks follow the stricter and higher capital adequacy ratio requirements stated in the Basel III accord, the expectation is that a well-capitalised bank will have a higher risk-taking behaviour compared to a less capitalized one (Karim et al., 2014; Nazir et al., 2012). The study of Karim et al (2014) and Jokipii and Milne (2011) asserts that highly capitalized banks, as required by the Basel III accord, tend to make more risky investment decisions because they have adequate cushion capital to fall back on. As such, the risk-taking behaviour of a bank is expected to be positively correlated with the capital adequacy ratio. However, in the current study the estimation

results confirmed an inverse relationship between capital adequacy ratio and bank risk-taking behaviour.

The static panel regression model across the RE estimator of the RWATA and LNZ-score model shows a significant negative relationship between capital adequacy ratio and bank risk-taking behaviour (refer to Table 4.15). This is because with a stricter and higher capital adequacy ratio, banks have limited capital at their disposal to use in making investment decision. Hence, their risk-taking behaviour falls as they critically evaluate all investment decisions before they implement them. The negative relationship between capital adequacy ratio and bank risk-taking behaviour is rather against the expected positive relationship.

With a view to the above, the alternative hypothesis, which states that there is a significant positive relationship between Basel III capital adequacy ratio and African banks' risk-taking behaviour, is rejected.

4.4.8 Results and presentation of hypothesis eight

Hypothesis eight is restated as follows:

H_1: There is a significant and positive relationship between risk-taking behaviour and African bank's capital structure.

H_0: There is no significant or positive relationship between risk-taking behaviour and African bank's capital structure.

According to Berger and Bouwman (2013), banks with high risk-taking behaviours are highly geared. This is because a heavy reliance on debt funding is a risky decision yet taken because a highly profitable bank can benefit from debt interest tax shields (Beltratti & Stulz, 2012; Lim, 2016). As such, a positive relationship is expected between risk-taking behaviour and the bank's capital structure.

The ratio of total debt to capital employed, in the current study, showed a positive relationship with the risk-taking behaviour of banks. This is because African banks are highly geared and tilts towards debt funding as compared to equity funding in order for them to benefit from the debt interest tax shields. This result is highly significant at 1% level (see Table 4.4). This finding is in congruence with the pecking order theory which argues that when firms become constrained to finance from their retained earnings, they seek funding from external sources in a pecking order with preference to debt over equity issuance.

The above findings therefore accept the alternative hypothesis in the current study, which states that there is significant positive relationship between risk-taking behaviour and African bank's capital structure.

4.4.9 Results and presentation of hypothesis nine

Hypothesis nine is restated as follows:

H_1: There is a significant and positive relationship between African banks' financial performance and risk-taking behaviour.

H_0: There is no significant or positive relationship between African banks' financial performance and risk-taking behaviour.

According to Rasiah and Kim (2011), a well performing firm with high profitability, free cash flow, and retained earnings is more likely to take more risk and or likely to invest in unprofitable projects. With high profitability, managers of financial firms can be motivated to take on excessive risk and misuse the free cash flow by investing the large free cash flow in value destroying investments such as unnecessary mergers or acquisitions. Thus, the excessive free cash flow increases the risk appetite of those charged with governance of the firm (De Jonghe & Öztekin, 2015, Teixeira et al., 2014).

As such, the risk-taking behaviour of a bank is expected to increase due to subsequent increase in its profitability. The estimation results in the current study confirmed a positive relationship between the profitability and the risk-taking behaviour of banks. The static panel regression model with the RE estimator of bank risk-taking behaviour measured by the ratio of risk weighted asset to total asset (RWATA) showed a positive relationship between the profitability and the risk-taking behaviour of banks (refer to Table 4.15). This is because a highly profitable African bank would take on more risks like other banks with poor financial performance and liquidity problems which would dread taking on risk as they fear liquidation. This result is highly significant at 1% level. Similarly, Ha and Quyen (2018), Milkau (2017) and Karim et al (2014) investigated financial firms and found a positive relationship between the profitability and the risk-taking behaviour.

The alternative hypothesis in the current study, which states that there is a significant positive relationship between African banks' financial performance and risk-taking behaviour is thereby supported.

4.4.10 Results and presentation of hypothesis ten

Hypothesis ten is restated as follows:

H_1: There is a significant and positive relationship between African banks' financial performance and capital structure.

H_0: There is no significant or positive relationship between African banks' financial performance and capital structure.

Udom and Onyekachi (2018) and DeBandt et al (2014) posit that a well performing bank with high profitability and growth rate would be more interested in debt funding to maintain and sustain its performance. They argue that a profitable firm would be in less danger of liquidation or liquidity risk, and thus rely more on debt financing in order to take advantage of the tax shield

benefits. This is similar to the proposition of the trade-off and agency cost theory that suggests a positive relationship between firms' financial performance and leverage.

As such, a positive relationship is expected between a banks' financial performance and its capital structure. The ratio of total debt to capital employed showed a positive relationship with the banks' financial performance. This is because a profitable African bank does not have a fear of liquidation or financial crisis nor does it have enough security to undertake and service debt funding. This result is highly significant at 1% level (see Table 4.4). Similarly, Vasquez and Federico (2015), Capgemini (2014) found a positive relationship between the firms' financial performance and capital structure for their samples of financial firms.

With a view to the above, the alternative hypothesis, which states that there is a significant positive relationship between African banks' financial performance and capital structure, is thereby supported.

4.4.11 Summary of hypotheses findings

Table 4.16 shows a summary of the results of the hypotheses tested in the current study.

Table 4.16: Summary results of the hypotheses testing

Hypotheses	Hypotheses statement	Decision
1	There is a significant positive relationship between Basel III minimum capital requirements and African banks' capital structure.	Accepted
2	There is a significant positive relationship between Basel III capital adequacy ratio and African banks' financial performance.	Accepted
3	There is a significant positive relationship between Basel III capital buffer premium and African banks' stability.	Rejected
4	There is a significant positive relationship between Basel III minimum capital requirements and African banks' operating efficiency.	Rejected
5	There is a significant positive relationship between Basel III liquidity requirements and African banks' stability.	Accepted
6	There is a significant positive relationship between Basel III liquidity requirements and African banks' financial performance.	Rejected
7	There is a significant positive relationship between Basel III capital adequacy ratio and African banks' risk-taking behaviour.	Rejected
8	There is a significant positive relationship between risk-taking behaviour and African bank's capital structure.	Accepted
9	There is a significant positive relationship between African banks' financial performance and risk-taking behaviour.	Accepted
10	There is a significant positive relationship between African banks' financial performance and capital structure.	Accepted

4.4.12 Summary of original findings

Table 4.17 shows a summary of the results of the findings in the current study.

Table 4.17: Summary results of the original findings

Research Questions	Model Specifications	Original findings
Is there a significant relationship between the Basel III regulatory requirements and the capital structure of the banks in Africa?	**Model Equation 1.1** $TCTEijt = \beta_0 TCTEijt - 1 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \beta_6 Pijt + \beta_7 BSijt + \beta_8 GRijt + \beta_9 Rijt + \beta_{10} ATijt + \varepsilon$ijt	The findings reveal that minimum capital requirements, capital adequacy ratio, capital buffer premium, and liquidity ratio have a significant positive relationship with the ratio of Tier1 capital to total exposure. However, the liquidity coverage ratio which is the recent development added to the Basel III regulatory framework has a significant negative relationship with the ratio of Tier1 capital to total exposure. Furthermore, profitability, bank size, growth rate, bank risk and asset tangibility which are firm-specific determinants have a negative yet significant relationship with bank leverage, measured by the ratio of Tier1 capital to total exposure.
	Model Equation 1.2 $TDCEijt = \beta_0 TDCEijt - 1 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \beta_6 Pijt + \beta_7 BSijt + \beta_8 GRijt + \beta_9 Rijt + \beta_{10} ATijt + \varepsilon ijt$	The result findings showed that minimum capital requirement and the liquidity coverage ratio have a significant positive relationship with bank leverage. Whilst capital buffer premium and liquidity ratio have a significant negative relationship with bank leverage. Furthermore, the firm-specific determinants; profitability, bank size, growth rate and bank risk have a significant and positive relationship with bank leverage. However, the asset tangibility has a negative yet significant relationship with bank leverage. These firm-specific determinants confirm the trade-off theory, agency cost theory and the pecking order theory. This result is premised on the measure of bank leverage which is the ratio of total debt to capital employed.

Does the Basel III capital adequacy ratio influence the financial performance of African banks?	**Model Equation 2.1** $ROEijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \varepsilon ijt$	The results show that the capital adequacy ratio positively influences the financial performance of African banks because there is a significant positive relationship between the capital adequacy ratio and the return on equity.
	Model Equation 2.2 $ROAijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \varepsilon ijt$	Using the return on asset as the measure of African banks' financial performance, the findings show that the positive relationship that exists between the capital adequacy ratio and the return on asset is statistically insignificant.
Is there a relationship between the capital buffer premium and the stability of African banks?	**Model Equation 3.1** $Z - scoreijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \varepsilon ijt\varepsilon$	The findings reveal that the capital buffer premium has no significant impact on the stability of African banks. Despite the negative relationship that exists between the capital buffer premium and banks' stability, the result is statistically insignificant.
Is there a significant relationship between Basel III liquidity requirements and the efficiency of African banks?	**Model Equation 4.1** $OETAijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \varepsilon ijt\varepsilon$	The findings reveal that there is a significant positive relationship between the Basel III liquidity coverage ratio and the efficiency of African banks. This result is premised on the measure of bank efficiency which is the ratio of operating expenses to total assets
	Model Equation 4.2 $NIMRijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \varepsilon ijt\varepsilon$	The findings reveal that the Basel III liquidity coverage ratio has no significant effect on the efficiency of African banks. Despite the negative relationship that exists between the liquidity coverage ratio and banks' efficiency, the result is statistically insignificant. This result is premised on the measure of bank efficiency which is the ratio of net interest revenue to total earnings
Does the risk-taking behaviour of African banks depend on the Basel III regulatory requirements?	**Model Equation 5.1** $RWATAijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \beta_6 Pijt + \varepsilon$ijt	The findings reveal that the capital buffer premium and liquidity ratio significantly influence the risk-taking behaviour of African banks positively. Whilst, the capital adequacy ratio has a significant negative impact on the African banks' risk-taking decisions. More so, banks' profitability has a significant positive impact on the risk-taking decisions of African banks. These results are premised on the measure of risk-taking behaviour which is the ratio of risk-weighted assets to total assets.

	Model Equation 5.2 $NPLTLijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \beta_6 Pijt + \varepsilon ijt$	The findings reveal that the minimum capital requirement and liquidity ratio significantly influence the risk-taking behaviour of African banks positively. These results are premised on the measure of risk-taking behaviour which is the ratio of non-performing loans to total loan
	Model Equation 5.3 $LNZ - scoreijt = \beta_0 + \beta_1 MCRijt + \beta_2 CARijt + \beta_3 CBPijt + \beta_4 LRijt + \beta_5 LCRijt + \beta_6 Pijt + \varepsilon ijt$	The findings reveal that the minimum capital requirement and liquidity ratio significantly influence the risk-taking behaviour of African banks positively. Whilst, the capital adequacy ratio and liquidity coverage ratio have a significant negative impact on the African banks' risk-taking decisions. These results are premised on the measure of risk-taking behaviour which is the natural log of Z-score computation.

4.5 Summary of the chapter

In this chapter, the results of the dynamic and static panel data model were presented and discussed extensively. The research objectives were achieved and discussed under the proposed five specification model. The first specification model, which was the capital structure specification model, provided an answer to the first research question. This specification model was fitted using the dynamic system generalised moment method. The result of this specification model showed that there was a relationship between the Basel III regulatory requirements and the capital structure of selected listed African banks. The second specification model- which was the financial performance specification model, provided an answer to the second research question. This specification model was fitted using the static FE and RE estimators. The result of this specification model showed that there was a relationship between the Basel III capital adequacy ratio and the financial performance of selected listed African banks.

Furthermore, the third specification model, which was the stability specification model, provided an answer to the third research question. This specification model was fitted using the static pooled OLS estimator. The result of the specification model showed that there was a non-significant relationship between the Basel III capital buffer premium and the stability of selected

listed African banks. The fourth specification model, which was the efficiency specification model, provided an answer to the fourth research question. This specification model was fitted using the static pooled OLS and RE estimators. The result of the specification model showed that there was a relationship between the Basel III liquidity requirements and the efficiency of selected listed African banks. Finally, the fifth specification model, which was the risk-taking behaviour specification model, provided an answer to the fifth research question. This specification model was fitted using the static RE estimator. The result of the specification model showed that there was a relationship between the Basel III regulatory requirements and the risk-taking behaviour of selected listed African banks.

The chapter also presented the descriptive and normality statistics and the important panel data diagnostic tests. The results were compared to those in the literature in order to draw meaningful interpretations. The chapter also used the results of the dynamic and static panel regression model to provide answers to the study research questions and hypotheses at the end of this chapter. The next chapter concludes the entire study.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarises the findings of this study, highlights its contributions to the body of knowledge as well as its limitations and finally makes some recommendations for future studies. The preceding chapter discussed the results of the dynamic and static panel data models used to test the research hypotheses of the current study. The results generated from these models provide evidence that some of the Basel III regulatory requirements have significant effect on the capital structure, financial performance, stability, and risk-taking behaviour of the selected African banks.

5.2 Research purpose revisited and conclusions based on the empirical evidence

This section summarises the aim and objectives of the study and presents the conclusions drawn from the empirical evidence in relation to the research objectives.

5.2.1 Research aim and objectives revisited

Generally, banks play a pivotal role in an economy and serve as intermediaries between holders of surplus resources and those with deficit amongst. Banks can only serve this purpose when they are financially sound, stable, and efficient and take reasonable risk within their operating capacity. The bank capital structure decision is important in ensuring bank stability, performance and operational efficiency. In view of this, the BCBS (2010) developed the Basel III Accord in order to strengthen regulation, supervision, transparency, disclosure and risk management within the banking industry, and to improve the banks' ability to handle shocks from financial stress, make informed financing decision, remain financially stable, be operationally efficient, and risk aware (BIS, 2013).

With regards to the importance of the banks' capital structure decision, scholars such as Al-Najjar and Hussainey (2011) and Bartoloni (2013) opine that lowly leveraged bank tend to achieve high profitability and free cash flow. This suggests that profitable banks with more retained earnings and FCF at their disposal are more efficient and able to make important investment decisions. Debandt et al (2014) posits that the level of bank leverage determines the stability of the bank, and that a highly leveraged bank faces an increased liquidity risk, which negatively affects its stability and operational efficiency. Furthermore, Al-Najjar and Hussainey (2011) and Antonious et al (2008) argue that the bank capital structure is important in the risk-taking behaviours of banks. They assert that highly leveraged banks have low risk appetite as their risk capability and risk-taking behaviour are consequentially affected.

