

**BANK CAPITAL AND PROFITABILITY: AN EMPIRICAL STUDY OF SOUTH
AFRICAN COMMERCIAL BANKS**

By

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Submitted in accordance with the requirements for the degree of

DOCTOR OF COMMERCE

in the subject

BUSINESS MANAGEMENT

at the

University of South Africa

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MARCH 2017

DECLARATION

Student number: 4626-862-6

I declare that the thesis entitled “**Bank capital and profitability: an empirical study of South African commercial banks**”, is my own work except where otherwise indicated and acknowledged by means of complete references. This thesis has not, either in whole or in part, been submitted for a degree or diploma at any other university. Errors and omissions noted in this work are attributed to my own imperfection.

Charles Jabulani Nyoka

Date

ACKNOWLEDGEMENTS

In the history of mankind, there is no record of any man who has walked the journey of life depending absolutely on him. I have walked this journey, the journey towards this qualification and achievement, not solely by myself but I have had the support and love of gallant men and women who ensured that when I fell, they were there to help me to my feet, when what lied ahead of me looked insurmountable, they provided that motivation, that oxygen that is needed for life, that water that is needed by a drying plant. These men among many include Professor Daniel Makina, a man whose insights and wisdom in matters of research I compare to none. He would throw mud into my face if I brought to him substandard work and yet he remained gentle enough to help me deal with my emotions. To you, Prof Makina, I say continue with your calling for the benefit of many to come after me. To Elvis Ganyaupfu, I tested your patience to the limit, I called you at odd hours, and you left the comfort of your bed and the company of your beautiful wife just to make sure you support me in my endeavour. I remain indebted to you for the statistical support. You were dealing with someone who was raw in that field but your shoulder was always tilted in my direction for me to lean on it.

- To Ms Juanita du Toit, thank you for the editorial support.
- My acknowledgements will be incomplete if I do not mention The University of South Africa (Unisa), especially the Department of Finance, Risk Management and Banking and the College of Economic and Management Sciences for the moral and financial support, without which, this research would have been impossible.
- To my wife, Pauline, now that this output is there as evidence, you can now understand my mood swings, the rough edges of the unpolished diamond and its effects on us as a couple. For putting you through all this, I thank you for remaining yourself in the midst of torrential character changes.

- To my daughters and my son, Princess, Patience and Prince respectively, I love you, I owe you for your endurance, for missing your father, and yet he shared the same house with you. I will make up to you and it is a promise.

DEDICATION

This thesis is dedicated to:

My parents, the late Mr Josephat Nyoka, and the late Mrs Cecelia Nyoka,
my wife Pauline and my children, Princess, Prince and Patience Nyoka.

ABSTRACT

BANK CAPITAL AND PROFITABILITY: AN EMPIRICAL STUDY OF SOUTH AFRICAN COMMERCIAL BANKS.

Bank capital has a critical role in banking business the world over. Capital is a principal aspect of regulation and will determine how long a bank remains in business from a regulatory point of view. Its cost and the regulatory amount have an impact on the competitiveness of an institution and will influence the rate of expansion of a bank.

The contribution of capital to the profitability and survival of a commercial bank remain an unresolved empirical issue.

Prior research on the relationship between capital and profitability has largely focused on developed economies, especially the USA, and Europe. However, the results have been inconclusive.

There is no evidence of such kind of a research done to date that focuses on an emerging economy such as South Africa.

The seemingly conflicting finding coupled with regulations imposing equity capital adequacy from the Basel 11 Accord present an opportune platform for further research on the relationship between capital and profitability.

Using South Africa as a unit of analysis and using the Generalised Methods of Moments (GMM), and Panel Two Stage Least Squares (2SLS) or Pooled IV method as the estimation techniques, this study tested the hypothesis that there is a positive and statistically significant relationship between bank capital and profitability.

The results from the study provide evidence of a positive relationship between capital ratio (CAR), return on equity (ROE) and return on assets (ROA) and

supported the generally held notion that there is a positive relationship between bank capital and profitability.

This research output provided new insights into the long-run impact of bank capital on profitability and survival. From a bank specific strategic decision-making perspective, this would assist financial institutions and investors in tailoring investment decisions in response to policy decisions that relate to bank capital. From the public policy perspective, this would assist both governments and regulators in formulating better- informed policy decisions regarding the importance of bank capital.

Key Words: *Capital, Profitability, South Africa, Commercial banking sector, Return on capital, Return on equity, Pooled IV, Regression, Analysis, Credit Risk, Size, Operating Expense, Regulator, Estimates, Sample, Data.*

LIST OF ACRONYMS

AMALGAMATED BANKS OF SOUTH AFRICA

AMB	AFRICAN MERCHANT BANK
BHCS	BANK HOLDING COMPANIES
BN	BILLION
BOE	BLACK OWNED ENTERPRISES
CAR	CAPITAL ASSET RATIO
CPI	CONSUMER PRICE INDEX
CR4	FOUR FIRM CONCENTRATION RATIO
ERM	ENTERPRISE RISK MANAGEMENT
ES	EFFICIENT STRUCTURE
FAIS	FINANCIAL ADVISORY & INTERMEDIARY SERVICES ACT
FICA	FINANCIAL INTELLIGENCE CENTRE ACT
FNB	FIRST NATIONAL BANK
G7	GROUP OF SEVEN
GDP	GROSS DOMESTIC PRODUCT
HHI	HEFINDAHL-HIRSCHMAN INDEX
INF	INFLATION
JSE	JOHANNESBURG SECURITIES EXCHANGE
MP	MONOPOLY POWER
NIM	NET INTEREST MARGIN
OBS	OFF BALANCE SHEET
OE	OPERATING EXPENSES
OPBS	OLD PRIVATE SECTOR BANKS
POP	PERSISTENCE OF PROFITS
ROA	RETURN ON ASSETS
ROC	RETURN ON CAPITAL
ROE	RETURN ON EQUITY
S A	SOUTH AFRICA
SANLAM	SOUTH AFRICAN NATIONAL LIFE ASSURANCE COMPANY

SARB	SOUTH AFRICAN RESERVE BANK
SCMB	STANDARD CHARTERED MERCHANT BANK
SCP	STRUCTURE CONDUCT PERFORMANCE
SEE	SOUTH EASTERN EUROPE
UAE	UNITED ARAB EMMIRATES
USA	UNITED STATES OF AMERICA

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CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 BACKGROUND

Bank capital has a critical role in banking business the world over. The question of capital adequacy has been raised at different forums and has been a matter of concern for both banks and regulators from a policy perspective. Capital is a principal aspect of regulation and will determine how long a bank remains in business from a regulatory point of view. The costs of capital and the regulatory amount have an impact on the competitiveness of an institution and will influence the rate of expansion of a bank.

Debate and studies around the subject of capital and profitability of banks have been carried out at international, regional and domestic levels (Curak, Poposki & Pupur, 2011). Conventional theory and empirical work on bank profitability suggests that bank profitability is determined by various firm-specific, industry-specific and macro-economic variables (Curak, Poposki & Pupur, 2011).

Over the past three decades deregulation, and more recently, regulation have changed the landscape in which financial intermediaries operate and compete. At the forefront of the regulatory debate has been the issue of capital adequacy for banks, which ultimately saw the establishment in 1988 of a landmark international regulatory agreement known as the Basel Capital Accord. Accordingly, it is important to understand the role that capital plays in determining bank performance of any bank. Early research (Bourke, 1989; Molyneux & Thornton, 1992; Short, 1979) on the determinants of bank profitability focused on the relationship between earnings and concentration. This line of work fits into the structure-conduct-performance (SCP) paradigm, which generally tries to explain the significant positive empirical relationship between bank earnings and industry concentration.

The study of capital and its relationship to profitability is a study that has a lot of literature around it. Empirical studies on the subject of bank profitability have focused on specific countries, while others have concentrated on a panel of countries.

Berger, (1995) and Angbazo, (1997) carried out studies on banking in the USA. Barajas, Steiner, and Salazar, (1999) covered banking in Columbia. Guru, Staunton and Balashanmugam, (2002) focused on banking in Malaysia, Afanasieff, Lhacer, and Nakane, (2002), covered banking in Brazil. Berger (1995) investigated the relationship between the return on equity and the capital asset ratio for a sample of United States of America (USA) banks for the period between 1983 and 1992. Berger found that there was a positive relationship between the two variables.

According to Angbazo (1997) who examined net interest margins for a sample of USA banks for the 1989–2003 periods, management efficiency, default risk, opportunity cost of non-interest bearing reserves and leverage are positively associated with the bank interest margin. Angbazo (1997) also concludes that net interest margins reflect primarily credit and macro-economic risk premia. From the same studies, there is evidence that net interest margins are positively related to core capital, non-interest bearing reserves, and management quality, but negatively correlated to liquidity risk.

In Columbia, Barajas, Steiner and Salazar (1999) examined the effects of financial liberalisation on the interest margin of banks, they concluded that after liberalisation of the banking sector in Columbia, loan quality increased, and overall spread did not decline. Barajas et al., (1999) conclude therefore that the relevance of the different factors behind the bank spreads is affected by such measures.

In Malaysia, Guru, Staunton, and Balashanmugam, (2002) after studies on a sample of seventeen commercial banks for the period 1986–1995, find that efficient expenses management is one of the most significant factors in explaining high bank profitability. In those same studies, it is also found that high interest

ratio is associated with low bank profitability and inflation is found to have a positive effect on bank performance.

In studies conducted by Naceur (2003) who investigated the impact of bank characteristics, capital structure and macro-economic indicators on the net interest margin and profitability of banks in the Tunisian banking industry for the 1983–2000 period, it finds that high net interest margin and profitability tend to be associated with banks that hold relatively high amount of capital and with large overheads.

Naceur (2003) further finds that inflation and growth rates have negative effects on net interest margin, and stock market development has a positive impact on profitability and net interest margin.

In Switzerland, the research of Dietrich and Wanzenried (2009) find significant differences in profitability between commercial banks and these differences could, largely, be explained by the factors that they include in their analysis. They find that better-capitalised banks seem to be more profitable. In cases where the loan volume of a bank is growing faster than the market, the impact on bank profitability was positive. They also find that banks with a higher interest income share are less profitable than other banks. Their conclusion is that, the most important factors are the GDP growth variable, which affects the bank profitability positively, the effective tax rate and the market concentration rate, which both had a significantly negative impact on bank profitability in Switzerland.

Mamatzakis and Remoundos (2003) in their studies show that the variables that are directly related to the strategic planning of the banks (i.e. personnel expenses, loans-to-assets ratio, equity-to-assets ratio) are the ones that mainly explain profitability. They report that economies of scale play a significant role in the market, and have a positive impact on profitability. Mamatzakis and Remoundos (2003) further find that the size of the market, an external variable, defined by the supply of money, significantly influences profitability.

Other studies on the subject include studies by Kosmidou (2008) who examined the subject from a Greek perspective. Pejic'bach, Posedel and Stojanovic' (2009) examined it from a Croatian perspective, and Kunt and Huizinga (1999) examined the subject at international level.

In a study by Saunders and Schumacher (2000) in which they analysed the determinants of interest margins in six countries of the European Union and the USA during the period 1988–1995, they found that macro-economic volatility and regulations have a significant impact on bank interest margins. The researchers were applying the model used by Ho and Saunders (1981).The study results further suggest an important trade-off between ensuring bank solvency, as defined by high capital-to-asset ratios, and lowering the cost of financial services to consumers, as measured by low interest rate margins.

As observed in the studies above, findings from all these studies have some common features, but still remained inconclusive.

Conclusions from other studies on the subject of capital (Arbabiyan & Safari, 2009; Chakraborty, 2010; Haldlock & James, 2002; Huang & Song, 2006; Mesquita & Lara, 2003; Pandey, 2004; Philips & Sipahioglu, 2004) are also not uniformly conclusive about the debate as they come up with findings, which are conflicting in nature.

Gill; Nahum and Neil (2011) take a slightly different approach to the discussion on profitability by introducing the concept of capital structure, and seek to extend Abor's (2005) findings regarding the effect of capital structure on profitability by examining the effect of capital structure on profitability of the American service and manufacturing firms. Abor (2005) had selected a sample of 272 American firms listed on the New York Stock Exchange for a period of three years from 2005–2007. The major conclusion from the empirical results show a positive relationship between short-term debt to total assets and profitability and between total debt to total assets and profitability in the service industry. The findings of this paper also showed a positive relationship between short-term debt to total

assets and profitability, long-term debt to total assets and profitability, and between total debt to total assets and profitability in the manufacturing industry. In all these studies capital remains the central issue, although there is no consensus on its contribution to profits.

Pandey (2009) takes a view on capital structure and argues that with an unplanned capital structure, companies may fail to economise the use of their funds. Consequently, it is being increasingly realised that a company should plan its capital structure to maximise the use of funds and to be able to adapt more easily to the changing conditions.

Berger (1995b) investigates the relationship between capital and earnings in a simple two-equation reduced form framework. He regresses the capital-to-asset ratio (CAR) and return on investment (ROE) on three years of lagged CAR and ROE along with a number of control variables. The study's main contribution to the debate on capital and profitability was the ability to identify potential explanations for the positive relationship between capital and profit that, with few exceptions, appears in literature today. Berger (1995b) argues that this finding could be the result of either a reduction in insurance and/or borrowing costs when holding more capital, or the result of a signalling equilibrium where it is easier for managers of less risky banks to signal quality by maintaining higher levels of capital than managers of riskier banks.

Ngo (2006) questions Berger's conclusions and argues that there is no systematic relationship between CAR and profitability. His argument is based on the cost of bringing capital into the bank. Ngo (2006) concludes that bringing capital into the bank has cost implications and that, as long as capital requirements are not binding, the capital ratio of the bank emerges endogenously within the profit maximisation equilibrium. Ngo (2006) may be correct that there are cost implications, however, if the spread is positive (what is borrowed against what is lent), then the margins will be positive.

Hutchison and Cox (2006) conclude in their research work that there is a positive relationship between equity capital and return on assets.

There seems to be no consensus on this debate from the review that has been carried out this far.

The thrust of this thesis is to test the hypothesis that bank capital is positively related to profitability from the perspective of a developing country such as South Africa.

1.1.1 Research Gap

The research results on the relationship between capital and profitability carried out in many countries over the last decade or so have not been conclusive in their nature. Using South African banks as a unit of analysis, this study tested the hypothesis that there is a positive and statistically significant relationship between bank capital and profitability.

Over the last 20–30 years, the South African banking sector experienced radical transformation. The country was in international financial limbo until up to the period leading to the democratic dispensation in 1994. The changes covered a variety of areas including changes in banking regulation, deregulation, financial deepening, consolidation and entry of foreign banks as well as the changes in bank activities and performances.

According to Curak, Poposki and Pupur (2011) changes in the banking regulations and areas of supervision and inspection are generally aimed at improving the operations of banks, restraining the level of their exposure to systematic risk, and reaching greater conformity with the internationally adopted laws and standards for banking activities.

As South Africa opened itself to international best practice, it had to embrace and be subjected to the same rigorous capital requirements that other internationally acclaimed banks have been subjected to for decades. Most importantly, its

banking sector had to accommodate a large portion of the population that had never had access to banking facilities before. That brought with it many changes in the practices of banks. This influx of new factors and considerations had a bearing on bank practices and profitability.

The determinants of the profitability of the South African banking market have never been examined under international standards. Will tests of this hypothesis in the context of South Africa give results that are consistent with both theory and literature?

The research sought to answer this question by examining the determinants of bank profitability in South Africa and testing the hypothesis that there is a statistically significant and positive relationship between capital and profitability.

South Africa makes a good test case for such research. South Africa is unique in that profit margins were high and there were many cartels due to the oligopolistic nature of the market. To the best of the researcher's knowledge, there is no known scholarly work done on South Africa on the subject of the relationship between capital and profitability. The fact that the results from previous international studies have not been conclusive was motivation enough for the researcher in his bid to add to the body of knowledge that is already out there and to crack open this once closed egg shell and to see whether the results will conform with what has been experienced elsewhere.

Guided by this background, this thesis tested the hypothesis that bank capital is positively related to profitability within the context of the South African commercial banking sector over the period 2006 to 2015.

1.2 PROBLEM STATEMENT

Bank capital has a critical role in banking business the world over. The question of capital adequacy has been raised at different forums and has been a matter of concern for both banks and regulators from a policy perspective. Capital is a

principal aspect of regulation and will determine how long a bank remains in business from a regulatory point of view.

The costs of capital and the regulatory amount have an impact on the competitiveness of an institution and will influence the rate of expansion of a bank. The availability or non-availability thereof of capital to a bank can also determine the bank's ability to raise capital and the amount of capital that a bank holds can be used by suppliers of capital as a measure of the shareholders' commitment to the business.

Empirical evidence for USA banks indicated a perverse negative relationship between financial leverage and the return on equity for the 1983 to 1989 period (Hutchison & Cox, 2006). The reason of such a relationship was attributed to a reputation effect for large banks who adopted an aggressive capital structure. However, results of all research work to date is not conclusive and to add to this, there is no evidence of such kind of a research done to date that focuses on an emerging economy such as South Africa.

South Africa, being a country in a very unique situation, which experienced and continues to experience a number of social, issues which include among others financial exclusion and an under-banked population makes it a very interesting tool of analysis. The banking sector in South Africa was heavily regulated prior to independence in 1994 and continued to be heavily regulated during the post-apartheid era as the government tried to redress the imbalances of the past through legislation.

The seemingly conflicting finding coupled with regulations imposing equity capital adequacy from the Basel 11 Accord present an opportune platform for further research on the relationship between capital and profitability.

1.3 RESEARCH QUESTIONS

The study acknowledged that South Africa is in a unique position in that it has a reasonably sophisticated banking sector, which compares favourably with that of the most developed countries and at the same time has a significant portion of its population who has no access to banking facilities. However, in order to facilitate the achievement of the stated objectives of the study, the following questions have been posed:

1. Is there a relationship between bank capital and profitability of commercial banks in South Africa?
2. To what extent is the profitability of commercial banks affected by the capital amount available to them?
3. What are the other drivers of bank profitability?

1.4 OBJECTIVES OF THE STUDY

This thesis had three broad objectives, which are:

- a) To test (within the South African banking environment) the hypothesis that there is a positive and statistically significant relationship between capital and profitability and to stimulate debate and further research on the subject of bank capital.
- b) To examine the relationship between bank capital and profitability (this was done using the South African banking sector covering the period 2006 to 2015).
- c) To establish the other determinants of bank profitability in the context of South Africa.

1.5 RESEARCH HYPOTHESIS

The null hypothesis: There is no positive and statistically significant relationship between bank capital and profitability.

Alternative hypothesis: There is a positive and statistically significant relationship between bank capital and profitability.

Following Ngo (2006) bank capital is measured by the capital-to-asset ratio (CAR), while profitability is measured by two indicators namely return on equity (ROE) and return on assets (ROA) in the context of this study.

This alternative hypothesis stipulates that those banks with a higher percentage of capital have a comparative advantage over those banks with a lower percentage of capital. It further stipulated that this comparative advantage is reflected in the profitability levels of these banks.

1.6 EXPECTED OUTPUTS AND BENEFITS

The role of capital to profitability and institution stability continues to be a subject of intense discussion especially in the context of the impact of the recent global financial crisis of 2007 to 2008. The results of all previous studies have not been conclusive.

The study wanted to test the hypothesis (albeit in a developing country) with the view of establishing whether a different conclusion could be reached in a context of a developing country.

This research was expected to provide new insights into the long-run impact of bank capital on profitability and survival. From a bank specific strategy perspective, this would assist financial institutions and investors in tailoring investment decisions in response to policy decisions that relate to bank capital. From the public policy perspective, this would assist both governments and regulators in formulating better-informed policy decisions regarding the importance of bank capital.

The study further contributed to the debate by providing new insights into the application of economic models in developing countries with South Africa as a typical example of a developing country that seems to have features of a partially developed country, but in many aspects still a developing country. Of particular interest, was the uniqueness of South Africa as both a developing country with a number of its citizens having no access to banking facilities, as well as having certain features of a developed country, with a highly developed banking sector as an example.

Finally, the study also sought to add to the existing academic knowledge in that it would serve as a reference for subsequent research in the area.

1.7 SCOPE OF THE STUDY

This study focused on examining the factors that determine profitability of a bank and the focus area was the role that bank capital plays in determining profitability in the context of South Africa.

This study was delimited in terms of participating financial institutions and the profiles of financial institutions. It was limited to commercial banks that have operated during the entire study period in terms of being in the same business and more or less retaining the same name. This population was identified to be thirteen (13) commercial banks. The entire sample population was used during the study.

1.8 METHOD OF INVESTIGATION

Issues around research and the research problem are of paramount importance to any research work. Not all research questions are answerable and are researchable. A question must be one for which observation or other data collection in the real world can provide answers (Emory & Cooper, 1991). Any research method chosen therefore must help the researcher reach a reasonable and defensible solution or recommendation to the research problem.

The study used a quantitative research approach as a mode of inquiry. This was done to ensure that all issues relating to capital and other determinants of profitability within the South African banking sector were captured. To this end, econometrical models used by Hutchison and Cox (2006), Ngo, (2006) and Berger (1995b) were reviewed and used. The strategy used resulted in a reasonably ordered collection of data.

1.9 DATA AND METHODOLOGY

Data was collected from Bank Scope, Bloomberg, audited financial statements of the banks concerned and the South African Reserve Bank quarterly call reports for the entire duration of the study period, which is from 2006 to 2015.

Annual measures of capital (defined as the quarterly average value of equity divided by assets), return on equity (ROE), defined as asset income divided by average equity and return on assets (ROA), and defined as net income divided by total assets were collected for the entire period.

The raw data was utilised in the regressions as well as two alternative techniques to handle negative figures and figures close to zero capital. Capital values less than one per cent were transformed to be one per cent to avoid nonsensical interpretations of negative capital and values close to zero. Regressions coefficients of lagged ROE and capital were estimated using deviations in the variables from their bank-specific mean values, rather than specifying individual dummies for each bank. (See Berger 1995 for an exposition of this technique.)

Correlation between values of capital and ROE may reflect a feedback loop from performance to capital. That is, bank capital may increase (or decrease) as profits strengthen (or weaken) due to the relative increase (or drop) in retained earnings. Historical data was used where issues of the composition of capital and profitability were concerned.

1.10 DATA SOURCES AND SAMPLE SIZE

This research examined capital structures of commercial banks operating in South Africa for the period covering 2006 to 2015. Population data was from commercial banks that operated during the entire period studied in terms of being in the same business and more or less retaining the same name. This population was identified to be 13 commercial banks. The entire sample population was used for testing. Market and accounting data regarding regulations on bank capital was obtained from databases of the central bank of South Africa and available data on capital adequacy as per Basel II Accord were used as supplementary data.

1.11 ANTICIPATED PROBLEMS AND RESOLUTION

Since the sample of banks is from a single economy, all the banks face the same macro-economic environment. It is therefore recognised that the operating conditions may differ from one economy to the other. Banks respond differently in different economies and there are specific situations where some banks may be affected by regulatory requirements more than others, especially where the political influence is perceived to play a role. The use of various sources of data may result in insignificant differences on the calculations of certain variables.

To the extent possible, these factors were addressed. It was not anticipated, however that these factors would render the results of this study invalid. Furthermore, the robustness of the model/result was diagnosed.

1.12 THESIS CHAPTER OUTLINES

CHAPTER 1: BACKGROUND AND INTRODUCTION

The author gave an introductory background to the research study in this chapter. The objectives, outputs and benefits of the study were discussed, and the structure of the rest of the thesis was summarised.

CHAPTER 2: HISTORICAL DEVELOPMENTS ON THE SUBJECT OF CAPITAL

The theory of capital was explored, various definitions of capital were examined and the foundations for discussions on the subject of capital and profitability were set.

CHAPTER 3: BANK CAPITAL STRUCTURES: THEORY AND EMPIRICAL ISSUES

The theory of bank capital, regulatory issues, developments within the sphere and its links with bank profitability and survival were critically examined. Issues, debates and experiences about matters that relate to bank capital were discussed.

CHAPTER 4: THE SOUTH AFRICAN COMMERCIAL BANKING SECTOR: HISTORICAL DEVELOPMENTS AND REGULATORY STRUCTURE.

In this chapter, the author further explained the rationale for selecting the South African commercial banking sector to provide data about banks for testing the research hypotheses.

CHAPTER 5: RESEARCH DESIGN AND ECONOMETRIC METHODS

The research equations were presented and discussed: the pros and cons of the equations pertaining to this particular research vis-à-vis other similar empirical studies were discussed.

Issues on research design, suitability and appropriateness of the econometric methods applied in this study were discussed and examined for applicability to the study. In particular, event study, tests for convergence, structural changes and panel data approaches were explored.

CHAPTER 6: DATA ANALYSIS

Econometric test results of different approaches were presented and analysed. Confounding problems were brought to the fore and possible resolutions were discussed.

CHAPTER 7: DISCUSSION AND SYNTHESIS OF RESULTS, SUMMARY OF CONCLUSIONS AND DIRECTION FOR FUTURE RESEARCH

Research results were discussed and synthesised and corroborated with the theory and other empirical studies. Contributions to new knowledge from the study were discussed. The chapter further summarised the thesis product together with recommendations and directions for future research.

1.13 CHAPTER SUMMARY

This chapter gave the background to the debate on the issue of the relationship between capital and profitability. It brought the subject matter into perspective by highlighting that debate on this subject has been raging on for years. It also pointed out that different scholars have tackled this topic from different angles.

The subject has been discussed at international level, at regional level and as well as at country level, focusing on country-specific factors that may affect bank profits.

The chapter also brought into perspective the lack of consensus in terms of the results of all the studies that have been reviewed in this study.

The question of research gap was emphasised and it was highlighted in the chapter that the lack of consensus on the results provided motivation for this study.

The research problem was defined in detail and the relevant research questions were posed and brought to the fore.

The chapter further spelled out the objectives of the study and highlighted the expected outputs and benefits of the study.

Issues of scope, method of investigation and data collection methods were also introduced.

Like with any research study, problems were anticipated and in this chapter, the issue of anticipated problems was brought to the fore.

The chapter closed with a detailed chapter outline of the thesis.

CHAPTER 2: HISTORICAL DEVELOPMENTS ON CAPITAL AND ISSUES OF REGULATION

2.1 INTRODUCTION

In the previous chapter, the author introduced and provided the background information on which the current study was based. The aim of the author in this chapter was to lay a foundation for discussing the issues around capital and issues of regulations as these issues affect the commercial banks in South Africa. In this chapter, the author reviewed the available literature on some of the important issues regarding capital. The definition of capital was discussed first and the characteristics of capital were reviewed.

2.2 THE DEFINITION OF CAPITAL

Capital and its structure is one of the most puzzling issues in corporate finance literature (Brounen & Eichholtz, 2001). Decisions regarding capital structure and its quantum are vital decisions since the profitability of an enterprise is directly affected by such decisions. In the balance sheet of an enterprise, the overall position of the enterprise regarding all kinds of assets and liabilities are shown. The capital of an enterprise can be a combination of equity shares, preference shares and long-term debt (Basel Committee on Banking Supervision, 1988).

A cautious approach to the subject of capital and its composition is therefore encouraged.

Capital is an essential investment either in the form of money, machinery, land or time, which can be converted in terms of money. Capital is the investment made in any industry or business. Capital is the foundation of any business and no business or industry can survive without capital (Basel Committee on Banking Supervision, 1988).

In the same way that a small trader needs money to invest in premises and products which he wishes to purchase and stock for selling to people, a consultant or technician wants investment capital for buying equipment that will enable him/her to provide his/her services, and money to keep himself/herself until such time the he/she receives payment or recovers his/her return on investment. Any bank or financial institution therefore also requires capital in order to prop up its operations.

For the purposes of the current study, capital was discussed in the context of a bank and it was discussed as a ratio. In the current study the capital ratio was defined in accordance with the Basel Accord guidelines, where Capital Ratio (CAR) is defined as the ratio of total capital (Tier 1 capital plus Tier 2 capital) to total risk weighted assets. (Basel Committee on Banking Supervision, 1988).

Tier 1 (core) capital for banks consists of: (1) common stock holders and equity capital; (2) non-cumulative, perpetual preferred stock and any related surplus; and (3) minority interests in equity capital accounts of consolidated subsidiaries, less goodwill, other disallowed intangible assets, and disallowed deferred tax assets, and any other amounts that are deducted in determining Tier 1 capital in accordance with the capital standards issued by the primary federal supervisory authority of the reporting bank. (Basel Committee on Banking Supervision, 1988).

Tier 2 (supplementary) capital is limited to 100% of Tier 1 capital and consists of: (1) cumulative perpetual preferred stock and any related surplus; (2) long-term preferred stock (original maturity of 20 years or more) and any related surplus (discounted for capital purposes as it approaches maturity); (3) auction rate and similar preferred stock (both cumulative and noncumulative); (4) hybrid capital instruments (including mandatory convertible debt securities); (5) term subordinated debt and intermediate-term preferred stock (original weighted average maturity of five years or more) to the extent of 50% of Tier 1 capital (and discounted for capital purposes as they approach maturity); and (6) the allowance for loan and lease losses (limited to the lesser of the balance of the allowance account or 1.25% of gross risk-weighted assets). When determining the amount

of risk-weighted assets, on-balance sheet assets are assigned an appropriate risk weight (0%, 20%, 50%, or 100%). (Basel Committee on Banking Supervision, 1988).

