THE DETERMINANTS OF SOUTH AFRICAN BANK PROFITABILITY

by

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Abstract

The banking sector fulfils a fundamental role within the economy of a country. In South Africa, this sector contributes in excess of 20% toward GDP, and is responsible for more than 10% of overall employment in the country. Bearing the importance of this sector in mind, this study empirically investigates the most significant determinants of South African bank profitability by examining bank-specific internal and macroeconomic external factors under a panel regression framework. The four largest commercial banks in South Africa (Absa, FirstRand Bank, Nedbank and Standard Bank) as well as South Africa's largest alternative banking institution (Capitec Bank), were examined between 2006 and 2015.

Based on the results obtained, this study concludes that both bank-specific internal as well as macroeconomic external variables are statistically significant determinants of South African bank profitability. The variables of asset quality, capital strength, operational efficiency, economic activity (GDP), annual inflation and the real interest rate were found to be statistically significant on a 95% confidence level. Capital strength, economic activity (GDP), annual inflation and the real interest rate respectively displayed positive relationships to bank profitability, whereas asset quality and operational efficiency displayed inverse relationships to bank profitability.

In light of these findings, this study asserts that bank management may increase profitability by closely monitoring asset quality and ensuring that expected loan losses are minimised. Banks should ensure that they are well capitalised at all times, and aim to minimise expenses incurred relative to income produced. From a macroeconomic perspective, this study informs strategic-level bank management that profitability may increase in times of positive economic growth, rising inflation levels and an increasing real interest rate. In order to ensure the profitability and longevity of South African banks, bank management needs to monitor and respond to changes in these identified variables as efficiently as possible to mitigate the risk of poor financial performance and potential bank failure in the future.

Declaration of original work

I, Keshiv Nayagar, declare that this minor dissertation is my own unaided work. Any assistance that I have received has been duly acknowledged in the dissertation. The work is submitted in partial fulfilment of the requirements for the degree Master of Commerce at the University of Johannesburg. It has not been submitted before for any degree at this or any other university.

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Signature Date

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Chapter 1

Introduction to the study

1.1 Introduction

The banking sector plays a fundamental role in the economic framework of a country (Demirgüç-Kunt & Huizinga, 1999). A bank may be described as a financial institution whose primary activities include receiving deposits with the aim of providing loans and investment (Wuite, 2009). Fundamentally, banking institutions perform the role of matching surplus and deficit units within an economy (Wuite, 2009).

According to Greenberg and Simbanegavi (2009), the performance of a country's banking sector has been shown to have a direct relationship to the economic well-being of a country. Alper and Anbar (2011) share similar views and further discuss how economies with a robust and profitable banking sector are better equipped to handle adverse economic conditions and financial downturns. Ifeacho and Ngalawa (2014) provide further context for these sentiments by describing how the South African banking sector contributes in excess of 20% toward South African GDP, and is responsible for more than 10% of overall employment in the country. The banking sector therefore play a vital role within the South African economy.

During the sample period under study, Kumbirai and Webb (2010) have noted that the South African banking sector became increasingly competitive, with expenses rising due to technological and financial innovation, the entry of large international banks to the market, and regulatory requirements that became increasingly stringent. It therefore becomes invaluable for strategic-level bank management to thoroughly understand the factors that affect the profitability of their business in an environment that is not only highly competitive, but where other aspects such as progressively stringent regulation and increasing costs make attaining healthy levels of profitability a challenge.

1.2 Problem statement

Within the current sphere of economic and financial literature, numerous studies regarding the determinants of bank profitability in various international markets such as Brazil, Korea, Macau, Nigeria, Pakistan, the Philippines, the Ukraine and Tunisia may be found (Alfanasief et al. 2002; Athanasoglou et al. 2008; Sufian & Chong, 2008; Aburime, 2009; Sufian & Habibullah, 2009; Vong & Chan, 2009; Davydenko, 2010; Dietrich & Wanzenried, 2011; Gul et al. 2011; Javaid et al. 2011; Ramadan, 2011; Sufian, 2011; Acaravaci & Calim, 2013). The fact that similar research has been conducted and is perceived to make a valuable contribution in numerous other international markets, provides further substantiation for a similar line of research to be pursued for the South African case. In addition, Kumbirai and Webb (2010) have previously discussed how research pertaining to bank performance in South Africa is relatively limited, and have proposed that research by both scholars and industry specialists in the area of bank performance is justified and welcomed in the face of rises in global bank failures, following global financial crises.