As a result of the importance of bank capital structure and its interconnectedness with the profitability, stability, efficiency and risk-taking behaviour of banks, bank capital structure is heavily regulated by the countries' regulatory authorities, usually the central bank. These authorities use the Basel Accord as the standard, though some prescribe their own requirements after considering the Accord's minimum requirements and the country's unique circumstances. Specifically, the Basel Accord is used to ensure strict governance of bank operational activities, detailed reporting, and compliance. This consequently promotes a resilient banking system with a better focus on capital, leverage, funding and liquidity position (Romano, 2014; Lyngen, 2012).

With a view to the above, the overarching aim of study was to investigate the impact of Basel III regulatory requirements on the financial performance, stability, efficiency, capital structure and risk-taking behaviour of selected listed African banks. The specific objectives of the study were to: i) examine the relationship between the Basel III regulatory requirements and the capital structure of selected listed African banks; ii) determine the relationship between the Basel III capital adequacy ratio and the financial performance of selected listed African banks; iii) determine the relationship between the capital buffer premium and the stability of selected listed African banks; iv) examine the relationship between the Basel III liquidity requirements and the efficiency of selected listed African banks; and v) investigate the relationship between the Basel III regulatory requirements and the risk-taking behaviour of selected listed African banks.

5.2.2 Conclusions based on the empirical evidence

This section presents the conclusions of the current study on the basis of its empirical evidence and research objectives. First, the findings of this study show that, despite the sources of finance available to the selected African banks, they rely largely on debt capital to meet their investments and operational funding requirements. This may be due to the fact that they are highly profitable and thus seek to exploit the valuable interest tax shields as the trade-off theory predicts. Specifically, the findings show that the selected African banks appear profitable, and this suggests that they have more taxable income and are capable of servicing more debt without risking financial distress. Furthermore, they benefit from the increased debt interest tax shields derived from the increased leverage. This observation is consistent with that of Nguyen (2020), Mwai et al (2017), Berger and Bouwman (2013) and Lim (2016) who asset that profitable banks tend to use more debt capital because they enjoy the debt interest tax shields from heavy reliance on debt funding. Similarly, the proposition of the agency costs theory asserts that highly profitable banks generate excess free cash flows, which invariably increases their agency cost of overinvestment. Furthermore, high leverage helps bank to reduce the agency cost as it disciplines management by aligning the managers' action with the interest of the shareholders. This forces the management to only undertake profitable investment and operating projects, such as undertaking investments with positive net present value which ensures that they can meet their debt obligations. As a result of this, the banks' investment efficiency is largely improved.

Moreover, the impact of the Basel III Accord on the banks' capital structure was investigated on the leverage of the African leverage by using the Basel III Accord's ratio of Tier 1 capital to total exposure. The findings showed that the minimum capital requirement, capital adequacy ratio, capital buffer premium differenced at first order level and the liquidity ratio were all positively correlated with African banks leverage except for the liquidity coverage ratio that showed a negative relationship. These findings suggest that the Basel III regulatory minimum requirements play a significant role in shaping the observed capital structure decisions of the selected African banks.

The findings of this study further showed that the selected African banks did not only focus on the Basel III regulatory minimums but created cushions by keeping a higher level of capital regarded as the discretionary capital. The discretionary capital is expected to yield cushion to protect banks against unexpected shocks that could lead to bank failure, and allows banks to exercise autonomy and use their discretion to determine the excess capital. The findings of this study further showed that bank size, asset tangibility and profitability were important determinants of the discretionary capital held by the selected African banks. Similarly, the above variables had a significant and positive impact on African banks' observed leverage. These findings are in line with the trade-off and agency cost theory of capital structure (Leary & Roberts, 2010; Berger & Bouwman, 2013; Moyo, 2015; Gavalas & Syriopoulos, 2018). The findings suggest that bank size, asset tangibility and profitability improve the bank's debt security and capacity to accumulate and service more debt, thus, leaving them highly geared. These finding further suggest that, like the Basel III minimum requirements, banks specific determinants such as size, asset tangibility and profitability play an important role in shaping the observed capital structure and discretionary capital decisions of African banks.

Furthermore, the findings of this study highlighted the role of Basel III regulatory requirements on the financial performance, stability, efficiency and risk-taking behaviour of the African banks. They showed that the effect of capital adequacy ratio had a more significant impact on the financial performance of the selected African banks as compared to the other Basel III regulatory requirements parameters. Moreover, the liquidity ratio is positively correlated to bank stability. These findings suggest that the selected African banks were stable because they maintained a high liquidity ratio. This further suggests that the selected African banks could effortlessly cover their operational and short-term obligations. In other words, they are operationally stable and have the capacity to withstand financial, market and economic shocks as a result of their high liquidity ratio.

The findings of this study further show that, amongst all the Basel III regulatory requirements tested on the operational and investment efficiency of African banks, only the differenced capital buffer premium had a significant and positive impact on both measures of bank efficiency

(NIMR and OETA). This suggests that the selected African banks were efficient because they kept sufficient capital buffers which served as a cushion and security for their operations. The capital buffer premiums safeguarded them against financial distress or unexpected shocks that could result in their failure. The above findings are consistent with those of Abbas and Younas (2021), Ha and Quyen (2018) and Kamran, et al. (2016).

Finally, the findings of this study showed that minimum capital requirements, capital buffer premium, liquidity ratio and profitability were significant determinants of the risk-taking behaviour of the African banks. However, compared to other variables, the liquidity ratio remained the most important factor in terms of determining the risk-taking behaviour of the selected African banks. This is because the liquidity ratio remained relevant and consistent across all the three measures of the risk-taking behaviour of the African banks. This suggests that a high liquidity ratio, translates to high risk-taking behaviour of banks. In other words, the selected African banks embarked on risky investments without fear of financial distress and liquidity risk. These findings are consistent with those of Karim et al (2014), Nazir et al (2012) and Jokipii and Milne (2011).

On the basis of the above findings, this study therefore, concludes that minimum capital requirements, capital adequacy ratio, differenced capital buffer premium and liquidity ratio are the most relevant Basel III regulatory requirements with a significant impact on the capital structure, financial performance, efficiency, stability and risk-taking behaviour of selected African banks respectively.

5.3. The theoretical and methodological insights

This section discusses the summary of the underpinning theories and methodological approach used in this study.

5.3.1 The theoretical conclusions of the study

In Chapter two of this thesis, the theories of capital structure were extensively reviewed. The purpose of the review of capital structure theories was to shed light and provide insight into understanding the financing behaviour of financial services firms. The study reviewed six theories of capital structure starting with the traditional perspective of capital structure to Modigliani and Miller theory, trade-off theory, pecking order theory, signalling theory and finally the agency cost theory. These theories were reviewed to provide insights into the financing behaviour of African banks, and to identify which of the theories best explain the capital structure decision made by the selected African banks.

This traditionalist perspective of capital structure is grounded on an optimal capital structure, which simply states that a firm uses a mix of debt and equity capital, where the firm value is maximised whilst its weighted average cost of capital is minimised (Rajagopal, 2011). Hence, the traditional view of capital structure indicates that firms should therefore strive to achieve an optimum capital structure mix in order to achieve their maximum value (Atrill, 2009).

Furthermore, the modern theory of optimal capital structure was propounded by Modigliani and Miller's (1958). They argued that capital structure irrelevance proposition indicates that firm value and real investment outcomes are not entirely dependent on the firms' financing decision. Furthermore, MM (1958) opined that the value of a firm depends on the income generated by its assets, and not on how its assets are financed (Yapa, 2017). The MM (1958) was revised in 1963 with the proposition that where debt financing increases, the overall cost of capital decreases as the involvement of interest on debt in the MM (1963) lowers tax burden. Thus, the MM (1963) laid the foundation for the trade-off theory.

The trade-off theory of Kraus and Litzenberger (1973) further proposes that there is an optimal capital structure where a firm's value is maximised whilst its weighted average cost of capital (WACC) is minimised. Optimal capital structure occurs at a point where the target debt benefit, which is the interest tax shields, offsets the costs of bankruptcy and financial distress. Bertrand

and Schoar (2002) added that the optimal capital structure refers to the debt ratio whereby a firm's value is maximised whilst its WACC is minimised. Myers (1984) asserts that, on the one hand, the static trade-off theory postulates that firms set a target debt-to-value ratio and gradually move towards the target. On the other hand, the dynamic trade-off theory proposes that firms passively accumulate earnings and losses, letting their debt ratios deviate from the target as long as the cost of adjusting the debt ratio does not exceed the costs of having a suboptimal capital structure (Barclay & Smith, 2020; Frank & Goyal, 2009; Hovakimian et al., 2004).

The Myers and Majluf's (1984) pecking order theory hypothesised that firms minimise their time-varying adverse selection costs by relying more on internal funding. The theory indicates that the information costs associated with issuing securities are so large that they dominate all other financing considerations. According to the pecking order theory, companies maximise value by systematically choosing to finance new investments with the cheapest or internally generated funds called retained earnings before considering any external funding (Barclay & Smith, 2020). Leary and Roberts (2010) and Moyo (2015) state that in a situation where firms are faced with internal fund deficiency, and the external fund seems to be inevitable, they prefer debt to equity because of the lower information costs associated with debt issues. In other words, firms issue equity as a last resort because the equity instrument is perceived negatively by the market and they highly associate information cost with equity.

Furthermore, the signalling theory of Ross (1977) posits that the financing choices of managers are based partly on the management's perception of the market's current valuation of stock. Thus, the managers' perception and the insider information signal the prospect of the firm to the market. According to Ross (1977), an increase in leverage sends a credible signal to the market that the firm has a positive expectation of a higher future cash flow. Hence, increased debt capital is expected to increase the market value of a firm and vice versa.

Moreover, Jensen and Meckling's (1976) agency cost theory postulates that firm managers may not always act in the best interest of the firm owners. As a result, firms employ more debt capital in order to align the managers' action with the interest of the shareholders. This is because the

debt financing decision has a first order real effect on the managers' incentives and their investment and operating decisions (Barclay & Smith, 2020; Myers, 2003).

Based on the empirical findings of this study, the trade-off theory, pecking order theory and agency cost theory stood out as the underpinning theories explaining the financing behaviours of the selected African banks. However, these theories were and none of them dominated the financing behaviour of African banks.

5.3.2 The methodological conclusions of the study

Extant literature shows that the empirical results of a study are largely dependent on its methodological choice and approach. The panel data and the nature of the regression models used in this study are susceptible to statistical errors or problems of unobserved heterogeneity among the unit of analysis; the problem of the existence of multicollinearity in multiple regression models; as well as the problem of autocorrelation in the residuals. As a result, this study recognised these misspecification errors in the models and conducted a number of statistical tests to address them. Some of the statistical tests conducted included the first and second order autocorrelation test, multicollinearity test, outliers test, and sargan test.

As previously indicated, this study investigated the impact of the Basel III regulatory requirements on the financial performance, stability, efficiency, risk-taking behaviour and the capital structure of financial service firms listed on the stock exchanges of selected African countries that had adopted and implemented the Basel III regulatory framework. Using financial data from different African countries, this study recognised and adjusted for country-specific effects of the financial data by converting each country's currencies into a uniform currency by using the South African Rand as the standard currency rate across all countries. This afforded uniformity of the financial data used across all the selected African nations. Also, since the data used in the study were obtained across similar yet dynamic African countries, the institutional and firm differences were accounted for not only by controlling for the exchange rate differences but also using robust sys-GMM techniques, and differencing the data used making them lagged

by one year (Frank & Goyal, 2009). This amongst other robustness tests was conducted and illustrated in Chapter four to account for institutional differences.

The regression models 1.1 and 1.2 were fitted using the dynamic panel data estimator whilst models 2.1, 2.2, 3.1, 4.1, 4.2, 5.1, 5.2, and 5.3 were fitted using the static panel data estimators.

The regression models 1.1 and 1.2, which represented the capital structure specification models, were fitted using the system GMM dynamic panel data estimator over the static panel data estimator. The system GMM estimator included the lagged dependent variables as an additional explanatory variable on the right-hand side of the regression equation. This is important because the current value of bank leverage is affected by the previous years' value which makes bank leverage a dynamic and not a static variable. The static panel estimator was therefore not suitable as it treats and assumes a static leverage for the bank. Amongst other dynamic panel data estimators such as the OLS and GLS estimators, the system GMM estimator of the Blundell and Bond (1998) was selected for this study. This is because of its robustness to certain model misspecification errors observable in this study. Some of the errors included the autocorrelation errors that arise as a result of the lagged dependent variables; and the heterogeneity errors that arise among the individual variables used in the regression model. The OLS and GLS estimators are not robust enough to cater for such misspecification errors. On the other hand, the system GMM estimator compensated for these misspecification errors by taking into account the heteroscedasticity and autocorrelation errors of a model, thus requiring the initial condition that the panel-level effects are uncorrelated with the first difference of the first observation of the dependent variable. Furthermore, the CBP variable was differenced to the first order level and used alongside other independent variables as a system to minimise the loss of information and reduce excess positive kurtosis in the panel data model. Differencing the CBP variable to the first order level also removed the existence of multicollinearity that exists between the right-hand independent variables, which could lead to higher standard errors for individual estimates, leading to wrong understanding of coefficient's statistical significance. Thus, the differencing of the CBP variable eliminated the multicollinear effect and was retained amongst the right-hand variables used on the regression model.

Furthermore, the study used the static panel data estimator over the dynamic panel data estimator to test the impact of Basel III regulatory requirements on the financial performance, stability, efficiency and risk-taking behaviour of African banks. The static panel data estimator is suitable for the financial performance, stability, efficiency and risk-taking behaviour specification models represented in the model equation 2.1, 2.2, 3.1, 4.1, 4.2, 5.1, 5.2, and 5.3 respectively. This is because the present value of the bank financial performance, stability, efficiency and risk-taking behaviour is independent of the previous years' value; hence, the static panel data estimator is suitable. The static panel data diagnostics tests such as the F- test, Breusch and Pagan test and the Hausman specification test were conducted to select the appropriate estimator amongst the pooled OLS, fixed effect and random effect estimator. First, for the financial performance specification model, the ROA model was fitted with the RE estimator and the ROE model was fitted with the FE estimator. Second, the study utilised the pooled OLS estimator for the bank stability specification model. Third, for the bank efficiency specification model, the NIMR model was fitted using the pooled OLS estimator; and the OETA model was fitted with the RE estimator. Finally, the RE estimator was utilised for the risk-taking behaviour specification model.

All in all, this study used both the dynamic and static panel data estimators for the regression model where appropriate in order to generate a robust result across the entire specification models.