2.3 THE THEORY OF CAPITAL STRUCTURE

Capital structure has been defined as the mix of debt and equity that a firm uses to finance its operations (Myers, 1984). According to Hutchinson and Xavier (2006), a capital structure decision is one of the most complex decisions that a firm faces. The cost of capital of a firm can thus be lowered through the implementation of effective capital structure decisions and hence increases shareholder's wealth. According to Gitman (2009), the corporate finance theory of profit maximisation stipulates that the value of the firm is maximised when its cost of capital is minimised. However, this is a difficult measure to determine the optimal combination of debt and equity to finance a company. Therefore, the optimal capital structure is the combination of debt, equity at which the weighted average cost of capital of a firm is minimised, and shareholder's wealth is maximised. The weighted average cost of capital is the average cost of debt and equity funding weighted by the proportion of the capital structure of the firm that the two components constitute (Gitman, 2009).

The relationship between capital structure and profitability is one that received considerable attention in the finance literature. The current study regarding the effects of capital structure on profitability will help us to understand the potential problems regarding performance and capital structure.

Contemporary theory of capital structure is based on the influential work of Modigliani and Miller (MM) (1958), who under the assumptions of the theory of perfect markets, propose a model that suggests that any changes in the capital structure of a firm has no impact on the value of the firm. The theory is based on the assumption that firms operate in a completely free and competitive market, without taxes, or transaction costs, where information is readily and freely available. Under these conditions, there is no optimal method of financing a firm.

Modigliani and Miller (1963) argue that, in the absence of taxes, the cost of capital remains constant as the benefits of using cheaper debt are exactly offset by the increase in the cost of equity due to increased risk.

When imperfect capital markets are taken into consideration, the capital structure of a firm becomes relevant. Since Modigliani and Miller's (1958) work, a number of theories have been put forward to explain the determinants of the capital structure of firms. These include the trade-off, the agency and the pecking order theories. Such theories take into consideration factors such as taxes, agency costs and information asymmetry that may cause deviations from the efficient market, thereby reinforcing the market imperfection hypothesis. In the seminal article, presented by MM's (1958) irrelevance theory, MM argue that capital structure is unrelated to the value of the firm. In the presence of corporate income tax and the cost of capital in MM's (1963) MM argue that the market value of the firm is positively related to the amount of long-term debt used.

The current study incorporated in part the approach by Harris and Raviv (1991) when they discuss the capital structure theory from the perspective of agency costs, asymmetric information, product/input market interactions, and corporate control considerations (but excluding tax-based theories).

2.3.1 Agency costs

Jensen and Meckling (1976) define an agency relationship as a "contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent". The agency problem therefore arises due to a possible conflict of interest, especially if both parties to the relationship are seeking to maximise their worth in the firm. The inference is that the agent will not always act in the best interest of the principal. There is good reason to believe that the agent will not always act in the best interests of the principal as the agent may have his/her own personal interests to safeguard in the organisation.

It is therefore in the interest of the principal to try to limit the divergences from his interest by the agent. This can be done through the establishment of appropriate incentives for the agent and by the willingness of the principal to incur costs to monitor the activities of the agent so that he/she does not disadvantage the principal.

Relating this to the capital structure theory, the agent in this case, senior management and board members are expected always to act in the best interest of the principal, who is principally the shareholder.

Financial decisions made by management with regard to the capital structure are expected to benefit shareholders through an increase in the value of shareholders' stock.

There is however, no way of guaranteeing that the agent will always act in the best interest of the firm. Therefore, from this perspective the principal is always at a disadvantage. The principal is therefore expected, in some situations, to incur extra costs to ensure that the agent will not take actions, which would harm the principal.

Jensen and Meckling (1976) refer to the cost of the agency relationship, as the "residual loss" and they define "agency costs" as the sum of: (1) the monitoring expenditures by the principal, (2) the bonding expenditures by the agent, and (3) the residual loss. The argument put forward by most researchers over the last decade or so is that capital structure is determined by agent costs (Harris & Raviv 1991).

Jensen and Meckling (1976) dwell on two types of conflicts identified in their studies.

They argue that conflicts between shareholders and managers arise because managers hold less than 100% of the residual claim. The managers do not capture all the gain from their profit maximisation activities. Because managers

do not hold 100% of the residual value of the firm it is possible for them to transfer some of the wealth to themselves through such decisions as increasing managerial perks and other benefits. Managers tend to overindulge in these types of activities to the detriment of the shareholders and the goal of maximising shareholder value. The inference then becomes that this cost or inefficiency is reduced if the portion of the firm held by the manager increases.

Jensen (1986) suggests that since debt commits the firm to pay out cash, it reduces the amount of “free” cash available to managers to engage in activities that will benefit them personally. The conclusion from this theory then becomes one, which says managers are not interested in debt as a component of capital structure.

The agency models predict that leverage is positively associated with firm value (Hirshleifer & Thakor (1989), Harris & Raviv (1990a), Stulz (1990)), default probability (Harris & Raviv (1990a)), the extent of regulation (Jensen & Meckling (1976), Stulz (1990)), free cash flow (Jensen (1986), Stulz (1990)), liquidation value (Williamson (1988), Harris & Raviv (1990a)), the extent to which the firm is a takeover target (Hirshleifer & Thakor (1989), Stulz (1990)), and the importance of managerial reputation (Hirshleifer & Thakor (1989)).

According to these models, leverage is expected to be negatively associated with the extent of growth opportunities (Jensen & Meckling (1976), Stulz (1990)), interest coverage, the cost of investigating firm prospects, and the probability of reorganisation following default (Harris & Raviv (1990a)).

2.3.2 Asymmetric information

Asymmetric information refers to situations or a situation in contract theory and economics, where one party has more or better information than the other. This creates an imbalance of power in transactions, which can sometimes cause one party to benefit over another. The asymmetric information theory has lately been used to explain capital structure.

According to these theories, company management or other staff members are assumed to have more information about the characteristics of the return stream or investment opportunities of the firm.

The choice of the capital structure of the firm therefore signals to outside investors the information that insiders to the firm have. This research work was pioneered by Ross (1977) and Leland and Pyle (1977).

On the other hand, Myers and Majluf (1984) and Myers (1984) suggest that , capital structure is designed to mitigate inefficiencies in the investment decisions of the firm that are caused by the information asymmetry. The main contributions of the asymmetry information theories centred on stock price reactions to the issuance and exchange of securities, the amount of leverage, and whether firms observe a pecking order for security issues.

2.3.3 Product/input market interactions

According to Harris and Raviv (1991), the capital structure of a firm can also be influenced by the strategy of the firm when competing in the product market.

The main conclusion from these theories is that oligopolistic companies will tend to have more debt than monopolists or firms in competitive industries (Brander & Lewis (1986)), and that the debt will tend to be long term (Glazer (1989)).

2.3.4 Corporate control considerations

These theories focus on the need to strike a balance between control and ownership. If a firm has more debt in its capital structure, it is unlikely to be a candidate for takeover and in many cases the providers of finance will want to have a say in the running of the organisation in order to protect their investment than it would be the case for firms, which have less debt. According to Harris and Raviv (1988) and Stulz (1988), capital structure affects the outcome of takeover contests through its effect on the distribution of votes, especially the fraction

owned by the manager. It can therefore be concluded that takeover targets tend to increase debt in their capital structure.

From the above discussions, it is clear that a number of factors determines capital structure of a firm.

What is not clear however is which ones are more important than the other. The debate on capital structure determinants is therefore not conclusive as there are many factors that come into play. A common observation from the discussions is that debt contract has important implications for determining capital structure.

These include, among others, bankruptcy provision, convexity of payoffs of levered equity, the effect of debt on managerial equity ownership, and the relative insensitivity of debt payoffs to firm performance.

Sarkar and Zapatero (2003) find a positive relationship between leverage and profitability. Myers and Majluf (1984) find firms that are profitable and generate high earnings are expected to use less debt capital compared to equity than those that do not generate high earnings.

Sheel (1994) showed that all leverage determinants factors studied, excepting firm size, are significant to explain debt behaviour variations.

In the studies by Gleason, Mathur, and Mathur, (2000), using data from retailers in 14 European countries, which were grouped into four cultural clusters, it is shown that capital structures for retailers vary by cultural clusters. This result holds in the presence of control variables. Using both financial and operational measures of performance, it is shown that capital structure influences financial performance, although not exclusively. A negative relationship between capital structure and performance suggests that agency issues may lead to the use of higher than appropriate levels of debt in the capital structure, thereby producing lower performance. Graham (2000) integrates under firm-specific benefit functions to estimate that the capitalised tax benefit of debt equals 9.7% of firm

value. The typical firm could double tax benefits by issuing debt until the marginal tax benefit begins to decline.

It is inferred how aggressively a firm uses debt by observing the shape of its tax-benefit function. Paradoxically large, liquid, profitable firms with low expected distress costs use debt conservatively. Product market factors, growth options, low asset collateral, and planning for future expenditures lead to conservative debt usage. Conservative debt policy is persistent.

Hennessy and Whited (2005) develop a dynamic trade-off model with endogenous choice of leverage, distributions, and real investment in the presence of a graduated corporate income tax, individual taxes on interest and corporate distributions, financial distress costs, and equity flotation costs. The study explains several empirical findings inconsistent with the static trade-off theory and shows that there is no target leverage ratio. Firms can be savers or heavily levered. Leverage is path dependent, leverage is decreasing in lagged liquidity, and leverage varies negatively with an external finance weighted average. Using estimates of structural parameters, they also find that simulated model moments match data moments.

The results of Chiang, Chan, & Hui, (2002) show that profitability and capital structure are interrelated. The study sample includes 35 companies listed in Hong Kong. Raheman, Zulfiqar, and Mustafa (2007) find a significant capital structure effect on the profitability for non-financial firms listed on Islamabad Stock Exchange.

Mendell, Sydor and Mishra (2006) investigate financing practices across firms in the forest products industry by studying the relationship between debt and taxes hypothesised in finance theory. In testing the theoretical relationship between taxes and capital structure for 20 publicly traded forest-industry firms for the years 1994-2003, the study finds a negative relationship between profitability and debt, a positive relationship between non-debt tax shields and debt, and a negative relationship between firm size and debt.

Gill, Nahum , and Neil (2011) seek to extend Abor's (2005) findings regarding the effect of capital structure on profitability by examining the effect of capital structure on profitability of the American service and manufacturing firms. A sample of 272 American firms listed on the New York Stock Exchange for a period of three years from 2005 – 2007 was selected. The correlations and regression analyses were used to estimate the functions relating to profitability (measured by return on equity) with measures of capital structure. Empirical results show a positive relationship between short-term debt to total assets and profitability and between total debt to total assets and profitability in the service industry. The findings of the same paper also show a positive relationship between short-term debt to total assets and profitability, long-term debt to total assets and profitability, and between total debt to total assets and profitability in the manufacturing industry. In all these studies capital remains the central issue, although there is no consensus on its contribution to profits. The modern industrial firm must conduct its business in a highly complex and competitive business environment.

According to Buser (1981), the capital structure decision of a bank is similar to that of a non-financial firm, although there are considerable inter-industry differences in the capital structure of firms due to the unique nature of business and the intrafirm variations of each industry attributed to the business and financial risk of individual firms.

An ultimate goal of a firm is the maximisation of wealth or value of that firm (Miller & Modigliani, 1958, 1963; Miller, 1977). Whereas the MM theory focuses on capital composition, there is nothing in their arguments that divorces the link between capital, in general, and profitability, which is the main thrust of this thesis. Pandey (2009) argues that the board of directors or the financial manager of a company should always endeavour to increase the equity of shareholders in particular, and value to the other groups such as employees, customers, creditors and society in general. It is safe to conclude that all these concerns emanate directly from the profitability level of an organisation.

Brander and Lewis (1986), and Maksimovic (1988) provide the theoretical framework that links capital structure and market structure. Contrary to the profit maximisation objective postulated in industrial organisation literature, these theories, like the corporate finance theory; assume that the objective of the firm is to maximise the wealth of shareholders and show that market structure affects capital structure by influencing the competitive behaviour and strategies of firms.

According to Brander and Lewis (1986), firms in the oligopolistic market will follow the strategy of maximising their output for improving profitability under favourable economic conditions. Under unfavourable economic conditions, firms would take a cut in production and reduce their profitability.

Shareholders enjoy increased wealth in good periods, but they tend to ignore a decline in profitability in bad times as unfavourable consequences are passed on to lenders because of shareholders' limited liability status. Thus the oligopoly firms, in contrast to the firms in the competitive markets, would employ higher levels of debt to produce more when opportunities to earn high profits arise. The implied prediction of the output maximisation hypothesis is that capital structure and market structure have a positive relationship.

According to the Business Dictionary, profitability is the ability of a firm to generate net income on a consistent basis. The capital-to-income ratio is used as a benchmark for evaluating the performance of a firm. Ratios help to summarise large quantities of financial data and to make qualitative judgement about the profitability of firms.

One of the most important financial decisions, which face companies, is the choice between debt and equity capital (Glen & Pinto, 1994). This decision can effectively and efficiently be taken when managers are first aware of how capital structure influences firm profitability. This is because this awareness would enable managers to know how profitable firms make their financing decisions in particular contexts to remain competitive. In the corporate finance literature, it is believed

that this decision differs from one economy to another, depending on country level characteristics.

Chiang, Chan and Hui (2002) show the inter-relationship between profitability, cost of capital and capital structure among property developers and contractors in Hong Kong. They reached a conclusion that show that gearing is generally higher among contractors than developers are.

Lalith (1999) investigates the capital structure of Sri Lankan companies and finds that the use of long-term debt is relatively low in Sri Lankan companies. He states that the mean leverage in Sri Lanka is estimated as 13.5%. The long-term debt-to-equity ratio is 24% while the total debt-to-equity ratio is 104.1%. This finding led to Lalith to suggest that the use of debt financing in Sri Lanka is significantly lower in comparison to G7 markets. The conclusion that may be reached is that gearing is positively related with assets but negatively with profit margins.

Petersen and Rajan (1994) find a significant positive association between profitability and debt ratios in a study designed to investigate the relationship.

Ooi (1999) argues that profitable firms are more attractive for financial institutions as lending prospects. The reason is that those firms are expected to have higher tax shields and low bankruptcy costs. Furthermore, Abor (2005) reports a significantly positive relationship between the ratios of short-term debt to total assets and profitability, but a negative association between the ratio of long-term debt to total assets and profitability.

Dimitris, and Maria, (2008) investigate the relationship between capital structure, ownership structure and firm performance across different industries using a sample of French manufacturing firms. They find that there is a negative relationship between past profitability and leverage and there will be a positive relation between profitability and leverage.

In order to find the impact of capital structure on the profitability of a firm, a lot of research has been undertaken so far by various researchers all over the world. The review of some of the major studies has been undertaken to develop a clear understanding about the relationship between capital structure and profitability.

Chiang et al., (2002) undertook a study and the findings of the study put forth that profitability and capital structure are interrelated. The study sample included 35 companies listed on the Hong Kong Stock Exchange. Abor (2005) investigates the relationship between capital structure and profitability of listed firms on the Ghana Stock Exchange and finds a significantly positive relationship between the ratio of short-term debt to total assets and ROE and negative relationship between the ratio of long-term debt to total assets and ROE.

The other major studies undertaken by Mesquita and Lara (2003), Philips and Sipahioglu (2004), Haldlock and James (2002), Arbabiyani and Safari (2009), Chakraborty (2010), Huang and Song (2006), and Pandey (2004) come up with findings which are conflicting in nature as some studies confirm a positive relationship between capital structure and profitability, while other studies confirm opposite relationship between the variables.

2.4 CHAPTER SUMMARY

In this chapter, the definition of capital was examined and it was noted that there are variations in the definition of capital. The definition of capital as per the Basel Committee on Banking Supervision of July 1988 was explored in detail. The theory of capital structure and its origins was also examined. A number of theories on capital structure and its effects on profitability advanced by various authors were reviewed and it was noted that there is neither consensus, nor a single and uniformly acceptable theory that explains the relationship between capital structure and profitability. The study adopted the definition of capital in the Basel guidelines as the proposed definition of capital throughout this thesis.

CHAPTER 3: EMPIRICAL REVIEW OF LITERATURE ON BANKS' PROFITABILITY

3.1 INTRODUCTION

In the previous chapter, the author examined the definition and importance of capital for an enterprise. The author observed that the composition of capital varies among different countries, as well as in South Africa, depending on the regulatory authorities of the particular country.

In this chapter, the author critically examined the theory of bank capital, regulatory issues, developments within the sphere and its links with bank profitability. Issues, debates and experiences on matters that relate to bank capital were discussed.

The capital of a bank, also known as equity, is the margin by which creditors are covered if the assets of the bank were to be liquidated. A measure of the financial health of the bank is its capital/asset ratio, which is required to be above a prescribed minimum (Hummel, 2002). When a bank creates a deposit to fund a loan, the assets and liabilities of the bank increase equally, with no increase in equity. That causes its capital ratio to drop. Therefore, the capital requirement limits the total amount of credit that a bank may issue. It is important to note that the capital requirement applies to assets while reserve requirement applies to liabilities.

Capital and its adequacy as a subject have been raised at different forums and has been a matter of concern for both banks and regulators from a policy perspective. Despite the immense amount of work that has been devoted to this issue, there has been little in the way of agreement among the various commentators as to the guiding principles (Pringle, 1975).

There has been debate on whether capital plays a role in curbing excessive risk taking by banks and reducing the probability of bankruptcy. The orthodox argument (Berger, Herring & Szego 1995; Kaufman, 1991; Furlong & Keeley,

1989; Furlong, 1990) is that capital acts as a buffer against failure, and therefore the regulation that forces banks to hold more capital will reduce the likelihood of bankruptcy.

Other authors (Kahane, 1977; Koen & Santomero, 1980; Lam & Chen, 1985) disagree and suggest that capital regulation may indeed lead to increased risk taking by banks.

The current study addresses the importance of capital. The author argued that the relationship between capital and profitability needs to be explored further.

Conventional wisdom suggests that the riskiness of a bank is determined by its ability to absorb unforeseen losses. Given that capital is viewed to act as a buffer against losses, a high capital asset ratio (CAR) tends to be associated with lower profitability.

Berger (1995b) appears to have been the first to have reported and provided a plausible theoretical explanation of the positive relationship between CAR and return on investment (ROE). First, Berger argues that a bank that is maintaining a low CAR relative to the equilibrium value may have relatively high-expected bankruptcy costs, thus an increase in the CAR may lead to an increase in the ROE by lowering insurance costs on uninsured debt. Secondly, Berger suggests that this positive relationship could be the result of a signalling equilibrium. Other authors (Bernaner & Koubi, 2002) suggest that competitive forces may motivate banks to maintain higher capital ratios as a means of covering their borrowing costs. It is worthy to note however that all the theoretical literature analysing banking behaviour assumes that capital requirements are a binding constraint on banking behaviour and therefore do not treat capital as a managerial decision.

3.2 OTHER DETERMINANTS OF BANK PERFORMANCE

Capital as measured by the present regulatory framework, though important, is not the only factor that determines profitability of a bank. Much also depends on

the quality of the assets of the bank and, importantly, the level of provisioning a bank may be holding outside its capital against assets of doubtful value.

Other than capital, the quality of assets and the level of provisioning, there are also other determinants of bank performance that are worthy of discussion.

In the review of existing literature, this thesis made use of the work of various scholars in the field. Two schools of thought about bank profitability dominate literature: some research has been done in developed countries and other in developing countries. This thesis identified divergent opinions within the literature regarding the contribution of factors such as equity capital, bank size, loans and advances, credit risk, market concentration, inflation, and economic growth in addition to other factors.

Researchers, such as Short (1979), Dermirguc-Kunt and Huizinga (1999, 2000), Bikker and Hu (2002), Davis and Zhu (2005) examined and compared the determinants of profitability across different countries, while authors such as Athanasoglou , Brissimis and Delis (2005, Berger (1995a, 1995b), Goddard, Molyneux, and Wilson, (2004a, 2004b),) focused on the banking sectors of individual countries. However, there is a relatively common list of factors that is advanced in recent literature as the usual determinants of bank profitability.

An observation is made in most of the studies around the topic of capital and profitability that the factors can broadly be grouped into two, internal factors and external factors (Alper & Adbar, 2011).

Gungor (2007) describes internal determinants as being related to bank management and referred to them as micro or bank-specific determinants of profitability. According to Gungor (2007), external determinants are reflective of the economic and legal environment that affects the operation and performance of banks.

Mamatzakis and Remoundos (2003) conclude that the variables that are directly related to the strategic planning of the banks that cover, among others, personnel expenses, loans-to-assets ratio, equity-to-assets ratio are responsible for the profit levels shown in their studies.

The pair also report that economies of scale play a significant role in the market, and has a positive impact on profitability. In their study, Mamatzakis and Remoundos also find that the size of the market, an external variable, defined by the supply of money, significantly influences profitability.

Findings by Afanasieff *et al.*, (2002) who examined the determinants of the interest spreads of banks in Brazil suggested that both macro and micro variables have the most impact on bank interest spread.

Naceur (2003) who investigates the impact of the characteristics of banks, capital structure and macro-economic indicators on the net interest margin and profitability of banks in the Tunisian banking industry for the 1983–2000 period, concludes that high net interest margin and profitability tend to be associated with banks that hold a relatively large amount of capital, and do not have large overheads.

In a research conducted in Switzerland, Dietrich and Wanzenried (2009) find significant differences in profitability between commercial banks and argued that the differences can largely be explained by the factors that they cover in their studies.

These factors revolved around capitalisation and the results support the notion that better capitalised banks are more profitable than other banks. They also touched on the loan volume of the bank and conclude that if the loan volume of a bank is growing at a faster rate than the rest of the market, the impact on bank profitability is positive.

The key variables included in these studies are GDP growth, which they find to affect bank profitability positively, the effective tax rate and the market concentration rate, which both had a significant negative impact on bank profitability in Switzerland.

In the case of Pakistan, Javaid, Anwar, Zaman, and Gafoor, (2011) find that more total assets may not necessarily lead to higher profits due to the diseconomies of scale, and bigger loans contribute towards profitability, but their impact is not significant.

They also conclude that equity and deposits have a significant impact on profitability thus supporting the widely held view that there is a positive relationship between capital and profitability.

There are some studies that are analysing bank profitability in groups of countries, such as Molyneux and Thornton (1992), Demirguc-Kunt and Huizinga (1999, 2001), Abreu and Mendes (2001), Bashir (2000), Hassan and Bashir (2003), Athanasoglou, Delis and Stakouras (2006).

The findings by Molyneux and Thornton (1992) who are the first to investigate a multi-country setting by examining the determinants of bank profitability for a panel of 18 European countries for the 1986–1989 period, suggest a significant and positive association between the return on equity and the level of interest rates in each country.

In the study by Demirguc-Kunt and Huizinga (1998) who examined the determinants of bank profit and net interest margins, using a comprehensive set of bank specific characteristics, as well as macro-economic conditions, taxation, regulations, financial structure and legal indicators for 80 countries, both developed and developing, for the 1988–1995 period find that foreign banks have higher profitability than domestic banks in developing countries, while the opposite holds in developed countries. The summarised position from these studies of clusters of countries is that costs in general are negatively correlated

with profits and that larger size of the bank, greater dependence on loans for revenue, higher the market concentration, greater GDP growth and higher proportion of equity capital to assets are generally associated with greater profitability.

In the same vein, banks with higher liquidity ratios, greater provisions for loan losses and who are more reliant on debt capital indicate lower bank profits.

3.2.1 Firm/bank size

The empirical evidence regarding size as a possible determinant of profitability/leverage of an institution is mixed. On the one hand, there is support for a positive relationship between firm size and capital structure of relatively small institutions (Sogorb-Mira, 2005); while on the other hand some studies find a negative relationship in the short-run (Chittenden, Hall, & Hutchinson, (1996); Hall, Hutchinson & Michaelas, (2004). These authors argue that small institutions tend to depend mostly on equity, while large firms are most likely to use debt. According to Newman, Gunessee, and Hilton, (2012) research conducted in developing countries also establishes a positive relationship between firm size, profitability and measures of capital structure.

Size is part of the argument in as far as the accounting of any (dis)economies of scale in the market is concerned. According to Akhavein, Berger and Humphrey (1997) and Smirlock (1985) there is a positive and significant relationship between size and profitability.

Size have been supported by other researchers basically to account for existing economies or diseconomies of scale within the banking market (Alper & Ambar, 2011; Miller & Athanasios, 2010; Peiy & Werner, 2005; Spathis, Kosmidov & Doumpus, 2002; Sufian & Habibullah, 2009).

Alper and Ambar (2011:149) examine the bank-specific and macro-economic determinants of bank profitability in Turkey during the period from 2002 to 2010. They find that asset size had a positive and significant effect on profitability.

Bank loans are expected to be the main source of income and to have a positive impact on bank performance. However, with regard to macro-economic variables, only real interest rate is found to have an effect on profitability, as measured by ROE. The remaining bank-specific factors (capital adequacy, liquidity, deposits/assets ratio and net interest margin) and macro-economic factors (real GDP growth rate and inflation rate) do not have any significant effect on bank profitability.

Miller and Athanasios (2010:505) examine large commercial banks to determine what factors affect bank profitability. They find that large banks experience poor performance because of the declining quality of the loan portfolio. However, real estate loans generally have a negative effect on the profitability of large banks, although not at high levels of significance. By contrast, contraction and land development loans have a strong positive effect on the profitability of these banks. In the same vein, Sufian and Habibullah (2009:288) investigate the determinants of profitability in the Chinese banking sector during the period 2000–2005. They find that the Chinese banking sector had undergone significant financial reforms, which had transformed the banking sector largely. However, it is reasonable to assume that these developments pose great challenges to banks in the Chinese banking sector, as the environment in which they operate change rapidly, a fact that consequently have an impact on the determinants of profitability of Chinese banks. Nevertheless, the overall results show that all the determinants have a statistically significant impact. Hussein and Al-Tamimi (2008:46) examine the determinants of the performance of commercial banks in the UAE. They find that the most significant determinants of the performance of the national banks are the size and portfolio composition of the banks.

Spathis, Kosmidou and Doumpos (2002:528) investigated the factors of Greek banks that were induced from their financial statements and were related to their size, for the period 1990–1999. They find that large banks are more efficient than small ones. They classify banks in the correct size in proportion to their differences in efficiency, liquidity, risk, leverage, and capital adequacy. Additionally, the size of a bank is crucial. Both small and large banks have advantages and disadvantages. They report that though small banks seem to be more efficient and vulnerable, large ones have lower operating costs due to the economies of scale and their network. In the same line of arguments, Peiy and Werner (2005:03) analyse a panel of 288 German banks from 1998 to 2002. Their conclusions support the structure-conduct performance hypothesis and the efficiencies-of-scale version of the efficient-structure hypothesis. They find that German banks may improve their profitability by increasing their asset size and or by consolidation. Additionally, they also find that portfolio risk is a key factor in determining the profit-structure relationship. However, some other researchers suggest views that are contrary. In their study Ali, Akhtar and Ahmed (2011:238) find size to be an insignificant factor in the relationship, but the relationship is negatively related to profitability (ROE). Corroborating this position, Athanasoglou et al., (2008:134) posit that the effect of bank size on profitability is not important. The explanation for this according to them may be that small-sized banks usually try to grow faster, even at the expense of their profitability. The empirical results as generated from the models show that size is one of the main variables, which determine the profitability of banks.

Other researchers (Berger, Hanweck &Humphrey (1987); Boyd & Grahame, 1991) indicate that economies of scale in banking tend to be exhausted at relatively small sizes, which suggests that large banks could eventually face scale inefficiencies.

Athanasoglou *et al.*, (2005) suggest that size is closely related to capital and that large banks are able to raise capital relatively cheaply, which consequently makes them appear more profitable. Large banks do possess market power due to

established brands, which enable them to attract low cost capital, thus resulting in them appearing more profitable.

It is conventional wisdom that growth in demand is constrained by the size of the market, thus there are limits to the size to which a firm can grow before adversely affecting profitability.

On the other hand, many authors have point out (Berger, 1995b; Goddard *et al.*, 2004b) that a principal source of capital is retained earnings.

As a result, under the current regulatory regime where banks are required to meet certain capital adequacy requirements, profit is an important determinant for the expansion of the portfolio of risk assets of a bank.

Size has been viewed as a determinant of both the profitability and capital structure of a firm. A number of reasons could be listed that justify the inclusion of size indicators to the capital structure of the firm (Cassar, 2004). First, smaller banks find it costly to resolve information asymmetry problems with potential lenders, resulting in limited access to finance or financing only being available at a higher cost (Newman, Gunesse & Hilton, 2013). Consequently, it becomes more efficient for small banks to use internally generated funds than external sources (Barbosa & Moraes, 2004; Myers, 1984). Information costs are lower for large banks than for small banks due to better quality of financial information in terms of accuracy and transparency (Daskalakis & Psillaki, 2009). Secondly, small banks/firms face higher transaction and interest rate charges than large banks/firms that have the advantage of economies of scale for the financial institution (Cassar, 2004). Since transaction costs are fixed, financing costs are inevitably more costly for small institutions than for large ones. Thirdly, small institutions are perceived to possess greater operating risk than larger institutions, resulting in a higher risk premium when raising loans or equity capital (Ortqvist, Masli, Rahman & Selvarajah, 2006). Thus small institutions have far higher risk of bankruptcy as they tend to fail more often than large institutions. At the same time, larger institutions have diversified streams of

revenue and established operations, making them more prone to succeed in the long run than small institutions. Therefore, size is expected to be positively related to higher profitability and leverage.