Macroeconomic variables that are external to banks are specifically significant, as banks have no control over these factors. The work of Sharma and Mani (2012) illustrates this point by showing how primary banking business associated with the lending and borrowing of funds is significantly affected by a country's macroeconomic determinants. McLeay, Radia and Thomas (2014) share these views, and further explain how bank profitability depends on the spread between the rate of interest on bank assets and bank liabilities. The rate of interest on these assets and liabilities relies directly on the policy rate set by the central bank, which in turn is influenced by macroeconomic variables (McLeay, Radia & Thomas, 2014). The significance of the effect of macroeconomic variables as a determinant of bank profitability has been further substantiated in many other studies within the current body of financial literature (Demirgüç-Kunt & Huizinga, 1999; Allen & Saunders, 2004; Sufian & Habibullah, 2009; Acaravci & Calim, 2013).

Bank-specific internal variables are equally important to enable the efficient management of risk associated with a bank's primary business activities of lending and borrowing, and have been found to be key drivers of bank failure (Athanasoglou, 2008). The significance of bank-specific internal variables as a determinant of bank profitability has been further substantiated in many other studies within the current body of financial literature (Demirgüç-Kunt & Huizinga, 1999; Sufian & Habibullah, 2009; Gul, Irshad & Zaman, 2011; Francis, 2013). Internal determinants of bank profitability commonly include measures of capital adequacy, measures

of operational efficiency, measures of liquidity, measures of asset quality and measures of size of the respective bank (Alper & Anbar, 2011; Acaravci & Calim, 2013).

Vong and Chang (2009) further discuss that these bank-specific internal determinants are directly influenced by management decisions. Therefore, a comprehensive understanding of how macroeconomic external and bank-specific internal determinants affect the profitability of banks within the banking sector of South Africa is critical in enabling strategic-level bank management to respond to these factors as swiftly and efficiently as possible. In addition, a comprehensive understanding of these determinants may serve to mitigate the risk of poor financial performance and potential bank failure in the future.

Previous research that has been conducted in South Africa pertaining to determinants of bank profitability has utilised various methodologies, such as the work of Kumbirai and Webb (2010) and Ifeacho and Ngalawa (2014). This research has focused on financial performance of the South African commercial banking sector by investigating bank-specific internal factors, industry-specific factors, and macroeconomic determinants. However, in concentrating solely on the commercial banking sector of South Africa, prior research has ignored other significant South African banking sectors such as the alternative banking sector, which has enjoyed increasing popularity among the low-income demographic within South Africa. Alternative banks may be described as banking institutions that target entry-level or lower income markets, such as Capitec Bank (Bankseta, 2013).

1.3 Research question and objectives

The research question addressed by this research study is stated as follows:
What are the internal and external determinants of profitability within the banking sector of South Africa?

1.3.1 Research objectives

This study aims to achieve the following objectives:

- Determine which bank-specific internal and macroeconomic external factors are statistically significant determinants of South African bank profitability by means of a panel regression analysis in order to better enable bank management to respond to these identified factors, thereby mitigating the risk of poor financial performance and potential bank failure in the future.

- Determine the relationships observed (either positive or negative) between the statistically significant internal and external determinants and bank profitability for the South African banking sector.
- Allow for the examination of a more conclusive sample of the South African banking population from internal (bank-specific) and external (macroeconomic) perspectives, by collectively examining the commercial and alternative banking sectors of South Africa.

1.4 Significance of this research

It has been argued in the literature that the current structure of the South African banking industry has, to an extent, alienated the poor by not catering to their specific banking needs (University of Pretoria, 2009). This is made evident by the rise in popularity of the alternative banking sector, such as African Bank and Capitec Bank. Given the significant role played by the alternative banking sector towards the overall well-being of a country, it therefore becomes important to understand the determinants of profitability for the banks contained within this banking sector.