5.4 Main contribution to the body of knowledge

A number of studies such as those of Gavalas and Syriopoulos (2018), Klefvenberg and Mannehed (2017), Fu et al (2014), Dietrich et al (2014), Hong et al (2014) and King (2013), investigated the capital structures of the financial services firms and the impact of the Basel Accords on banks' financing behaviours. These studies, however, mainly used data from the developed nations, with scant studies from the developing nations. This left important gaps within the African literature and hence the current study. By the time of this study no research had addressed the effect of the liquidity requirements on African banks' stability, and efficiency

as well as on the relationship between the capital structure and risk-taking behaviours of African bank with the Basel III regulatory requirements. The findings of this study have some important policy and practical implications on the adoptions of the Basel III Accord and African bank financing. This provides relevant information and guide for the African Bank regulators, directors, CEOs, and investors in making informed decisions. A summary of the significant contributions from this study are provided below.

First, this study provides the most recent comprehensive analysis of the intervening impact of the Basel III regulatory requirements on the financing of selected African banks since the last GFC. Specifically, this study contributes to the knowledge that the Basel III Accord is a determinant of bank capital structure by showing evidence that supports the fact that the Basel III minimum capital requirements have a significant importance in the financing decisions of African banks. This study also validates one of the aims of the Basel III Accord which is to reduce bank failure caused by excessive leverage. This suggests that the selected African banks were resilient to financial and economic shocks and could also withstand any probable future economic shocks. Furthermore, this provides the African bank with a pathway to managing their financing decisions effectively by steadily maintaining the minimum capital requirements introduced by the Basel III Accord.

Second, the research findings contribute a new dimension to the growing empirical literature on capital structure and open a new avenue for in-depth investigation into the importance of bank specific capital structure determinants outside of the Basel III Accord. In view of this, the study used the most recent measure of leverage proposed by the Basel Committee which is the ratio of the tier 1 capital to total exposure. This measure was largely ignored by previous scholars as it was not a specific bank determining measure of capital structure. This study used the ratio of the tier 1 capital to total exposure because it is a non-risk-based leverage ratio aimed to manage the build-up of excessive leverage in the banking system. The study tested the relationship between the non-risk-based leverage ratio and the bank-specific determinants of capital structure. The results showed that the non-risk-based leverage ratio had a significant relationship with the bank size. This suggests that as the selected African banks grow in size and tend to finance their

business through debt capital, leading to increased leverage, the non-risk-based leverage ratio, which aims to manage the build-up of excessive leverage, keeps the banks in check and balance so that they do not become excessively leveraged. This also provides a new insight into the effectiveness of the non-risk-based leverage ratio proposed by the Basel III Accord on the selected African bank. Thus, the significant importance of the result of the Basel III non-risk-based leverage ratio to bank management is the confidence it gives that they will not build up excess leverage which could lead to bank failure despite their growth in size provided they stay within the leverage ratio threshold.

Third, this study unveils the financial performance of African banks especially after the 2007 GFC. It also relates to how the recent Basel III regulatory requirements impacted on the performance of banks since then. The findings of this study show that the Basel III capital adequacy ratio was the most important determinant of the financial performance of selected African banks as compared to the other Basel III regulatory requirements. This implies that the Basel III capital adequacy ratio positively impacted on the selected African banks' profitability and enabled them to make profitable investment decisions as they were financially stable with high retained earnings and free cash flow. The findings of this study further validate the CAR as a measure of bank soundness, proving that the selected African banks can withstand sudden deposit withdrawals and absorb the losses that can hurt the banks' financial soundness or going concern.

Fourth, the current study provides a relevant contribution to knowledge about the Basel III liquidity requirements. Using the African context, it validates the expectation of the Basel III liquidity requirements on the stability of banks. It provides evidence that the liquidity requirements of the Basel III Accord have a significant effect on determining the stability of the selected African banks, especially after the GFC. This suggests that the selected African banks are stable because they adopt the liquidity requirements.

This study further contributes significantly to the body of knowledge by showing that adopting the liquidity requirements by the selected African banks gave them the capacity to have better-

quality lending with lower interbank lending rates due to the banks interconnectedness. In other words, as liquidity ratios rose in line with Basel recommendations, interbank lending rates fell. This consequently contributed to the growth of the African economy because lower interbank lending rates transcribe to lower commercial lending rates and more business, and the economy at large can access the funding without leaving the bank stability fractured or at risk. Hence, the liquidity requirements which led to the stability of the selected African banks would increase the confidence of bank investors in the strength and stability of the banks' balance sheet, making the banks safer and better to survive and to thrive under any financial stress.

Fifth, this study contributes knowledge about the role of the capital buffer premium on bank efficiency. The capital buffer view has taken prominence since the last GFC. The findings of this study strongly validate the view that bank buffer premiums play a significant role in the operational efficiency of selected African banks. This is a significant revelation in the context of African banks as it fulfils the expectation of the Basel III regulatory requirements. It provides the knowledge that in times of unexpected financial crisis or shock, the selected African banks will be well-cushioned with sufficient capital to fall back on. In other words, this helps the selected African banks to remain efficient operationally and investment wise.

Sixth, the findings of this study shed light on the banks' risk-taking behaviour within the context of Basel III regulatory requirements. They show that the Basel III minimum capital requirements, capital buffer premiums and the liquidity ratio, strongly determine the risk-taking behaviour of the selected African banks. This provides evidence for the important parameters for bank stress testing models. For example, having the liquidity ratio as one of significant determinants of risk-taking behaviour clears a path for liquidity stress test to access the impact of adverse scenarios on the bank cash flows, as well as on the availability of funding sources, choices of financing, and market prices of liquid assets. Hence, the risk-taking behaviour of the selected African banks helps to establish risk limits, improve risk identification, and to establish a platform for bank stress testing, financing decisions, as well as other strategic business decisions. These findings will equip the bank manager, policy makers and the regulators because no African country has

a comprehensive detailed checklist and framework on what constitutes the stress testing model, methodology, and proper communication.

Furthermore, this study found that the liquidity coverage ratio did not have a significant and positive effect on the financial performance and risk-taking behaviour of selected African banks. According to the Basel III framework, the LCR is expected to cushion the bank from short term liquidity stress and foster its financial performance. However, the findings of this study showed that a negative relationship existed between these variables and that adopting the LCR did not provide a consequential positive effect on the profitability of the selected African banks. It rather constrained them from operating efficiently in full capacity, which invariably affected their profitability. Thus, the selected African bank regulators, directors, and managers should critically consider what works for them within the context of Africa and should not necessarily adopt the new Basel III liquidity requirements to remain profitable.

Moreover, the findings of this study showed that, despite the enormous significant and positive impact of the Basel III requirements, the selected African banks should maintain the minimum capital requirement rather than keep excess discretionary capital. This is because the excess capital kept by the selected African banks constrains their available capital and severe their core operational activities of lending purposes which invariably affects their stability. The expectation based on the Basel III accord is that capital buffer premium will serve as a cushion and give confidence and stability to banks activities, however, the findings of this study showed the opposite. The study showed that the Basel III capital buffer premium did neither had a significant and positive effect on the African banks' stability nor on its profitability. Depending on the country's unique fundamentals, the selected African bank regulators and CEO should focus more on possessing a reasonable amount of CAR rather than a high level of capital buffers as the latter does not have the expected positive effect on profitability and stability. Based on the robust result in section 4.3.2.1.3, African banks should keep a CAR that ranges between 10.56% and 48.18% (See Table 4.1) in order to remain financially sound, stable and profitable.

It should be emphasised that it is important for African banks to adopt an optimum mix of the Basel III regulatory requirements that largely suits their prioritised needs. This is because the Basel III regulatory requirements appear to be a two-edged sword within the African context having both positive and negative impacts on the financial performance, efficiency and stability of African banks. This study found that the liquidity requirement had a positive impact on the stability and efficiency of banks on one hand, whilst on the other hand it equally had a negative impact on the financial performance and risk-taking behaviour of the selected African bank. Furthermore, the capital buffer premium, which results from the discretionary capital held in excess of the minimum capital, had a positive impact on the efficiency of selected African banks efficiency, whilst on the other hand it did not have a significant positive effect on the stability of the selected African banks. The above findings are important for the African bank directors and managers because they will guide them in terms of prioritising aspects of their core banking area - profitability, stability or investment and operational efficiency - that need improvement. With that knowledge they will choose a suitable mix of the Basel III regulatory requirements that largely meet the prioritised needs.

Finally, this study, therefore, proposes a suitable optimum model and capital regulatory mix that can maximise the financial performance, stability and efficiency of African banks. With a view to the discussions above, this study recommends that African banks should consistently maintain their actual minimum capital and capital adequacy ratio over the prescribed minimum. At the same time, they should maintain the prescribed minimum of LCR over the excess LCR that they currently keep. This is because for the selected African banks to remain financially sound and profitable they should maintain a CAR that ranges between 10.56% and 48.18%, whilst they maintain a minimum MCR that is above 6.28% and maximum of 20.90% in order to maintain their stability and confidence. Furthermore, the selected African banks should keep their LCR closely to the prescribed minimum threshold of 100% but lesser than 181.71% in order to avoid the consequential effect of tying down excess capital that could be used for a profitable investment and their primary lending activities. This study therefore serves a significant purpose within the African context and provides African banks with a suitable path to follow in terms of the importance of adopting the Basel III Accord.

5.5 Limitations and recommendations for future research

First, the potential limitation of this study is the number of African countries it used as a sample. It should be noted however that the small sample size was determined by the requirement that the banks should have used the Basel III regulatory framework in Africa. With that in mind, this study used only the listed banks from six African countries for ease of data availability. Specifically, the study used a sample size of 45 listed African banks that had their financial data published publicly. The study time frame was also limited to the period 2010 to 2019 because the Basel III Accord was only introduced after the 2007 GFC to replace Basel II. However, this limited sample size was compensated for by using a panel data model which increased the number of observations to 450. Moreover, the study conducted a robust panel of diagnostic tests to account for validity and reliability. Amongst these tests were the multicollinearity test, outliers test, and Hausman specification test. With a view to the fact that the study used robust tests its findings can be relied upon in terms of informed decision making. Given the fact that developed countries used dataset with more data points and had access to a large number of banks that had adopted the Basel III Accord the current study should therefore be repeated after a period of five to ten years from 2019. This recommendation is premised on the assumption that by that time more African countries would have come on board with adopting Basel III Accord, provided the Basel III Accord has not been fully updated to Basel IV Accord within that period.

The second limitation of this study concerns the model it developed and tested because it excluded some additional predictors such as the corporate governance, credit risk rating, and stress testing. This is largely because within the African context there are currently no comprehensive stress testing frameworks and communication strategies in place leading to difficulty in acquiring relevant data for its inclusion. Thus, these additional predictors were excluded mainly because of the unavailability of relevant data across the sampled African countries. Future research, therefore, should focus on this specific area and should request appropriate help from the international monetary fund and or World Bank for data and technical assistance in order to include it as additional explanatory variables. It is envisaged that such

robust inclusion could expand the knowledge insight in relation to the predictors that explain bank financing apart from the Basel III Accord and bank specific capital structure determinants.

Third, this study is limited to a number of Basel III regulatory requirements such as the minimum capital requirements, capital adequacy ratio, capital buffer premium, and the liquidity coverage ratio. These requirements have been largely adopted within the context of African banks. This study therefore recommends that future studies should test the significance of revised sections of the Basel III regulatory requirements, such as the minimum haircut floors for security financing transactions, standardised credit risk mitigation approach, credit valuation adjustment framework, securitisation of non-performing loans, and models to counterparty credit risk amongst many others. These tests should be adapted to the African context. The current study could not consider these revised sections because at the time of the study they were recent amendments mostly planned to take effect after the year 2020.

Finally, the study can be further complemented by a deep dive comparative analysis to assess any significant impactful consistency or deviation between Basel I, II and III Accord. This will also increase the testing of performance and stability of African banks prior to the 2007 GFC and beyond. The result of such a comparative study within the African context will provide a significant view to the practical and significant importance of adopting the Basel I, Basel II, Basel III and any other future Basel Accords.

REFERENCES

Abbas, F. and Younas, Z.I., 2021. How Do Bank Capital and Capital Buffer Affect Risk: Empirical Evidence from Large US Commercial Banks. *Journal of Central Banking Theory and Practice*, *2*, pp.109-131.

Abdel-Baki, M.A., 2012. The impact of Basel III on emerging economies. *Global Economy Journal*, *12*(2), p.1850256.

Abdul, J.M., 2017. Impact of capital adequacy on the performance of Nigerian Banks using the Basel Accord Framework. *East Africa Research Papers in Business, Entrepreneurship and Management*, *7*, pp.1-15.

Abor, J. and Biekpe, N., 2007. Corporate governance, ownership structure and performance of SMEs in Ghana: implications for financing opportunities. *Corporate Governance: The international journal of business in society*, *7*(3), pp.288-300.

Abor, J., 2008. Determinants of the capital structure of Ghanaian firms. African Economic Research Consortium, Nairobi: AERC Research Paper 176.

Aboura, S., and Lépinette, E., 2015. Do banks satisfy the Modigliani-Miller theorem? Economic Bulletin; Volume 35, pp. 924-935.

Acharya, V.V., Mehran, H. and Thakor, A.V., 2016. Caught between Scylla and Charybdis? Regulating bank leverage when there is rent seeking and risk shifting. *The Review of Corporate Finance Studies*, *5*(1), pp.36-75.

Admati, A. R., DeMarzo, P. M., Hellwig, M. F., and Pfleiderer, P., 2013. Fallacies, irrelevant facts, and myths in the discussion of capital regulation: Why bank equity is not socially expensive.

Adrian, T. and Shin, H.S., 2010. Liquidity and leverage. *Journal of financial intermediation*, *19*(3), pp.418-437.

Affinito, M. and Tagliaferri, E., 2010. Why do (or did?) banks securitize their loans? Evidence from Italy. *Journal of Financial Stability*, *6*(4), pp.189-202.

Afinindy, I., Salim, U. and Ratnawati, K., 2021. The Effect of Profitability, Firm Size, Liquidity, Sales Growth on Firm Value Mediated Capital Structure. *International Journal of Business, Economics and Law*, *24*(4), pp.15-22.

Aggarwal, R. and Jacques, K.T., 2001. The impact of FDICIA and prompt corrective action on bank capital and risk: Estimates using a simultaneous equations model. *Journal of Banking & Finance*, *25*(6), pp.1139-1160.

Agoraki, M.E.K., Delis, M.D. and Pasiouras, F., 2011. Regulations, competition and bank risk-taking in transition countries. *Journal of Financial Stability*, *7*(1), pp.38-48.

Ahmad, F. and Abbas, Z., 2011. Role of firm's level characteristics in determining the capital structure of banks: Evidence from the Pakistan banks. Interdisciplinary Journal of Contemporary Research in Business, 2(12):201 –216.