3.2.2 Age of the firm/bank

According to Abor and Biepke (2007), age is a standard measure of reputation and risk in capital structure models. Age plays a significant role on the ability of the bank/firm to acquire debt. Old banks are deemed more stable, and thus more reputable, than new banks due to their ability to survive over a longer period of time (Diamond, 1991). Therefore, the prediction is that old banks/firms tend to have more long-term debt in their capital structures, which has a bearing on profitability due to tax benefits. Empirical work on the relationship between age of a bank/firm and its use of external finance is mixed. Petersen and Rajan (1994:24) find a significant relationship between age and leverage of small banks/ firms. Similarly, Barton, Ned and Sundaram (1989:41) conclude that mature banks/firms experience lower earnings volatility and hence are expected to have higher debt ratios. Hall *et al.*, (2004) find a positive relationship between age and long-term debt, but negatively related to short-term debt. This suggests that the reputational capital held by old firms is sufficient to ensure that the risk of default on the bank credit is minimised. In Ghana, Abor and Biepke (2007) also find that age is positively related to debt, suggesting that age is an important factor influencing access to debt capital of institutions.

Curak, Poposki and Pepur (2011) examine the determinants of profitability within the Macedonian banking sector and find that new banks have a higher cost-to-income ratio, a phenomenon that is consistent with the conventional wisdom, which says that if an institution is new in a market, the institution cannot benefit from economies of scale because it has none. There are no reputational benefits in the early years of operations and the cost of capital is equally expensive.

The well-established banks/firms will thus have a competitive advantage over new banks/firms. As the new banks strive for market share and recognition, their

expenses goes up in the early years of their operations. It is expected therefore that newer banks should be at a disadvantage compared to older banks in a market.

3.2.3 Asset quality

The consensus among researchers is that asset quality and structure is directly related to leverage (Bester, 1985). However, due to a conflict of interest between providers and shareholders, lenders face the risk of adverse selection and moral hazard. Therefore, lenders take action to protect themselves by requiring tangible assets. Collateral also provides a means to mitigate the risks of information asymmetry between lenders and borrowers (Besanko & Thakor, 1987) thereby limiting monitoring costs or any extra risk acceptance required by banks/firms with unsecured positions (Newman, et al., 2013). Hence, asset quality and structure is likely to be positively associated with profitability and capital structure of institutions. Furthermore, in the event of bankruptcy, a higher proportion of tangible assets could enhance the salvage value of the assets of a firm (Stiglitz & Weiss, 1981). The lenders of finance are thus willing to advance loans to firms with a high proportion of tangible assets.

In general, empirical studies on small institutions in developed countries are in support of a positive association between asset structure and long-term leverage and a negative relationship between asset structure and short-term leverage (Cassar & Holmes, 2003; Chittenden et al., 1999; Sorgob-Mira, 2005). This emanates from the fact that small institutions use internal sources of finance which do not require fixed assets as collateral in the short-term, while in the long-term, financing is secured against fixed assets (Newman, et al., 2013). Thus, assets function as guarantee in case of default (Harris & Raviv, 1991). Similarly, it has also been argued that collateral reduces adverse selection and moral hazard costs (Forte, Barros & Nakamura, 2013) for small banks with information asymmetry. Empirical evidence discussed so far provides strong support for the positive association between asset structure and leverage predicted by capital structure theorists. This is also evident in developing economies as supported by

studies in Ghana (Abor & Biepke, 2007) and in China (Huang & Song, 2006). It can be suggested that the asset structure of a bank/firm influences its use of debt finance. Without tangible assets, the bank/firm cannot access bank finance and has to look for alternative sources of finance.

3.2.4 Bank/firm risk

The level of risk is said to be one of the primary determinants of capital structure and hence profitability of a bank/firm. According to Kim and Sorensen (1986), banks/firms with a high degree of business risk have less capacity to sustain financial risks, and thus use less debt. Theoretically, riskiness is expected to be negatively related to leverage. However, empirical evidence between risk and leverage for institutions is limited and varied. Halov and Heider (2011) empirically examine the role of risk in the capital structure of firms. The authors argue that the traditional theory puts too much emphasis on the role of information asymmetry to explain financing decisions of banks/firms. However, an important factor that has been ignored in the literature is the role of risk. Small banks face more severe information asymmetry problems than large and mature banks.

3.2.5 Lagged profitability

According to Ngo (2006), the persistence of profits (POP) literature concerns itself with testing the hypothesis that markets are sufficiently competitive so that any abnormal profits are eroded quickly and that the profits of all firms tend to some long-term average. Another viewpoint is that firms pose some kind of market power or competitive advantage, which enables them to achieve above-average profits persistently over time.

There are a few empirical tests of the POP hypothesis in the banking literature, but in spite of this, one recent example by Berger *et al.*, (2000) presents evidence of POP in USA banking. The results show that profit converges more slowly to its long-run average value in banking than in manufacturing and that market power plays a crucial role in allowing abnormal profits to persist.

3.2.6 Diversification

Demsetz and Strahan (1997) examined the role of diversification in the USA banking market and concluded that the risk reducing potential of diversification at large bank holding companies (BHCs) is offset by their lower capital ratios and larger commercial and industrial loan portfolios than is the case for small banks.

During the early 1970s international competition in banking increased, intensifying during the 1980s and 1990s and resulting in a drastic fall in bank fees and margins. In an attempt to maintain market share and profitability levels, many banks responded by expanding their product portfolios, mergers and expansion to overseas markets. This resulted in more product diversification, which allowed banks to spread risks across different assets. This was predominantly achieved via conducting a significant portion of their business “off balance-sheet” (OBS), including loan commitments, letters of credit and derivatives.

The few other studies which included the size of the OBS portfolio of a bank as a determinant of profitability report mixed results. (See Goddard *et al.*, 2004a)

3.2.7 Credit risk

Credit risk also plays a role in the profitability equation. Poor asset quality resulting in non-performing loans is a key element in bank failures. Given the above, it is therefore not out of the order for one to associate poor quality loans with negative profitability *ceteris paribus*.

Flamini, McDonald and Schumacher (2009), refer to Al-Haschimi (2007) who uses accounting decompositions, as well as panel regressions, find that credit risk has a negative effect on profitability. He concludes that credit risk and operating inefficiencies explained most of the variations in interest earning for the banks that he reviewed.

It is also safe to conclude therefore that banks can improve their profitability by improving screening, monitoring and forecasting of credit facilities.

Empirical literature tends to find a negative relationship between credit risk and earnings (Athanasoglou *et al.*, 2005).

Several studies however seem to also support credit risk to have an important relationship with profitability (Manoj, 2010; Raghavan, 2003; Sufian & Habibullah, 2009).

Manoj (2010:18) identifies the determinants of profitability and operational efficiency of old private sector banks (OPBs), by using an econometric methodology. He finds that the OPBs in general, have used credit risk as a factor for enhancing operational efficiency and risk management capability.

To avoid losses from the start, Raghavan (2003:02) suggests that risk management could play an essential role by identifying, measuring and, more importantly, monitoring the profile of a bank. Risk management in the banking sector also plays an important role in economic growth by converting deposits into productive investments.

However, Sufian and Habibullah (2009:207) indicate that bank-specific characteristics, in particular loan intensity, credit risk and cost, have positive and significant impacts on bank performance, while non-interest income seems to have a negative relationship to bank profitability.

Alexiou and Sofoklis (2009:114) identify the key factors that influenced the profitability of Greek commercial banks during the period 2000–2007. They find that bank profitability could be improved considerably if appropriate mechanisms to screen, monitor and forecast future levels of risk are put in place. By contrast, Alper and Anbar, (2011:149) indicate that the ratios of loans/assets and loan under follow up/loans were significantly and negatively affecting ROA. Ali, Akhtar and Ahmed's (2011:238) study of the profitability of Islamic banks in Pakistan

indicate that profitability is negatively and significantly related to credit risk when profitability is measured by return on assets (ROA), but insignificant and negatively affected when profitability is measured by return on equity (ROE).

3.2.8 Loans and advances

Sufian and Habibullah (2009), Davydenko (2010), Chirwa (2003) and Rasiah Devinaga (2010), among others, look at the impact of loans and advances on profitability.

Sufian and Habibullah (2009:207) examine the performance of 37 Bangladeshi commercial banks between 1997 and 2004. They find that bank-specific characteristics, in particular loan intensity, credit risk and cost, have a positive and significant impact on bank performance, while non-interest income exhibits a negative relationship with bank profitability.

Davydenko (2010) examines the determinants of bank profitability in Ukraine. The study relates bank-specific, industry-specific and macro-economic indicators to the overall profitability of Ukrainian banks from 2005 to 2009. He finds that Ukrainian banks suffer from a low quality of loans and do not manage to extract considerable profits from the growing volume of deposits. The study also finds evidence for the difference in profitability patterns of banks with foreign capital versus exclusively domestically owned banks.

Chirwa (2003:571) investigates the relationship between market structure and profitability of commercial banks in Malawi, between 1970 and 1994. He finds that a long-run relationship exists between profitability and market structure in the Malawian banking sector. Furthermore, his conclusions are that other variables that positively and significantly influence commercial bank profitability in the long run and short-run are the loan-assets ratio and the demand-deposit ratio.

Rasiah Devinaga (2010:01) identifies two main determinants of profitability of commercial banks, which he divides into two main categories, namely, the internal determinants and the external determinants. The internal determinants include management controllable factors such as liquidity, investment in securities, investment in subsidiaries, loans, non-performing loans and overhead expenditure. Other determinants such as saving, current account deposits, fixed deposits, total capital and capital reserves, and money supply also play a major role in influencing the profitability. Similarly, external determinants include those factors, which are beyond the control of management of these institutions such as interest rates, inflation rates, market growth and market share.

Contrary of this view, Vong and Chan (2008:108) examine the impact of bank characteristics as well as macro-economic and financial structure variables on the performance of the Macao banking industry. They reveal that a higher loan-to-total assets ratio may not necessarily lead to a higher level of profits. Furthermore, a lower spread together with higher loan-loss provisions lead to lower profitability. Therefore, instead of loan size, it is the spread and quality of the loans that matter. Lastly, their study shows that small banks achieve a higher return on assets than large ones. Only, the inflation rate plays an important role in explaining the return on assets of banks regarding the macro-economic indicators.

3.2.9 Operating expenses

The cost component of a standard profit function is important and should be captured in any analysis of profitability. Bourke (1989) and Molyneux and Thornton (1992), amongst others, include staff expenses as a proxy for general overhead expenses. Athanasoglou et al., (2005) suggest that higher staff expenses could be due to the hiring of higher quality management, which then results in higher profits.

The study by Curak, Poposki and Pepur (2011) centres on the effects of operating expenses on profitability within the Macedonian banking sector and they find, as expected, that there is a negative relationship between operating expenses and

profitability. They conclude that operating expenses have the highest impact on profitability among all internal variables. The management therefore of operating expenses becomes critical in the bank profitability equation.

3.2.10 Market concentration

The impact of market concentration on profitability cannot be ignored. The literature on market concentration and profitability is principally concerned with explaining the common empirical finding of a positive relationship between market concentration and profitability. (Bhattia & Hussian 2010; Short 1979).

Bhattia and Hussian (2010) examine the relationship between market structure and performance in the banking sector using data from Pakistani commercial banks. They find that there is a positive relationship between profitability and market concentration. The empirical findings suggest that market concentration determines the profitability in Pakistani commercial banks. Furthermore, they also conclude that there is a negative relationship between competition and profitability in the Pakistani commercial banks.

Short (1979:213) examines the relationship between the profit rates of 60 banks and market concentration in the 'home' banking market of each. He finds that greater market power leads to higher bank profit rates. However, the relatively small coefficients of the market concentration are necessary to reduce profit rates by one percentage point. On the contrary, Dietrich and Wanzenried (2009:34) examine how bank specific characteristics, macro-economic variables and industry-specific factors affect the profitability of 453 commercial banks in Switzerland over the period from 1999 to 2006. They find that the market concentration rate has a significantly negative impact on bank profitability.

Berger (1995a) advances two opposing but mutually acceptable explanations for this positive relationship: monopoly power (MP) or structure-conduct performance (SCP) and the efficient structure (ES).

Although there are slight variants on the MP and ES hypotheses, broadly, the MP asserts that the positive finding reflects the setting of less favourable prices to consumers (lower deposit rates, higher loan rates) in more concentrated markets because of market power.

By contrast, the ES hypothesis, whether it is an X-efficiency or economies of scale argument, advocates that large banks/firms can achieve cost savings and thus higher profits than small banks/firms.

However, the focus of the current study is not to try to explain which of these hypothesis best explains the positive profit structure relationship. Rather, market concentration is simply included as a control variable for completeness.

3.2.11 Macro-economy

The impact of demand side factors and the macro-economic environment have always been recognised as potentially influencing bank performance.

According to Athanasoglou, *et al.*, (2006b), the market structure is not perfectly competitive. These studies were conducted on Greek banks over the period from 1985 to 2001. The results led them to conclude that the profitability of Greek banks is shaped by bank-specific factors and macro-economic control variables, which are not under the direct control of the bank management. Industry structures do seem to have significant influence on profitability. To this end, prudent risk management is required, according to Athanasoglou *et al.*, (2006). In a study of the profitability behaviour of the South Eastern European banking industry over the period from 1998 to 2002, the results suggest that the enhancement of bank profitability in those countries require a new approach to risk management. The variables that have been included in the past include, but are not limited to, gross domestic product (GDP), some measure of growth in the banking market, inflation and/or interest rates.

3.2.12 Economic growth (GDP)

Economic growth is measured by the real GDP growth rate and it is hypothesised to affect banking profitability positively. This is because the default risk is lower in an upturn than in downturn economy. In addition, higher economic growth may lead to a greater demand for both interest bearing and non-interest bearing financial services, thereby improving the profitability of banks.

Dietrich and Wanzenried (2009:34) find that the GDP growth variable is one of the most important factors, which affect bank profitability. Ali, Akhtar and Ahmed (2011:238) indicate that macro-economic variables, GDP in particular, have a positive effect on profitability (as measured by ROA and ROE). By contrast, Athanasoglou, Delis and Stakouras (2006) analyse the effect of a selected set of determinants on banks profitability in the South Eastern region over from 1998 to 2002. They conclude that bank profits are not significantly affected by real GDP per capita.

3.2.13 Lending interest rate (LIR)

The real interest rate is expected to have a positive relationship with profitability according to the lend-long and borrow-short argument (Vong & Chan, 2008). On the other hand, the rise in real interest rates may increase the real debt burden on borrowers and this may lower asset quality, resulting in the interest rate having a negative impact on profitability. Gelos (2006) studies the determinants of bank interest margins in Latin America using bank and country level data. He reaches the conclusion that spreads are relatively high and this is attributed to high interest rates.

3.2.14 Inflation (INF)

Some studies support the relationship between bank profitability and inflation (Naceur & Goaid, 2006; Athanasoglou *et al.*, (2006).

Naceur and Goaid (2006:02) investigate the impact of the characteristics, financial structure and macro-economic indicators of banks on the net interest margins and profitability in the Tunisian banking industry for the 1980–2000 periods. They find that the inflation has a positive impact on net interest margin of banks, while economic growth has no influence. In addition, they find that competition and stock market development have a positive effect on bank profitability. Furthermore, they conclude that the disintermediation of the Tunisian financial system is favourable to the banking sector profitability. This view is supported by Athanasoglou et al., (2006:22) who examine the profitability behaviour of bank-specific, industry-related and macro-economic determinants using an unbalanced panel dataset of South Eastern European (SEE) credit institutions during the 1998–2005 period. They come to a rigorous consensus that the SEE countries need stable, profitable and predictable expenditures. Finally, with respect to the macroeconomic variables, inflation has a strong effect on profitability, while bank profits are not significantly affected owing to the small sample period. However, as financial systems develop and the reform process ends, both the current and future rates of economic growth are likely to have an enhanced impact on bank profitability.

Contrary on this view, Ali, Akhtar and Ahmed (2011:237) also indicate that the consumer price inflation (CPI) is statistically significant and associated with profitability (as measured by ROA).

A high inflation rate is associated with higher costs as well as higher income. If the income of a bank rises more rapidly than its costs, inflation is expected to exert a positive effect on profitability. On the other hand, a negative coefficient is expected when its costs increase faster than its income.

3.3 EQUITY CAPITAL (CAP)

Researchers such as Dietrich and Wanzenried (2009), Athanasoglou, Brissimis and Delis (2005), KPMG (1998), Athanasoglou *et al.*, (2008), Kosmidou *et al.*, (2006), Flaminin *et al.*, (2009), Atemnkeng *et al.*, (2000), Athanasoglou *et al.*,

(2005), Ligeti Sandor (1985), Rasiah (2010), and Javari, Anwar and Gafoor (2010) argue for the significance of equity capital as a key determinant to profitability. Dietrich and Wanzenried (2009:34) analyse the profitability of commercial banks in Switzerland during the period from 1999 to 2006. They find that better capitalised banks seemed to be more profitable. In addition, in the case where the loan volume of a bank grows faster than the market, this has an impact on bank profitability.

Athanasoglou, Brissimis and Delis (2005:134) analyse the effect of a selected set of determinants on bank profitability in Greece. They find that capital is important in explaining bank profitability and that an increased exposure to credit risk lowers profits. In addition, labour productivity growth has a positive and significant impact on profitability, while operating expenses are negatively and strongly correlated with profitability, indicating that cost decisions of bank management are instrumental in influencing bank performance. On the other hand, the ownership status of banks is insignificant in explaining profitability, as private banks do not generally achieve higher profits, at least not during the period under review.

Javaid, Anwar and Gafoor (2011:69) analyse the determinants of bank profitability in Pakistan during the period 2004 to 2008. They find that the characteristics of individual banks (internal factors only) are considered determinants of bank profitability in Pakistan. In addition, banks with more equity capital, total assets, loans and deposits are perceived to have more security, and such an advantage can be translated into higher profitability.

KPMG (1998:53) focuses on bank margins and their relationship to profitability for the four major banks in the South African market. The ROE is identified as being the significant performance measure and the profitability is reviewed on this basis. In addition, it is further illustrated by the fact that the margins of South African banks remain stable under varying interest rate scenarios.

Athanasoglou *et al.*, (2008:134) examine the effect of bank-specific, industry-specific and macro-economic determinants on the profitability of Greek banks over the period 1985 to 2001. They find that capital is important in explaining bank profitability and that increased exposure to credit risk lowers profits. Additionally, labour productivity growth has a positive and significant impact on profitability while operating expenses are negatively and strongly linked to it, showing that cost decisions of bank management are instrumental in influencing bank performance.

Kosmidou *et al.*, (2006:02) investigate the impact of bank-specific characteristics, macro-economic conditions and financial-market structure on the profits of UK-owned commercial banks during the period 1995 to 2002. They find that capital strength, represented by the equity-to-assets ratio, is the main determinant of the profits of UK banks providing support to the argument that well-capitalised banks face lower costs of external financing, which reduces their costs and enhances profits. In addition, macro-economic and financial-market measures of bank performance, which adds little to the explanatory power, but appear to influence profitability positively.

Flaminin *et al.*, (2009:01) examine a sample of 389 banks in 41 sub-Saharan African countries to study the determinants of bank profitability. They find that apart from credit risk, higher returns on assets are associated with larger bank size, activity diversification and private ownership. Bank returns are affected by macro-economic variables, suggesting that macro-economic policies that promote low inflation and stable output growth do boost credit expansion. They also moderate persistence in profitability.

Atemnkeng *et al.*, (2000:01) examine the structure-performance (S-P) hypothesis empirically within the context of the Cameroonian commercial banking system during the period 1987 to 1999. They find three accounting measures of the performance of a bank are utilised: return on capital (ROC), return on assets (ROA) and return on equity (ROE). They indicate a positive relationship between

structure and bank profitability within the institutional context of the banking system in Cameroon.

Aburime (2002:01) investigates company-level determinant of bank profitability using a panel data set comprising of 91 observations of 33 banks over the period 2000 to 2004. He finds that capital size, size of credit portfolio and extent of ownership concentration are significant company level determinants of bank profitability in Nigeria. Furthermore, in order to maximise profit, the focus is on maintaining a sizable amount of reserves, improving the quality of their portfolios and beefing up the concentration of their ownership. This supports the findings of Athanasoglou, et al., (2005:25) who examined the effect of bank-specific, industry-specific and macro-economic determinants of bank profitability, using an empirical framework that incorporates the traditional structure-conduct-performance (SCP) hypothesis on a panel of Greek banks over the period 1985 to 2001. They find that capital is important in explaining bank profitability and that increased exposure to credit risk lowers profits. Additionally, labour productivity growth has a positive and significant impact on profitability, while operating expenses are negatively and strongly linked to it, showing that the cost decisions of bank management are instrumental in influencing bank performance.

Ligeti Sandor (1985:307) establishes that a development bank demands the supply of their financial resources. He finds that the main sources of finance are both capital and loans. Additionally, mainly the absorptive capacity of the respective economy and the proportion of the development bank in financing investment determine the level of a development bank.

When the proper capital structure has been decided, there is a danger in both over-capitalisation and under-capitalisation. Therefore, Boskey (1959:22) explains this issue when he argues that the bank ought to have sufficient capital to enable it to make an impact on industrial development, and to earn enough for expenses, the accumulation of adequate reserves and in the case of a private institution, payment of a satisfactory dividend. On the other hand, resources

should not be so large that they greatly exceed what appears reasonably necessary for the fulfilment of bank purposes.

Rasiah (2010:565) analyses the internal determinants and the external determinants of profitability of commercial banks. Rasiah finds that the variables of internal determinants are items involving total revenue and total cost. The internal variables included in the study are items such as asset portfolio mix, total expenses, liability composition, and liquidity ratio and capital structure. In addition to the above, the external determinants that are taken into consideration are competition, regulation, inflation, market share, market growth, firm size and interest rate.

Contrary to the above-mentioned studies, others find an inverse relationship between profitability and capital adequacy. Ali, Akhtar and Ahmed (2011:238) examine the profitability indicators of public and private commercial banks in Pakistan during the period 2006 to 2009. They find bank profitability is negatively affected by capital and credit risk, in the event that profitability is measured by return on asset (ROA).

Al-Tamimi (2005:35) examines the determinants of the performance of the UAE commercial banks and states that the problem of maintaining capital reveals the negative relationship with profitability.

The debate thus surrounding capital and its adequacy is an important concern for both banks and the regulators, and has been at the forefront of policy discussions for decades. Despite the immense amount of work that has been devoted to the issue, there has been little in the way of agreement among the various commentators as to the guiding principles (Pringle, 1975). First, the effectiveness of capital in curbing excessive risk taking by banks and reducing the probability of bankruptcy is contested.

The orthodox argument (Berger, Herring and Szego, 1995; Furlong and Keeley, 1989; Kaufman, 1991; Keeley and Furlong, 1990) is that capital acts as a buffer against failure, thus regulations that force banks to hold more capital will reduce the likelihood of bankruptcy. Other authors however disagree and suggest that capital regulations may indeed lead to increased risk taking by banks (Kahane, 1977; Koehn and Santomero, 1980; Lam and Chen, 1985). Secondly, whether capital regulations have any impact on the actual capital decision of a bank is also a moot point. Previous empirical works on the effectiveness of bank capital regulation in determining actual capital levels have contrasting results.

Peltzman (1970), and Dietrich and James (1983) find no regulatory effect on bank capital whereas Mingo (1975) finds that capital adequacy regulation had a significant impact on bank capital.

According to conventional wisdom, the riskiness of a bank is determined by its ability to absorb unforeseen losses. Given that capital is viewed to act as a buffer against losses, a high CAR tends to be associated with lower profitability. That is, capital tends to lower the risk on equity and thus lowers the equilibrium expected ROE (Berger, 1995b). This hypothesised lower-risk lower-return relationship, based on standard Markowitzian reasoning, seems quite plausible. Nevertheless, previous empirical studies on the impact of capital on profitability provide conflicting results. Some authors (Berger, 1995b; Bourke, 1989; Goddard et. al., 2004a; Molyneux and Thornton, 1992) find a positive relationship between capital and profitability, whereas others (Goddard et. al., 2004b) provide evidence in favour of the hypothesised relationship. Berger (1995b) is the only paper that looks closely at the relationship between capital and earnings. In Granger-causality tests, he finds that positive causation runs both ways between CAR and ROE. The positive causation from ROE to CAR is not particularly surprising, given the hypothesis that banks retain part of their marginal earnings in the form of increases in capital (Berger, 1995b). The positive relationship that runs from CAR to ROE is more surprising, and is the result that is most relevant to the capital adequacy debate. Although not the first to report a positive relationship between CAR and ROE, Berger (1995b) is the first to propose some plausible theoretical

explanations for this finding. Outside of the Markowitzian single-period world with perfect capital markets, Berger (1995b) comes up with two seemingly possible reasons for a positive relationship between CAR and ROE. First, a bank that is maintaining a low CAR, relative to the equilibrium value, may have relatively high-expected bankruptcy costs, thus an increase in the CAR may lead to an increase in the ROE by lowering insurance costs on uninsured debt. Secondly, Berger (1995b) suggests that this positive relationship could be the result of a signalling equilibrium. That is, bank managers may have private information about the future profitability of the bank and/or a stake in the value of the bank through incentives.

Even if we do not believe that the CAR is a good proxy for how risky a bank is, there are other arguments as to why raising capital may lead to reduced profits. First, debt is usually a cheap form of financing. Thus forcing banks away from their optimal capital ratio should result in a reduction in profitability, although this is only a problem if capital requirements are binding. Second, from the perspective of a bank, holding idle capital is an expensive safeguard against risk because the shareholders of the bank demand a return on their investment and idle capital provides no such return.

All this suggests that CAR may be endogenous, and although almost all the work that has followed Berger (1995b) discusses his results, none attempts to estimate a structural relationship. It is worth noting here that virtually all the theoretical literature analysing banking behaviour assume that capital requirements are a binding constraint on banking behaviour and therefore does not treat capital as a managerial decision. Nevertheless, Baltensperger (1980) presents a model where banks choose a level of capital that weighs up the benefits of reduced insolvency costs against the costs of holding more capital, which is assumed greater than the cost of debt. Potential bankruptcy provides banks with an incentive to hold a positive amount of capital. Pringle (1974) also discusses the capital decision of a bank, but in a model that ignores bankruptcy costs, which Baltensperger's (1980) analysis stresses. These two models however ignore any potential influence that formal capital requirements may have on the banks optimal choice of capital ratio. On this point Ngo (2006) presents a model of the optimising behaviour of a bank

in the presence of capital requirements. He shows that banks will tend to hold capital in excess of the official requirements in order to avoid the expected costs associated with regulatory breach and suggests that this might be an explanation for the observed over-compliance with capital regulations and therefore existence of non-binding capital requirements. Here the capital ratio is defined in accordance with the Basel Accord guidelines, CAR is the ratio of total capital (Tier 1 capital plus Tier 2 capital) to total risk weighted assets.

To summarise, the evidence documented suggests contrasting conclusions pertaining to which factors influence profitability positively and negatively.

There is extensive empirical literature on bank performance and the current study rather focused on the results of the more prominent studies that use profitability and earnings as measures of performance.

As evidenced from the above discussions, there are significant variations in the studies in terms of their both approaches and subsequent findings.

Therefore, in the light of all these seemingly contradicting conclusions and the lack of studies/research within the South African banking market, an explicit analysis of the determinants of bank profitability in South Africa is indeed lacking. It is therefore hoped that the current study expanded the existing literature on banking and finance in South Africa, particularly in the context of the determinants of bank profitability.

3.4 CHAPTER SUMMARY

In this chapter, the author reviewed contemporary issues regarding capital. Scholarly views on the subject were contrasted and compared. A number of variables that are linked to profitability of banks were examined. These included, but were not limited to bank size, age of the firm, asset quality, firm risk, lagged profitability, credit risk, loans and advances, operating expenses and gross domestic product and inflation respectively.

The examination and review process was guided by the following questions: what is the variable and its effects on profitability, what does the theory say about its relationship to profitability and what do other researchers say and conclude about this relationship?

It was established that there are contrasting views by researchers on the subject of capital and profitability. It was however noted that none such discussions and examinations and tests were carried out in a developing country such as South Africa. I hope that the current study contributes something new to the already existing body of knowledge on this subject.

CHAPTER 4: THE SOUTH AFRICAN COMMERCIAL BANKING SECTOR: HISTORICAL DEVELOPMENTS, LEGISLATIVE AND REGULATORY STRUCTURES

4.1 INTRODUCTION

In this chapter, the author presented and covered six sections that are relevant to the South African commercial banking sector. In Section 4.1, the author introduced the chapter. In Section 4.2, the author reviewed the historical developments within the South African commercial banking sector. In Section 4.3, the author gave an overview of the South African commercial banking sector during the apartheid era. In Section 4.4, the author presented an overview of the respective commercial banking sectors during the post-apartheid era up to the recent period with respect to sectorial developments, capital and profitability levels. In Section 4.5, the author explored the legislative and regulatory structure of the sector. In Section 4.6, the author reconciled the information and provided a summary of all the sections in this chapter.