This research will contribute to the current body of financial literature by including an alternative banking institution alongside the big four commercial banks of South Africa, so that one may acquire a better understanding of how macroeconomic and bank-specific internal determinants affect the profitability of a more conclusive sample of the South African banking sector. Based on the importance of a banking sector in a country, and more specifically a developing country such as South Africa, this research asserts that examining the greater horizon of the South African banking industry will aid in bridging this gap in the literature, and make a positive contribution to this knowledge problem.

Bearing these sentiments in mind, this research empirically investigates the most significant determinants of bank profitability for the four largest commercial banks in South Africa (Absa, FirstRand Limited, Standard Bank, Nedbank), and South Africa's largest alternative banking institution (Capitec Bank), for the period 2006-2015. This was done with the intention of establishing what internal (bank-specific) and external (macroeconomic) factors most significantly affect the profitability of these banks in order to better enable strategic-level bank management to respond to these factors as quickly and efficiently as possible.

1.5 Research methodology

This research aimed to identify the bank-specific internal and macroeconomic external determinants of profitability within the commercial banking sector of South Africa. The research methodology was quantitative in nature and adhered to a positivist research paradigm. The four largest commercial banks in South Africa (Absa, FirstRand Bank, Nedbank, Standard Bank) as well as South Africa's largest alternative banking institution (Capitec Bank), were included in the analysis. A panel regression framework was followed with return on average assets (ROAA) serving as the dependent variable and the measure of bank profitability.

The independent variables of the model included the bank-specific internal and macroeconomic external variables, in line with prior international bank profitability literature that has found these variables to be significant determinants of bank profitability. Internal determinants examined included asset quality, capital strength, operational efficiency and liquidity. External determinants included economic activity, annual inflation, level of real interest and level of unemployment.

1.6 Collecting and analysing the information

Only secondary data were utilised in this study, with annual data observations from December 2006 until December 2015. Data pertaining to bank-specific internal factors for the specified sample period was obtained from the Bankscope database for all commercial and alternative banks observed (Bankscope, 2016). Independent variables pertaining to the macroeconomic external variables were obtained from the World Bank database (World Bank, 2016). The data were analysed using EViews statistical analysis software. The results of the analysis are presented and discussed in Chapter 4.

1.7 Limitations of the study

Limitations of this study arise from issues regarding data availability, the limiting of external determinants to macroeconomic variables only, and finally, excluding South African private banks from the analysis. These limitations are outlined in detail in Chapter 3, and are summarised below as follows:

- Due to a lack of availability of other alternative bank data, only Capitec Bank was considered in this study as a proxy for the alternative banking sector of South Africa.

- The explanatory variable bank size (measured by total assets) was omitted from this study due to the lack of available data for the alternative banking institutions included in the sample. Bank size has been indicated to be a significant determinant of bank profitability in previous bank profitability studies.
- External determinants were limited to macroeconomic variables and exclude industry-specific factors. Macroeconomic determinants in previous studies have been shown to significantly affect the profitability of a bank; however, results pertaining to the effects of industry-specific factors are varied, and in most studies, are found to have an insignificant effect on bank profitability.
- Private banking institutions have been omitted from this research due to the fact that private banking is a specialised field within the South African banking industry, with specific barriers of entry, and cater to a particular target market that represents a small percentage of the South African population.

1.8 Chapter outline

Table 1.1: Summary of chapters and content

CHAPTER	CONTENT
Chapter 1:	**Orientation and motivation of the study** An introduction and background to the study, which resulted in the research problem is explained.
Chapter 2:	**Literature review** A critical review of the current literature on the research problem is presented.
Chapter 3:	**Research methodology** The research design and methodology used in the study is explained. The chapter commences with a discussion of the issues of research design, and the methods for collecting and measuring the data. Techniques to ensure the validity and reliability of the data are also considered.
Chapter 4:	**Results and findings** The results of the study are presented.
Chapter 5:	**Conclusion** Conclusions are drawn based on the results of the study. Limitations and recommendations for further study are addressed.

Source: *Researcher's compilation*

Chapter 2

Literature review

2.1 Introduction

According to Quinlan (2011:483), a theoretical framework can be defined as 'the framework that the researcher builds from the literature (theory) that s/he reviews for the research project'. As stated above, the research question addressed in this research study is stated as: What are the internal and external determinants of profitability within the banking sector of South Africa? A bank may be formally defined as 'a financial institution whose principal activities are to take deposits and borrow with the objective of lending and investing' (Wuite, 2009: 33).