Ahmed, N., Ahmed, Z. and Ahmed, I., 2010. Determinants of capital structure: A case of life insurance sector of Pakistan. European Journal of Economics, Finance and Administrative Sciences, 24:7–12.

Ahmed, S.U., Ahmed, S.P., Islam, M.N., and Ullah, S.M., 2015. Impact of Basel II implementation on the financial performance of private commercial banks of Bangladesh. European Journal of Economics, Finance and Administrative Sciences, 77, 73-84.

Ajayi, S.O., Ajayi, H.F., Enimola, D.J. and Orugun, F.I., 2019. Effect of Capital Adequacy Ratio (CAR) on Profitability of Deposit Money Banks (DMB's): A Study of DMB's with International Operating License in Nigeria. *Research Journal of Finance and Accounting*, *10*(10), pp.84-91.

Al-Hares, O.M., AbuGhazaleh, N.M. and El-Galfy, A.M., 2013. Financial performance and compliance with Basel III capital standards: Conventional vs. Islamic banks. *Journal of Applied Business Research (JABR)*, *29*(4), pp.1031-1048.

Al-Najjar, B. and Hussainey, K., 2011. Revisiting the capital-structure puzzle: UK evidence. The Journal of Risk Finance, 12(4):329–338.

Altunbas, Y., Carbo, S., Gardener, E.P. and Molyneux, P., 2007. Examining the relationships between capital, risk and efficiency in European banking. *European Financial Management*, *13*(1), pp.49-70.

Anarfo, E.B., 2015. Determinants of capital structure of banks: Evidence from sub-Sahara Africa. Asian Economic and Financial Review, 5(4), pp. 624 – 640.

Andaiyani, S., Hidayat, A., Djambak, S. and Hamidi, I., 2021. Counter-Cyclical Capital Buffer and Regional Development Bank Profitability: An Empirical Study in Indonesia. *The Journal of Asian Finance, Economics and Business*, *8*(5), pp.829-837.

Andries, A.M., 2011. The determinants of bank efficiency and productivity growth in the Central and Eastern European banking systems. *Eastern European Economics*, *49*(6), pp.38-59.

Antoniou, A., Guney, Y. and Paudyal, K., 2008. The determinants of capital structure: Capital market-oriented versus bank-oriented institutions. Journal of Financial and Quantitative Analysis, 43(1):59–92.

Arellano, M. and Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies*, *58*(2), pp.277-297.

Arellano, M. and Bover, O., 1995. Another look at the instrumental variable estimation of error-components models. *Journal of econometrics*, *68*(1), pp.29-51.

Aremu, M.A., Ekpo, I.C., Mustapha, A.M. and Adedoyin, S.I., 2013. Determinants of capital structure in Nigerian banking sector. *International Journal of Academic Research in Economics and Management Sciences*, *2*(4), p.27.

Artikis, G.P., Eriotis, N., Vasiliou, D. and Ventoura-Neokosmidi, Z., 2007. How firm characteristics affect capital structure: an empirical study. *Managerial finance*.

Asaf, S., 2004. *Executive corporate finance: the business of enhancing shareholder value*. Pearson Education.

Ashraf, B., Arshad, S. and Hu, Y., 2016. Capital regulation and bank risk-taking behaviour: evidence from Pakistan. *International Journal of Financial Studies*, *4*(3), p.16.

Aspal, P.K. and Nazneen, A., 2014. An empirical analysis of capital adequacy in the Indian private sector banks. *American Journal of Research Communication*, *2*(11), pp.28-42.

Assfaw, A.M., 2019. Firm-specific and macroeconomic determinants of Banks Liquidity: Empirical investigation from Ethiopian private commercial banks.

Atrill, P. and McLaney, E., 2009. *Management accounting for decision makers*. Pearson Education.

Aviral, K.T. and Raveesh, K., 2015. Determinants of capital structure: a quantile regression analysis. *Studies in Business and Economics*, *10*(1), pp.16-34.

Ayaydin, H. and Karakaya, A., 2014. The effect of bank capital on profitability and risk in Turkish banking. *International Journal of Business and Social Science*, *5*(1).

Ayuso, J., Pérez, D. and Saurina, J., 2004. Are capital buffers pro-cyclical?: Evidence from Spanish panel data. *Journal of financial intermediation*, *13*(2), pp.249-264.

Babic, B., 2011. Status on Basel III–Liquidity and Capital. *Danmarks Nationalbank Monetary Review 1st Quarter Part*.

Baker, M. and Wurgler, J., 2002. Market timing and capital structure. *The journal of finance*, *57*(1), pp.1-32.

Balin, B.J., 2008. Basel I, Basel II, and emerging markets: A nontechnical analysis. *Available at SSRN 1477712*.

Baltagi, B.H., Song, S.H. and Kwon, J.H., 2009. Testing for heteroskedasticity and spatial correlation in a random effects panel data model. *Computational Statistics & Data Analysis*, *53*(8), pp.2897-2922.

Balthazar, L., 2006. *From Basel 1 to Basel 3: The integration of state of the art risk modelling in banking regulation*. Springer.

Ban, M. and Chen, C.C., 2019. Ambiguity and capital structure adjustments. *International Review of Economics & Finance*, *64*, pp.242-270.

Banerjee, R. N., and Mio, H., 2017. The impact of liquidity regulation on banks. Journal of Financial intermediation, 11(7), 1-15. https://doi.org/10.1016/j.jfi.2017.05.008

Bank for International Settlements., 2001. Range of practices and issues in economic capital frameworks. Bank for International Settlements.

Bank for International Settlements., 2013. Basel III: The liquidity coverage ratio and liquidity risk monitoring tools. Available: *http://www.bis.org/publ/bcbs238.htm***.**

Bank of Tanzania (BOT)., 2010. Banking Supervision: Commercial Banks. http://www.bot-tz.org.

Bank of Uganda., 2013. Annual supervision report 2013. Bank of Uganda. [Online]. Available at: https:// www.bou.or.ug/bou/bou-downloads/asr/2013/Dec/Annual-Supervision-Report-2013.pdf [Accessed: 2021, September 15].

Barclay, M.J. and Smith, C., 2020. The capital structure puzzle: Another look at the evidence. *Journal of Applied Corporate Finance*, *32*(1), pp.80-91.

Barclay, M.J. and Smith, C.W., 2005. The capital structure puzzle: The evidence revisited. *Journal of Applied Corporate Finance*, *17*(1), pp.8-17.

Barth, J. R. Caprino, G. and Levine, R., 2006. Rethinking bank regulation: Till angels govern. Cambridge: Cambridge University Press.

Barth, J.R., Caprio, G. and Levine, R., 2013. Bank regulation and supervision in 180 countries from 1999 to 2011. *Journal of Financial Economic Policy*.

Bartoloni, E., 2013. Capital structure and innovation: Causality and determinants. Empirica, 40(1):111–151.

Basel Committee on Banking Supervision., (BCBS). 2010. Basel III: *International framework for liquidity risk measurements, standards and monitoring* (December).

Basel Committee on Banking Supervision., (BCBS). 2013. Basel III: The liquidity Coverage Ratio and Liquidity Risk Monitoring Tools, *http://www.bis.org/publ/bcbs238.pdf***.**

Basel Committee., 2010. Basel III: A global regulatory framework for more resilient banks and banking systems. *Basel Committee on Banking Supervision, Basel*.

Beck, T. and Rojas-Suarez, L., 2019. Making Basel III Work for Emerging Markets and Developing Economies: A CGD Task Force Report. *Available at SSRN 3391886*.

Beltratti, A. and Stulz, R.M., 2012. The credit crisis around the globe: Why did some banks perform better?. *Journal of Financial Economics*, *105*(1), pp.1-17.

Berger, A.N. and Bouwman, C.H., 2013. How does capital affect bank performance during financial crises?. *Journal of Financial Economics*, *109*(1), pp.146-176.

Berger, A.N. and Di Patti, E.B., 2006. Capital structure and firm performance: A new approach to testing agency theory and an application to the banking industry. *Journal of Banking & Finance*, *30*(4), pp.1065-1102.

Berger, A.N., Kick, T. and Schaeck, K., 2014. Executive board composition and bank risk taking. *Journal of Corporate Finance*, *28*, pp.48-65.

Berle, A. and Means, G., 1932. The Modern Corporation and Private Property Macmillan. *New York*, *2*(3), pp.45-53.

Bertrand, M. and Schoar, A., 2002. Managing with style: The effect of managers on firm policies (SSRN Scholarly Paper No. ID 376880). *Rochester, NY: Social Science Research Network*.

Besley, S., Brigham, E.F. and Sibindi, A.B., 2015. *Corporate Finance: A South African Perspective*. Cengage Learning EMEA.

Bessler, W., Drobetz, W. and Grüninger, M.C., 2011. Information asymmetry and financing decisions. *International Review of Finance*, *11*(1), pp.123-154.

Bilal, Z.O. and Salim, B.F., 2016. Does Basil III Implementation Impact on Financial Performance? Evidence from Omani's Commercial Banks. *International Journal of Economics and Financial Issues*, *6*(3), pp.963-970.

Bilen, A. and Kalash, I., 2020. Factors Affecting the Financial Leverage of Service Firms in Turkey: An Empirical Investigation. *İstanbul Gelişim Üniversitesi Sosyal Bilimler Dergisi*, *7*(1), pp.142-152.

BIS (Bank for International Settlements)., 1999. Capital requirements and bank behaviour: The impact of the Basle Accord. Basle.

BIS (Bank for International Settlements)., 2006. Basel II: International convergence of capital measurement and capital standards: A revised framework. Basle.

BIS (Bank for International Settlements)., 2015. Assessment of Basel III risk-based capital regulations: South Africa. Basle.

Blundell, R. and Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics*, *87*(1), pp.115-143.

Blundell-Wignall, A. and Atkinson, P., 2010. Thinking beyond basel iii. *OECD Journal: Financial Market Trends*, *2010*(1), pp.9-33.

Bogale, A.T., 2020. Effect of bank specific and macroeconomic determinants on capital adequacy ratio a study on Ethiopian private commercial banks. *Research Journal of Finance and Accounting*, *11*(21), pp.1-11.

Bond, S.R. and Windmeijer, F., 2002. Finite sample inference for GMM estimators in linear panel data models.

Bordens, K.S. and Abbott, B.B., 2002. *Research design and methods: A process approach*. McGraw-Hill.

Bouheni, F.B., Ameur, H.B., Cheffou, A.I. and Jawadi, F., 2014. The Effects of regulation and supervision on European Banking profitability and risk: a panel Data Investigation. *Journal of Applied Business Research (JABR)*, *30*(6), pp.1665-1670.

Boyle, G.W. and Eckhold, K.R., 1997. Capital structure choice and financial market liberalization: evidence from New Zealand. *Applied Financial Economics*, *7*(4), pp.427-437.

Brennan, M.J. and Schwartz, E.S., 1978. Corporate income taxes, valuation, and the problem of optimal capital structure. *Journal of business*, pp.103-114.

Brief, A.E., 2015. The Banking System in Africa: Main Facts and Challenges.

Brigham, E.F. and Ehrhardt, M.C., 2005. Financial Management: Theory and Practice, 11e. *Thomson South Western*.

Burrell, G. and Morgan, G., 2017. *Sociological paradigms and organisational analysis: Elements of the sociology of corporate life*. Routledge.

Caggiano, G. and Calice, P., 2011. *The macroeconomic impact of higher capital ratios on African economies*. African Development Bank Group.

Calomiris, C.W., 2009. The subprime turmoil: What's old, what's new, and what's next. *The Journal of Structured Finance*, *15*(1), pp.6-52.

Campello, M. and Giambona, E., 2013. Real assets and capital structure. *Journal of Financial and Quantitative Analysis*, *48*(5), pp.1333-1370.

CapGemini, M.L., 2014. World wealth report. *Pobrano z: https://www. worldwealthreport. com (3.02. 2021)*.

Carpentier, C., 2006. The valuation effects of long-term changes in capital structure. International Journal of Managerial Finance, 2(1):4–18.

Carvallo, O., Kasman, A. and Kontbay-Busun, S., 2015. The Latin American bank capital buffers and business cycle: Are they pro-cyclical?. *Journal of International Financial Markets, Institutions and Money*, *36*, pp.148-160.

Central Bank of Kenya., 2010. Regulation and Supervision of Bank Channels. Policy options for Kenya Nairobi.

Central Bank of Nigeria (CBN)., 2011. Corporate governance code for banks and discount houses in Nigeria. Retrieved from https://www.cbn.gov.ng/ut/2014/fprd/circular%20on%20code%20of%20circular%20on%20corporate% 20governance%20and%20whistle%20blowing-may%202014%20(3).pdf.

Chadha, S., and Sharma, A. K., 2015. Capital structure and firm performance: Empirical evidence from India. Sage India.

Chakrabarti, A. and Chakrabarti, A., 2019. The capital structure puzzle–evidence from Indian energy sector. *International Journal of Energy Sector Management*.

Chiaramonte, L. and Casu, B., 2017. Capital and liquidity ratios and financial distress. Evidence from the European banking industry. *The British Accounting Review*, *49*(2), pp.138-161.

Chipeta, C. and McClelland, D., 2018. In search of conclusive evidence on the trade-off and pecking order theories of capital structure: Evidence from the Johannesburg Stock Exchange. *Investment Analysts Journal*, *47*(1), pp.15-30.

Chortareas, G.E., Girardone, C. and Ventouri, A., 2012. Bank supervision, regulation, and efficiency: Evidence from the European Union. *Journal of Financial Stability*, *8*(4), pp.292-302.

Chun, S., Kim, H. and Ko, W., 2012. The impact of strengthened Basel III Banking regulation on lending spreads: Comparisons across countries and business models.

Claessens, S. and Kodres, M.L.E., 2014. *The regulatory responses to the global financial crisis: Some uncomfortable questions* (No. 14-46). International Monetary Fund.

Collins, H., 2010. Creative Research: The Theory and Practice of Research for the Creative Industries, AVA Publications: 38-40.

Dănilă, O.M., 2012. Impact and Limitations Deriving from Basel II within the Context of the Current Financial Crisis. *Theoretical & Applied Economics*, *19*(6).

Danso, A., 2014. *Dimensions of Capital Structure of Companies: Evidence from Sub-Saharan Africa* (Doctoral dissertation, University of York).

De Bandt, O., Camara, B., Pessarossi, P. and Rose, M., 2014. Does the capital structure affect banks' profitability. *Pre and post financial crisis evidence from significant banks in France*.

De Haan, L., and Van den End, J. W., 2013. Bank liquidity, the maturity ladder, and regulation. Journal of Banking & Finance, 37(10), 3930-3950.