4.2 THE SOUTH AFRICAN BANKING SECTOR: AN OVERVIEW

The South African banking sector is relatively developed and compares favourably with most developed countries.

In the context of the economies of emerging markets, South Africa is considered to have one of the most developed and highly sophisticated financial systems (Odhiambo, 2011:78).

Akinboade and Makina (2006:125) bemoan the lack of concerted effort to develop the financial sector further and the inability of the banking sector to introduce new non-deposit financial products in order to attract more savings from the wider population. The principal function of financial institutions is to attract deposits from surplus units and to lend that to the deficit units.

Financial institutions are vital for economic growth and as financial intermediaries; banks play a crucial role in the operation of most economies. The conventional theory of financial intermediation maintains that it is the primary function of banks to collect deposits from surplus units (savers, typically households) and to channel those funds to deficit units (borrowers, typically the enterprise sector and the government) (Gurley & Shaw, 1960; Schmidt et al, 1997). As such, banking institutions exist as intermediaries and transformers of funds to increase the social value of capital by channelling it towards uses that are more efficient rather than just leaving it in the bank. In the realm of financial intermediation, Diamond (1984) postulates that banks play a special role of providing liquidity and financing investment projects of borrowers which capital markets would not be able to do efficiently. It is in this respect that banks are therefore regarded as the primary conduit between savers and borrowers for intermediation purposes.

According to Gurley and Shaw (1960) and Hester (1969), financial intermediation is a process where financial transactions between borrowers and savers take place through the banking system. Even under conditions where bank capital is a key issue, the role of the banks as financial intermediaries should remain efficient in order to enhance a well-functioning financial system in the economy.

In the context of the South African economy, the banking sector system is highly concentrated and sophisticated with the five largest banks, being Absa, First National Bank, Investec, Nedbank and Standard Bank. In absolute terms, these five banks account for between 70% and 90% of the market share of the assets of the banking industry (Ojah, 2005). The banking sector of the country consists of a high concentration of corporate ownership with most of the large insurance and other non-bank financial institutions (NBFIs) being either controlled by banks or the NBFIs themselves having controlling interest in banks. This reveals both the complexity and intensity of the competition in the industry, which should therefore enhance efficient financial intermediation.

Banks need to be efficiently and fully engaged in financial intermediation in a manner that embraces customers, and at the same time avoids the emergence of disintermediation. This helps to ensure that banks continue to serve as channels through which financial system consolidation realises its full potential in curbing financial instability, and thus increasing the economic welfare of the citizens in the economy (Ojah, 2005). In the realisation that the primary function of banks is to mobilise savings from surplus units and allocate these funds among competing users and deficit units on the basis of expected return and risk trade-offs, the banks therefore act as catalysts for economic growth (Pati & Shome, 2006). Thus, failure by banks to execute this crucial intermediation role efficiently leads to far-reaching repercussions for economic development as experienced during the global financial crisis of 2007 and 2008. Levine (2002) concurs with the view that financing, both bank-based and market-based, is essential for economic growth and that financial development enhances efficiency in the allocation of scarcely available productive resources, thus stimulating the growth process.

In the study by Rajan and Zingales (1998), who examine whether a link exists between financial development and economic growth, specifically investigating whether financial development facilitates economic growth by reducing the costs of transactions and external financing, the results from the study indicate that financial development influences economic growth through reduction of transaction and external financing costs.

Levine (1996) in his research survey concludes that the efficacy of financial intermediation can also affect economic growth.

4.2.1 The development of the South African banking sector

The commercial banking sector in South Africa is under the supervision of the South African Reserve Bank (SARB). Among its many functions, the Reserve bank is tasked with the responsibilities of supervising the banking sector in order to ensure financial stability. Its key responsibilities include ensuring that banks

under its jurisdiction maintain acceptable levels of capital guided by the Basel Committee on Banking Supervision guidelines of July 1988 (SARB, 2012).

The country has a well-developed private banking sector, which was controlled by commercial banks until the 1950s when banking services began to diversify. Until then, commercial banks had avoided critical lines of services such as personal loans, property leasing, and credit-card facilities. The emergency of new institutions which included, among others, discount houses, merchant banks, and general banks who lived on the peripheries of commercial banking services forced the banks to open up to new product lines. In this regard, banks started entering into medium-term credit arrangements with commerce and industry and bought interests in hire-purchase firms and leasing activities. They started expanding their operations into insurance and even invested in manufacturing and commercial enterprises.

During the late 1980s, the "big five" commercial banks, First National Bank (formerly Barclays), Standard Bank of South Africa, Nedbank, Volkskas, and Trust Bank were increasingly challenged by building societies, which had listed as holding companies on the Johannesburg Stock Exchange (JSE) and had set up commercial and/or general banking arms. The Deposit Taking Institutions Act of 1991 formalised the overlapping of functions between the banks and the building societies that had existed for more than a decade. The Act brought South Africa into line with internationally recognised standards for capital requirements.

Mergers and acquisitions started to take place culminating in a landmark deal in February 1991, which saw four of the leading financial institutions of the country (Allied Bank, United Bank, Volkskas, and Sage Bank) merged to create the largest banking group in the country, the Amalgamated Banks of South Africa (ABSA), with assets of R56 billion.

The Rembrandt tobacco group and the South African National Life Assurance Company (Sanlam), the second-largest insurance group in the country, jointly control ABSA, which merged with a fifth bank in 1992.

Dominance of the banking industry was starting to emerge and the industry continued to undergo further reorganisation in the mid-1990s, in part to establish banking services in poor communities that were neglected under apartheid.

4.3 SOUTH AFRICAN COMMERCIAL BANKING SECTOR: THE APARTHEID ERA

During the rest of the apartheid era since 1948, the South African banking industry was highly regulated and commercial banking sector operations were centred on soliciting deposits and lending transactions (Knight, 1990). Against the backdrop of protests against the system of apartheid, the banking sector and other key sectors of the economy experienced massive disinvestment from the 1960s to mid-1970s.

Knight (1990) further points that between the mid-1970s and mid-1980s, the commercial banking sector suffered high-risk exposures, which precipitated implementation of the first drastic changes in the industry in the 1980s to contain possible risk hazards from detrimentally affecting bank operations.

Deregulation progressively grew and drastically widened the range of products and services offered by banks. Most commercial banks diversified their operations away from their normal core lines of business.

Trading on the financial markets in Johannesburg reached a new all-time high on April 26, 1994, reflecting the buoyant mood of voters of all races who were about to participate in the first democratic elections in the country. As the country progressively emerged from the economic stagnation and international isolation of the apartheid era, the new government and its theme of economic reconstruction received international acclaim and encouragement. At the same time, however, it faced conflicting pressures to speed up economic growth, to strengthen standing of South Africa among international investors, particularly in the commercial banking and the rest of the financial sector. By the mid-1980s, the economy was distorted by government policies designed to bolster the economic and political power of a small minority. The economy was largely dominated by

the mining industry, coupled with a moderate performance of the commercial banking sector.

The emergence of a new banking sector, market opportunities and products during the mid-1990s stimulated the growth of earnings from sources other than from the pure lending activity through intermediation (Contemporary Economic Policy, 1997). Value-added services such as advisory services, structured transactions, mergers and acquisitions, project finance, derivative trading and off-balance sheet activities developed at a rapid pace. As a result, commercial banks began to post significantly higher profit margins until the early-1990s (Contemporary Economic Policy, 1997).

4.4 SOUTH AFRICAN BANKING SECTOR: POST-APARTHEID ERA

Since after the arrival of democracy in 1994 until today, the South African commercial banking industry grew and became oligopolistic in nature, dominated by five large commercial banks, currently accounting for more than 90% of deposits (Banking Association of South Africa, 2012). Commercial banking is that portion of the business of a bank, which involves deposit taking, lending to handling the transactions of the public and corporations. In light of the fact that the process involves deposit transactions, every bank is mandated to observe compliance with the Banks Act and maintain the required ratio of capital to total assets. The South African Reserve Bank consistently monitors such capital levels to ensure protection of depositors' funds, and the capital level is determined based on international best practices.

In light of the view that commercial banks conduct all lending transactions to the general public and corporations, the bulk of their capital resources are related to their commercial banking activities. Currently, the bulk of commercial banking; approximately 90%, is done by the four major banks in the country. Despite such developments, historically the commercial banking sector in South Africa experienced high cost ratios due to its dependence on large branch networks, combined with information technology costs, which rose significantly.

Furthermore, the sector was reliant on margin income as its main source of revenue. This has been exacerbated by the fact that a large proportion of the funds held by the banks to finance the loans they grant are short-term in nature.

In late 1998, a comparative analysis of the performance of commercial banks between lending and non-lending activities for the four largest banks revealed that much of the profits of the respective banks were generated from lending activities (KPMG, 1998). For prudential purposes, the estimated benchmark of the risk premium for the commercial banking industry was set to range between 4% and 6% to ensure a safekeeping of depositor funds.

Until then, commercial banks did not deal with transactions related to services such as personal loans, property leasing, and credit-card facilities. New institutions, including discount houses, merchant banks, and general banks emerged to meet this demand. In reaction to these changes in the banking sector, commercial banks increasingly entered into medium-term credit arrangements with commerce and industry and acquired interests in hire-purchase firms and leasing activities (Ludin & Grobler, 2008). In addition, the commercial banks extended their operations into insurance, manufacturing and commercial enterprises.

Growth in the banking sector profitability levels posted significant margins due to improved market conditions. In 1997, the average return on assets (ROA) for the industry stood at 1.39% for the four major banks, up from 1.24% for the four major banks in 1996. Additionally, the average returns on equity (ROE) for the industry in South Africa was 18.90% (21.55% for the four major banks) compared with 17.10% (19.94% for the four major banks) in 1996. For the commercial banking sector alone, the net interest margin (NIM) average rate paid on funds by the four major banks stood at 12.46% and the average net interest margin in 1997 for the four major banks was 3.73% (against 3.67% in 1996).

By the end of 2001, about 43 commercial banks were registered in the country. The announcement of the financial troubles of Saambou in 2002, however, resulted in a run on BOE (black-owned enterprises) and other smaller banks which led to a number of banks not renewing their banking licenses and others seeking financial assistance from foreign shareholders. Other banks such as Regal Bank also experienced financial difficulties during that period and were placed under curatorship.

However, although the banking sector went through a process of volatility and drastic changes in the past, it attracted a lot of interest from abroad with a number of foreign banks establishing commercial banking operations in the country while others acquired stakes in major banks, such as the Barclays-ABSA and Standard Bank deals. Currently, the commercial banking sector in South Africa is comprised of 32 commercial banking institutions.

The banking institutions include among others, Amalgamated Banks of South Africa (ABSA), African Merchant Bank (AMB), Development Bank of Southern Africa, First National Bank (FNB), Investec Group, Nedbank, Nedcor Group, Old Mutual South Africa, Rand Merchant Bank, SCMB (Standard Corporate and Merchant Bank), Standard Bank of South Africa, and WesBank.

Some of the locally controlled ones were African Bank Limited; Bidvest Bank Limited; Capitec Bank Limited; FirstRand Bank (a subsidiary of First Rand Limited); Imperial Bank South Africa; Investec Bank Limited; Nedbank Limited; Sasfin Bank Limited and Standard Bank of South Africa.

Foreign-controlled banks include Absa Bank Limited; Habib Overseas Bank Limited; Habib Bank AG Zurich; Mercantile Bank Limited and South African Bank of Athens Limited (World Bank, Global Development Finance Report, 2011).

Although there has been a sizeable presence of foreign banks in the banking sector, they have had minimal impact on commercial banking as many of them have focused on treasury and capital markets dealings (Napier, 2005). Barclays

Bank, a giant UK retail bank was granted approval in 2005 to acquire shareholding in ABSA, a local bank. This deal signified the entrance of big players in the South African commercial banking arena, which increased competition in the commercial banking sector market.

Such growth and expansion in the respective parts of the banking sector also were coupled with a number of changes in respect of the legislative and regulatory environments, product offerings and number of participants resulting in a greater level of competition from smaller banks such as Capitec Bank and African Bank, which penetrated the market by targeting the low-income segments. According to the World Economic Forum Competitiveness Survey (2012/13), South African commercial banks stood second out of 144 countries in terms of soundness and the entire banking industry of the country rated 3rd in terms of financial sector development.

With respect of the commercial banking sector market and competitive structure of the country, the World Economic Forum (2012) granted a clean opinion that the South African banking sector is highly concentrated with four major banking groups, characterized by high levels of concentration determined from the Herfindahl-Hirschman Index (HHI) and the four firm concentration (CR4) ratio. The HHI is the summation of squares of market shares of all firms in the market and the CR4 is the aggregate of market shares of the first four largest firms in the relevant market. While this is not unusual, the market share of the top four firms, as a proportion of the total market, is indeed very large.

Table 4.1: Major South African Banks Market Shares (2009)

BANK	ASSETS (R bn)	MARKET SHARE	CUMULATIVE MARKET SHARE
Standard Bank of South Africa	R803	27.1%	27.1%
ABSA Bank Limited	R649	21.8%	48.9%
First Rand Bank Limited	R548	18.5%	67.4%
Nedbank Limited	R510	17.2%	84.6%
Investec Bank Limited	R182	6.1%	90.7%
Other	R27	9.3%	100.0%
	R2,967	100.0%	

Source: South African Reserve Bank, Bank Supervision Department, 2009

From the table presented above, it can be seen that up to the year 2009, the four largest banks supplied more than 90% of the products in the commercial banking sector, with Standard Bank accounting for the largest market share of up to 27.1% of the entire commercial banking sector. The four main banking groups did disaggregate the supply of retail products based on three income segments, lower-income (mass) market, middle-income market and the upper-income market.

In South Africa, the Reserve Bank computes the HHI for the banking industry in the conventional way but then divides the result by 10,000. As of December 2009, the HHI for the South African commercial banking sector stood at 0.189; which shows high concentration in the sector (SARB, 2011). The HHI has remained high due to the continued dominance in terms of market share by the five largest banks in the country, which held more than 90% of the entire banking sector assets as of December 2009. This level of concentration can also be deduced from the decline in the number of registered banks, which were 61 in 2000 and have since declined to 32 by December 2009.

Table 4.2: Market shares of the four major commercial banks (June 2012)

BANK	MARKET SHARE	CUMULATIVE MARKET SHARE
Standard Bank of South Africa	31%	31%
ABSA Bank Limited	26%	57%
First Rand Bank Limited	23%	80%
Nedbank Limited	20%	100%

Source: The Banking Association of South Africa, South African Banking Sector Overview Report, 2012

By virtue of the market shares accounted for by the four major commercial banks indicated above, it can be deduced that such commercial banking giants have some significant degree of market power in the sector due to the high market shares they each hold. From the competition analytical point of view, dominance is essentially a “legal” rather than an “economic” concept in the sense that economists frequently focus on the subject of market power rather than dominance; as well as the legislative and regulatory framework controlling conduct in the sector or industry of concern.

4.5 BANKING LEGISLATIVE FRAMEWORK

In order to achieve financial soundness and stability, the South African banking sector is subjected to regulation/supervision by law through an increasing number of statutes and regulations. Although the banking sectors in sophisticated economies such as the United States, Australia and Europe are also subject to similar levels of regulation, South Africa is unique given that it has a sophisticated banking system, which must increasingly ensure that it provides services to those portions of the population, which have not previously enjoyed equal banking services. The importance of careful regulation of the banking sector has been recognised in many of the competition commission investigations into the banking sector.

Handling consumers' and business' money, savings and loans involves risks, not only for the customers and financial intermediaries, but also for the economy as a whole. The fear that failing banks could cause a systematic crisis has brought about a traditionally high degree of regulation with respect to the capital adequacy and governance of banks, referred to as prudential regulation implemented to avoid bank failure, which can pose widespread consequences even beyond national boundaries.

In the early 2000s, the framework for banking sector supervision was strengthened to correct two sets of market failures; namely the inability of depositors to monitor the risk-taking conduct of banks and the systematic risk of a "run on bank" when specific problems with one or a small number of banks cause depositors to lose confidence in the banking system. In South Africa, this was demonstrated by the difficulties, which led to the failure of Saambou in 2001/2002. This led banking sector regulators to seek to achieve two primary objectives: prudent financial management by banks and supporting public confidence in the banking sector. The legislature also introduced a variety of measures to protect less sophisticated consumers and to increase the provision of banking services to those euphemistically referred to as the "unbanked" in the community.

As such, the South African Reserve Bank plays a cardinal role in the regulation of the South African banking sector and is enjoined to protect the stability and security of the banking sector as a whole. In fulfilling these functions, it has significant powers and obligations that are constitutional in nature.

The principal statutes which govern banking institutions in South Africa are the South African Reserve Bank Act 90 of 1989 (the Reserve Bank Act), the Banks Act 94 of 1990 (the Banks Act), Mutual Banks Act 124 of 1993 (Mutual Banks Act), the Postal Services Act 124 of 1998 (Postal Services Act), Co-operatives Act 14 of 2005 (New Co-operatives Act), Inspection of Financial Institutions Act 80 of 1998, Financial Institutions (Investment of Funds) Act 39 of 1984, Currency and Exchanges Act 9 of 1933, Bills of Exchange Act 34 of 1964, National Payment

System Act 78 of 1998, Securities Services Act 36 of 2004, Financial Intelligence Centre Act 39 of 2001 (FICA), and Financial Advisory and Intermediary Services Act 37 of 2002 (FAIS).

The Banks Act was introduced in 1990 to provide for improvement in the regulation and supervision of the business of public companies taking deposits from the public, and to provide for matters related to banking transactions. Under the Act, no entity, other than certain specified exceptions, may accept “deposits from the general public,” unless it has been registered in terms of the Banks Act, Mutual Banks Act or the Co-operatives Act. Each of these Acts has different requirements for registration and provide for different prudential requirements. The differing prudential requirements and registration requirements result in differing costs.

4.6 THE SOUTH AFRICAN RESERVE BANK

The Reserve Bank is the central bank of South Africa and is regulated in terms of the Reserve Bank Act. Its primary objective is to protect the value of the South African currency in the interests of balanced and sustainable economic growth and has a duty to oversee the entire banking system in the economy. The Reserve Bank is managed by a board of 14 directors, who are primarily appointed by the government and operates independently from the banks. The Reserve Bank Act specifically forbids the appointment of any person who is “a director, officer or employee of a bank or a mutual bank” (South African Reserve Bank 2012).

The South African Reserve Bank (SARB) oversees the banking sector in a supervisory role. One of its major objectives is to achieve and maintain price stability, and has used interest rates as the main tool in trying to attain this objective.

In addition to its supervisory role, the bank also articulates monetary policy objectives and acts as banker and advisor to the government. It oversees and is directly responsible for the efficient and effective functioning of the national

payment system, bank regulation, supervision, and administering of exchange control measures (SARB, 2012).

The Reserve Bank is responsible for the production of coins and notes as well as taking such steps as may be necessary to establish, conduct, monitor, regulate and supervise payment, clearing or settlement systems (Section 10(1) (c)). One of the primary prudential requirements is that banks should maintain an account with the Reserve Bank (section 10 A (1)), in which a certain minimum balance must be maintained. The Reserve Bank also has the responsibility for determining the “minimum reserve balances” which banks have to maintain in their accounts in line with the reserve ratio requirement. The same applies to the so-called “special deposit accounts”, which are the separate accounts, which the banks must hold at the Reserve Bank in order to comply with the obligation of maintaining certain specified average monthly credit balances.

Under circumstances where Reserve Bank suspects any entity of carrying out the business of a bank without being registered, the central bank, in terms of sections 11 and 12 of the Reserve Bank Act, is empowered to inspect such entities. The Reserve Bank may also cause inspections to be carried out into the affairs of any bank or mutual bank.

With respect to registration of an entity whose pursuit it is to operate as a bank in South Africa, registration thereafter is done with an employee of the Reserve Bank who is designated (subject to the approval of the Minister of Finance) as the Registrar of Banks (called the Registrar). The Registrar is also responsible for regulation of payments, clearing or settlement systems, as well as regulating the keeping of determined minimum reserve balances by South African banks. Additionally, the Registrar also performs all functions assigned to him or her under both the Banks Act and the Mutual Banks Act under the supervision of the Reserve Bank.

4.7 THE BANKS ACT

The Banks Act provides for the regulation and supervision of banks, that is, entities, which take deposits from the public, except for those institutions, which are specifically exempted from the provisions of the Banks Act. The Registrar and the Reserve Bank are primarily responsible for ensuring compliance with the provisions of the Banks Act. Under this Act, one of the primary tools for ensuring compliance with the provisions of the Banks Act is the requirement that all banks, other than certain specific exceptions, have to be registered in terms of the Banks Act. Section 11 provides expressly that “no person shall conduct the business of a bank unless such a person is a public company and is registered as a bank in terms of [the Banks Act]”. The Act also imposes requirements with which any institution must comply before it may carry on the business of a bank.

4.8 REGISTRATION

A public company, duly registered as a bank, is the only kind of entity that is permitted to operate as a bank. One exception to this rule is that a foreign bank may conduct business as a branch in South Africa, but only if it obtains the Registrar’s prior written authorisation, subject to such conditions as the Registrar may impose. Such an application by a foreign bank may not be granted unless the Registrar is satisfied that proper supervision will be exercised by the responsible supervisory authority in the country of domicile of the foreign institution (SARB2012).

In order to commence operating as a bank in South Africa, two applications have to be made to the Registrar, namely an application for authorisation to establish a bank and, secondly, an application for registration as a bank.

The Registrar is empowered to grant or refuse these applications, or to grant it subject to conditions as he or she may determine. An institution, which is registered as a bank for the first time, may not commence the business of a bank until it has furnished proof to the Registrar that it complies with the relevant prudential requirements. In other words, it may not commence operations until the

Registrar has been assured that depositors are unlikely to be prejudiced through making deposits with the applicant. This is enforced to achieve three objectives: to protect depositors, to encourage saving, and to reduce the risk of crises such as a “run on banks” (SARB 2012).

4.9 ANNUAL LICENSE

One of the more minor costs, which a bank, a branch of a foreign institution and a representative office will have to incur in terms of the Banks Act, is the obligation to obtain an annual business license from the Registrar at the prevailing cost value.

4.10 PRUDENTIAL REQUIREMENTS

The Banks Act stipulates that banks must comply with specified “prudential requirements”. The primary form of these prudential conditions is the requirement to maintain a minimum level of capital. The main purpose of requiring a bank to maintain a minimum level of capital is to create a cushion to absorb losses if any of the risks to which banks are exposed in the conduct of their business should materialise, to provide a safeguard against the risk of insolvency. Currently, commercial banks are required to maintain a minimum capital balance of R250 million. It is the mandate of every bank or its controlling company to ensure that the prescribed aggregate of the minimum capital and reserve funds required to be maintained by the bank are maintained at all times.

4.11 MINIMUM RESERVE BALANCE

A bank is statutorily required to maintain a specified minimum credit balance in the statutory account, which it is obliged to hold with the Reserve Bank. The Governor of the Reserve Bank is empowered to specify a percentage of the total amount of the holdings of a bank in notes and coins that may be taken into account in calculating the minimum reserve balance that the bank is required to maintain in its Reserve Bank account.

4.12 MINIMUM LIQUID ASSETS

Every bank is also required to maintain a minimum level of “liquid assets” as per the specifications of the Banks Act. These relate to notes and coins, treasury bills, Land Bank bills and securities issued by the Reserve Bank. The purpose of this requirement is also to guard against liquidity risk to ensure that the bank is able to meet its obligations whenever required to do so. The minimum liquid assets requirement is measured against the liabilities of the bank, principally the deposits that it receives from its customers. The current liquidity requirement is that a bank in South Africa must hold liquid assets in excess of a specified value. This value is calculated as a percentage of the various categories of liability of the bank. The percentage may not exceed 20%, and the manner in which the calculation must occur is specified by regulation.

4.13 LARGE EXPOSURES: CONCENTRATION OF RISKS

Another prudential requirement is that a bank is encouraged to diversify its risk exposure. In that respect, the Banks Act precludes banks from lending amounts in excess of certain prescribed amounts to any person, without the approval of the board of directors of the bank. Neither a bank, nor its controlling company may, without the permission of its board of directors, make investments with, or grant loans, or other forms of credit, to any person in excess of 10% of a prescribed amount of its capital and reserves. In addition, where the exposure of a bank exceeds 8% of a prescribed amount of the capital and reserves of a bank, additional capital and reserve requirements may be imposed. A bank, controlling company or branch of a bank may not, without the prior written approval of the Registrar, commit itself to an exposure of more than 25% of a prescribed amount to a specific “private sector person”. Any situation where a bank has an exposure to such a person in excess of 25% of the prescribed amount must be reported to the Registrar who may then impose additional capital requirements on the bank.

4.14 REPORTING TO THE REGISTRAR

To enable the Registrar to monitor compliance with the prudential requirements or the nature and amount of its assets, liabilities and contingent liabilities, banks must provide the Registrar with regular returns in respect of these requirements.

4.15 RESTRICTIONS ON INVESTMENTS AND LOANS

The Banks Act imposes a limitation on the ability of banks as custodians of deposits received from the public, to engage in business activities outside their specialized fields of operation. Section 76 of the Banks Act limits the extent to which a bank may invest in either immovable property or in shares, and the amount, which it may lend or advance to subsidiaries whose main object is the acquisition and holding or development of immovable property. Similarly, a bank and its associates may not hold more than 49% of the issued shares in any registered long or short-term insurer.

4.16 CONCLUSION

It is evident from the above that the prudential requirements set out in the Banks Act serve to restrict the number of entities, which can operate as banks. While these requirements have been imposed in the interests of protecting the public, they also have implications for the manner in which banks can conduct their operations and the costs of running a banking business. The Registrar of Banks, in conjunction with the Reserve Bank, exercises a close supervisory role over the manner in which banks conduct their operations.

4.17 REGULATORY COMPLIANCE

In support of the legislative framework described above, the South African banking sector regulatory framework imposes a number of obligations on all banks operating within the boundaries of the Republic to strengthen soundness and prudential standards of the entire financial sector. This complex web of

legislation, regulations, codes, guidance notes and directives circumscribe the manner in which banks operate within the country.

4.18 FINANCIAL INTELLIGENCE CENTER ACT 38 OF 2001 (FICA)

The FICA was introduced in 2001 with the primary objective of combating money-laundering activities: the establishment of a Financial Intelligence Centre (FIC) and Money-Laundering Advisory Council (the Council). The principal objective of the FIC is to assist in the identification of the proceeds of unlawful activities and to combat money-laundering activities.

4.18.1 Financial advisory and intermediary services act 37 of 2002 (fais)

FAIS was introduced in 2002 to regulate the business of rendering financial advice and intermediary services to clients in respect of a wide range of financial products. This includes any recommendation, guidance or proposal of a financial nature in respect of a purchase or variation thereof or investment in any financial product or with respect to the conclusion of any other transaction aimed at the incurring of any liability or the acquisition of any right or benefit in respect of any financial product. The definition of a “financial product” is extensive and includes, among other things, a deposit as defined in the Banks Act in respect of deposits, which are for a period of more than 12 months. Deposits of less than 12 months are subject to a specific code which has been published in the Government Gazette in terms of section 15 (2) (b) of FAIS.

4.18.2 Financial services ombud schemes act 37 of 2004

The Financial Services Ombud Schemes Act grants statutory recognition to arrangements by financial institutions, or between groups of financial institutions to create a system to allow the resolution of clients’ complaints by an “ombud”. Furthermore, the Financial Services Ombud Schemes Act empowers the Ombud for Financial Service Providers to entertain client complaints if those complaints cannot be accommodated by any of the ombuds in the voluntary arrangements

(for example, in the absence of voluntary ombud arrangements or where a financial institution has decided not to participate in a voluntary arrangement).

4.18.3 Home loan and mortgage disclosure act 63 of 2000

The purpose of this Act is to compel disclosure by financial institutions of information regarding the provision of home loans. An Office of Disclosure was established as a mechanism to regulate the conduct of financial institutions in this regard. Banks are required to disclose the number and rand value of home loan applications during that financial year in respect of the categories of borrowers and geographic areas prescribed by the Minister of Housing that were received, declined, closed, disbursed, and approved. The Office of Disclosure is responsible for collating, analysing and interpreting this information.

4.18.4 Electronic communications and transactions act 25 of 2002

The Electronic Communications and Transactions Act do not directly regulate banking services but may have an indirect impact on banks. For example, Chapter 7 of the Electronic Communications and Transactions Act deals with consumer protection. Although banks are excluded from this section the Electronic Communications and Transactions Act indicates that a supplier offering goods and services for sale, for hire or exchange by way of an electronic transaction must utilise a payment system that is sufficiently secure with reference to accepted technological standards at the time of the transaction and the type of transaction concerned.

4.18.5 Inspection of financial institutions act 80 of 1998

The Inspection of Financial Institutions Act authorises the Registrar to appoint an inspector at any time to investigate the affairs of a bank for evidence of any irregularities or offences committed. The matter may then be referred to the relevant authority for further enforcement.