De Jonghe, O. and Öztekin, Ö., 2015. Bank capital management: International evidence. *Journal of Financial Intermediation*, *24*(2), pp.154-177.

De Silva, D.N., Chinna, K. and Azam, S.F., 2019. An Exploratory Factor Analysis on Variables Affecting the Profitability of Sri Lankan Local Commercial Banks. *European Journal of Management and Marketing Studies*.

De Vos, A.S., Strydom, H., Fouche, C.B. and Delport, C.S.L., 2011. Research at Grass Roots for the Social Science and Human Service Professions. 4th ed. Cape Town: Van Schaik Publishers, 473-490.

Delcoure, N., 2007. The determinants of capital structure in transitional economies. International Review of Economics and Finance. 16(3): 400-415.

Delimatsis, P., 2012. Financial innovation and prudential regulation: The new Basel III rules. *Journal of World Trade*, *46*(6), pp.1309-1342.

DeMarzo, P.M. and Duffie, D., 1995. Corporate incentives for hedging and hedge accounting. *The review of financial studies*, *8*(3), pp.743-771.

Demirguc-Kunt, A., Detragiache, E. and Merrouche, O., 2013. Bank capital: Lessons from the financial crisis. *Journal of Money, Credit and Banking*, *45*(6), pp.1147-1164.

D'Hulster, K., 2009. The leverage ratio: A new binding limit on banks. *The review of financial studies*, 4(3), pp.74-77.

Diantimala, Y., Syahnur, S., Mulyany, R. and Faisal, F., 2021. Firm size sensitivity on the correlation between financing choice and firm value. *Cogent Business & Management*, *8*(1), p.1926404.

Dietrich, A. and Wanzenried, G., 2011. Determinants of bank profitability before and during the crisis: Evidence from Switzerland. *Journal of International Financial Markets, Institutions and Money*, *21*(3), pp.307-327.

Dietrich, A., Hess, K. and Wanzenried, G., 2014. The good and bad news about the new liquidity rules of Basel III in Western European countries. *Journal of Banking & Finance*, *44*, pp.13-25.

Doan, T., 2020. Determinants of financing decisions: Evidence using GMM estimation. *Accounting*, *6*(5), pp.681-686.

Dougherty, C., 2006. The marriage earnings premium as a distributed fixed effect. *Journal of Human Resources*, *41*(2), pp.433-443.

Drakos, A.A. and Kouretas, G.P., 2015. Bank ownership, financial segments and the measurement of systemic risk: An application of CoVaR. *International Review of Economics & Finance*, *40*, pp.127-140.

Drakos, K., 2012. US banks' capitalization speed-of-adjustment: a microeconometric approach. *Journal of Financial Economic Policy*.

Effendi, K. A., 2017. The Optimization of Capital Structure in Maximizing Profit and Corporate Value. Binus Business Review, 8(1), 41-47. http://dx.doi.org/10.21512/bbr.v8i1.1678

Ejoh, N.O. and Iwara, U.U., 2014. The impact of capital adequacy on deposit money banks' profitability in Nigeria. *Research Journal of Finance and Accounting*, *5*(12), pp.7-15.

Elsas, R. and Florysiak, D., 2013. Dynamic capital structure adjustment and the impact of fractional dependent variables. *Journal of Financial and Quantitative Analysis (JFQA), Forthcoming*.

Eriotis, N., Vasiliou, D. and Ventoura-Neokosmidi, Z., 2007. How firm characteristics affect capital structure: an empirical study. *Managerial Finance*.

Ernst and Young (EY)., 2013. Doing business in Africa: from strategy to execution. Growing Beyond. Accessed 17 August 2019.

Eubanks, W.W., 2010. *Status of the Basel III Capital Adequacy Accord*. DIANE Publishing.

European Central Bank., 2010. Beyond ROE - How to measure bank performance. *Appendix to the report on EU banking structures*.

European Central Bank., 2015. ECB Banking Supervision recommends prudent dividend policy and announces review of variable remuneration. Retrieved from European Central Bank: *https://www.bankingsupervision.europa.eu/press/pr/date/2015/html/sr150129.en.html*

Ezike, J.E. and Mo, O., 2013. Capital adequacy standards, Basel accord and bank performance: the Nigerian experience (A case study of selected Banks in Nigeria). *Asian Economic and Financial Review*, *3*(2), p.146.

Faulkender, M. and Petersen, M., 2012. Investment and capital constraints: repatriations under the American Jobs Creation Act. *The Review of Financial Studies*, *25*(11), pp.3351-3388.

Ferdous, L.T., 2019. Capital Structure Theories in Finance Research: A Historical Review. *Australian Finance & Banking Review*, *3*(1), pp.11-19.

Fiordelisi, F. and Mare, D.S., 2014. Competition and financial stability in European cooperative banks. *Journal of International Money and Finance*, *45*, pp.1-16.

Francis, W.B. and Osborne, M., 2012. Capital requirements and bank behaviour in the UK: Are there lessons for international capital standards?. *Journal of Banking & Finance*, *36*(3), pp.803-816.

Frank, M.Z. and Goyal, V.K., 2008. Trade-off and pecking order theories of debt. In *Handbook of empirical corporate finance.* pp. 135-202. Elsevier.

Frank, M.Z. and Goyal, V.K., 2009. Capital structure decisions: which factors are reliably important?. *Financial management*, *38*(1), pp.1-37.

Froot, K.A. and Stein, J.C., 1998. Risk management, capital budgeting, and capital structure policy for financial institutions: an integrated approach. *Journal of financial economics*, *47*(1), pp.55-82.

FSB., 2009. Guidance to assess the systemic importance of financial institutions, markets and instruments: initial considerations. *Report to the G20 Finance Ministers and Governors*.

Fu, X.M., Lin, Y.R. and Molyneux, P., 2014. Bank competition and financial stability in Asia Pacific. *Journal of Banking & Finance*, *38*, pp.64-77.

Gabriel, G., 2016. The impact of the Basel 3 capital requirements on the performance of European banks.

Gadanecz, B. and Jayaram, K., 2015. Macroprudential policy frameworks, instruments and indicators: a review. *Режим доступу: https://www. bis. org*.

García-Suaza, A.F., Gómez-González, J.E., Pabón, A.M. and Tenjo-Galarza, F., 2012. The cyclical behaviour of bank capital buffers in an emerging economy: Size does matter. *Economic Modelling*, *29*(5), pp.1612-1617.

Gavalas, D. and Syriopoulos, T., 2018. Basel III and its effects on banking performance: investigating lending rates and loan quantity. *Journal of Finance and Bank Management*, *2*(3), pp.17-52.

Ghosh, A., 2017. *Capital structure and firm performance*. Routledge.

Giordana, G.A. and Schumacher, I., 2017. An empirical study on the impact of Basel III standards on banks' default risk: The case of Luxembourg. *Journal of Risk and Financial Management*, *10*(2), p.8.

Gobat, J., Yanase, M. and Maloney, J., 2014. *The net stable funding ratio: Impact and issues for consideration* (No. 14-106). International Monetary Fund.

Goddard, J., Liu, H., Molyneux, P. and Wilson, J.O., 2010. *Bangor Business School* (Doctoral dissertation, Bangor University).

Gordon, M.J., 1963. Optimal investment and financing policy. Journal of Finance, 18(2): 264-272.

Goyal, A., 2013. Impact of capital structure on the performance of listed public sector banks in India. International Journal of Business and Management Invention; Volume 2, pp. 35-43.

Gropp, R. and Heider, F., 2010. The determinants of bank capital structure. *Review of finance*, *14*(4), pp.587-622.

Gual, J., 2012. *Capital requirements under Basel III and their impact on the banking industry*. " La Caixa", Research Department.

Guidara, A., Soumaré, I. and Tchana, F.T., 2013. Banks' capital buffer, risk and performance in the Canadian banking system: Impact of business cycles and regulatory changes. *Journal of Banking & Finance*, *37*(9), pp.3373-3387.

Gungoraydinoglu, A. and Öztekin, Ö., 2011. Firm-and country-level determinants of corporate leverage: Some new international evidence. *Journal of Corporate Finance*, *17*(5), pp.1457-1474.

Gwatidzo, T. and Ojah, K., 2009. Corporate capital structure determinants: evidence from five African countries. African Finance Journal,11(1): 1-23.

Gwatidzo, T., 2008. *Capital Structure of African Firms: Case Study of Kenya, Ghana, Nigeria and South Africa* (Doctoral dissertation, Ph. D. Thesis University of South Africa, 09th October).

Ha, N.T.T. and Quyen, G., 2018. The Impact of Funding Liquidity on Risk-taking Behaviour of Vietnamese Banks: Approaching by Z-Score Measure. *International Journal of Economics and Financial Issues*, *8*(3), p.29.

Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. and Tatham, R.L., 2006. Multivariate data analysis sixth edition pearson education. *New Jersey*, pp.42-43.

Haitovsky, Y., 1969. Multicollinearity in regression analysis: Comment. *The Review of economics and statistics*, pp.486-489.

Hakenes, H. and Schnabel, I., 2011. Bank size and risk-taking under Basel II. *Journal of Banking & Finance*, *35*(6), pp.1436-1449.

Haldane, A., 2009. Why banks failed the stress test. *BIS Review*, *18*, p.2009.

Haq, M. and Heaney, R., 2012. Factors determining European bank risk. *Journal of International Financial Markets, Institutions and Money*, *22*(4), pp.696-718.

Harris, M. and Raviv, A., 1990. Capital structure and the informational role of debt. *The Journal of Finance*, *45*(2), pp.321-349.

Hartlage, A.W., 2012. The Basel III liquidity coverage ratio and financial stability. Michigan Law Review. 111:453.

Hoenig, T.M., 2013. Basel III capital: a well-intended illusion. International Association of Deposit Insurers 2013 Research Conference [online].

Hong, H., Huang, J.Z. and Wu, D., 2014. The information content of Basel III liquidity risk measures. *Journal of Financial Stability*, *15*, pp.91-111.

Hovakimian, A., Hovakimian, G. and Tehranian, H., 2004. Determinants of target capital structure: The case of dual debt and equity issues. Journal of Financial Economics, 71(3):517–540.

Huang, G, and Song, F.M., 2006. The determinants of capital structure: Evidence from China. China Economic Review. 17(1): 14-36.

Huang, X., Xiong, Q., 2015. Bank capital buffer decisions under macroeconomic fluctuations: evidence for the banking industry of China. Int. Rev. Econ. Finance 36, 30–39.

Hussain, M.E. and Hassan, M.K., 2005. Basel capital requirements and bank credit risk taking in developing countries.

Hussainey, K. and Al-Najjar, B., 2012. Understanding the determinants of RiskMetrics/ISS Ratings of the quality of UK companies' corporate governance practice. *Canadian Journal of Administrative Sciences/Revue canadienne des sciences de l'administration*, *29*(4), pp.366-377.

Ikpefan O.A., 2013. Capital Adequacy, Management andPerformance in Nigeria Commercial Bank, African Journal of Business Management, 7(30)2938-2950.

Ikpesu, F., 2019. Firm specific determinants of financial distress: Empirical evidence from Nigeria. *Journal of Accounting and Taxation*, *11*(3), pp.49-56.

IMF (International Monetary Fund)., 2010. South Africa: Detailed assessment on compliance on Basel core principles for effective banking supervision. IMF Country Report no. 10/353. Washington, DC.

IMF (International Monetary Fund)., 2014. South Africa financial system stability assessment. IMF Country Report no. 14/340. Washington, DC

Jablecki, J., 2009. The impact of Basel I capital requirements on bank behaviour and the efficacy of monetary policy. *International Journal of Economic Sciences and Applied Research*, *2*(1), pp.16-35.

Jensen, M.C. and Meckling, W.H., 1976. Theory of the firm: Managerial behaviour, agency costs and ownership structure. *Journal of financial economics*, *3*(4), pp.305-360.

Jensen, M.C., 1986. Agency cost of free cash flow, corporate finance, and takeovers. American Economic Review, 76(2): 323-329.

Joanes, D.N. and Gill, C.A., 1998. Comparing measures of sample skewness and kurtosis. *Journal of the Royal Statistical Society: Series D (The Statistician)*, *47*(1), pp.183-189.

Joeveer, K. 2013. Firm, Country and Macroeconomic Determinants of Capital Structure. Evidence from Transitional Economics. Journal of Comparative Economics, 41 (1) 294–308.

Jokipii, T. and Milne, A., 2008. The cyclical behaviour of European bank capital buffers. *Journal of banking & finance*, *32*(8), pp.1440-1451.

Jokipii, T. and Milne, A., 2011. Bank capital buffer and risk adjustment decisions. *Journal of Financial Stability*, *7*(3), pp.165-178.

Ju, N., Parrino, R., Poteshman, A.M. and Weisbach, M.S., 2005. Horses and rabbits? Trade-off theory and optimal capital structure. *Journal of Financial and Quantitative analysis*, *40*(2), pp.259-281.

Jul-Larsen, L., 2014. *Basel III-Financial stability at the expense of innovation and economic growth? An analysis of the possible effects Basel III have on access to funding for small and medium sized enterprises, entrepreneurs and economic growth* (Master's thesis).

Kahn, G.A., 2010. Taylor rule deviations and financial imbalances. *Federal Reserve Bank of Kansas City Economic Review, Second Quarter*, *2010*, pp.63-99.

Kalemli-Ozcan, S., Sorensen, B. and Yesiltas, S., 2012. Leverage across firms, banks, and countries. *Journal of international Economics*, *88*(2), pp.284-298.

Kamran, H.W., Chaudhry, N., Murtaza, M.M., Zafar, N., Yousaf, A. and Nazish, H., 2016. Financial Market Development, Bank Risk with Key Indicators and Their Impact on Financial Performance: A Study from Pakistan. *American Journal of Industrial and Business Management*, *6*(03), p.373.

Karim, M.A., Hassan, M.K., Hassan, T. and Mohamad, S., 2014. Capital adequacy and lending and deposit behaviours of conventional and Islamic banks. *Pacific-Basin Finance Journal*, *28*, pp.58-75.

Kashyap, A., Rajan, R. and Stein, J., 2008. Rethinking capital regulation. *Maintaining stability in a changing financial system*, *43171*.

Kayo, E.K. and Kimura, H., 2011. Hierarchical determinants of capital structure. *Journal of Banking & Finance*, *35*(2), pp.358-371.

King, M., 2010. Mapping capital and liquidity requirements to bank lending spreads. BIS Working Papers No 324. Available: *http://www.bis.org/publ/work324.pdf***.**

King, M.R., 2013. The Basel III net stable funding ratio and bank net interest margins. *Journal of Banking & Finance*, *37*(11), pp.4144-4156.

Klefvenberg, L and Mannehed, M., 2017. Basel III-Evidence from Sweden Possible implications of Basel III on capital structure of companies in the Industrial Goods sector.