4.18.6 Prevention and combating of corrupt activities act 12 of 2004

The Prevention and Combating of Corrupt Activities Act defines corruption and corrupt activities and imposes measures to prevent and combat corruption and corrupt activities. This Act provides for investigative measures designed to cater for corruption and corrupt activities to report corrupt activities. Under this act, the commercial banks are obliged to report any suspicious transactions.

4.18.7 Prevention of counterfeiting of currency act 16 of 1965

The Prevention of Counterfeiting of Currency Act provides for the prevention of coin counterfeiting as well as the prevention of forging or alteration of bank notes. The Act stipulates that any person caught counterfeiting (i.e. altering a coin or bank note) shall be guilty of an offence.

4.18.8 The code of banking practice (the code)

In respect of all banks that are members of the Banking Association of South Africa South Africa, the Code formalises standards of disclosure, conduct and principles of fairness concerning the relationship of a bank with individual clients and small business clients in South Africa. The fundamental principles of the Code provide that members act fairly and reasonably, in all dealings with their clients and that members must ensure that all their services and products comply with the Code.

4.18.9 Conclusion

It is evident from the above that there are an extensive number of regulatory provisions, which impose substantial compliance obligations on banks. All the legislative Acts as discussed above give credence to the notion of uniqueness of the South African Commercial Banking Sector. Such legislation has contributed to the sector avoiding major setbacks during the banking crisis of 2007-2008 periods.

4.19 Basel ii and Basel iii framework

The principal objective of Basel II, which replaced the 1988 Capital Accord (Basel I), is to strengthen the soundness and stability of the international banking system by promoting the adoption of stronger risk management practices by the banking industry. It focuses on substantially improving the risk sensitivity of banks to the minimum capital requirements by moving away from the “one size fits all” approach advocated by Basel I. It seeks to achieve this by aligning the capital measurement framework more closely to the underlying risks banks actually face based on three pillars.

Pillar 1 concerns the maintenance of regulatory capital calculated in relation to three factors relevant to a bank, namely credit risk, operational risk and market risk. Pillar 2 provides for supervisory reviews which are intended, not only to ensure that banks have adequate capital to support all their risks, but also to encourage banks to develop and use better risk management techniques in monitoring and managing their risks. Lastly, Pillar 3 encourages market discipline in order to complement the minimum capital requirements.

Basel III

This is a refinement of Basel II. It is a comprehensive set of reform measures, developed by the Basel Committee on Banking Supervision (primarily in response to the global economic crises) to strengthen the regulation, supervision and risk management of the banking sector. These measures aim to improve the banking sector’s ability to absorb shocks arising from financial and economic stress, improve risk management and governance; and strengthen banks’ transparency and disclosures.

4.20 CHAPTER SUMMARY

In this chapter, the author reviewed substantial literature pertaining to the evolution of the South African financial market. The author reviewed the apartheid

era and examined the post-apartheid era. Key focus areas were the regulatory environment (particularly as it relates to capital issues), the size of the market and the level of concentration, and issues of ownership. The author showed that the market is relatively centred and dominated by foreign ownership. This has a bearing on the cost structures and capital adequacy issues as most of the banks have to adhere to international practices on capital structures and other issues.

CHAPTER 5: RESEARCH METHODOLOGY

5.1 INTRODUCTION

In this chapter, the author dealt with the research methodology, which is of paramount importance as it underpins the analysis of the literature.

The author also presented the research design for this study and the implementation thereof.

The author highlighted methodological issues specifically related to this study. The author further discussed in detail, issues covering the sample of the study, issues regarding the population size used in the study, econometric equations used in the study and it discussed the merits and demerits of the econometric equations and estimating models used in the study.

Issues around research and the research problem are important for any research work. Not all research questions are answerable and are researchable. A question must be one for which observation or other data collection in the real world can provide answers (Emory & Cooper, 1991).

Any research method chosen therefore must help the researcher reach a reasonable and defensible solution or recommendation to the research problem.

In support of the above, McGivern (2006) states, that research is about enquiry, and a systematic investigation to find relevant solutions to problems.

5.1.1 Significance of research

“All progress is born of inquiry. Doubt is often better than overconfidence, for it leads to inquiry, and inquiry leads to invention” is a famous Hudson maxim in the context of which the significance of research can well be understood. Increased quantities of research make progress possible. Research inculcates scientific

and inductive thinking and it promotes the development of logical habits of thinking and organisation (Redmad & Mory, 1923).

Research provides the basis for nearly all government policies in our economic system.

To this end, this research is expected to significantly contribute towards the body of knowledge already available on the subject of capital, to stimulate debate and further research on the subject of bank capital. From a bank specific strategic decision-making perspective, this research output would assist financial institutions and investors in tailoring investment decisions in response to policy decisions that relate to bank capital. From the public policy perspective, this would assist both governments and regulators in formulating better- informed policy decisions regarding the importance of bank capital.

The author carried out a review of the research process applied in this study in the next section.

5.2 THE RESEARCH PROCESS

In order to give direction for this study, the research process 'onion' of Saunders, Thornhill and Lewis (2012) was adopted. This research 'onion' illustrates the paradigms, strategies and methods followed by the researcher during the research process. The concept of the research 'onion' provides a summary of the important issues that need to be taken into consideration and reviewed before undertaking any research. The different layers of the 'onion' serve as a platform for the following considerations: the philosophical positioning of the researcher, the research approach adopted, appropriate research strategies, the research time lines that are under review, and the data collection techniques employed by the researcher.

Figure 5.1 below shows the research ‘onion’, which was used as a guideline and justification for the chosen research designs and strategies, used in this study.

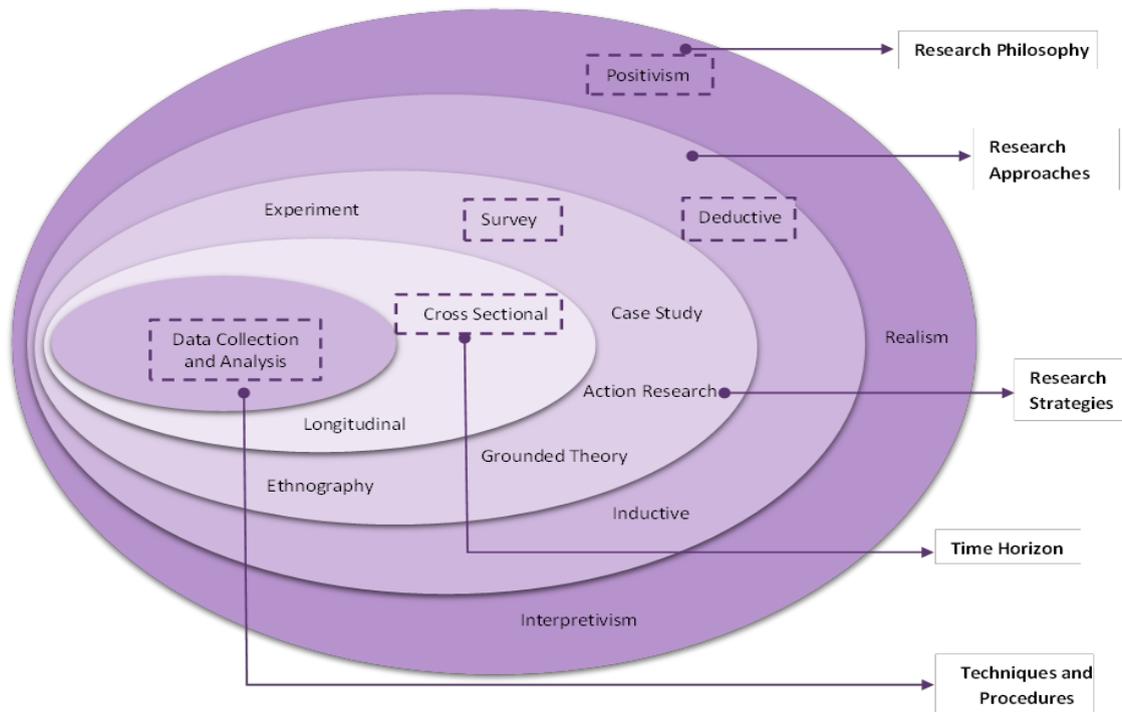


Figure 5.1: The research ‘onion’ (Saunders et al., 2012:128)

A detailed review of the various components that make up the research onion is presented below.

5.2.1 Research philosophy

According to Saunders et al., (2012) the first important layer of the research onion deals with the research philosophy. Research is defined as the systematic collection and interpretation of information with a clear purpose to identify issues/concepts (Saunders et al., 2012). It is a careful and systematic means of solving problems.

Redman and Mory (1923) define research as a “systematized effort to gain new knowledge”.

To this end, the philosophy behind this research was to establish whether there is a positive relationship between capital and profitability of commercial banks in South Africa.

5.2.1.1 Objectives of research

The main objective of this thesis is to test a hypothesis of the relationship between capital and profitability in banks, which puts it into the fourth group of research objectives known as hypothesis testing.

5.2.1.2 Motivation in research

This research was motivated by the desire to understand the causal relationship between capital and profitability of banks and the research was in part fulfilment of the researcher's doctoral qualification requirement.

According to Johnson (2010), positivist scholars argue that the world is concrete and real, and that a separation is necessary between the researcher and the research object in order to prevent the former's subjective feelings from affecting the research process, which might, otherwise, lead to biases in the study. Positivists believe that observations and measurements constitute the core of all scientific undertakings.

Easterby-Smith *et al.*, (2003), postulate that interpretivists use approaches epitomised by the rigorous application of techniques in a carefully structured design to establish high authenticity and credibility. In support of such an argument, Fellows and Liu (2008) contend that truth and reality are socially constructed and cannot, therefore, exist independently. Interpretivists, therefore, maintain that the researcher's key role in the research process is to gain a general overview of the context of the topic under investigation. As a result, qualitative methods of analysis and their explanation highly favour interpretivist research.

Contrary to this, the interpretivists argue that all data is qualitative, with numbers merely being attached to meanings in a quantitative analysis. As the debate rages on, various research methods characterising both the positivist and interpretivist approaches have emerged (see Tables 5.1 and 5.2 below).

Table 5.1: Various research approaches in terms of the positivist paradigm

Research approach	Questions	Main features
Experiments (Laboratory)	How, why	Intensive study; precise relationship;
Experiments (field)	How, why	Quantitative Real-life situation experiments
Archival analysis	Who, what, where, how many	Quantitative and qualitative analysis
Forecasting future research	What, how much	Insights into likely future events
Simulation, game role- playing	What, how	Simulating the behaviour of a system by generating and introducing random
Surveys	Who, what, where, how many, how much	Questionnaires, interviews, observations used to obtain data on practices or situations

Source: Adapted from Saunders et al., (2012)

Table 5.2: Various research approaches in terms of the interpretivism paradigm

Research approach	Questions	Main features
Case study	How, why	Explanatory; exploratory;
Archival analysis	Who, what, where, how many	Quantitative and qualitative analysis of
History	How, why	Explanatory studies relating
Subjective argumentative	What	Creative; free flowing; unstructured
Action research	What to do, how, why	Obtaining results and benefits for practical value
Grounded theory	What	Structured approach to forming theory grounded in data
Descriptive interpretive	What, how, why	Based on the philosophy that phenomena are the essence of experience; development of cumulative knowledge

Source: Adapted from Saunders et al., (2012)

The current study applied the interpretivism paradigm, based on the understanding that the researcher intends to test a hypothesis in the context of a certain environment.

5.3 RESEARCH APPROACH

According to Saunders et al., (2012), the second important layer of the 'onion' deals with the approach between deduction and induction. Deduction is a research approach, which involves the testing of a theoretical proposition by using a research strategy, designed to perform this test, while induction is a research approach which involves the development of the theory as a result of analysing data already collected (Burney, 2008).

As the main objective of this study was to establish whether there is a relationship between capital and profitability, the empirical approach was used as the mode of inquiry, which is consistent with Saunder's deductive approach.

5.4 RESEARCH DESIGN

For the purposes of this study, the researcher utilised the descriptive research design to achieve the stated objectives. According to Saunders et al., (2012) a descriptive study is a research designed to produce an accurate representation of persons, events or situations and therefore considered appropriate for this study, as a lot is known around the subject and hence there is no need for exploratory designs.

In conducting the research study, a quantitative research method was used. Babbie (2013) defines quantitative research as the method that primarily seeks to express information numerically, in terms of quantities or measurements. Quantitative research methods derive empirical generalisations which can be used to determine future courses of action, or which solve a particular research problem. Quantitative research is usually used in descriptive studies and subjects the results to statistical tests in order to quantify data and generalise the results obtained from a representative sample to the target population (Hollensen, 2003; Tustin, Ligthelm, Martins & van Wyk, 2005). The research format for this study follows a quantitative approach.

Quantitative data was collected on all commercial banks that operated during the entire study period in terms of being in the same business and more or less retaining the same name. This population was identified to be thirteen (13) commercial banks. The entire sample population was used for testing. Market and accounting data regarding regulations on bank capital was obtained from databases of Bank scope, Bloomberg, financial statements of the banks concerned and the Reserve Bank quarterly call reports for the entire duration of the study period, which covers the period from 2006 to 2015.

5.5 TIME DIMENSION

The time attribute of a research study plays an important part in the design and execution of a study (Babbie, 2013). This study collected data from different sources as in most cases the variables could not be recovered from one source. Many constraints were met and therefore needed to be put into consideration, especially in terms of time. In this case, data was gathered for the period from 2006 to 2015 inclusively.

5.6 DATA AND SAMPLE

5.6.1 Study population

A target population is the entire group under study as specified by the research (Bradley, 2007). For the purposes of this research, the target population comprised all commercial banks that operated during the entire study period in terms of being in the same business and more or less retaining the same name and the population comprised of 13 commercial banks.

It is worth noting that there is no existing database for other smaller banks and in particular those that may not be listed on the JSE, a situation consistent with the observation of Babbie and Mouton (2011) that, unlike in developed countries, researchers in developing countries struggle to acquire data, either because extensive information is not available, or when it is available, it is erratic.

5.6.2 Sample and sampling method

Sampling is the process of choosing units (for instance organisations or people) from a specific population of interest so that, by studying the sample, we can generalise the results to the target population from which they were chosen (Neuman, 2011). Sampling falls into two main categories: probability and non-probability sampling. Probability sampling is organised in terms of simple random, complex random, systematic, cluster and stratified sampling (Leedy & Omrod,

2010:205). Non-probability sampling, by contrast, constitutes convenient sampling, purposive sampling and snowball sampling.

In ensuring that the sample population remained consistent with the research objectives, the researcher used non-probability sampling in his choice of banks.

5.6.3 Sample size

The sample size is significant to consider in the research. According to Quinlan (2011), the size of a sample in any research relies on the type of study being carried out, although practical restrictions might have an influence. Hence, by involving specified inclusion criteria, the sample becomes homogeneous, which means that there is not much difference within the sample, permitting a smaller sample size (Kaplan & Saccuzzo, 2008). According to Bradley (2007:185), the best sample size depends on the following factors:

- Required precision of the study
- Budget, resources and time available
- Nature and size of the population under study
- Significance of the results.

The technique based on Krejcie and Morgan's (1970) table, as reproduced by Sekaran (2003:294) was used in determining the sample size for the current study. The total commercial banks population in South Africa was estimated to be 32 as at 31 December 2015. The sample for the commercial banks used in this study is 13, which represent about 40% of the total population.

5.6.4 Datacollection procedure

According to Babbie (2011) data collection methods are the actual ways of collecting data for a study, conducting an experiment or focusing on the analysis of statistics that are already created by others. Secondary data was extracted from dependable data bank sources and its authenticity was not in question as

most of the data emanated from the commercial banks regulatory authorities in South Africa.

5.7 METHODOLOGY AND DATA SOURCES

The study used cross-sectional time-series annual data for thirteen banks ($n = 13$) during the sample period from 2006 to 2015 ($T = 10$), yielding one hundred and thirty total observations ($N = 130$). Annual data on return on equity (ROE), return on assets (ROA), capital-to-asset ratio (CAR), size, operating expenses, credit risk (CR), gross domestic product (GDP), consumer price index (CPI), Herfindahl-Hirschman Index (HHI) and stock were used for econometric modelling.

Data on all the variables were obtained from numerous sources, which include Bank scope, Bloomberg, financial statements of the banks concerned and the Reserve Bank quarterly reports for the entire duration of the study period from 2006 to 2015. Market and accounting data regarding regulations on bank capital was obtained from the database of the South African Reserve Bank, while available data on capital adequacy as per Basel II Accord were used as supplementary data.

5.8 ESTIMATION METHODS

The estimation techniques applied in the econometric estimation process are the generalised methods of moments (GMM), and panel two stage least squares (2SLS) or the pooled IV method. The statistical evaluation and estimation technique selection procedure of the panel 2SLS or pooled IV regression, GLS random effects (RE) model and fixed effects (FE) model was undertaken based on the Hausman-test approach.

Panel 2SLS or Pooled IV

$$Y_{it} = \alpha + X'_{it} \beta (\alpha_i - \alpha + e_{it}) \quad (5.1)$$

5.8.1 Two-stage least squares (2sls) regression analysis

Two-stage least squares (2SLS) regression analysis is a statistical technique that is used in the analysis of structural equations. The technique is the extension of the ordinary least square (OLS) method. The technique is used when the error terms of the dependent variable are correlated with the independent variables. It is most useful when there are feedback loops in the model. (<http://www.statisticssolutions.com/resources/directory-of-statistical-analysis/structural-equations-modelling>); (Statistics Solutions Advancement through Clarity 2017).

The panel two-stage least squares (2SLS) technique, has the strength to address or eliminate endogeneity bias from regression estimates. The method finds a variable (instrument) that yields exogenous variation in the regressor or predictor of interest to the study. Once determined, such exogenous variation can be used to estimate the relationship between the specified predictor and the dependent variable in the model.

In the first stage, the 2SLS regresses the endogenous regressor against the instrument and a set of covariates to find coefficients that reveal the amount of variation in the dependent variable. In the second stage, the equation adjusts standard errors and produces precise estimates showing the relationship between the predictor(s) and the outcome variable. As such, the 2SLS or pooled IV produces estimates that are consistent and not subject to bias, meaning that the estimates become closer to population parameters as the sample size becomes relatively larger (Statistics Solutions Advancement through Clarity 2017).

5.8.2 Advantages of 2SLS over OLS and other models

In the ordinary least squares method, there is a basic assumption that the value of the error terms is independent of predictor variables. When this assumption is broken, the 2SLS technique helps to solve this problem. This analysis assumes

that there is a secondary predictor that is correlated to the problematic predictor but not with the error term.

The 2SLS estimator for latent variable models developed by Bollen (1996) separately estimates the measurement model and structural model of structural equation modelling (SEM). It can therefore be used either as a stand-alone procedure for a full SEM or combine it with factor analysis, for example, establish the measurement model using factor analysis and then employ 2SLS for the structural model only. The advantages of using 2SLS over the more conventional maximum likelihood (ML) method for SEM include that it does not require any distributional assumptions for RHS independent variables, they can be non-normal, binary, and in the context of a multi-equation non-recursive SEM it isolates specification errors to single equations (Bollen, 2001).

It is computationally simple and does not require the use of numerical optimisation algorithms, it easily caters for non-linear and interactions effects (Bollen & Paxton, 1998) and it permits the routine use of often-ignored diagnostic testing procedures for problems such as heteroscedasticity and specification error (Pesaran & Taylor, 1999).

Simulation evidence from econometrics suggests that 2SLS may perform better in small samples than ML (Bollen, 1996:120-121). It is for this reason that the 2SLS model was chosen as the mode of inquiry.

The 2SLS model however has some disadvantages compared to ML, and this include the fact that the ML estimator is more efficient than 2SLS given its simultaneous estimation of all relationships, hence ML will always dominate 2SLS in sufficiently large samples if all assumptions are valid and the model specification is correct. The ML becomes more valid where the data sample is much bigger. In this study though, the ML will not be applicable as the data sample is very small.

The 2SLS method computes unbiased estimates by first calculating values of the problematical predictors in the first-stage iteration. The endogenous variables of the equation are regressed against all the exogenous variables in the reduced form, and fitted values are obtained. The computed values in the first stage are then used to estimate a linear regression model of the response variable in the second stage iteration.

Unlike the standard linear regression model, which assumes that errors in the dependent variable are uncorrelated with the regressor and, the two-stage least-squares regression uses instrumental variables that are uncorrelated with the error terms to compute estimated values of the dubious predictors. Since the computed values are based on variables that are uncorrelated with the errors, the results of the two-stage model are optimal, unbiased and efficient.

Scenarios under which 2SLS applies

The two-stage least square applies when regressions have to be performed on equations or models that contain both endogenous regressors and instrumental variables. The endogenous regressor assumes that the dependent variable and regressors are both random and satisfy the linear relation condition, which is a departure from the assumptions of the classical ordinary least squares models. In terms of data considerations, the 2SLS method requires that for each value of the independent variable, the observations of the dependent variable must exhibit normal distribution. The variance of the distribution of the dependent variable must be constant for all values of the given independent variables. In that regard, the relationship between the regressor and each independent variable should therefore be linear in nature.

How general methods of moments (GMM) improved over OLS

In OLS regression, estimated equations are calculated by determining equations that minimise the sums of the squared distances between the data points of the

sample and values predicted by equations. However, in order for OLS regression to provide unbiased estimates, the following assumptions should be met.

- Linearity in parameters of the regression model.
- Values of explanatory variables are fixed in repeated sampling.
- Zero mean value of the random disturbance term.
- Homoscedasticity or equal variance of the disturbance term.
- No autocorrelation between the disturbances.
- Zero covariance between the disturbance and the explanatory variable.
- The number of observations must exceed the number of parameters to be estimated.
- Variability in values of explanatory variables.
- No specification bias in the model used in empirical analysis.
- There exists no perfect multi-collinearity.

Because OLS regression provides the best estimates only when all of these assumptions are met, it is extremely important to test them. Common methods include examining residual plots, using lack of fit tests, and checking the correlation between predictors using the variance inflation factor (VIF). In real practice however, OLS does not meet all the specified assumptions. Therefore, the GMM proves to be the best approach applied to address such shortcomings of OLS, especially when the equation contains endogenous variables. Unlike the OLS method, the GMM has the statistical power to address cases or conditions in which the number of instruments exceeds the number of parameters to be estimated. GMM corrects for bias caused by endogenous explanatory variables.

5.8.3 Random Effects (RE) model

$$Y_{it} = \alpha + X'_{it} \beta + (u_i + v_{it}); v_{it} \sim \text{IID}(0, \sigma_v^2) \quad (5.2)$$

Following Kouassi, Kamdem, Mougoue and Brou (2014), a random effects (RE) model is preferred in situations where there is an assumption that there is no

correlation between the individual specific effects and the independent variables. In situations where differences across given entities potentially have an effect on the dependent variable, the RE model becomes more suitable. Another of the characteristics of the model is that it uses the OLS regression on the complete pooled cross-sectional and time series data.

5.8.4 Fixed Effects (FE) model

$$Y_{it} = \alpha_i + X'_{it} \beta + u_i + e_{it} \quad (5.3)$$

The fixed effects (FE) model makes inference about the group of measurements or subjects being examined. According to Hahn, Ham and Moon (2011), the model applies under the assumption that there is a correlation between the individual explicit effect and independent variable. Technically, the model estimates effects of time-varying explanatory variables while allowing for arbitrary correlation between the additive, the explanatory variables and unobserved heterogeneity. Overall, the model has the power to control for unobserved heterogeneity under conditions where such heterogeneity remains constant over time, while at the same time correlated with regressors. For all the above three models, Y_{it} signifies the dependent variable, α denotes the constant, X'_{it} represents a vector of regressors influencing the dependent variable, β denotes the estimated coefficient and e_{it} denotes the error term. Following Hausman (1978), the Hausman-test was performed to choose between the RE model and the FE model based on the specification:

$$H = \left(\hat{\beta}_{FE} - \hat{\beta}_{RE} \right)' \left[\left(V \left(\hat{\beta}_{FE} \right) - V \left(\hat{\beta}_{RE} \right) \right) \right] \left(\hat{\beta}_{FE} - \hat{\beta}_{RE} \right) \quad (5.4)$$

5.8.5 Generalised method of moments

$$Y_{it} = X'_{it}\beta + u_i, u \sim (0, \Omega) \quad (5.5)$$

The X' vector denotes a vector of regressors, in which the lagged dependent variable was also integrated as a covariate. Since the GMM performs dynamic modelling and is an extension of the method of moments procedure, the method was used to ensure flexible specification of the model instruments (Sato and Soderbom, 2017). The model has the computational power to nest the standard method of moments, maximum likelihood and linear regression. Accordingly, the GMM estimator is therefore asymptotically normal since the estimators follow the distribution of the mean value. The remarkable strength of the GMM technique is that it efficiently models the unobserved effects under conditions where independent variables are not sternly exogenous and when the model contains a lagged outcome variable. As such, the econometric estimation equations used in this research study were specified as follows.

5.8.6 Pooled iv profitability functions

Variable descriptions are as shown in the table below and the Equations are as given after the table below.

Table 5.3: Definitions of variables used in the study

Variable number	Independent Variables	Definition
1	Capital asset ratio (CAR)	Defined as the ratio of capital to total risk weighted assets (tier1 capital +tier 2 capital/total risk weighted assets)
2	Return on equity (ROE)	Defined as the ratio of net profit to total equity (net profit/total equity).
3	Return on assets (ROA)	Defined as the ratio of net profit to total assets (net profit/total assets)
4	Size	Proxy for size defined as the square of the natural logarithm of total assets $-\ln(\text{total asset})^2$
5	Operating expenses (OE)	Ratio of operating expenses to total assets (operating expenses/total assets)
6	Credit risk (CR)	Proxy for credit risk, defined as the ratio of loan loss provisions to total loans (Loan loss provisions/total loans)
7	Gross domestic product (GDP)	Annual growth in real gross domestic product.
8	Consumer price index (CPI)	Annual growth in consumer price index
9	Herfindahl-Hirschman index for market concentration (HHI)	(HHI) Herfindal-Hirschman Index for market concentration, being the sum of the % market share for an individual bank squared for the particular period.
10	Stock	Stock, being the average annual all share index from the Johannesburg Stock Exchange

Following the panel data econometric methods applied by Ngo (2006), the following lagged and no-lagged dependent variables equations for ROE, ROA and CAR were estimated.

5.8.6.1 No-lagged dependent variables

$$ROE_{it} = \alpha + \beta_1(CAR) + \beta_2(CR) + \beta_3(Size) + \beta_4(OE) + \beta_5(GDP) + \beta_6(CPI) + \beta_7(HHI) + u_{it}$$

(5.6)

$$ROA_{it} = \alpha + \beta_1(CAR) + \beta_2(CR) + \beta_3(Size) + \beta_4(OE) + \beta_5(GDP) + \beta_6(CPI) + \beta_7(HHI) + u_{it}$$

(5.7)

5.8.7 Lagged dependent variables

$$ROE_{it} = \alpha + \theta(ROE)_{t-1} + \beta_1(CAR) + \beta_2(CR) + \beta_3(Size) + \beta_4(OE) + \beta_5(GDP) + \beta_6(CPI) + \beta_7(HHI) + u_{it}$$

(5.8)

$$ROA_{it} = \alpha + \theta(ROA)_{t-1} + \beta_1(CAR) + \beta_2(CR) + \beta_3(Size) + \beta_4(OE) + \beta_5(GDP) + \beta_6(CPI) + \beta_7(HHI) + u_{it}$$

(5.9)

5.9 GMM PROFITABILITY FUNCTIONS

The equations were presented in detail below.

5.9.1 No-lagged dependent variables

$$ROE_{it} = \alpha + \beta_1(CAR) + \beta_2(CR) + \beta_3(Size) + \beta_4(OE) + \beta_5(GDP) + \beta_6(CPI) + \beta_7(HHI) + u_{it}$$

(5.10)

$$ROA_{it} = \alpha + \beta_1(CAR) + \beta_2(CR) + \beta_3(Size) + \beta_4(OE) + \beta_5(GDP) + \beta_6(CPI) + \beta_7(HHI) + u_{it}$$

(5.11)

5.9.2 Lagged dependent variables

$$ROE_{it} = \alpha + \theta(ROE)_{t-1} + \beta_1(CAR) + \beta_2(CR) + \beta_3(Size) + \beta_4(OE) + \beta_5(GDP) + \beta_6(CPI) + \beta_7(HHI) + u_{it}$$

(5.12)

$$ROA_{it} = \alpha + \theta(ROA)_{t-1} + \beta_1(CAR) + \beta_2(CR) + \beta_3(Size) + \beta_4(OE) + \beta_5(GDP) + \beta_6(CPI) + \beta_7(HHI) + u_{it}$$

(5.13)

5.10 POOLED IV CAPITAL-TO-ASSET RATIO (CAR) FUNCTIONS

The equations were presented in detail below.

5.10.1 No lagged dependent variables

$$CAR_{it} = \alpha + \beta_1(ROE) + \beta_2(Stock) + \beta_3(Size) + \beta_4(CR) + \beta_5(GDP) + \beta_6(CPI) + \beta_7(HHI) + u_{it}$$

(5.14)

$$CAR_{it} = \alpha + \beta_1(ROA) + \beta_2(Stock) + \beta_3(Size) + \beta_4(CR) + \beta_5(GDP) + \beta_6(CPI) + \beta_7(HHI) + u_{it}$$

(5.15)

5.10.2 Lagged dependent variables

$$CAR_{it} = \alpha + \theta(CAR)_{t-1} + \beta_1(ROE) + \beta_2(CR) + \beta_3(Size) + \beta_4(Stock) + \beta_5(GDP) + \beta_6(CPI) + \beta_7(HHI) + u_{it}$$

(5.16)

$$CAR_{it} = \alpha + \theta(CAR)_{t-1} + \beta_1(ROA) + \beta_2(CR) + \beta_3(Size) + \beta_4(Stock) + \beta_5(GDP) + \beta_6(CPI) + \beta_7(HHI) + u_{it}$$

(5.17)

5.11 GMM CAPITAL-TO-ASSET (CAR) FUNCTIONS

The equations were presented in detail below.

5.11.1 No lagged dependent variables

$$CAR_{it} = \alpha + \beta_1(\text{ROE}) + \beta_2(\text{Stock}) + \beta_3(\text{Size}) + \beta_4(\text{S_Size}) + \beta_5(\text{CR}) + \beta_6(\text{GDP}) + \beta_7(\text{CPI}) + u_{it}$$

(5.18)

$$CAR_{it} = \alpha + \beta_1(\text{ROA}) + \beta_2(\text{Stock}) + \beta_3(\text{Size}) + \beta_4(\text{S_Size}) + \beta_5(\text{CR}) + \beta_6(\text{GDP}) + \beta_7(\text{CPI}) + u_{it}$$

(5.19)

5.11.2 Lagged dependent variables

$$CAR_{it} = \alpha + \theta(CAR)_{t-1} + \beta_1(\text{ROE}) + \beta_2(\text{CR}) + \beta_3(\text{Size}) + \beta_4(\text{Stock}) + \beta_5(\text{GDP}) + \beta_6(\text{CPI}) + \beta_7(\text{HHI}) + u_{it}$$

(5.20)

$$CAR_{it} = \alpha + \theta(CAR)_{t-1} + \beta_1(\text{ROA}) + \beta_2(\text{CR}) + \beta_3(\text{Size}) + \beta_4(\text{Stock}) + \beta_5(\text{GDP}) + \beta_6(\text{CPI}) + \beta_7(\text{HHI}) + u_{it}$$

(5.21)

5.12 CORRELATIONAL ANALYSIS

In probability theory and statistics, correlation (often measured in terms of a correlation coefficient) indicates the strength and direction of a linear relationship between two random variables (Pallant, 2010). Correlation analysis was conducted among the variables to provide insight into possible relationships among variables. Because of the conventional dictum that correlation does not imply causation, these correlations cannot be validly used to infer causal relationship between the variables (Pallant, 2010). Having established the presence of correlation, regression analysis was done to determine the influence of the predictor variables on the endogenous variables.

5.13 REGRESSION ANALYSIS

Regression analysis is a collective name for methods that can be used for the modelling and analysis of numerical data consisting of values of a dependent variable (also called a response variable or measurement) and one or more independent variables (also known as explanatory variables or predictors (Pallant, 2010).

Regression is used for hypothesis testing, and it is referred to as modelling of causal relationships (Pallant, 2010).

5.14 HOMOSCEDASTICITY

The assumption of homoscedasticity (literally, same variance) is central to linear regression models. Homoscedasticity describes a situation in which the error term (that is, the “noise” or random disturbance in the relationship between the independent variables and the dependent variable) is the same across all values of the independent variables (Pallant, 2010).

The use of regression analysis relies heavily on the underlying assumptions being satisfied. A dependent variable is described as a measured variable that depends on the behaviour of an independent variable (Albright, Winston & Zappe, 2009). In this study, the dependent variable for banks is the capital asset ratio (CAR).

The problem: endogeneity

There are two kinds of variables in our models: exogenous variables and endogenous variables.

Endogenous variables: These are variables determined within the system of equations, which represent the true world. This means that they are functions of other variables present in the system. Up until now (in the single equation world), the only endogenous variable we have dealt with has always been the dependent variable.

Exogenous variables: These are variables determined outside the system. Up until now (in the single equation world), we have treated all of our independent variables as exogenous.

As a rule, when a variable is endogenous, it will be correlated with the disturbance term, hence violating the GM assumptions and making our OLS estimates biased.

5.15 METHODOLOGICAL LIMITATIONS

The non-availability of data on a number of other banks limited this study to only 13 banks thus resulting in a shorter panel of data. As a way of circumventing this problem, reliance was placed on the collection of authentic data obtained from recognised databank sources.

5.16 ETHICAL CONSIDERATIONS

The researcher's ethical responsibility to the participants and funders of the project is vital (McGivern, 2006). Where there is conflict, the participants' rights, as individuals, must come first. According to Van der Wal (2006), researchers must do everything in their power to protect the physical, social, and psychological welfare, and to honour the dignity and privacy of those studied. There are three types of ethical guidelines for surveys that a researcher should consider. These are permission to conduct the survey, informed consent and confidentiality (the right to privacy and protecting identification).

Ethical clearance that addressed issues on privacy, confidentiality, risk and protection of funders and participants was obtained in writing from the Research Ethics Review Committee of the College of Economic and Management Sciences at the University of South Africa (see Appendix 1).

5.17 INFORMED CONSENT

Informed consent relates to the principle of voluntary participation in research (McGivern, 2006:28). Informed consent describes the nature of the research project, as well as the nature of one's participation in it (Leedy & Omrod, 2010). The purpose of the research did not require the researcher to explain to any particular party other than to seek an ethical clearance from the Research and Ethics Committee of the University.

5.18 CHAPTER SUMMARY

In Chapter 5, the author discussed the use of the research methods used in this research work. Issues of data, samples, population of the study, sampling methods and the size of the sample were critically reviewed.

The estimation techniques applied in the econometric estimation processes, which are the generalised methods of moments (GMM), and panel two stage, least squares (2SLS) or pooled IV methods were examined. Reasons why these estimation techniques were preferred over the other estimation techniques were also discussed.

The sample for the research was taken from commercial banks, which operated in South Africa for the entire duration under the study.

The sample population at 13 represents 40.63 % of the total population. The chapter closed a general review on issues of regression, highlighted issues of methodological limitations and addressed issues of both ethical considerations and issues of consent for conducting the study.

CHAPTER 6: RESULTS AND DATA ANALYSIS

6.1 INTRODUCTION

The aim of this research was empirically to test the hypothesis that there is a positive and statistically significant relationship between bank capital and profitability with capital being measured by the capital-to-asset ratio (CAR), while two indicators measured profitability namely return on equity (ROE) and return on assets (ROA).

This hypothesis stipulated that those banks with a higher percentage of capital have a comparative advantage over those banks with a lower percentage of capital. It further stipulated that this comparative advantage be reflected in the profitability levels of these banks.

This study focused on the South African banking sector, critically examining the relationship between bank capital and profitability (which was done in the context of the South African banking sector covering the period from 2006 to 2015).

To this end, the study set foundations for further debate and research on the subject of bank capital especially in the context of a developing country such as South Africa. The study further enhanced the body of knowledge that already exists on the subject of bank capital.

6.2 CHARACTERISTICS OF THE SAMPLE

A target population was the entire group under study as specified by the research (Bradley, 2007). For the purposes of this research, the target population was comprised of all commercial banks that operated during the entire period under study in terms of being in the same business and more or less retaining the same name. This population was identified to be thirteen (13) commercial banks. The entire sample population was used for testing. The reason for this selection is that it was difficult to find data on other banks that covered the entire

period of study. From the total sample of 13 banks, some are subsidiaries of international banks and some are wholly owned local banks, a factor that may result in different approaches to capital adequacy ratio management.

It is also worth noting that there was no existing database for other small banks and in particular those that may not be listed on the JSE, a situation consistent with the observation of Babbie and Mouton (2011) that, unlike in developed countries, researchers in developing countries struggle to acquire data either because extensive information is not available, or when it is available, it is erratic.

6.3 THE RESULTS

In this chapter, the author provided econometric results on the relationship between the capital ratios and profitability of commercial banks in South African during the period from 2006 to 2015. Results provided include the summary descriptive statistics, a description of the Hausman diagnostic tests performed to determine suitability of using either the panel random effects (RE) model or fixed effects (FE) model, as well as pooled IV and GMM profitability and capital ratio regressions.

6.3.1 Definition of variables

The study adopted the equation used by Ngo (2006), with a few variations as shown in Table 6.1 below. The model by Ngo (2006) was chosen on the strength of its appropriateness to the study in that it applied similar variables.

Table 6.1: Definitions of variables used in the study (cf Table 5.3)

Variable number	Independent Variables	Definition
1	Capital asset ratio (CAR)	Defined as the ratio of capital to total risk weighted assets (tier1 capital +tier 2 capital/total risk weighted assets)
2	Return on equity (ROE)	Defined as the ratio of net profit to total equity (net profit/total equity).
3	Return on assets (ROA)	Defined as the ratio of net profit to total assets (net profit/total assets)
4	Size	Proxy for size defined as the square of the natural logarithm of total assets $-\ln(\text{total asset})^2$
5	Operating expenses (OE)	Ratio of operating expenses to total assets (operating expenses/total assets)
6	Credit risk (CR)	Proxy for credit risk, defined as the ratio of loan loss provisions to total loans (Loan loss provisions/total loans)
7	Gross domestic product (GDP)	Annual growth in real gross domestic product.
8	Consumer price index (CPI)	Annual growth in consumer price index
9	Herfindahl-Hirschman index for market concentration (HHI)	(HHI) Herfindal-Hirschman Index for market concentration, being the sum of the % market share for an individual bank squared for the particular period.
10	Stock	Stock, being the average annual all share index from the Johannesburg Stock Exchange

Table 6.2: Summary of descriptive statistics

	ROE	ROA	CAR	Stock	Size	S_Size	CR	OE	GDP	HHI	CPI
Mean	14.39254	2.300308	20.56762	47042.10	1.818068	3.339632	2.133750	6.092259	6.966402	1582.243	5.882000
Median	13.47692	1.545000	20.63538	45812.50	1.797463	3.232031	2.267917	5.960705	4.510000	1557.850	5.515000
Maximum	29.40308	5.952308	23.30769	54704.00	2.153658	4.638242	2.561667	8.639488	36.19723	1749.860	9.350000
Minimum	-18.81000	-0.169231	17.23615	40123.00	1.541877	2.377384	1.236667	3.950711	-0.050000	1492.500	3.370000
Std. Dev.	13.53498	2.082590	1.782477	5049.207	0.185810	0.688902	0.428978	1.479442	10.26008	81.25767	1.538920
Skewness	-1.192441	0.574168	-0.434244	0.235213	0.360599	0.511031	-0.809001	0.157591	2.226774	0.814339	0.800238
Kurtosis	4.016546	1.810909	2.476468	1.766070	2.143415	2.239302	2.452768	1.916045	6.763502	2.502203	3.517395
Jarque-Bera	36.40557	14.80164	5.570276	9.446040	6.791773	8.792731	15.80253	6.902450	184.1561	15.71046	15.32495
Probability	0.000000	0.000611	0.061721	0.008888	0.033511	0.012322	0.000370	0.031707	0.000000	0.000388	0.000470
Sum	1871.030	299.0400	2673.790	6115473.	236.3489	434.1521	277.3875	791.9937	905.6323	205691.6	764.6600
Sum Sq. Dev.	23632.25	559.4965	409.8619	3.29E+09	4.453766	61.22168	23.73889	282.3487	13579.73	851762.3	305.5073
Observations	130	130	130	130	130	130	130	130	130	130	130

With the Jacque-Bera statistics presented in Table 6.2 the author showed that the data for all the variables used for econometric estimation suffered from non-normality. The data that demonstrated normality in terms of distribution was only the capital-to-asset ratio (CAR) variable.

6.4 DIAGNOSTIC TESTS

The Hausman-test was conducted to determine the selection of a suitable estimation model between the RE and the FE model. Though the results of the test showed that the FE model was the suitable method, the cross-section test variance was invalid and the Hausman statistic was set to zero, hence the estimated cross-section RE variance was zero (see Appendices 2-15). In the light of that background, the RE model was therefore not used, and only results estimated using the pooled IV were presented.

6.5 PANEL TWO-STAGE LEAST SQUARES (2SLS) PROFITABILITY REGRESSIONS

The pooled IV or panel 2SLS profitability regressions for ROE and ROA were provided for two models for each distinct aforementioned dependent variable, with no-lagged dependent variable and with lagged dependent variable.

Table 6.3: Pooled IV (panel 2SLS) profitability regression estimates

	No-Lagged Variable	Dependent Variable	Lagged Variable	Dependent Variable
Dependent Variable	ROE _{it}	ROA _{it}	ROE _{it}	ROA _{it}
ROE _{it} (-1)	-	-	0.298 (1.340)	-
ROA _{it} (-1)	-	-	-	-0.097 (-1.216)
CAR	5.830** (14.733)	0.596** (18.968)	5.779** (16.536)	0.595** (20.417)

CR	-45.103** (-12.707)	-5.476** (-19.404)	-51.745** (-8.526)	-5.287** (-17.234)
Size	132.512** (10.317)	7.115** (6.967)	115.721** (3.918)	9.249** (4.871)
OE	-3.401** (-8.526)	0.256** (8.056)	-4.763** (-8.029)	0.320** (10.678)
GDP	0.3460** (5.276)	0.0838** (16.086)	0.0783 (0.842)	0.103** (12.044)
CPI	0.705** (2.007)	0.133** (4.751)	-2.034** (-2.470)	0.337** (5.297)
HHI	-0.149** (-9.674)	-0.009** (-7.293)	-0.105** (-3.832)	-0.0127** (-6.011)
R ²	0.846	0.959	0.888	0.966
Adj. R ²	0.838	0.957	0.880	0.964
S.E. of regression	5.443	0.433	4.755	0.383
DW statistic	2.305	2.972	2.550	3.529
Instrument rank	8	8	9	9
Mean dependent var	14.392	2.300	13.189	2.019
S.D. dependent var	13.535	2.083	13.752	2.007
Sum squared resid	3643.436	23.032	2464.685	15.984
Second-Stage SSR	3643.436	23.032	2464.685	15.984

* Statistically significant at the 10% level

** Statistically significant at the 5% level

*** Statistically significant at the 1% level

The figures in brackets () are the computed t-statistics

With the results presented in Table 6.3 the author showed that CAR had statistically significant and positive effect on both ROE and ROA in both scenarios where the dependent variable (CAR) was not lagged and when the dependent

variable (CAR) was lagged. Results showed that the statistically significant and positive effect of CAR was more pronounced on ROE relative to ROA in both panels. In the scenario where CAR was not lagged, results revealed that a 1% increase in CAR led to about 5.8% increase in ROE, and about 0.6% rise in ROA during the sample period from 2006 to 2015 under review. Similar results were also found in the scenario where CAR was lagged, for which results show that a 1% increase in CAR led to approximately 5.8% rise in ROE and 0.6% rise in ROA across banks during the period from 2006 to 2015.

Credit risk (CR) demonstrated statistically significant and negative effect on both ROE and ROA in both scenarios with and without the dependent variable lagged. Similarly, size had a significant and positive effect on both ROE and ROA, while the Herfindahl Hirschman Index (HHI) consistently had significant and negative effects on both ROE and ROA in both scenarios with and without the lagged dependent variable. Furthermore, operating expenses (OE) consistently had significant and negative effects on ROE, and a significant and positive effect on ROA. Except for the panel where ROE was lagged on itself where GDP had a positive but insignificant effect, GDP had a significant and positive effect on both ROE and ROA. The CPI consistently had significant and positive effects on both ROE and ROA, except for the panel where ROE was lagged. In the panel where ROE was lagged on itself, where the effect of GDP was positive but insignificant, GDP had significant and positive effects on ROE and ROA. In the lagged dependent variable panel, lagged ROE had a positive but insignificant effect on itself, while ROA had a negative but insignificant effect on itself.

6.5.1 GMM profitability regressions

Table 6.4: GMM profitability regression estimates

	No-Lagged Variable	Dependent	Lagged Variable	Dependent
Dependent Variable	ROE _{it}	ROA _{it}	ROE _{it}	ROA _{it}
ROE _{it} (-1)	-	-	0.298 (1.340)	-
ROA _{it} (-1)	-	-	-	-0.097 (-1.216)
CAR	5.830** (14.733)	0.596** (18.968)	5.779** (16.536)	0.595** (20.417)
CR	-45.103** (-12.708)	-5.476** (-19.404)	-51.741** (-8.526)	-5.287** (-17.235)
Size	132.511** (10.317)	7.11453** (6.967)	115.721** (3.9177)	9.249** (4.871)
OE	-3.401** (-8.526)	0.255** (8.056)	-4.763** (-8.029)	0.320** (10.678)
GDP	0.346** (5.276)	0.0839** (16.086)	0.0783 (0.842)	0.103** (12.044)
CPI	0.705** (2.007)	0.1326** (4.751)	-2.0338** (-2.470)	0.337** (5.297)
HHI	-0.149** (-9.674)	-0.001** (-7.293)	-0.105** (-3.832)	-0.0127** (-6.011)
R ²	0.846	0.959	0.888	0.966
Adj. R ²	0.838	0.957	0.880	0.964
S.E. of regression	5.442	0.433	4.755	0.383
DW statistic	2.305	2.972	2.550	3.529
Instrument rank	8	8	9	9

Mean dependent var	14.393	2.300	13.190	2.019
S.D. dependent var	13.535	2.083	13.753	2.007
Sum squared resid	3643.436	23.032	2464.685	15.984
J-statistic	26.468	28.239	109.000	109.000

* Statistically significant at the 10% level

** Statistically significant at the 5% level

*** Statistically significant at the 1% level

The figures in brackets () are the computed t-statistics

With the estimated results in Table 6.4, the author revealed that capital-to-asset ratio (CAR) consistently demonstrated statistically significant and positive effects on both ROE and ROA in both scenarios with and without the dependent variable (CAR) lagged on itself. The computed econometric estimates show that the statistically significant and positive effect of CAR was more noticeable on ROE comparative to ROA in both scenarios. In the scenario where CAR was not lagged, results reveal that a 1% increase in CAR led to approximately 5.8% increase in ROE, and about 0.6% rise in ROA during the sample period from 2006 to 2015. Similar results were also obtained in the scenario where CAR was lagged, for which the estimated results show that a 1% increase in CAR led to approximately 5.8% rise in ROE and about 0.6% rise in ROA across banks during the sample period 2006 to 2015 under review.

Consistent with the results obtained using the panel 2SLS method; credit risk (CR) recurrently had statistically significant and negative effects on both ROE and ROA both with and without the dependent variable lagged. Likewise, size consistently had statistically significant and positive effects on both ROE and ROA, while the Herfindahl Hirschman Index (HHI) consistently had significant and negative effects on both ROE and ROA in both scenarios with and without the lagged dependent variable. Conversely, OE consistently had a significant and negative

effect on ROE, and a significant and positive effect on ROA in both scenarios with and without the lagged dependent variable.

With the exception of the panel where ROE was lagged on itself, where GDP had a positive but insignificant effect, GDP had statistically significant and positive effects on both ROE and ROA. The consumer price index (CPI) had statistically significant and positive effects on both ROE and ROA, except for the panel where ROE was lagged. In the panel where ROE was lagged on itself, where the effect of GDP was positive but insignificant, GDP had a significant and positive effect on ROE and ROA. In the lagged dependent variable panel, lagged ROE had a positive but insignificant effect on itself, while ROA had a negative but statistically insignificant effect on itself. The adjusted R-square values showed that more than 84% overall variation in each of the distinct models of ROE and ROA were explained by the independent variables captured in the respective estimated models.

6.5.2 Pooled IV capital-to-asset ratio (CAR) regression estimates

Table 6.5: Pooled IV capital-to-asset ratio (CAR) regression estimates

	No-Lagged Variable	Dependent Variable	Lagged Variable	Dependent Variable
Dependent Variable: Capital-to-Asset Ratio (CAR _{it})				
Endogenous Regressor	ROE _{it}	ROA _{it}	ROE _{it}	ROA _{it}
ROE _{it}	0.080634 (10.61961)**	-	0.076476 (7.509609)**	-
ROA _{it}	-	1.067740 (11.72807)**	-	1.239563 (7.438631)**
CAR _{it} (-1)	-	-	0.175374 (2.435605)**	-0.149296 (-1.781099)
Stock	5.32E-05 (2.921201)**	2.37E-05 (1.289580)	0.000156 (6.203385)**	0.000131 (4.920064)**
Size	-25.94389 (-27.34569)**	-15.55784 (-12.51505)**	-7.760979 (-9.121174)**	-3.835543 (-3.661240)**
CR	8.317196 (29.71585)**	7.464892 (29.77775)**	8.069960 (13.35642)**	8.794265 (13.87024)**
GDP	-0.077248 (-9.251632)**	-0.099543 (-11.98143)**	0.016483 (1.473551)	-0.055301 (-3.692038)**
CPI	0.172665 (3.088658)**	-0.089134 (-1.394276)	0.794479 (7.977027)**	0.481796 (4.130103)**
HHI	0.028974 (23.10186)**	0.019322 (14.13415)**	-	-
R ²	0.811018	0.828986	0.694072	0.692109
Adj. R ²	0.801799	0.820643	0.677385	0.675315
S.E. of regression	0.793554	0.754888	1.066276	1.069692
DW statistic	3.484970	2.785397	3.536202	3.076812
Instrument rank	8	8	8	8
Mean dependent var	20.56762	20.56762	20.53752	20.53752
S.D. dependent var	1.782477	1.782477	1.877274	1.877274
Sum squared resid	77.45646	70.09226	125.0639	125.8665
Second-Stage SSR	77.45646	70.09226	125.0639	125.8665

With the computed results presented in Table 6.5, the author indicated that both ROE and ROA endogenous variables had statistically significant and positive effects on capital-to-asset (CAR) ratio of commercial banks in South Africa during the period from 2006 to 2015. These results remained consistent in both scenarios where the dependent variable (CAR) was not lagged and where the dependent variable (CAR) was lagged. Results showed that the statistically significant and positive effect of both ROE and ROA endogenous variables were moderately different in terms of magnitude in both panels. In the scenario where CAR was not lagged, results revealed that a 1% increase in ROE led to about a 0.1% increase in CAR, while a 1% increase in ROA led to about 1.1% rise in CAR during the 2006 to 2015 sample period under review. Similar results were also found in the scenario where CAR was lagged, for which results showed that a 1% increase in ROE led to approximately 0.1% rise in CAR, while a 1% rise in ROA led to approximately 1.2% upsurge in CAR across the sampled commercial banks in South Africa during the period from 2006 to 2015. In general, results show that ROA had a more pronounced significant and positive effect on CAR compared to ROE during the sample period under review.

Stock had statistically significant and positive effects on both ROE and ROA in both scenarios with and without the dependent variable lagged, with the exception of the scenario where the dependent variable CAR was not lagged in which stock had a positive but statistically insignificant effect. Size continually had statistically significant and negative effects on both ROE and ROA in both scenarios with and without the dependent variable CAR lagged. By contrast, credit risk (CR) consistently had statistically significant and positive effects on both ROE and ROA, while the Herfindahl Hirschman Index (HHI) had significant and positive effects on both ROE and ROA only in the scenario where the dependent variable CAR was not lagged.

In the scenario where the dependent variable CAR was lagged with ROE being the endogenous variable, lagged CAR had a statistically significant and positive effect on CAR. Nonetheless, in the scenario where the dependent variable CAR was lagged with ROA being the endogenous variable, lagged CAR had a

statistically insignificant and negative effect on CAR of commercial banks in South Africa during the sample period. The estimated adjusted R-square values showed that more than 80% overall variation in each of the distinct models of ROE and ROA in which the dependent variable CAR was not lagged were explained by the independent variables captured in the respective models. In the case of the scenario where the dependent variable CAR was lagged, about 67% overall variations in CAR for each of the models where ROE and ROA were distinct endogenous variables were explained by the independent variables captured in the respective estimated models.

6.5.3 GMM capital-to-asset ratio regressions

Table 6.6: GMM capital-to-asset ratio regressions

No-Lagged Dependent Variable		
Dependent Variable: Capital-to-Asset Ratio (CAR_{it})		
Endogenous Regressor	ROE_{it}	ROA_{it}
ROE_{it}	0.049665 (6.881929) **	-
ROA_{it}	-	0.492363 (3.552498) **
Stock	-0.000119 (-5.279644) **	-7.88E-05 (-3.222354) **
Size	33.26938 (18.47303) **	27.71804 (10.68559) **
S_Size	-10.83750 (-24.39309) **	-8.886040 (-11.45589) **
CR	1.089316 (3.049654) **	1.756347 (3.256539) **
GDP	0.038086 (4.676206) **	0.009355 (0.725114)
CPI	-0.246623 (-3.820660) **	-0.235701 (-3.180899) **
R^2	0.827159	0.782884
Adj. R^2	0.818728	0.772293

S.E. of regression	0.758908	0.850574
DW statistic	3.775941	3.229470
Instrument rank	8	8
Mean dependent var	20.56762	20.56762
S.D. dependent var	1.782477	1.782477
Sum squared resid	70.84083	88.98755
Second-Stage SSR	2.169845	2.637106

In Table 6.6 the author presented the results computed using the GMM method with both ROE and ROA as endogenous variables, and the dependent variable CAR not lagged on itself. The results showed that both ROE and ROA had statistically significant and positive effects on CAR. Results revealed that a 1% increase in ROE led to about 0.05% increase in CAR, while a 1% increase in ROA led to about 0.5% rise in CAR. Stock had a significant and negative effect on CAR in both models where ROE and ROA were discretely endogenous variables. Conversely, size consistently had a statistically significant and positive effect on CAR in both scenarios where ROE and ROA were individually endogenous variables. Size had a more pronounced significant and positive effect on CAR in the scenario where ROE was the endogenous variable relative to the scenario where ROA was the endogenous variable.

Furthermore, the effect of the credit risk (CR) on CAR was statistically significant and positive, and remained almost of the same magnitude in both scenarios where ROE and ROA were distinctive endogenous variables. The effect of GDP on CAR was positive for both scenarios where ROE and ROA were endogenous variables, but only statistically significant where ROE was the endogenous variable. The effect of CPI on CR was statistically significant and negative, and remained nearly of the same magnitude in both scenarios where ROE and ROA were distinctive endogenous variables. The adjusted R-square values showed that the independent variables explained about 82% of the overall variation in CAR for the model in which ROE was the endogenous variable. Similarly, the same independent variables explained about 78% of the overall variation in CAR for the model in which ROA was the endogenous variable.

6.6 CHAPTER SUMMARY

This chapter reviewed the main purpose of the research study, which was to test the hypothesis that there is a statistically significant and positive relationship between bank capital and profitability. This was done in the context of the South African banking market. The chapter went on to describe the main characteristics of the sample used in this study, providing definitions for the variables used in the study. Lastly, the chapter presented the research results, which confirmed that there was indeed a positive relationship between capital and profitability as most of the test results confirmed that there was a statistically significant and positive relationship between capital and profitability. Most of the statistical thresholds confirmed this relationship across all variables with the exception of a few, particularly when tests were done from a lagged position.

The results remained consistent with both theory and literature on most of the variables used in the study.

CHAPTER 7: DISCUSSION, SYNTHESIS OF RESULTS, SUMMARY OF CONCLUSIONS AND DIRECTION FOR FUTURE RESEARCH

7.1 INTRODUCTION

Bank capital has become a critical aspect for business and bank management the world over. The debate on capital adequacy has rumbled on in different forums and has been a matter of concern for both banks and regulators from a policy perspective. Capital is a principal aspect of regulation and has a huge bearing on business continuity, growth, competitiveness and access to credit.

The costs and the amount of capital have an impact on competitiveness of an institution and will influence the rate of expansion of a bank.

It is a generally recognised fact that more capital puts a bank at an advantage against its competitors as the availability of capital has a bearing on the issues of control, level of growth and access to credit.

In the previous chapter the author discussed the main purpose of the research study, examined the main characteristics of the sample used in this study, and provided definitions for the variables used in the study. The author further presented the research results in detail. The results suggested that there was a positive relationship between capital and profitability.

The objective of the author in this chapter was to review the results, discuss the results in the context of other conclusions from literature, synthesise the results and corroborate the results with theory and other empirical studies.

The author also discussed the contribution of this study to new knowledge and made recommendations for further research.

7.2 RESEARCH OBJECTIVES AND HYPOTHESES REVISITED

The main aim of this research was to test the hypothesis and in the process establish whether there existed a positive and statistically significant relationship between bank capital and profitability. Following Ngo (2006) bank capital was measured by the capital-to-asset ratio (CAR), while two indicators, namely return on equity (ROE) and return on assets (ROA), measured profitability. The hypothesis stipulated that those banks with a higher percentage of capital have a comparative advantage over those banks with a lower percentage of capital. It further stipulated that this comparative advantage is reflected in the profitability levels of these banks.

Empirical evidence for USA banks as an example indicated a perverse negative relationship between financial leverage and the return on equity for the 1983 to 1989 period (Hutchison & Cox, 2006).