Klomp, J. and De Haan, J., 2012. Banking risk and regulation: Does one size fit all?. *Journal of Banking & Finance*, *36*(12), pp.3197-3212.

Kombo, K., 2014. Effects of Basel III Framework on Capital Adequacy of Commercial Banks in Kenya. Degree Thesis in Master Submitted to United State International University, School of Business.

Koop, G., 2005. Analysis of economic data. England: John Wiley & Sons Ltd

Kosmidou, K. and Zopounidis, C., 2008. Measurement of bank performance in Greece. *South-Eastern Europe Journal of Economics*, *1*(1), pp.79-95.

Kosmidou, K., Tanna, S. and Pasiouras, F., 2005, June. Determinants of profitability of domestic UK commercial banks: panel evidence from the period 1995-2002. In *Money Macro and Finance (MMF) Research Group Conference* (Vol. 45, pp. 1-27).

Kothari, C.R. and Gaurav, G., 2014. Research Methodology: Methods and techniques third edition. *New Age International (P) limited Publishers, New Delhi, Page-107*.

Kraus, A. and Litzenberger, R.H., 1973. A state-preference model of optimal financial leverage. *The journal of finance*, *28*(4), pp.911-922.

Krugman, P., 2009. How did economists get it so wrong? *New York Times*, *2*(9), p.2009.

Kumar, S., Sureka, R. and Colombage, S., 2020. Capital structure of SMEs: a systematic literature review and bibliometric analysis. *Management Review Quarterly*, *70*(4), pp.535-565.

Leary, M.T. and Roberts, M.R., 2005. Do firms rebalance their capital structures? *The journal of finance*, *60*(6), pp.2575-2619.

Leary, M.T. and Roberts, M.R., 2010. The pecking order, debt capacity, and information asymmetry. *Journal of financial economics*, *95*(3), pp.332-355.

Lee, C.C and Hsieh, M.F., 2012. The impact of capital on profitability and risk in Asian banking", Journal of International Money and Finance, 1 – 31.

Lee, C.C. and Hsieh, M.F., 2013. The impact of bank capital on profitability and risk in Asian banking. *Journal of international money and finance*, *32*, pp.251-281.

Lee, C.C., Ning, S.L. and Lee, C.C., 2015. How does bank Capital affect bank profitability and risk? Evidence from china's WTO accession, China & World Economy. *Journal of international money and finance*, *23*(4), pp.19-39.

Lee, T.H. and Chih, S.H., 2013. Does financial regulation affect the profit efficiency and risk of banks? Evidence from China's commercial banks. *The North American Journal of Economics and Finance*, *26*, pp.705-724.

Leedy, P.D. and Ormrod, J.E., 2005. Practical Research Planning & Design. 8th Edition. Pearson Education, Inc Upper Saddle River. New Jersey.

Leland, H., 1994. *Bond prices, yield spreads, and optimal capital structure with default risk* (No. RPF-240). University of California at Berkeley.

Lemma, T. and Negash, M., 2014. Determinants of the adjustment speed of capital structure: Evidence from developing economies. *Journal of Applied Accounting Research*, *15*(1), pp.64-99.

Li, L. and Islam, S.Z., 2019. Firm and industry specific determinants of capital structure: Evidence from the Australian market. *International Review of Economics & Finance*, *59*, pp.425-437.

Lim, K., 2016. The shift of a dividend policy and a leverage policy during the 2008 financial crisis. International Journal of Finance & Banking Studies, 5(6):9–14.

Lim, T.C., 2012. Determinants of capital structure empirical evidence from financial services listed firms in China, International Journal of Economics and Finance, 4(3):191-203.

Lindquist, K., 2004. Bank's buffer capital: how important is risk, Journal of International Money and Finance, 23(3):493-513.

Lintner, J., 1962. Dividends, earnings, leverage, stock prices and the supply of capital to corporations. *The review of Economics and Statistics*, pp.243-269.

Lipunga, A.M., 2014. Determinants of profitability of listed commercial banks in developing countries: Evidence from Malawi. *Research Journal of Finance and Accounting*, *5*(6), pp.41-49.

Liu, H. and Wilson, J.O., 2010. The profitability of banks in Japan. *Applied Financial Economics*, *20*(24), pp.1851-1866.

Lotto, J., 2018. The empirical analysis of the impact of bank capital regulations on operating efficiency. *International Journal of Financial Studies*, *6*(2), p.34.

Lyngen, N., 2012. Basel III: dynamics of state implementation. *Harv. Int'l LJ*, *53*, p.519.

Malawian Financial Service Act., 2018. Financial services act – Laws of Malawi. GN 33 of 2018.pdf (malawilaws.com). Assessed 02/10/2020.

Malik, M.F. and Rafique, A., 2013. Banks Liquidity in Pakistan: Firm Specific and Macroeconomic Factors. *Romanian Economic Journal*, *16*(48).

Mashamba, T., 2018. The effects of Basel III liquidity regulations on banks' profitability. Journal of Governance & Regulation, 7(2), 34-48. http://doi.org/10.22495/jgr_v7_i2_p4.

Mateev, M., Poutziouris, P. and Ivanov, K., 2013. On the determinants of SME capital structure in Central and Eastern Europe: A dynamic panel analysis. *Research in International Business and Finance*, *27*(1), pp.28-51.

Mathuva, D.M., 2009. Capital adequacy, cost income ratio and the performance of commercial banks: the Kenyan scenario. *The International journal of applied economics and Finance*, *3*(2), pp.35-47.

Mbizi, R., 2012. An analysis of the impact of minimum capital requirements on commercial bank performance in Zimbabwe. *International journal of independent research and studies*, *1*(4), pp.124-134.

McCoy, P.A., 2007. The moral hazard implications of deposit insurance: Theory and evidence. Seminar on current developments in monetary and financial law. Washington, DC, October 23–27, 2006.

McNabb, D. E., 2008. Research Methods in Public Administration and Non-profit Management: Quantitative and Qualitative Approaches. 2nd ed. M.E. Sharpe, Inc.

Menichini, A.M.C., 2017. Miglo, Anton: Capital structure in the modern world.

Miah, M.D. and Sharmeen, K., 2015. Relationship between capital, risk and efficiency. *International Journal of Islamic and Middle Eastern Finance and Management*.

Milkau, U., 2017. Risk Culture during the Last 2000 Years—From an Aleatory Society to the Illusion of Risk Control. *International Journal of Financial Studies*, *5*(4), p.31.

Miller, M.H., 1988. The Modigliani-Miller propositions after thirty years. Journal of Economic Perspectives, 2(4):99-120.

Modigliani, F. and Miller, M.H., 1958. The cost of capital, corporation finance and the theory of investment. The American Economic Review, 48(3):261-297.

Modigliani, F. and Miller, M.H., 1963. Corporate income taxes and the cost of capital: A correction. The American Economic Review, 53(3):433-443

Mohan, T.R., 2007. Mumbai as International Financial Centre: Finance Tail Wagging the Economy Dog. *Economic and Political Weekly*, pp.2138-2142.

Moosa, I., 2011. Basel II to Basel III: a great leap forward? In *Managing Risk in the Financial System* (pp. 374-396). RMIT University.

Moudud-Ul-Huq, S., 2019. Banks' capital buffers, risk, and efficiency in emerging economies: are they counter-cyclical? *Eurasian Economic Review*, *9*(4), pp.467-492.

Mouton, J., 2012. How to Succeed in your Masters and Doctoral Studies. A South African Guide and Resource Book. Pretoria: Van Schaik.

Moyo, V., 2015. What Drives Security Issuance Decisions of Firms Listed on The Johannesburg Stock Exchange: Market Timing or Dynamic Trade-Off Theory or Both? *Journal of Applied Business Research (JABR)*, *31*(6), pp.2047-2068.

Moyo, V., 2016. Navigating the debt-equity decisions of financial services firms: Some evidence from South Africa. *Journal of Applied Business Research (JABR)*, *32*(2), pp.417-438.

Moyo, V., Wolmarans, H. and Brümmer, L., 2013. Trade-off or pecking order hypothesis? Evidence from South African manufacturing, mining and retail firms. *International Business & Economics Research Journal*, 12(8), pp.927-944.

Mugumisi, N. and Mawanza, W., 2014. Corporate cash holding under liquidity crisis: A Panel analysis of Zimbabwean firms. *Research Journal of Economics & Business Studies*, *3*(3), pp.66-76.

Mukherjee, S. and Mahakud, J., 2010. Dynamic adjustment towards target capital structure: evidence from Indian companies. *Journal of Advances in Management Research*.

Mvita, M.F., 2020. *Inter-relationship between the capital structure and distribution policies of companies listed on the JSE* (Doctoral dissertation, University of Pretoria).

Mvita, M.F., Brümmer, L. and Wolmarans, H.P., 2020. The interrelationship between capital structure and distribution policies of companies listed on the Johannesburg Stock Exchange. *Management Dynamics: Journal of the Southern African Institute for Management Scientists*, *29*(4), pp.15-32.

Mwai, E.N., Jagongo, A. and Fredrick, N., 2017. The relationship between capital requirement and financial performance of Commercial Banks in Kenya. *International Journal of Business and Social Science volume*, *8*.

Myers, S C., 2003. Capital structure, Journal of Economic Perspectives 15, pp. 81-102

Myers, S.C. and Majluf, N.S., 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics*, *13*(2), pp.187-221.

Myers, S.C., 1984. The Capital Structure Puzzle. The Journal of capital structure puzzle. *J. Finance*, *39*(3).

Myers, S.C., 2001. Capital structure. The Journal of Economic Perspectives, 15(2), pp. 81-102.

Nazir, M.S., Daniel, A. and Nawaz, M.M., 2012. Risk management practices: A comparison of conventional and Islamic banks in Pakistan. *American Journal of Scientific Research*, *68*(1), pp.14-122.

Neuman, W.L., 2011. Basics of Social Research: Qualitative and Quantitative Approaches, 2nd ed. Pearson Education.

Neves, M.E., Serrasqueiro, Z., Dias, A. and Hermano, C., 2020. Capital structure decisions in a period of economic intervention: Empirical evidence of Portuguese companies with panel data. *International Journal of Accounting & Information Management*.

Ngugi, R., 2008. Capital financing behaviour: evidence from firms listed on the Nairobi stock exchange. The European Journal of Finance, 14 (7): 609-624.

Nguyen, T.H., 2020. Impact of bank capital adequacy on bank profitability under Basel III Accord: Evidence from Vietnam. *Journal of Economic Development*, *45*(1).

Nier, E. and Baumann, U., 2006. Market discipline, disclosure and moral hazard in banking. *Journal of Financial Intermediation*, *15*(3), pp.332-361.

Nigist, M., 2015. Determinants of banks liquidity: Empirical evidence on Ethiopian banks. *Unpublished PhD dissertation). Addis Ababa University, Addis Ababa*.

Nijam, H.M., Ismail, S.M.M. and Musthafa, A.M.M., 2015. The impact of macro-economic variables on stock market performance; evidence from Sri Lanka. *Journal of Emerging Trends in Economics and Management Sciences*, *6*(2), pp.151-157.

Nikoo, S. F., 2015. Impact of Capital Structure on Banking Performance: Evidence from Tehran Stock Exchange. International Research Journal of Applied and Basic Sciences 9: 923–27.

Nunkoo, P.K. and Boateng, A., 2010. The empirical determinants of target capital structure and adjustment to long run target: evidence from Canadian firms. Applied Economics Letters, 17 (10): 983-990.

Odunga, R.M., 2016. Specific performance indicators, market share and operating efficiency for commercial banks in Kenya. *International Journal of Finance and Accounting*, *5*(3), pp.135-145.

Okahara, N., 2018. Banks' capital structure and capital regulations. https://mpra.ub.uni-muenchen.de/id/eprint/98801/

Olalekan, A. and Adeyinka, S., 2013. Capital adequacy and banks' profitability: empirical evidence from Nigeria. *American International Journal of Contemporary Research*, *3*(10), pp.87-93.

Oleksyk, P., 2018. Financial reporting analyses in preparation of dividend payments in polish banks. *Transformations in Business & Economics*, *17*.

Olweny, T. and Omondi, K., 2011. The effect of macro-economic factors on stock return volatility in the Nairobi stock exchange, Kenya. *Economics and Finance review*, *1*(10), pp.34-48.

Onaolapo, A.A. and Olufemi, A.E., 2012. Effect of capital adequacy on the profitability of the Nigerian banking sector. *Journal of Money, Investment and Banking*, *24*, pp.62-72.

Ongore, V., 2011. The relationship between ownership structure and firm performance: An empirical analysis of listed companies in Kenya. African Journal of Business Management, 5(6), 2120-2128.

Ozili, P.K., 2015. Determinants of bank profitability and basel capital regulation: Empirical evidence from Nigeria. *Research Journal of Finance and Accounting*, *6*(2), pp.124-131.

Ozili, P.K., 2019. Basel III in Africa: making it work. *African Journal of Economic and Management Studies*.

Öztekin, Ö. and Flannery, M.J., 2012. Institutional determinants of capital structure adjustment speeds. *Journal of financial economics*, *103*(1), pp.88-112.

Parcon, H.C., Eufrocinio, M., Bernabe, J., 2012. The macroeconomic effects of Basel III Implementation in the Philippines: A Preliminary Assessment. Bangko Sentral ng Pilipinas BSP Working Paper Series.

Patton, M.Q., 2002. Qualitative research and evaluation methods. Thousand Oaks. *Cal.: Sage Publications*.

Patton, M.Q., 2007. Sampling, qualitative (purposive). *The Blackwell encyclopedia of sociology*.

Pistor, K., 2013. A legal theory of finance. *Journal of Comparative Economics*, *41*(2), pp.315-330.

Portes, R., 2009. Global imbalances. *Macroeconomic Stability and Financial Regulation: Key Issues for the G20*, *19*.

Qian, L., Zhou, G., Kong, F. and Zhu, Q., 2009. Semi-supervised learning for semantic relation classification using stratified sampling strategy. In *Proceedings of the 2009 Conference on Empirical Methods in Natural Language Processing: Volume 3* (pp. 1437-1445). Association for Computational Linguistics.

Raheman, A. and Zulfiqar, B., 2007. Capital Structure and Profitability: A Case of Islamabad Stock Exchange". *International Review of Business Research Papers*, *3*(5), pp.347-61.

Rahman, M.M., Chowdhury, A.A. and Dey, M., 2018. Relationship between risk-taking, capital regulation and bank performance: Empirical evidence from Bangladesh. *Eurasian Journal of Business and Economics*, *11*(2), pp.29-57.

Rajagopal, S., 2011. The portability of capital structure theory: Do traditional models fit in an emerging economy? *Journal of Finance and Accountancy*, *5*, p.1.

Rajan, R.G. and Zingales, L., 1995. What do we know about capital structure? Some evidence from international data. *The journal of Finance*, *50*(5), pp.1421-1460.

Rajhi, W. and Hassairi, S.A., 2013. Islamic banks and financial stability: a comparative empirical analysis between MENA and southeast Asian countries. *Région et développement*, *37*(1), pp.1-31.

Raman, R., 2015. Basel III-An easy way to understand. *Retrieved from iCreate Software: http://www. icreate. in/pdf/Basel% 20III*, *20*.

Ramjee, A. and Gwatidzo, T., 2012. Dynamics in capital structure determinants in South Africa. *Meditari Accountancy Research*.

Ramlall, I., 2009. Determinants of capital structure among non-quoted Mauritian firms under specificity of leverage: Looking for a modified pecking order theory. *International Research Journal of Finance and Economics*, *31*(31), pp.83-92.

Ramli, N.A., Latan, H. and Solovida, G.T., 2019. Determinants of capital structure and firm financial performance—A PLS-SEM approach: Evidence from Malaysia and Indonesia. *The Quarterly Review of Economics and Finance*, *71*, pp.148-160.

Rasiah, D. and Kim, P.K., 2011. A theoretical review on the use of the static trade-off theory, the pecking order theory and agency cost theory of capital structure.

Reserve Bank of Malawi., 2012. Regulation and Supervision of Banks in Malawi: Past and Present. http://www.rbm.mw/publications/documents/Regulation%20Supervision%20Banks%20in%20Malawi.pdf (accessed on 30 September, 2021).

Reserve Bank of New Zealand., 2012. Reserve Bank of New Zealand Bulletin. *Reserve Bank of New Zealand Bulletin*, *75*(3), pp.1-79.

Rime, B., 2001. Capital requirements and bank behaviour: Empirical evidence for Switzerland. *Journal of Banking & Finance*, *25*(4), pp.789-805.

Romano, R., 2014. For diversity in the international regulation of financial institutions: critiquing and recalibrating the Basel architecture. *Yale J. on Reg.*, *31*, p.1.

Romdhane, M., 2010. The determinants of banks' capital ratio in developing countries: Empirical evidence from Tunisia. *Available at SSRN 1688325*.

Ross, S.A., 1977. The determination of financial structure: The incentive-signalling approach. The Bell Journal of Economics, 8(1):23–40.

Ross, S.A., Westerfield, R.W., Jaffe, J. and Jordan, B.D. 2008. Modern Financial Management. 8th ed. New York: McGraw-Hill/Irwin.

Sadien, E., 2017. *The impact of the change from Basel II to Basel III on the profitability of the South African banking sector* (Doctoral dissertation, University of Cape Town).

Salawu, R.O., 2007. An Empirical Analysis of the Capital Structure of Selected Quoted Companies in Nigeria. The International Journal of applied Economics and Finance 1 (1), 16-28.

Saldías, M., 2013. A market-based approach to sector risk determinants and transmission in the euro area. *Journal of Banking & Finance*, *37*(11), pp.4534-4555.

Salim, R., Arjomandi, A. and Seufert, J.H., 2016. Does corporate governance affect Australian banks' performance? *Journal of International Financial Markets, Institutions and Money*, *43*, pp.113-125.

Santos, O. and Elliott, D., 2012. Estimating the Costs of Financial Regulation, IMF Staff Discussion Note, 11 September. 2012.

SARB (South African Reserve Bank)., 2013. Selected South African bank trends for the period ending 30 April 2013. Pretoria.

Saunders, M., Lewis, P. and Thornhill, A., 2007. Research Methods for Busines Students. 4th Edition. England: Pearson Education Limited.

Saunders, M., Lewis, P. and Thornhill, A., 2009. *Research methods for business students*. Pearson education.

Saunders, M.N., Lewis, P., Thornhill, A. and Bristow, A., 2015. Understanding research philosophy and approaches to theory development.

Schooner, H. and Taylor, M., 2010. Global bank regulation: Principles and policies. London: Academic Press.

Sekaran, U. and Bougie, R., 2009. Research Methods for Business: a Skill Building approach. 5th ed. Sussex: John Wiley & Sons.

Selma-Mokni, R.B., Rajhi, M.T. and Rachdi, H., 2016. Bank risk-taking in the MENA region: A comparison between Islamic banks and conventional banks. *International Journal of Social Economics*, *43*(12), pp.1367-1385.

Shahsavaripour, N. and Heydarbeygi, S., 2022. Time-Cost-Quality Trade-off in Project Scheduling with fuzzy quality. *Fuzzy Systems and its Applications*, *4*(2), pp.43-68.

Sharma, J and Baráybar, J.A., 2013. Basel III: Issues and Implications - Financial Services - South Africa (mondaq.com) (Accessed May 14, 2022).

Shawk., 2008. Operational Efficiency a Brand Point Management Perspective. Available online: http://www.schawk.com (accessed on 20 June 2020)

Shim, J., 2013. Bank capital buffer and portfolio risk: The influence of business cycle and revenue diversification. *Journal of Banking & Finance*, *37*(3), pp.761-772.

Shivdasani, A. and Zenner, M., 2005. How to choose a capital structure: navigating the debt-equity decision. *Journal of Applied Corporate Finance*, *17*(1), pp.26-35.

Shumet, M., 2016. *Determinants of Liquidity in Banks of Ethiopia: The Case of Selected Private Banks* (Doctoral dissertation, Addis Ababa University).

Sibindi, A.B., 2016. Determinants of capital structure: A literature review. Risk Governance & Control: Financial Markets & Institutions, 6(4):227–237.

Sigauke, C., 2014. *Modelling electricity demand in South Africa* (Doctoral dissertation, University of the Free State).

Smith, C.W. and Stulz, R.M., 1985. The determinants of firms' hedging policies. *Journal of financial and quantitative analysis*, *20*(4), pp.391-405.

Starbuck, W.H., 2003. The origins of organization theory. In *The Oxford handbook of organization theory*.

Strebulaev, I.A., 2007. Do tests of capital structure theory mean what they say? The Journal of Finance, 62(4): 1747-1787.

Susilo, D., Wahyudi, S. and Demi Pangestuti, I.R., 2020. Profitability determinants of manufacturing firms in Indonesia.

Sutorova, B. and Teplý, P., 2013. The impact of Basel III on lending rates of EU banks. *Finance a Uver*, *63*(3), p.226.

Tabak, B.M., Fazio, D.M. and Cajueiro, D.O., 2013. Systemically important banks and financial stability: The case of Latin America. *Journal of Banking & Finance*, *37*(10), pp.3855-3866.

Tan, Y. and Floros, C., 2013. Risk, capital and efficiency in Chinese banking. *Journal of International Financial Markets, Institutions and Money*, *26*, pp.378-393.

Tarullo, D.K., 2008. *Banking on Basel: the future of international financial regulation*. Peterson Institute.

Taskinsoy, J., 2013. Rigorous Capital Requirements under Basel III: Possible impact on Turkey's financial sector. *Journal of WEI Business and Economics-April*.

Taylor, J.B., 2009. *The financial crisis and the policy responses: An empirical analysis of what went wrong* (No. w14631). National Bureau of Economic Research.

Teixeira, J.C., Silva, F.J., Fernandes, A.V. and Alves, A.C., 2014. Banks' capital, regulation and the financial crisis. *The North American Journal of Economics and Finance*, *28*, pp.33-58.

Tong, G. and Green, C.J., 2005. Pecking order or trade-off hypothesis? Evidence on the capital structure of Chinese companies. *Applied economics*, *37*(19), pp.2179-2189.

Torres-Reyna, O., 2007. Panel data analysis fixed and random effects using Stata (v. 4.2). *Data & Statistical Services, Priceton University*, *112*.

Trong, N.N. and Nguyen, C.T., 2020. Firm performance: The moderation impact of debt and dividend policies on overinvestment. *Journal of Asian Business and Economic Studies*.

Truman, E.M., 2010. The G-20 and International Financial Institution Governance. *Peterson Institute for International Economics Working Paper*, (10-13).

Tsai, S., 2008. Information asymmetry and corporate investment decisions: A dynamic approach. The Financial Review, 43(2):241-271.

Tseganesh, T., 2012. Determinants of banks liquidity and their impact on financial performance. *Published Thesis (MSc), University Addis Ababa, Ethiopia*.

Udom, I. and Eze, O.R., 2018. Effect of capital adequacy requirements on the profitability of commercial banks in Nigeria. *International Research Journal of Finance and Economics*, *165*, pp.79-89.

Ugwuanyi G.O. and Ewah E.B., 2015. Bank Capital Requirements as Regulatory Tool in Nigeria- a critique, International Journal of Economics, Commerce and Management, 1, pp.1-18.

Vazquez, F. and Federico, P., 2015. Bank funding structures and risk: Evidence from the global financial crisis. *Journal of banking & finance*, *61*, pp.1-14.

Vigario, F.A.A., 2002. Managerial Finance. 2nd ed. Pietermaritzburg, South Africa: Interpak Book.

Vijayakumaran, R., 2019. Efficiency of working capital management and firm value: evidence from Chinese listed firms. *International Journal of Financial Research*, *10*(6), pp.133-144.

Vollmer, U. and Wiese, H., 2013. Minimum capital requirements, bank supervision and special resolution schemes. Consequences for bank risk-taking. *Journal of Financial Stability*, *9*(4), pp.487-497.

Yapa Abeywardhana, D., 2017. Capital structure theory: An overview. *Accounting and finance research*, *6*(1).

Yartey, C., 2006. The Stock Market and the Financing of Corporate Growth in Africa: The Case of Ghana. IMF Working Paper WP/06/201, Washington DC, USA.

Yitayaw, M., 2021. Firm-specific, industry-specific and macroeconomic determinants of commercial banks' lending in Ethiopia: Panel data approach. *Cogent Economics & Finance*, *9*(1), p.1952718.

Yousef, I., 2019. The determinants of capital structure: evidence from GCC and UK real estate sectors. *Real Estate Management and Valuation*, *27*(2), pp.108-125.

Zhang, D. and Liu, D., 2017. Determinants of the capital structure of Chinese non-listed enterprises: Is TFP efficient? *Economic Systems*, *41*(2), pp.179-202.

Zheng, C., Moudud-Ul-Huq, S., Rahman, M.M. and Ashraf, B.N., 2017. Does the ownership structure matter for banks' capital regulation and risk-taking behaviour? Empirical evidence from a developing country. *Research in International Business and Finance*, *42*, pp.404-421.

Zikmund, W.G. 2003. Business Research Methods. 7th ed. Thomson South-Western: Ohio.

APPENDICES

Appendix A

The description of the variables used in the model equations

S/N	Variables	Acronym	Measurement/ Proxies
Basel III regulatory requirements: Independent Variables			
1	Minimum Capital Requirement	MCR	*Minimum ratio of Tier 1+ Tier 2
2	Capital Adequacy Ratio	CAR	*Tier 1 + Tier 2 / Risk Weighted Asset
3	Capital Buffer Premium	CBP	*Actual capital (core capital plus supplementary capital) less minimum regulatory capital.
4	Liquidity Requirements	LCR LR	* HQLA/ ENCO; * Total Loan/Total Asset
5	Prescribed Minimum Capital Requirement	pMCR	* As Prescribed in Basel III Accord
6	Prescribed Capital Adequacy Ratio	pCAR	* As Prescribed in Basel III Accord
7	Prescribed Capital Buffer Premium	pCBP	* As Prescribed in Basel III Accord
8	Prescribed Liquidity Requirements	pLCR	* As Prescribed in Basel III Accord
Dependent Variables			
9	Capital Structure	C/S	*Tier 1 capital / Total Exposure; *Total Debt / Capital Employed
10	Financial Performance	FP	*ROE = ratio of profit after taxes to equity; *ROA = ratio of profit after taxes to total assets.
11	Stability	STAB	*Z-score = (ROA + ratio of equity to total asset) / standard deviation of ROA
12	Efficiency	EFF	*OETA = ratio of operating expenses to total assets; *NIMR = ratio of net interest revenue to total earnings
13	Risk Taking Behaviour	RTB	*RWATA = Risk Weighted Asset/Total Asset; *NPLTL = ratio of non-performing loan to total loan; *LNZ-score = Natural Log of Z-Score
Bank specific determinants of capital structure			
14	Profitability	P	*ROA = ratio profit after taxes to total assets.
15	Bank Size	BS	* Natural Log of Total Asset
16	Growth Rate	GR	*Market value of equity / book value of equity
17	Risk	R	*Natural Log of Z-Score (LNZ-score);
18	Asset Tangibility	AT	*Fixed Asset / Total Asset

Source: Authors compilation (2021).