However, results of the previous research work to date have not been conclusive, as they have presented mixed conclusions on the subject with a number of researchers presenting a positive relationship between bank capital and profitability and an equally large number of researchers presenting results to the contrary.

The study was therefore motivated by the contrasting and conflicting results and by the fact that and there is no evidence of research done to date that focuses on an emerging economy such as South Africa.

In view of these observations, the study intended to address the following objectives:

- a) To test (within the South African banking environment) the hypothesis that there is a positive and statistically significant relationship between capital and profitability and to stimulate debate and further research on the subject of bank capital.

- b) To examine critically the relationship between bank capital and profitability (this was done using data from the South African banking sector covering the period from 2006 to 2015.
- c) To establish the other determinants of bank profitability in the context of South Africa.

The study was guided by the following research questions:

1. Will tests of the hypothesis that there is a positive and statistically significant relationship between capital and profitability in the context of South Africa give results that are consistent with both theory and literature.
2. To what extent is the profitability of commercial banks affected by the capital amount available to them?
3. What are the other drivers of bank profitability?

7.3 RESULTS AND DISCUSSIONS

All equations used in this study were estimated using four different techniques, once with ROE as the proxy for profitability and then repeated using ROA as the proxy for profitability yielding eight sets of results for each equation, which were discussed in turn.

The results were discussed guided by the following: first, the results of the study were brought to the fore, commentary or reference to theory was discussed or mentioned, the results were compared to both theory and empirical studies and finally commentary was made on the implications of these results to both banks and policy makers.

7.4 POOLED IV (PANEL 2SLS) PROFITABILITY REGRESSIONS

The commentary on the results follows below.

7.4.1 Capital Asset Ratio (CAR)

The author showed from the results of the profitability regressions that CAR had a positive and statistically significant effect on both ROE and ROA in both scenarios where the dependent variable (CAR) was not lagged and when the dependent variable (CAR) was lagged. The author showed from the results that the statistically significant and positive effect of CAR was more pronounced on ROE compared to ROA in both panels. In the scenario where CAR was not lagged, results revealed that a 1% increase in CAR led to about a 5.8% increase in ROE, and about 0.6% increase in ROA during the sample period from 2006 to 2015. Similar results were also found in the scenario where CAR was lagged, for which results showed that a 1% increase in CAR led to approximately 5.8% increase in ROE and a 0.6% increase in ROA across banks during the period from 2006 to 2015.

These results seemed to be consistent with the findings by Angbazo (1997) on United States banks for the period from 1989 to 93 in which he concludes that net interest margins reflect primarily credit and macro-economic risk premia. Evidence from the same studies suggest that net interest margins are positively related to core capital, non-interest bearing reserves, and management quality, but negatively related to liquidity risk. The research results from the current study seemed to agree with those of Angbazo (1997) particularly on the impact of capital on interest earnings, though the measurement variable may have been slightly different.

The research results were also consistent with the findings by Saunders and Schumacher (2000) where they analyse the determinants of interest margins in six countries from the European Union and the US during the period from 1988 to 95. Their findings were that macro-economic volatility and regulations have significant impact on bank interest margins. The concept of capital is silently brought into the fore through the aspect of regulation. The study results imply an important trade-off between ensuring bank solvency, as defined by high capital to

asset ratios, and lowering the cost of financial services to consumers, as measured by low interest rate margins.

From the results from the current research, a 1% increase in CAR had the effect of increasing ROE by approximately 5.8% and ROA by approximately 0.6%. This is consistent with the findings of Flamini, McDonald and Schumacher (2009) in the IMF Working Paper (WP09/15) in which they sought to understand the determinants of high bank profits in sub-Saharan Africa (SSA), explore the relationship between profits and equity in the commercial banking sector of the region. The researchers based their analysis on a sample of 389 banks operating in 41 countries from 1998 through to 2006. In their research, the trio find that the coefficient of equity is positive and highly significant, implying therefore that well-capitalised banks experience higher returns than other banks. There are further deductions that can be made from the trio's studies. It can be concluded that a positive link between profits and level of capital may have a bearing on the future earning capacity of the bank, in that a bank that expects to have better future performances, credibly sends this information to the market through an increase in the capital ratio. The results of this study were also consistent with the findings by Kunt and Huizinga (1998) who conclude in their studies that well-capitalised banks have higher interest margins and that they are more profitable than other banks.

This may be influenced by the generally accepted view of many scholars that banks with higher capital ratios tend to face lower cost of funding because of the perceived low risk in those banks.

Besides, a bank with a high equity ratio needs to borrow less resulting in low interest costs and hence higher profit levels.

According to the current study, there was little difference between the results whether ROE or ROA was used as the measure of profitability.

With the exception of the fixed-effects regression using ROE as the dependent variable, the coefficient on CAR in both the pooled and fixed effects 2SLS/IV was positive and significant. This conforms to the findings in almost all previous research looking at the determinants of banking performance that include some measure of capital as a possible determinant.

To the contrary, however, wisdom suggests that holding more capital should reduce profitability as there is a holding cost component attached to holding more capital. Berger (1995b), however suggests that this positive relationship between capital and profitability could be the result of either a reduction in insurance and/or borrowing costs for banks with higher levels of capital or the result of some kind of signalling equilibrium where it is easier for managers of less risky banks to signal quality by maintaining high levels of capital than managers of riskier banks. This line of thought seems to carry weight and is therefore plausible, and is widely accepted in the literature that followed Berger's (1995b) contribution.

The results of the study by Berger and Bouwman (2009) in their studies on the impact of capital to the survival chances of a bank during a market crisis further reinforce the importance of capital for a bank. They conclude that banks with higher capital ratios stand a better chance of surviving a market crisis, as such, banks are likely to increase market share, profitability and stock returns.

In the context of South Africa, large banks such as the ABSA seem not to have been affected a lot during the financial crisis of 2008 to 2009 due to their perceived capital muscle.

7.4.2 Credit Risk (CR)

The author used these research findings to observe that credit risk (CR) demonstrated statistically significant and negative effects on both ROE and ROA in both scenarios with and without the dependent variable lagged. This finding was consistent with Al-Haschimi's (2007) conclusions in his studies of the determinants of bank net interest margins in 10 SSA countries.

He concludes that credit risk and operating inefficiencies (which are an indication of market power) had a bearing on most of the variations in net interest margins across the banks. Where credit risk is perceived to be high, it has a negative effect on both ROE and ROA.

Athanasoglou, et al., (2006b) corroborate these research findings on credit risk through their study on the profitability behaviour of the South Eastern European banking industry from 1998 to 2002 when their research results suggest that the enhancement of bank profitability in the European countries covered in their studies has to introduce new measures of risk management and operating efficiency, which according to the evidence they present in the paper, crucially affects profits. Notably, market concentration had a positive effect on profitability and the effects of other macro-economic variables on the results are mixed.

Findings by Flamini, McDonald, and Schumacher (2009) however seem to contrast the findings of this research results as they in their IMF Working Paper (WP/09/15) find that credit risk has a positive and significant effect on profitability, suggesting therefore that risk-averse shareholders target risk-adjusted returns and seek larger earnings to compensate higher credit risk.

The results from this research study give credence to the unique nature of the South African banking market where credit risk is a significant variable in computing ROE and ROA.

7.4.3 Size

The research findings of the current study on size were that size has a significant and positive effect on both ROE and ROA. Size denotes asset power and it comes as no surprise that there is a positive link between size and profits.

These research findings were consistent with those from Flamini, McDonald and Schumacher (2009) who find a positive and significant coefficient of the size variable in their studies.

According to the trio, the positive and significant coefficient of the size variable gives weight to the economies-of-scale market-power hypothesis.

Large banks are at an advantage compared to small banks, which is expressed through higher earnings of large banks because they do not operate in very competitive markets. The ability of large banks to pass on inefficiency costs to their clients means that large banks can retain higher profit margins despite costs that may be associated with the size of a bank. This typifies the situation on the ground in South Africa, as the large banks who command a lot more market share have remained profitable despite their sizes, which should have led to an increase in operating costs due to inefficiencies.

7.4.4 Herfindal Hirschman Index (HHI)

The results of the study showed that the Herfindahl Hirschman Index (HHI) consistently had significant and negative effects on both ROE and ROA. This result can be attributed to the oligopolistic nature of the South African Banking market.

7.4.5 Operating Expenses (OE)

Theory suggests that there must be a negative relationship between growth in expenses and profitability.

It was expected that as operating expenses increase, the profits for a bank should decrease. The results from this study showed that in both scenarios, with and without a lagged dependent variable, operating expenses (OE) consistently had a significant and negative effect on ROE, (a result which is consistent with the theory) and a significant and positive effect on ROA.

This result was out of the norm with theoretical expectations as in normal situations a negative relationship between operating expenses and ROA was expected.

However, this result was not unique as Ngo (2006) who finds a positive and statistically significant relationship between operating expenses and return on equity and return on assets respectively corroborated it.

Ngo (2006) does not explain this anomaly. The current study used the DuPont equation to explain this anomaly.

According to the DuPont analysis, ROE is affected by three things: operating efficiency (which is measured by profit margin), asset use efficiency (which is measured by total asset turnover), and financial leverage (which is measured by the equity multiplier).

Therefore, the DuPont analysis was represented in a mathematical form by the following calculation: $ROE = \text{Profit Margin} \times \text{Asset Turnover Ratio} \times \text{Equity Multiplier}$.

The DuPont analysis breaks ROE into its constituent components to determine which of these components is most responsible for changes in ROE.

Net margin (expressed as a percentage) is the revenue that remains after subtracting all operating expenses, taxes, interest and preferred stock dividends from the total revenue of a company. Asset turnover ratio is an efficiency measurement used to determine how effectively a company uses its assets to generate revenue. The formula for calculating the asset turnover ratio was total revenue divided by total assets. As a rule, the higher the resulting number, the better the company is performing.

Equity multiplier measures financial leverage. By comparing total assets to total stockholders' equity, the equity multiplier indicates whether a company finances the purchase of assets primarily through debt or equity. The higher the equity multiplier, the more leveraged the company, or the more debt it has in relation to its total assets.

The DuPont analysis involves examining changes in these figures over time and matching them to corresponding changes in ROE.

By using this approach (though the researcher's focus was on ROA), the researcher was able to determine whether operating efficiency, asset use efficiency or leverage was most responsible for ROE variations.

Applying this equation, it could be concluded that efficiency in the utilisation of assets may result in revenue growing at a faster rate than the growth in operating expenses which may result in an increase in net profits, hence an increase in the return on assets. It was clear from the results that operating expenses had a bearing on profitability. The effective management of operating expenses will keep banks competitive and will improve profitability and indirectly increase the access to capital of a bank.

7.4.6 Gross Domestic Product (GDP)

Theoretical expectations regarding the relationship between GDP and profitability were that as GDP increases, so should the profitability of banks. As expected, output growth had a positive impact on bank profitability in the results of the current research.

Except for the panel where ROE was lagged on itself, where the effect of GDP was positive but insignificant, GDP had a significant and positive effect on both ROE and ROA. Flamini, McDonald, corroborates this and Schumacher (2009) who find that growth in output has a positive effect on profits.

As the economy grows, the level of activity in the economy increases and consumer spending patterns also change in a positive manner, hence the positive impact of GDP on profits.

Policymakers, in particular governments, should always strive to create a conducive environment that fosters economic growth as this has positive downstream effects on the economy, including on banks.

7.4.7 inflation (CPI)

The results of the current study showed a positive relationship between inflation and profits. The CPI consistently had significant and positive effects on both ROE and ROA, except for the panel where ROE was lagged.

Inflation is associated with higher interest margins for banks. In the studies by Kunt and Huizinga (1998), a positive relationship between inflation and an increase in profits is corroborated. Inflation results in higher costs and more transactions and in most instances an increase in economic activity. In the context of South Africa, an increase in inflation is usually accompanied by a rise in interest rates and because South Africa is a credit-driven economy, any rise in interest rates has a positive bearing on bank profitability. The low interest paid by banks on deposits enhances this inference that bank profit margins increase as inflation increases, because of the increase in free float.

Results from the studies by Flamini, McDonald and Schumacher (2009), show that macro-economic variables significantly affect bank profits. Of particular note is inflation, which they find to have a positive effect on profitability. According to the trio, this suggests that banks forecast future changes in inflation correctly and quickly adjust their interest rates to reflect the expected changes in inflation. This results in banks realising higher interest margins.

7.5 GMM PROFITABILITY REGRESSIONS

The estimated results in Table 6.4 revealed that capital-to-asset ratio (CAR) consistently demonstrated statistically significant and positive effects on both ROE and ROA in both scenarios with and without the dependent variable (CAR) lagged on itself. The results were the same as those obtained under the Pooled

IV (Panel 2SLS) profitability regressions and the use of the GMM estimation technique was meant to reinforce robustness of the tests. The fact that the results were the same under both models reinforced the dependability of the results derived from this study.

This further reinforced the importance of capital to banking institutions and further highlighted the importance of the current study to literature.

The computed econometric estimates showed that the statistically significant and positive effect of CAR was more noticeable on ROE compared to ROA in both scenarios. In the scenario where CAR was not lagged, results reveal that a 1% increase in CAR led to approximately a 5.8% increase in ROE, and about a 0.6% rise in ROA during the sample period from 2006 to 2015. Similar results were also obtained in the scenario where CAR was lagged, for which the estimated results showed that a 1% increase in CAR led to an approximately 5.8% increase in ROE and about a 0.6% increase in ROA across banks during the sample period from 2006 to 2015 under review.

Consistent with the results obtained using the Panel 2SLS method; credit risk (CR) recurrently had statistically significant and negative effects on both ROE and ROA, both with and without the dependent variable lagged.

As discussed under the main discussion of the results section, the results of credit risk were consistent with both theory and contemporary literature.

Results on both size and the HHI were consistent with both theory and literature as these types of results have been supported and corroborated by other researchers before.

Likewise, size consistently had statistically significant and positive effects on both ROE and ROA, while the Herfindahl Hirschman Index (HHI) consistently had significant and negative effects on both ROE and ROA in both scenarios, with and without the lagged dependent variable. Conversely, OE consistently had a

significant and positive effect on ROE, and significant and negative effects on ROA in both scenarios, with and without the lagged dependent variable.

With the exception of the panel where ROE was lagged on itself where GDP had a positive but insignificant effect, GDP had statistically significant and positive effects on both ROE and ROA. The consumer price index (CPI) had statistically significant and positive effects on both ROE and ROA, except for the panel where ROE was lagged. In the panel where ROE was lagged on itself, where the effect of GDP was positive but insignificant, GDP had a significant and positive effect on ROE and ROA. In the lagged dependent variable panel, lagged ROE had a positive but insignificant effect on itself, while ROA had a negative but statistically insignificant effect on itself. The adjusted R-square values showed that more than 84% overall variation in each of the distinct models of ROE and ROA were explained by the independent variables captured in the respective estimated models.

7.6 POOLED IV (PANEL 2SLS) CAPITAL-TO-ASSET RATIO REGRESSIONS

Computed results for capital to asset ratio regressions indicated that both ROE and ROA endogenous variables had statistically significant and positive effects on capital-to-asset (CAR) ratio of commercial banks in South Africa during the period from 2006 to 2015. These results remained consistent in both scenarios where the dependent variable (CAR) was not lagged and where the dependent variable (CAR) was lagged. Results showed that the statistically significant and positive effect of both ROE and ROA endogenous variables were moderately different in terms of magnitude in both panels. In the scenario where CAR was not lagged, results revealed that a 1% increase in ROE led to about a 0.1% increase in CAR, while a 1% increase in ROA led to about a 1.1% increase in CAR during the 2006 to 2015 sample period under review. Similar results were also found in the scenario where CAR was lagged, for which results show that a 1% increase in ROE led to an approximately 0.1% increase in CAR, while a 1% increase in ROA led to an approximately 1.2% upsurge in CAR across the sampled commercial banks in South Africa during the period from 2006 to 2015.

In general, results showed that ROA had a more pronounced significant and positive effect on CAR relative to ROE during the sample period under review.

Again the results remained consistent with both theory and literature as have been supported by others scholars before.

Stock had statistically significant and positive effects on both ROE and ROA in both scenarios with and without the dependent variable lagged, with the exception of the scenario where the dependent variable CAR was not lagged, in which stock had a positive but statistically insignificant effect. Size continually had statistically significant and negative effects on both ROE and ROA in both scenarios with and without the dependent variable CAR lagged. In contrast, credit ratio (CR) consistently had statistically significant and positive effect on both ROE and ROA, while the Herfindahl Hirschman Index (HHI) had significant and positive effects on both ROE and ROA only in the scenario where the dependent variable CAR was not lagged.

In the scenario where the dependent variable CAR was lagged with ROE being the endogenous variable, lagged CAR had a statistically significant and positive effect on CAR. Nonetheless, in the scenario where the dependent variable CAR was lagged with ROA being the endogenous variable, lagged CAR had a statistically insignificant and negative effect on CAR of commercial banks in South Africa during the sample period. The estimated adjusted R-square values showed that more than 80% overall variation in each of the distinct models of ROE and ROA in which the dependent variable CAR was not lagged, were explained by the independent variables captured in the respective models. In the case of the scenario where the dependent variable CAR was lagged, about 67% overall variations in CAR for each of the models where ROE and ROA were distinct endogenous variables were explained by the dependent variables captured in the respective estimated models.

7.7 GMM CAPITAL-TO-ASSET RATIO REGRESSIONS

Table 6.6 presented the results computed using the GMM method with both ROE and ROA as endogenous variables, and the dependent variable CAR not lagged on itself. Results showed that both ROE and ROA had statistically significant and positive effects on CAR. Results revealed that a 1% increase in ROE led to about a 0.05% increase in CAR, while a 1% increase in ROA led to about a 0.5 increase in CAR. Stock had a significant and negative effect on CAR in both models where ROE and ROA were discretely endogenous variables. Conversely, size consistently had a statistically significant and positive effect on CAR in both scenarios where ROE and ROA were individually endogenous variables. Size had a more pronounced significant and positive effect on CAR in the scenario where ROE was the endogenous variable relative to the scenario where ROA was the endogenous variable.

Furthermore, the effect of credit risk (CR) on CAR was statistically significant and positive, and remained almost of the same magnitude in both scenarios where ROE and ROA were distinctive endogenous variables. The effect of GDP on CAR was positive for both scenarios where ROE and ROA were endogenous variables, but only statistically significant where ROE was the endogenous variable. The effect of CPI on CR was statistically significant and negative, and remained nearly of the same magnitude in both scenarios where ROE and ROA were distinctive endogenous variables. The adjusted R-square values showed that the independent variables explained about 82% of the overall variation in CAR for the model in which ROE was the endogenous variable. Similarly, the same independent variables explained about 78% of the overall variation in CAR for the model in which ROA was the endogenous variable.

7.8 RECOMMENDATIONS

Based on the literature and the findings of the studies, the author used the following section to make recommendations and to suggest the way forward. The author elaborated on potential strategies to improve bank profitability and capital management within the South African banking sector.

7.8.1 Capital ratios

Literature discusses and debates issues of capital intensely. Regulators have made it a focal point and of late, shareholders and other stakeholders have brought both return on capital and return on assets to the fore in their investment decision-making processes. In the main, the research results from the current study supported the importance and contribution of capital to profitability. It is in this light and with a background that banks are encouraged to view both capital and its management as key performance indicators going into the future. The management or mismanagement of capital can determine a bank's competitiveness.

Poor management of capital may also result in a shorter life span and limited growth rate of any bank or financial institution, compared to other banks.

From a regulatory perspective, there has been a push towards prudent management of capital as financial markets grapple with the introduction of new products, which, by their very nature, bring new types of risks. There has been an emphasis and the adoption at international level of Basel III as a mitigating factor on risk.

There has also been a lot more emphasis put on the involvement of board members in the management of capital as board members can now be held personally liable for some of the strategic decisions, which may be implemented by banks.

In the South African banking market, there has been legislation after legislation being promulgated under the auspices of the Financial Services Board (FSB) in a bid to put a regulatory lid on the mismanagement of capital.

More emphasis has also been put on issues of compliance and ethical practices through the introduction of both the King III and King IV reports.

It is a common fact that access to capital results in an institution having competitive muscle and more so in an environment which is experiencing deregulation on a continuous basis.

It is therefore recommended that awareness on capital and its management and regulation be intensified especially considering the important role banks play in the development of economies. This is given further impetus by recent developments within the financial markets both locally and internationally. Locally (i.e. the South African banking market) there had been a collapse of one of the commercial banks as a result of unsecured lending practices which has had a bearing on shareholder capital.

Internationally the effects of the 2008-9 financial crises are still being felt with financial instability having been reported in Greece and other European Countries.

From a policy perspective, it must also be noted that high profitability can result in a reduction in the intermediation function if the high returns imply that interest rates on loans- for the same maturity, are higher than in the other parts of the world.

Policymakers are therefore encouraged to guard against unfair usage of capital muscle by bigger banks as this can easily lead to a change in the financial landscape, with those banks that have access to capital bullying smaller banks with no access to capital into submission and death. This may result in the formation of cartels and development of monopolies in the long run. The subsequent results may be an increase in inefficiencies and hence an increase in the cost of banking services.

7.8.2 Effects of credit risk

The study results provided evidence that credit risk has a negative effect on profitability.

Banks are under pressure to show more profits (Nyoka, 2013) and the temptation to underprovide for non-performing loans is very high. As banks become desperate to report higher returns on both equity and assets and (thus increase capital ratios through retained earnings in both the near and longer term) it is up to policy-makers, especially those that are in the supervision sphere, continuously to review banking practices and to report on such important issues such as provisions for bad loans. It is recommended therefore that policy-makers should be on the guard and must at least devise mechanisms to monitor these provisions by putting a threshold in place as a guide and to improve the quality of staff at regulating institutions.

7.8.3 Size

The research results showed that the size of a bank does affect the profitability of a bank.

Large banks are able to attract capital at lower cost because of economies of scale. This leads to large banks managing to keep their costs down, and therefore in the process increase their interest margins.

Large banks do have market power, which can be turned into monopoly power in the long run. Their ability to dominate the market causes them to charge higher rates to their clients.

There is however, another side to the argument on size in that as the bank grows larger; it attracts many overheads, which results in cost increases. The size of a bank can also result in inefficiencies due to both red tape and bureaucracy.

7.8.4 Risk management

Risk management in the broad context has not been a variable incorporated in this study. Its influence on the results cannot, however, be ignored.

The results of the study implied that poor risk-taking could result in poor quality of loans, and hence higher credit risk, which, as evidenced by the results, has a negative effect on profitability. The most common risk that affects most banks in addition to credit risk is operational risk.

Operational risk management is one of the most topical issues within the financial sector at the time of the current study. The effects of operational risk on an organisation are noteworthy and can be highly important and sometimes fatal (Bessis, 1998).

Regulators have intervened and placed the management of operational risk at the centre of all their regulatory functions. For example, the Basel Accord II framework on operational risk management gives guidelines on the approach for the management of operational risk. In spite of the concerted efforts from all concerned, operational risk has continued to dominate as the main cause for company failures over the past ten years

Operational risk is defined as the probability of losses that occur in an organisation as a result of failure in systems, fraud, human failures and breakdowns in controls (including external controls) and in some instances the inability to appreciate the risk itself (Alvarez, 2005). The effects of operational risk on profitability cannot be ignored.

Most approaches to operational risk management within the banking fraternity are modelled as per the Basel Accord II guidelines, where risk is defined as the risk of loss resulting from inadequate or failed internal processes, people, systems, or from external events (Basel Committee on Banking Supervision, 2004).

Many banking markets are aware of the effects of operational risks for organisations, particularly the impact that good or bad management of operational risk has on the rating of an organisation. This in turn has a knock-on effect on the ability of a bank to raise capital at low cost.

In November 2007, S&P Viewpoint, published an Request for Comment (RFC) discussing their approach to assess operational risks alongside credit risks as part of an overall enterprise risk management (ERM) and its initial application to non-financial companies. According to the research, approximately 10% of the assessed firms would face negative ratings evaluations due to weak ERM, 60% of assessed firms would receive neutral evaluations, 25% would receive supporting evaluations and the top 5% would receive evaluations, which strengthen their ratings (Steven & Ingram, 2007). However, the Basel Accord has long been adopted by most banking institutions and is useful in some respects, events such as the terrorist attacks on 11 September 2001 in New York, rogue-trading losses at Société Générale, Barings, AIB and National Australia Bank added impetus to the need for banks to manage risk in a more robust way than before.

There are many developments that have taken place and continue to take place within the financial sector and which continue to affect banks in their bid to maintain capital ratios that are in line with regulation.

Deregulation, financial deepening and financial engineering, are all developments that have contributed to the prominence of risk in organisations, and banks in particular.

Most of these developments require a high level of understanding of the markets and the new products, but in most situations where institutions have suffered losses as a result of risks emanating from such developments, it has emerged that those responsible for its management did not fully comprehend the products and risks associated with those products.

Financial deepening is the term used often by economic development experts to refer to the increased provision of financial services with a wider choice of services geared to all levels of society. The term “deepening” implies taking something to a new dimension or a new level, which tends to be higher. This implies therefore that there are macro effects on the larger economy because of financial deepening.

Financial deepening brings with it a whole array of new products and with that, new opportunities for all players in an economy. However, with those new products come many new risks that many people who are in the employment of banks and other regulatory bodies are unable to comprehend. The pace at which new financial products are being developed is much faster than the pace at which the regulators are gaining an understanding of the risks that are associated with the introduction of those products.

The recent reported case of investors losing billions of Rand in a fraud within the South African financial sector in a pyramid scheme can be used to advance the argument that there is a knowledge gap that needs to be filled well before a product is traded on the markets.

Financial deepening also implies the availability of many liquid funds. In an environment where interest rates are falling, coupled with an increase in the number of intermediaries (implying an increase in investments costs) and higher expectations on the part of investors, many markets, individual investors, speculators and fund managers have opted for financial engineering at times at risk levels that are frightening to the average person. All this has happened so fast and well outside the appreciation of the regulator who, based on the evidence of the recent frauds and collapses of many banks and other financial institutions the world over, has often been left wondering what actually happened.

Financial engineering refers to a process of developing new financial instruments and processes that enhance shareholders or intermediaries' wealth. It focuses on improving on existing products with a view of increasing returns for the investor. Financial engineering is heavily associated with the birth of most derivatives.

This process is meant to result in improved earnings, (hence higher returns, improved risk management) and is meant to result in creative solutions to corporate finance problems.

Financial engineering should result in the issuers, developers, or users of these instruments accomplishing something that they could not do previously and in a sense making the market more efficient.

Motivations for developing new instruments vary from risk management, tax advantages, agency and issuance cost reductions, regulation compliance or evasion, interest and exchange rate changes, technological advances, accounting gimmicks and academic research.

What is consistent about these assertions is that financial engineering is motivated primarily by the desire to outwit the other. In most instances, the regulator and controller are the ones that have been outwitted.

In this innovation process there is an array of risks that are sometimes or never brought to the fore. Most of the people that have to process some of these instruments have no clue what so ever about what the instruments entail, let alone the risk that is attached to them.

In the light of this, it is therefore recommended that banks should develop more robust risk management models and should completely rejuvenate their creditworthiness assessment models and tools and other traditional credit scoring techniques.

Recommended new approaches include psychometric testing which uses test scores to separate good clients from bad ones, and the use of the Qualitative Credit Assessment.

In the context of South Africa, where banks have taken onto their books a lot of clients from the previously unbanked population, banks should also manage risk innovatively by designing simple, data- and technology-enabled approaches, which go beyond the standard risk management models, and accommodate the characteristics of the “new” customer.

Banks can also manage risk better through diversification of products and financial services offered to their clients as opposed to the traditional loans that have a strong bearing on levels of provisions.

7.8.5 Management of Operational Expenses (OE)

The study results showed that there is a negative relationship between profits and operating expenses although there was an abnormal situation in the results where operating expenses had a significant and positive effect on ROA.

This result is out of the norm with theoretical expectations as in normal situations a negative relationship between operating expenses and ROA was expected. However, the management of operational expenses has become a key determinant to good performance especially in an environment where there is limited scope to increase revenue. In a market where there is perfect competition, the upside of revenue generation is limited unless a bank introduces a unique product or service that allows it to charge a premium on it. That implies therefore that where there is a ceiling on price increases, banks can only increase their profits by selling more products (volume driven growth in revenue, with expenses remaining constant) or they can increase their profit margins through a cut in operating costs, applying one of the two strategies or both.

Banks can either increase their supplier base, and or use their size muscle to good effect, or they can purchase supplies in bulk resulting in lowering procurement costs.

It must however be noted that in a heavily regulated market such as the one in South Africa, there are many impediments to increasing prices as it may both be against the law, can result in customer resistance and or customer affordability which will in turn increase credit risk.

The bank has to be weary of competitor reaction too before trying to increase profits through an increase in price.

It is therefore critical for banks going forward to manage their operating expenses as tightly as possible in order to increase chances of survival and increase capital levels through an increase in retained earnings, which filters into the capital component.

By applying the latest technology, that lowers both transaction costs and staff costs banks are able to increase their profit margins and therefore their capital holdings.

7.8.6 Gross Domestic Product (GDP)

The study results showed that an increase in GDP has a positive effect on profitability.