Appendix B

The comprehensive list of the sampled listed banks

S/N		Sample Size
Country: Kenya		
1	Absa Bank	1
2	BK Group Plc	2
3	Co-operative Bank of Kenya Ltd	3
4	Diamond Trust Bank	4
5	Equity Group Holdings Plc	5
6	I&M Holdings	6
7	KCB Group	7
8	National Bank of Kenya	8
9	NIC Group Plc	9
10	Stanbic Holdings Plc	10
11	Standard Chartered Bank	11
Country: Nigeria		
12	Access Bank Plc	1
13	Eco Bank	2
14	FBN Holdings Plc	3
15	FCMB Group	4

16	Fidelity Bank	5
17	Stanbic IBTC Holding Plc	6
18	Sterling Bank	7
19	Union Bank of Nigeria	8
20	United Bank for Africa	9
21	Unity Bank	10
22	Wema Bank	11
23	Zenith Bank	12
24	Guaranty Trust Bank	13
Country: South Africa		
25	ABSA Bank Ltd	1
26	Capitec Bank Holdings	2
27	First National Bank	3
28	Nedbank Group Ltd	4
29	Sasfin Holdings Ltd	5
30	Standard Bank Group Ltd	6
Country: Uganda		
31	Bank of Baroda Uganda	1
32	DFCU Ltd	2
33	Equity Bank Ltd	3

34	KCB Group Plc	4
35	Stanbic Bank Uganda Ltd	5
Country: Tanzania		
36	CRDB Bank	1
37	OCB Commercial Bank	2
38	KCB Group Plc	3
39	Maendeleo Bank Plc	4
40	Mkombozi Commercial Bank Plc	5
41	Mucoba Bank	6
42	NMB Bank Plc	7
Country: Malawi		
43	National Bank of Malawi	1
44	NBS Bank	2
45	Standard Bank Malawi	3

Source: African Stock Markets (2020)

Appendix C

The Breusch and pagan L-M Test results

```
Breusch and Pagan Lagrangian multiplier test for random effects

        roe[bankcode,t] = Xb + u[bankcode] + e[bankcode,t]

        Estimated results:
                     |       Var     sd = sqrt(Var)
             ---------+------------------------------
                 roe |     435.069        20.85831
                   e |    414.2682        20.35358
                   u |    18.02484        4.245567

        Test:   Var(u) = 0
                             chibar2(01) =     2.02
                          Prob > chibar2 =   0.0777
```

```
Breusch and Pagan Lagrangian multiplier test for random effects

        roa[bankcode,t] = Xb + u[bankcode] + e[bankcode,t]

        Estimated results:
                     |       Var     sd = sqrt(Var)
             ---------+------------------------------
                 roa |    2.999358        1.731865
                   e |    1.527548         1.23594
                   u |    1.562023        1.249809

        Test:   Var(u) = 0
                             chibar2(01) =   357.39
                          Prob > chibar2 =   0.0000
```

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        zscore[bankcode,t] = Xb + u[bankcode] + e[bankcode,t]

        Estimated results:
                     |       Var     sd = sqrt(Var)
             ---------+------------------------------
              zscore |     2456571       1567.345
                   e |     2443162       1563.062
                   u |           0              0

        Test:   Var(u) = 0
                                chibar2(01) =     0.00
                            Prob > chibar2 =   1.0000


Breusch and Pagan Lagrangian multiplier test for random effects

        oeta[bankcode,t] = Xb + u[bankcode] + e[bankcode,t]

        Estimated results:
                     |       Var     sd = sqrt(Var)
             ---------+------------------------------
                oeta |     .446962       .6685522
                   e |     .216099       .4648645
                   u |   .1959381       .4426489

        Test:   Var(u) = 0
                            chibar2(01) =   347.33
                        Prob > chibar2 =   0.0000



Breusch and Pagan Lagrangian multiplier test for random effects

        nimr[bankcode,t] = Xb + u[bankcode] + e[bankcode,t]

        Estimated results:
                     |       Var     sd = sqrt(Var)
             ---------+------------------------------
                nimr |     4840256       2200.058
                   e |     4661321       2159.009
                   u |   139607.3       373.6406

        Test:   Var(u) = 0
                                chibar2(01) =     0.61
                            Prob > chibar2 =   0.2170

.
```

Breusch and Pagan Lagrangian multiplier test for random effects

rwata[bankcode,t] = Xb + u[bankcode] + e[bankcode,t]

Estimated results:

	Var	sd = sqrt(Var)
rwata	43117.11	207.6466
e	12191.28	110.4141
u	22566.57	150.2217

Test: Var(u) = 0

chibar2(01) = 606.41
Prob > chibar2 = 0.0000

Breusch and Pagan Lagrangian multiplier test for random effects

npltl[bankcode,t] = Xb + u[bankcode] + e[bankcode,t]

Estimated results:

	Var	sd = sqrt(Var)
npltl	154055.5	392.4991
e	101599.4	318.7466
u	45253.97	212.7298

Test: Var(u) = 0

chibar2(01) = 125.41
Prob > chibar2 = 0.0000

Breusch and Pagan Lagrangian multiplier test for random effects

Lnzscore [bankcode, t] = Xb + u[bankcode] + e [bankcode, t]

Estimated results:

	Var	sd = sqrt (Var)
lnzscore	2.071309	1.439204
e	1.626019	1.275154
u	.2615772	.5114462

Test: Var(u) = 0

chibar2(01) = 38.81

Prob > chibar2 = 0.0000

Appendix D

Hausman specification test

ROE

```
. hausman  fixed_group random_group

                 ---- Coefficients ----
              |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
              | fixed_group  random_group    Difference          S.E.
--------------+----------------------------------------------------------------
          mcr |   -1.105646    -.3194581       -.7861882        .2555142
          car |    .4288845     .1016633        .3272213        .2190581
        dcbp  |   -.4258691    -.2073216       -.2185475        .1259673
          lr  |     .011496     .0119192       -.0004232        .0231723
          lcr |    .0007553    -.0063732        .0071285        .0094725
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       10.83
                Prob>chi2 =      0.0548
```

ROA

```
. hausman  fixed_group random_group

                 ---- Coefficients ----
              |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
              | fixed_group  random_group    Difference          S.E.
--------------+----------------------------------------------------------------
          mcr |   -.0124854    -.0011769       -.0113085        .0086884
          car |    .0161393     .0109763        .0051631        .0105442
        dcbp  |     .011095     .0139708       -.0028758        .0058097
          lr  |    .0019022     .0020696       -.0001675         .000708
          lcr |   -.0017773    -.0016279       -.0001494        .0002709
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        4.45
                Prob>chi2 =      0.4860
```

ZSCORE

```
. hausman  fixed_group random_group

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             | fixed_group  random_group    Difference          S.E.
-------------+----------------------------------------------------------------
         roa |    -25.7388     2.395571      -28.13437        49.57002
         mcr |    -100.593    -53.16239      -47.43058        21.30635
         car |    37.81705     4.957199       32.85985        17.14443
        dcbp |   -21.52381    -4.179548      -17.34426        10.46867
          lr |    .4681211     4.518862      -4.050741        1.969296
         lcr |    2.385316     1.226547       1.158769         .817217
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       11.80
                Prob>chi2 =      0.0666
```

OETA

```
. hausman  fixed_group random_group

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             | fixed_group  random_group    Difference          S.E.
-------------+----------------------------------------------------------------
         mcr |    .0109709     .0108605       .0001105        .0032234
         car |   -.0105214    -.0045293      -.0059921        .0040307
        dcbp |    .0140326     .0117781       .0022545        .0020677
          lr |    .0028802     .0028327       .0000475        .0002577
         lcr |   -.0001788    -.0000981      -.0000807        .0000978
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        6.23
                Prob>chi2 =      0.2843
                (V_b-V_B is not positive definite)
```

NIMR

```
. hausman  fixed_group random_group

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             | fixed_group  random_group    Difference          S.E.
-------------+----------------------------------------------------------------
         mcr |    37.52036     26.31695       11.20341        27.86654
         car |    30.99143    -6.834796       37.82622        23.35594
        dcbp |     49.7348     69.88414      -20.14935        13.83396
          lr |   -4.649422    -2.567617      -2.081805        2.540311
         lcr |   -1.649607    -.7178301      -.9317765        1.040684
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =         6.90
                Prob>chi2 =       0.2281
```

RWATA

```
. hausman  fixed_group random_group

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             | fixed_group  random_group    Difference          S.E.
-------------+----------------------------------------------------------------
         mcr |    3.052703      2.85419       .1985138        .6198387
         car |   -3.211025    -2.301329      -.9096958        .8219945
        dcbp |    3.869707     3.533615       .3360917        .4326815
          lr |    1.281963     1.223611       .0583516        .0478258
         lcr |    .1156291     .1035731        .012056        .0181578
           p |    38.68599     39.65642      -.9704332        1.178837
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =         5.57
                Prob>chi2 =       0.4733
                (V_b-V_B is not positive definite)
```

NPLTL

```
. hausman  fixed_group random_group

                 ---- Coefficients ----
              |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
              | fixed_group  random_group    Difference          S.E.
--------------+----------------------------------------------------------------
          mcr |    8.150041     9.504209      -1.354169         2.83894
          car |    .2612865    -2.141902       2.403189        3.078341
         dcbp |    .1616744     1.148385      -.9867106         1.71668
           lr |   -2.373773    -2.561839       .1880664        .2415411
          lcr |    .0562231     .0003509       .0558722        .0960548
            p |    20.82394     11.20085       9.623094        6.119305
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        4.96
                Prob>chi2 =      0.5496
```

LNZSCORE

```
. hausman  fixed_group random_group

                 ---- Coefficients ----
              |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
              | fixed_group  random_group    Difference          S.E.
--------------+----------------------------------------------------------------
          mcr |   -.0010276    -.0356736        .034646        .0133996
          car |   -.0357133    -.0115538      -.0241595        .0132208
         dcbp |    .0156835    -.0028759       .0185594        .0067242
           lr |    .0023051      .004323      -.0020179        .0011741
          lcr |     .002795     .0025871       .0002079        .0004771
            p |   -.0861088    -.0667548       -.019354        .0303703
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       10.44
                Prob>chi2 =      0.1073
                (V_b-V_B is not positive definite)
```

Appendix E

Joint VIF Result for the Robustness Test Results

Variables	ROE		ROA	
	VIF	1/VIF	VIF	1/VIF
pMCR	5.01	0.1997	5.01	0.1997
pLCR	4.95	0.2019	4.95	0.2019
pCAR	3.81	0.2622	3.81	0.2622
pDCBP	1.66	0.6024	1.66	0.6024
Mean VIF	**3.86**		**3.86**	
	Z-score			
	VIF	1/VIF	VIF	1/VIF
pMCR	5.01	0.1997	5.01	0.1997
pLCR	4.95	0.2019	4.95	0.2019
pCAR	3.81	0.2622	3.81	0.2622
pDCBP	1.66	0.6024	1.66	0.6024
Mean VIF	**3.86**		**3.86**	
	NIMR		OETA	
	VIF	1/VIF	VIF	1/VIF
pMCR	5.01	0.1997	5.01	0.1997
pLCR	4.95	0.2019	4.95	0.2019
pCAR	3.81	0.2622	3.81	0.2622
pDCBP	1.66	0.6024	1.66	0.6024
Mean VIF	**3.86**		**3.86**	

Appendix F

The Breusch and pagan L-M Test results – Robustness Test

Breusch and Pagan Lagrangian multiplier test for random effects

roe[bankcode,t] = Xb + u[bankcode] + e[bankcode,t]

Estimated results:

	Var	sd = sqrt(Var)
roe	435.0682	20.85829
e	412.4288	20.30834
u	14.66937	3.830061

Test: Var(u) = 0

chibar2(01) = 1.74
Prob > chibar2 = 0.0933

Breusch and Pagan Lagrangian multiplier test for random effects

roa[bankcode,t] = Xb + u[bankcode] + e[bankcode,t]

Estimated results:

	Var	sd = sqrt(Var)
roa	2.99936	1.731866
e	1.529226	1.236619
u	1.488647	1.220101

Test: Var(u) = 0

chibar2(01) = 389.17
Prob > chibar2 = 0.0000

Breusch and Pagan Lagrangian multiplier test for random effects

zscore[bankcode,t] = Xb + u[bankcode] + e[bankcode,t]

Estimated results:

	Var	sd = sqrt(Var)
zscore	2456567	1567.344
e	2486447	1576.847
u	0	0

Test: Var(u) = 0

chibar2(01) = 0.00
Prob > chibar2 = 1.0000

Breusch and Pagan Lagrangian multiplier test for random effects

oeta[bankcode,t] = Xb + u[bankcode] + e[bankcode,t]

Estimated results:

	Var	sd = sqrt(Var)
oeta	.4469621	.6685522
e	.2228804	.4721021
u	.2269981	.4764432

Test: Var(u) = 0

chibar2(01) = 407.34
Prob > chibar2 = 0.0000

Breusch and Pagan Lagrangian multiplier test for random effects

nimr[bankcode,t] = Xb + u[bankcode] + e[bankcode,t]

Estimated results:

	Var	sd = sqrt(Var)
nimr	4840255	2200.058
e	4754376	2180.453
u	124824	353.3043

Test: Var(u) = 0

chibar2(01) = 0.94
Prob > chibar2 = 0.1659

Appendix G

Hausman specification test– Robustness Test

ROE

```
. hausman random_group fixed_group
```

	Coefficients (b) random_group	(B) fixed_group	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
pmcr	-1.207854	-1.207854	1.76e-12	6.75e-07
pcar	-1.894259	-1.894259	-1.15e-14	.
pcbp1	.0325154	.0325154	3.87e-13	.
plcr	.140815	.140815	-3.59e-13	1.27e-07

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 0.00
Prob>chi2 = 1.0000
(V_b-V_B is not positive definite)

ROA

```
. hausman fixed_group random_group
```

	Coefficients (b) fixed_group	(B) random_group	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
pmcr	-1.207854	-.135332	-1.072522	1.295783
pcar	-1.894259	-.0108506	-1.883409	1.192165
pcbp1	.0325154	-.0024742	.0349897	.8049751
plcr	.140815	.009812	.131003	.1941135

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 11.25
Prob>chi2 = 0.0239

Z-score

```
. hausman fixed_group random_group

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             | fixed_group  random_group    Difference          S.E.
-------------+------------------------------------------------------------
        pmcr |   -33.20523    -33.20523      -4.68e-12       12.13028
        pcar |   -156.7588    -156.7588       5.46e-12       11.16027
       pcbp1 |    7.081812     7.081812      -2.45e-12        7.53565
        plcr |    15.58197     15.58197      -3.55e-14       1.817164
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =          0.00
                Prob>chi2 =        1.0000
```

OETA

```
. hausman random_group fixed_group

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             | random_group fixed_group     Difference          S.E.
-------------+------------------------------------------------------------
        pmcr |     .0438306     .0438306      -1.39e-17               .
        pcar |     -.033638     -.033638      -1.04e-14        1.28e-08
       pcbp1 |     .0422725     .0422725       2.31e-15        3.87e-09
        plcr |     .0016697     .0016697       1.39e-15               .
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =          0.00
                Prob>chi2 =        1.0000
                (V_b-V_B is not positive definite)
```

NIMR

```
. hausman fixed_group random_group

                 ---- Coefficients ----
              |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
              | fixed_group  random_group    Difference          S.E.
--------------+----------------------------------------------------------------
         pmcr |    -63.8682     -63.8682      -2.41e-12                .
         pcar |    88.73605     88.73605       4.34e-11         .000095
        pcbp1 |    3.791267     3.791267      -1.11e-11        .0000205
         plcr |    -.8018209    -.8018209      -7.42e-12                .
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =         0.00
                Prob>chi2 =       1.0000
                (V_b-V_B is not positive definite)
```

Appendix H

Language Editor Letter

UNIVERSITY of BOTSWANA

Centre for Academic Development
Communication & Study Skills Unit

Corner of Notwane and Mobuto Road, Gaborone, Botswana
Private Bag 0022 Gaborone, Botswana
Tel: [267] 355 2419/20
Fax:[267] 390 2884
E-mail: cad@mopipi.ub.bw

22 November, 2021

To whom it may concern,

Dear Sir/Madam,

Re: Letter of confirmation of language editing

I hereby confirm that I have proof read and edited Obadire Ayodeji Michael's (ID 16003735) thesis entitled:

Basel III Regulatory Requirements and the Performance, Efficiency and Capital Structure of Selected African Banks.

A Thesis Submitted to The Department of Accountancy in Fulfillment of the Requirements of PhD in Accounting and Finance.

Although the greatest care was taken in the editing of this document, the final responsibility for the product rests with the author.

Yours faithfully,

Prof Joel M. Magogwe
Associate Professor, Communication & Study Skills Unit
Tel: 3552421(W)
Email: magogwej@.ub.ac.bw

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