Growth in GDP is not solely the responsibility of banks but they do play an important role in this equation.

Prudent lending requires that banks lend money to deficit units of the society that will use the money for expansion purposes and not for consumption purposes. Should banks effectively play this role, they indirectly play a part in the growth of any economy, which in turn is in their favour in the long run. Other factors affect GDP however. These include, but not limited to, government policy on growth through its monetary policy objectives, the nature of the resources of countries in terms of the effects of changes in prices on the international platform, the productivity of the population and the dependency of the country on imported goods.

It is recommended therefore that in light of all this, banks should be on the forefront of growth in GDP through their lending practises, which must promote growth as opposed to consumption.

The regulators have a say in this too, in that they must ensure that banks are not tempted by profits (obviously at high risk) by remaining active in the consumer market where there is a minimum (if any) return on investment.

The government has the largest role to play as far as growth in GDP is concerned. The government should always create a conducive atmosphere for economic growth through both its fiscal and monetary policies.

7.8.7 Inflation

The results of the study showed a positive relationship between inflation and profits. This however does not necessarily mean that high inflation should be encouraged.

In most cases, high inflation rates have negative implications for the economy. The currency of the country experiencing high inflation rates is usually affected negatively through the erosion of purchasing power. The standard of living of the majority of the population is usually negatively impacted.

Banks are not directly responsible for the growth in inflation as there are many factors at play. However, by continuously increasing their service charges to their clients, especially the corporate world, banks indirectly contribute to a rise in inflation, as these corporates tend to pass on the costs to their clients as well.

Government, through the Reserve Bank, has a bigger role to play as far as containing inflation growth is concerned. The Reserve Bank should always aim to maintain real interest rates for savers to promote economic growth.

It is recommended that both government and regulators should continue to monitor the behaviour of banks and other institutions that can cause inflation to increase. The regulators should adopt strict measures on inflation management to the benefit of both banks and the economy at large.

7.9 CONTRIBUTION OF THE STUDY

Rigorous tests and studies have been carried out in many other financial markets, especially the European markets, on the relationship between capital and profitability.

None such studies and tests are known to have been carried out in a developing country such South Africa before.

The results from the study did yield unequivocal evidence of a positive relationship between capital ratio (CAR), return on equity (ROE) and return on assets (ROA), and supported the generally held notion that there is a positive relationship between bank capital and profitability.

Whereas most of previous studies in literature and tests are not conclusive, these results attest to the positive relationship between capital and profitability.

It is interesting that this relationship is confirmed from a country such as South Africa, which has so many unique features. The results therefore support the hypothesis that there is a positive and statistically significant relationship between capital and profitability.

South Africa is unique in a number of ways. It is a market, which has just emerged from apartheid, an era where only a minority of the population had access to banking facilities. This skewed bank performance and profitability in a certain direction. The introduction of a numbers of Acts in post- apartheid South Africa, especially the National Credit Act of 2009 to some extent brought some financial inclusion. The banking landscape changed completely and the operational modalities of banks could not remain this same. It therefore became appetising for research to be conducted in such a market where there were so many new practices.

The empirical results of the study highlighted by their nature the uniqueness of this market and provided new insights into banking practise and the factors that affect profitability. The results brought to the fore the importance of understanding the importance of any industry- or market-specific factors in any research. As an example, the results reported South African banks as highly profitable compared to the others in the world. This phenomenon is driven by the high interest margins that the South African banking market enjoys. The effects of credit risk featured prominently in the results, a factor consistent with the nature of the current South African banking market at the time of this study. The study exposed the oligopolistic nature of the market and identified the weaknesses of a concentrated banking market as evidenced by disparities in the earnings ratios of the banks that have been included in this study.

The study further highlighted the need for both regulatory authorities and policymakers to keep a stronghold on the banking market in terms of both supervision and regulation in order to encourage both reform and prudent practices in banking.

Furthermore, the study contributed to the existing body of knowledge by focusing on a unique market such as South Africa, therefore serving as a source of reference for subsequent research in the area of bank capital and profitability.

Results also confirmed the theory when it established a negative relationship between profits and credit risk. However, though the results supported the stated hypothesis, it must be appreciated and noted that there are market-specific factors that affect the nature of the results. Different markets experience different regulatory regimes (albeit with some uniformity), differing operating terrains and different economic structural models.

However, the findings supported the view expressed elsewhere in literature that capital remains a pivot as far as the level of profitability for banks is concerned.

7.10 LIMITATIONS OF THE STUDY

The sample of banks was from a single economy, and in this case, all the banks faced the same macro-economic environment. It was recognised therefore that the operating conditions might differ from one economy to the other. Banks respond differently in different economies and there are specific situations where banks may be more affected by regulatory requirements in one country compared to others, especially where the political influence is perceived to play a role. The data used was not from a single source and as such, the use of various sources of data may result in insignificant differences on the calculations of certain variables.

To try to circumvent this challenge, the study used data which is in the public domain and which had an element of authenticity about it, in that most of the data was extracted from audited statements of the financial institutions concerned and most of it was transmitted via a regulatory authority such as the South African Reserve Bank (SARB).

Although the study used a limited number of banks in the sample population, the sampled population was considered sufficient to generalise the results for economies with similar circumstances.

7.11 SUGGESTIONS FOR FURTHER STUDY

Most studies produced mixed results on the relationship between capital and profitability. This study presented new data on the South African banking sector in from 2006-2015. Results were in the main supportive of previous studies. A positive relationship between capital and profitability was affirmed and it would appear that over the centuries, at least, the economic laws seem to be working.

The study did not, however, look at bank-specific factors and/or impact of specific events such as the financial crisis of 2008 to 2009. It limited itself to a few banks and did not cover the entire banking sector. The findings of the study suggest that there are a number of variables that affect these relationships and some variables

were not included in the equation that was used to test the hypothesis. Although this study advanced the understanding of the relationship between capital and profitability, much work remains for future research. Notably, the study could be extended to other financial institutions. Future research can also look at the impact of bank-specific factors and the general impact of macro-economic factors such as those experienced in other financial markets like Zimbabwe, for example, where banks operate in an environment where there is no local currency as at the time of this study. Further research can also be carried out on why part of the results of this study defied both theory and literature by showing a positive relationship between operating expenses and ROA.

This study was limited to a selection of banks on which information for the entire study period could easily be obtained. These banks were in the main banks that have a lot of reputational risk to manage and were on the radar of regulators due to their prominence and dominance in terms of market power. To this end therefore, the results cannot be generalised towards the rest of South Africa. It will be interesting to repeat the empirical part of the research with a bigger representative dataset of all banks operating in South Africa.

Arguably, the application of FICA regulations and other regulatory acts may be peculiar to South Africa and may thus have a significant impact on the results, thus providing more motivation for further research. Further research may therefore be required to understand the specific impact of FICA, the NCA and other regulatory acts on the performance and hence profitability of financial institutions.

7.12 FINAL CONCLUSION

This study set out to investigate in detail the relationship between capital and profitability in banking and the main thrust of the thesis was to test the hypothesis that there is a positive and statistically significant relationship between bank capital and profitability.

This research output was expected to provide new insights into the long-run impact of bank capital on profitability and survival of the bank. From a micro-economic perspective, this would assist financial institutions and investors in tailoring investment decisions in response to policy decisions that relate to bank capital. From the macro-economic perspective, this would assist both governments and regulators to formulate better-informed policy decisions regarding the importance of bank capital. The research reviewed contemporary literature on the subject of capital and profitability. It noted that debate and studies around the subject of capital have been carried out at international, regional and domestic levels (Curak, Poposki & Pupur. 2011). Researchers such as Kosmidou (2008) looked at the subject from a Greek perspective, Pejic'bach, Posedel and Stojanović (2009) looked at it from a Croatian perspective, Flamini, MacDonald and Schumacher looked at the subject from a regional level and Kunt and Huizinga looked at the subject at international level.

A number of variables that are linked to the profitability of banks were examined. It was established that there were contrasting and conflicting views and results from researchers on the subject of capital and profitability. Findings from these studies have some common features, but the most common conclusion is that not all the results are conclusive.

It was also noted however, that none such discussions and examinations have been carried out in a developing country such as South Africa. Driven by the fact that, so far, the results on this subject are not conclusive, the research sought to establish whether tests of this hypothesis will provide the same results in an environment as that which prevails in South Africa today.

The results of this study supported the hypothesis that there was a positive and statistically significant relationship between bank capital and profitability. With the exception of the operating-expense variable, where the results showed that there was a positive relationship between capital and profitability, all the other results on the variables remained consistent with the theory and were corroborated by literature. The DuPont equation was used in this study to explain the abnormal

results on the relationship between operating expenses and ROA. The research attributed this anomaly to a possible efficiency in the utilisation of assets by banks that lead to a higher increase in revenue compared to the growth in operating expenses.

Because capital and its adequacy are and will remain at the forefront of the regulatory debate for years to come and because there seemed to be no consensus in terms of results, the results of this study will go a long way towards opening new avenues for further research. The results of a positive relationship between operating expenses and ROA defy both theory and literature and will therefore make further research on this relationship interesting.

The results from the study did prove the importance of capital and did support the stated hypothesis and to this end the study of the importance of capital can assume new dimensions going into the future.

Banks, regulators and policymakers should never lose momentum on the studies of this relationship.

Banks remain pivotal to economic development through the many functions and activities that they partake in via their intermediation process. The profitability of banks and their survival is critical and it is thus in the interest of both regulators and policymakers to continue keeping the oxygen supply line to these important institutions open. Policymakers need to be firm and robust about risk management, unusually high returns should trigger policymakers into taking a stance on introducing measures to lower risks, remove bank entry barriers and remove all obstacles that discourage competition.

While it is encouraged for policymakers to promote competition, it remains equally important for policymakers, through regulation, continuously to promote ethical profitability by promoting ethical and equitable banking practices in the market.

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APPENDIX 1: ETHICS CLEARANCE LETTER



Ref #: 2013/CEMS/017

12 June 2013

COLLEGE OF ECONOMIC AND MANAGEMENT SCIENCES RESEARCH ETHICS REVIEW COMMITTEE (CRERC)

To the applicant:

Mr Charles Nyoka (Student #:4626-862-6) [nyokac@unisa.ac.za]

Prof D Makina

Finance, Risk Management and Banking

PO Box 392

Unisa

0003

**Request for ethics approval of a research project for the fulfillment of a D Com degree, entitled:
Bank Capital and Profitability: An Empirical Study of the South African Commercial Banks**

Dear Mr Nyoka

**Decision:
Conditional Research Ethics
Approval**

The College Research Ethics Review Committee of the College of Economic and Management Sciences (CRERC) reviewed your application documents (2013_CEMS_017) in compliance with the Unisa Policy on Research Ethics on 22 May 2013. The application has been conditionally approved pending clarification of the following concerns raised by the committee:

1. A lack of a clear indication of the data to be used for the research project. You seemingly intend to make use of secondary data, but it could not be established whether the data is in the public domain or not. If it is not in the public domain you will have to provide proof that permission was obtained to use the data.
2. It is not clear whether any other data collection instruments will be used. In the attached proposal you indicate that you will use both qualitative and quantitative approaches (pg. 5). If this is the case, the study may not be deemed as low risk and additional safeguards will have to be put in place, e.g. informed consent from participants.
3. The research methodology of the project is not clear. It was also unclear whether the data will be used to compare the different South African banks with one another. The study is currently classified as a low risk study. However, if the results of the study could be damaging to the reputation of the banks, the study might be deemed a higher risk study.
4. The validity of the research design should be in line with the chosen research design – if a mixed methods study will be conducted it will be imperative to indicate how validity and trustworthiness will be ensured.



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APPENDIX 2

Least Squares Profitability Regressions

Pooled IV Model for ROE

Model 1: ROE - No lagged dependent variable

Dependent Variable: ROE				
Method: Panel Two-Stage Least Squares				
Date: 01/29/17 Time: 10:22				
Sample: 2006 2015				
Periods included: 10				
Cross-sections included: 13				
Total panel (balanced) observations: 130				
Instrument specification: C CAR CR SIZE OE GDP CPI HHI				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR	5.830349	0.395715	14.73369	0.0000
CR	-45.10305	3.549284	-12.70765	0.0000
SIZE	132.5121	12.84434	10.31676	0.0000
OE	-3.401030	0.398892	-8.526199	0.0000
GDP	0.346044	0.065592	5.275728	0.0000
CPI	0.704693	0.351141	2.006864	0.0470
HHI	-0.149210	0.015424	-9.674001	0.0000
R-squared	0.845828	Mean dependent var		14.39254
Adjusted R-squared	0.838307	S.D. dependent var		13.53498
S.E. of regression	5.442558	Sum squared resid		3643.436
Durbin-Watson stat	2.305492	Second-Stage SSR		3643.436
Instrument rank	8			

APPENDIX 3

MODEL 2

Model 2: ROE - Lagged dependent variable

Dependent Variable: ROE				
Method: Panel Two-Stage Least Squares				
Date: 01/29/17 Time: 10:35				
Sample (adjusted): 2007 2015				
Periods included: 9				
Cross-sections included: 13				
Total panel (balanced) observations: 117				
Instrument specification: C CAR ROE(-1) CR SIZE OE GDP CPI HHI				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROE(-1)	0.298868	0.222932	1.340628	0.1828
CAR	5.779210	0.349488	16.53620	0.0000
CR	-51.74057	6.068565	-8.525996	0.0000
SIZE	115.7207	29.53779	3.917717	0.0002
OE	-4.762812	0.593208	-8.028906	0.0000
GDP	0.078266	0.092923	0.842268	0.4015
CPI	-2.033763	0.823290	-2.470286	0.0151
HHI	-0.104705	0.027322	-3.832218	0.0002
R-squared	0.887662	Mean dependent var		13.18983
Adjusted R-squared	0.880447	S.D. dependent var		13.75269
S.E. of regression	4.755185	Sum squared resid		2464.685
Durbin-Watson stat	2.550433	Second-Stage SSR		2464.685
Instrument rank	9			

APPENDIX 4

Pooled IV Model for ROA

Model 1: ROA - No lagged dependent variable

Dependent Variable: ROA				
Method: Panel Two-Stage Least Squares				
Date: 01/29/17 Time: 12:02				
Sample: 2006 2015				
Periods included: 10				
Cross-sections included: 13				
Total panel (balanced) observations: 130				
Instrument specification: C CAR CR SIZE OE GDP CPI HHI				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR	0.596809	0.031462	18.96896	0.0000
CR	-5.475841	0.282195	-19.40445	0.0000
SIZE	7.114527	1.021223	6.966673	0.0000
OE	0.255498	0.031715	8.056092	0.0000
GDP	0.083888	0.005215	16.08588	0.0000
CPI	0.132635	0.027918	4.750804	0.0000
HHI	-0.008943	0.001226	-7.292824	0.0000
R-squared	0.958835	Mean dependent var		2.300308
Adjusted R-squared	0.956827	S.D. dependent var		2.082590
S.E. of regression	0.432725	Sum squared resid		23.03184
Durbin-Watson stat	2.971529	Second-Stage SSR		23.03184
Instrument rank	8			

APPENDIX 5

Model 2: ROA - Lagged dependent variable

Dependent Variable: ROA				
Method: Panel Two-Stage Least Squares				
Date: 01/29/17 Time: 12:04				
Sample (adjusted): 2007 2015				
Periods included: 9				
Cross-sections included: 13				
Total panel (balanced) observations: 117				
Instrument specification: C CAR ROA(-1) CR SIZE OE GDP CPI HHI				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROA(-1)	-0.097688	0.080314	-1.216327	0.2265
CAR	0.595375	0.029160	20.41728	0.0000
CR	-5.286771	0.306749	-17.23486	0.0000
SIZE	9.249195	1.898753	4.871195	0.0000
OE	0.320219	0.029988	10.67821	0.0000
GDP	0.102977	0.008550	12.04399	0.0000
CPI	0.336698	0.063563	5.297106	0.0000
HHI	-0.012665	0.002107	-6.010811	0.0000
R-squared	0.965789	Mean dependent var		2.019487
Adjusted R-squared	0.963592	S.D. dependent var		2.006949
S.E. of regression	0.382941	Sum squared resid		15.98420
Durbin-Watson stat	3.529038	Second-Stage SSR		15.98420
Instrument rank	9			

APPENDIX 6

GMM Profitability Regressions

ROE Models

Model 1: No lagged dependent variable

Dependent Variable: ROE				
Method: Panel Generalized Method of Moments				
Date: 01/29/17 Time: 13:32				
Sample: 2006 2015				
Periods included: 10				
Cross-sections included: 13				
Total panel (balanced) observations: 130				
2SLS instrument weighting matrix				
Instrument specification: C CAR CR SIZE OE GDP CPI HHI				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR	5.830349	0.395715	14.73369	0.0000
CR	-45.10305	3.549284	-12.70765	0.0000
SIZE	132.5121	12.84434	10.31676	0.0000
OE	-3.401030	0.398892	-8.526199	0.0000
GDP	0.346044	0.065592	5.275728	0.0000
CPI	0.704693	0.351141	2.006864	0.0470
HHI	-0.149210	0.015424	-9.674001	0.0000
R-squared	0.845828	Mean dependent var		14.39254
Adjusted R-squared	0.838307	S.D. dependent var		13.53498
S.E. of regression	5.442558	Sum squared resid		3643.436
Durbin-Watson stat	2.305492	J-statistic		26.46790
Instrument rank	8			

APPENDIX 7

Model 2: Lagged dependent variable

Dependent Variable: ROE				
Method: Panel Generalized Method of Moments				
Date: 01/29/17 Time: 13:35				
Sample (adjusted): 2007 2015				
Periods included: 9				
Cross-sections included: 13				
Total panel (balanced) observations: 117				
2SLS instrument weighting matrix				
Instrument specification: C ROE(-1) CAR CR SIZE OE GDP CPI HHI				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROE(-1)	0.298868	0.222932	1.340628	0.1828
CAR	5.779210	0.349488	16.53620	0.0000
CR	-51.74057	6.068565	-8.525996	0.0000
SIZE	115.7207	29.53779	3.917717	0.0002
OE	-4.762812	0.593208	-8.028906	0.0000
GDP	0.078266	0.092923	0.842268	0.4015
CPI	-2.033763	0.823290	-2.470286	0.0151
HHI	-0.104705	0.027322	-3.832218	0.0002
R-squared	0.887662	Mean dependent var		13.18983
Adjusted R-squared	0.880447	S.D. dependent var		13.75269
S.E. of regression	4.755185	Sum squared resid		2464.685
Durbin-Watson stat	2.550433	J-statistic		109.0000
Instrument rank	9			

APPENDIX 8

ROA Models

Model 1: No lagged dependent variable

Dependent Variable: ROA				
Method: Panel Generalized Method of Moments				
Date: 01/29/17 Time: 13:39				
Sample: 2006 2015				
Periods included: 10				
Cross-sections included: 13				
Total panel (balanced) observations: 130				
2SLS instrument weighting matrix				
Instrument specification: C CAR CR SIZE OE GDP CPI HHI				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR	0.596809	0.031462	18.96896	0.0000
CR	-5.475841	0.282195	-19.40445	0.0000
SIZE	7.114527	1.021223	6.966673	0.0000
OE	0.255498	0.031715	8.056092	0.0000
GDP	0.083888	0.005215	16.08588	0.0000
CPI	0.132635	0.027918	4.750804	0.0000
HHI	-0.008943	0.001226	-7.292824	0.0000
R-squared	0.958835	Mean dependent var		2.300308
Adjusted R-squared	0.956827	S.D. dependent var		2.082590
S.E. of regression	0.432725	Sum squared resid		23.03184
Durbin-Watson stat	2.971529	J-statistic		28.23871
Instrument rank	8			

APPENDIX 9

Model 2: Lagged dependent variable

Dependent Variable: ROA				
Method: Panel Generalized Method of Moments				
Date: 01/29/17 Time: 13:41				
Sample (adjusted): 2007 2015				
Periods included: 9				
Cross-sections included: 13				
Total panel (balanced) observations: 117				
2SLS instrument weighting matrix				
Instrument specification: C ROA(-1) CAR CR SIZE OE GDP CPI HHI				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROA(-1)	-0.097688	0.080314	-1.216326	0.2265
CAR	0.595375	0.029160	20.41728	0.0000
CR	-5.286771	0.306749	-17.23486	0.0000
SIZE	9.249196	1.898753	4.871195	0.0000
OE	0.320219	0.029988	10.67821	0.0000
GDP	0.102977	0.008550	12.04399	0.0000
CPI	0.336698	0.063563	5.297106	0.0000
HHI	-0.012665	0.002107	-6.010811	0.0000
R-squared	0.965789	Mean dependent var	2.019487	
Adjusted R-squared	0.963592	S.D. dependent var	2.006949	
S.E. of regression	0.382941	Sum squared resid	15.98420	
Durbin-Watson stat	3.529038	J-statistic	109.0000	
Instrument rank	9			

APPENDIX 10

Least Squares Capital-to-Asset Ratio Regressions

Pooled IV Model for CAR (with ROE as endogenous regressor)

Model 1: No lagged dependent variable

Dependent Variable: CAR				
Method: Panel Two-Stage Least Squares				
Date: 01/29/17 Time: 12:35				
Sample: 2006 2015				
Periods included: 10				
Cross-sections included: 13				
Total panel (balanced) observations: 130				
Instrument specification: C ROE STOCK SIZE CR GDP CPI HHI				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROE	0.080634	0.007593	10.61961	0.0000
STOCK	5.32E-05	1.82E-05	2.921201	0.0041
SIZE	-25.94389	0.948738	-27.34569	0.0000
CR	8.317196	0.279891	29.71585	0.0000
GDP	-0.077248	0.008350	-9.251632	0.0000
CPI	0.172665	0.055903	3.088658	0.0025
HHI	0.028974	0.001254	23.10186	0.0000
R-squared	0.811018	Mean dependent var		20.56762
Adjusted R-squared	0.801799	S.D. dependent var		1.782477
S.E. of regression	0.793554	Sum squared resid		77.45646
Durbin-Watson stat	3.484970	Second-Stage SSR		77.45646
Instrument rank	8			

APPENDIX 11

Model 2: Lagged dependent variable

Dependent Variable: CAR				
Method: Panel Two-Stage Least Squares				
Date: 01/29/17 Time: 12:39				
Sample (adjusted): 2007 2015				
Periods included: 9				
Cross-sections included: 13				
Total panel (balanced) observations: 117				
Instrument specification: C CAR(-1) ROE STOCK SIZE CR GDP CPI				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR(-1)	0.175374	0.072004	2.435605	0.0165
ROE	0.076476	0.010184	7.509609	0.0000
STOCK	0.000156	2.51E-05	6.203385	0.0000
SIZE	-7.760979	0.850875	-9.121174	0.0000
CR	8.069960	0.604201	13.35642	0.0000
GDP	0.016483	0.011186	1.473551	0.1435
CPI	0.794479	0.099596	7.977027	0.0000
R-squared	0.694072	Mean dependent var		20.53752
Adjusted R-squared	0.677385	S.D. dependent var		1.877274
S.E. of regression	1.066276	Sum squared resid		125.0639
Durbin-Watson stat	3.536202	Second-Stage SSR		125.0639
Instrument rank	8			

APPENDIX 12

Pooled IV Model for CAR (with ROA as endogenous regressor)

Model 1: No lagged dependent variable

Dependent Variable: CAR				
Method: Panel Two-Stage Least Squares				
Date: 01/29/17 Time: 12:59				
Sample: 2006 2015				
Periods included: 10				
Cross-sections included: 13				
Total panel (balanced) observations: 130				
Instrument specification: C ROA STOCK SIZE CR GDP CPI HHI				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROA	1.067740	0.091041	11.72807	0.0000
STOCK	2.37E-05	1.84E-05	1.289580	0.1996
SIZE	-15.55784	1.243131	-12.51505	0.0000
CR	7.464892	0.250687	29.77775	0.0000
GDP	-0.099543	0.008308	-11.98143	0.0000
CPI	-0.089134	0.063928	-1.394276	0.1657
HHI	0.019322	0.001367	14.13415	0.0000
R-squared	0.828986	Mean dependent var	20.56762	
Adjusted R-squared	0.820643	S.D. dependent var	1.782477	
S.E. of regression	0.754888	Sum squared resid	70.09226	
Durbin-Watson stat	2.785397	Second-Stage SSR	70.09226	
Instrument rank	8			

APPENDIX 13

Model 2: Lagged dependent variable

Dependent Variable: CAR				
Method: Panel Two-Stage Least Squares				
Date: 01/29/17 Time: 13:02				
Sample (adjusted): 2007 2015				
Periods included: 9				
Cross-sections included: 13				
Total panel (balanced) observations: 117				
Instrument specification: C CAR(-1) ROA STOCK SIZE CR GDP CPI				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR(-1)	-0.149296	0.083822	-1.781099	0.0777
ROA	1.239563	0.166639	7.438631	0.0000
STOCK	0.000131	2.67E-05	4.920064	0.0000
SIZE	-3.835543	1.047608	-3.661240	0.0004
CR	8.794265	0.634038	13.87024	0.0000
GDP	-0.055301	0.014978	-3.692038	0.0003
CPI	0.481796	0.116655	4.130103	0.0001
R-squared	0.692109	Mean dependent var	20.53752	
Adjusted R-squared	0.675315	S.D. dependent var	1.877274	
S.E. of regression	1.069692	Sum squared resid	125.8665	
Durbin-Watson stat	3.076812	Second-Stage SSR	125.8665	
Instrument rank	8			

APPENDIX 14

GMM Capital-to-Asset Ratio Regressions

CAR Models

Model 1: No lagged dependent variable (with ROE as endogenous regressor)

Dependent Variable: CAR				
Method: Panel Generalized Method of Moments				
Date: 01/29/17 Time: 13:52				
Sample: 2006 2015				
Periods included: 10				
Cross-sections included: 13				
Total panel (balanced) observations: 130				
2SLS instrument weighting matrix				
Instrument specification: C ROE STOCK SIZE S_SIZE CR GDP CPI				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROE	0.049665	0.007217	6.881929	0.0000
STOCK	-0.000119	2.25E-05	-5.279644	0.0000
SIZE	33.26938	1.800970	18.47303	0.0000
S_SIZE	-10.83750	0.444285	-24.39309	0.0000
CR	1.089316	0.357193	3.049654	0.0028
GDP	0.038086	0.008145	4.676206	0.0000
CPI	-0.246623	0.064550	-3.820660	0.0002
R-squared	0.827159	Mean dependent var		20.56762
Adjusted R-squared	0.818728	S.D. dependent var		1.782477
S.E. of regression	0.758908	Sum squared resid		70.84083
Durbin-Watson stat	3.775941	J-statistic		2.169845
Instrument rank	8			

APPENDIX 15

Model 1: No lagged dependent variable (with ROA as endogenous regressor)

Dependent Variable: CAR				
Method: Panel Generalized Method of Moments				
Date: 01/29/17 Time: 14:03				
Sample: 2006 2015				
Periods included: 10				
Cross-sections included: 13				
Total panel (balanced) observations: 130				
2SLS instrument weighting matrix				
Instrument specification: C ROA STOCK SIZE S_SIZE CR GDP CPI				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROA	0.492363	0.138596	3.552498	0.0005
STOCK	-7.88E-05	2.45E-05	-3.222354	0.0016
SIZE	27.71804	2.593965	10.68559	0.0000
S_SIZE	-8.886040	0.775674	-11.45589	0.0000
CR	1.756347	0.539329	3.256539	0.0015
GDP	0.009355	0.012901	0.725114	0.4698
CPI	-0.235701	0.074099	-3.180899	0.0019
R-squared	0.782884	Mean dependent var	20.56762	
Adjusted R-squared	0.772293	S.D. dependent var	1.782477	
S.E. of regression	0.850574	Sum squared resid	88.98755	
Durbin-Watson stat	3.229470	J-statistic	2.637106	
Instrument rank	8			

APPENDIX 16: Request for Ethics Approval

Ref #:
2013/CEMS/017

12 June
2013

To the Ethics Committee.

From: Charles Nyoka

Ref 2013/CEMS/017: Charles Nyoka

**Subject: Request for ethics approval of a research project for the fulfillment of a D Com degree, entitled:
Bank Capital and Profitability: An Empirical Study of the South African Commercial Banks**

Dear committee

I thank you for your feedback with regards to my application for clearance.

I have noted all your concerns and have provided clarification on them as detailed below:

1. A lack of a clear indication of the data to be used for the research project. You seemingly intend to make use of secondary data, but it could not be established whether the data is in the public domain or not. If it is not in the public domain you will have to provide proof that permission was obtained to use the data.

I assure the committee that the data is in the public domain as this data is taken from the Reserve Bank of South Africa and is available to all interested members of the public.

2. It is not clear whether any other data collection instruments will be used. In the attached proposal you indicate that you will use both qualitative and quantitative approaches (pg. 5). If this is the case, the study may not be deemed as low risk and additional safeguards will have to be put in place, e.g. informed consent from participants.

I regret the error on my part and the error has been rectified. Only quantitative data will be used. May the committee accept my apologies for this oversight?

3. The research methodology of the project is not clear. It was also unclear whether the data will be used to compare the different South African banks with one another. The study is currently classified as a low risk study. However, if the results of the study