When investigating bank financial performance, the current literature suggests that determinants of bank profitability are generally classified into internal and external determinants (Acaravci & Calim, 2013). Within these classifications, three main sub-classes are usually identified in order to examine bank profitability. These include bank-specific internal determinants, macroeconomic external determinants and industry-specific external determinants (Francis, 2013). Francis (2013) further discusses that bank-specific and macroeconomic determinants have been explicitly shown in previous studies to significantly affect the profitability of a bank. However, conclusions regarding the effects of industry-specific variables are ambiguous, and in most studies, show insignificant effect on bank profitability. In light of this, the research concentrated exclusively on examining the effect of various macroeconomic external and bank-specific internal determinants for the South African banking sector.

This chapter aims to support the research question by examining and arguing existing research concerning bank financial performance contained in the current sphere of financial and economic literature. Aspects relating to bank-specific internal and macroeconomic external determinants are examined first in order to introduce and contextualise the variables under study. These sections are followed by a review of existing bank profitability research from various international markets, presenting the respective variables that have been found

to be statistically significant determinants of bank profitability in foreign banking sectors. Following this, an overview of the South African banking sector is provided, and current research regarding the financial performance of the South African banking sector is examined. This section includes a discussion concerning alternative banking institutions in South Africa, facilitating a deeper understanding of the South African banking landscape. Lastly, a discussion concerning commonly used measures of bank profitability in the prior bank performance literature is examined.

2.2 Internal determinants of bank profitability

When examining the current bank performance literature, numerous studies have investigated the relationship between bank-specific internal factors and bank profitability (Vong & Chang, 2009; Alper & Anbar, 2011; Staikouras & Wood, 2011). According to the work of Vong and Chang (2009:95), internal determinants of bank performance may be defined as 'factors that are influenced by a bank's management decisions'. Staikouras and Wood (2011) share these views, and discuss that management decisions are attributable to the different management policies and objectives that drive the overall operations of a bank. Therefore, these factors directly impact the operational activity and resulting profitability of a bank (Vong & Chang, 2009; Staikouras & Wood, 2011). These views are further supported in the work of Alper and Anbar (2011).

Alper and Anbar (2011) discuss that these internal factors are usually measured by financial ratios calculated by using a bank's individual financial figures as presented in a bank's financial statements. Kumbirai and Webb (2010) discuss that the use of financial ratios allows one to recognise distinct strengths and weaknesses inherent within a bank. In the bank performance literature, financial ratios are commonly used to represent measures of asset quality, capital strength, operational efficiency, liquidity and size of the respective bank (Alper & Anbar, 2011; Acaravci & Calim, 2013). Therefore, based on these findings, it becomes clear that there is a link between bank-specific internal factors and bank profitability.

2.2.1. Bank-specific internal variables

The bank-specific internal variables examined in this study include measures of asset quality, capital strength, operational efficiency and liquidity. This section presents a review of the existing literature from the current sphere of economic and financial literature regarding these variables.

2.2.1.1. Asset quality

Asset quality is included in the study to consider the overall health of the loans issued within a bank's asset portfolio, which can be measured by many financial ratios (Kumbirai & Webb, 2010). For the purpose of this study, asset quality of the sampled banks is measured by the loan loss reserve to gross loans ratio (LRGL), as previously used in the work of Kumbirai and Webb (2010) for the commercial banking sector of South Africa. The LRGL is calculated by dividing the loan loss reserve by gross loans, and indicates the proportion of the total portfolio that has been allocated for loan losses expressed as a percentage of total loans.

The LRGL therefore, serves as an indication of expected loan losses (Ahmad, Ariff & Skully, 2007). Greater loan loss reserves may provide an indication of poor loan portfolio quality expectations in the future (Ahmad et el., 2007). The work of Ongore and Kusa (2013) further discusses that the quality of a bank's loan portfolio has a direct impact on the overall profitability of a bank. Miller and Noulas (1997) share a similar view, and argue that an increase in high-risk loans leads to an increase in the accrual of unpaid loans, ultimately leading to a decrease in overall bank profitability.

Conversely, Sufian and Habbibullah (2009) have found a positive relationship between the ratio of loan loss provisions to total loans and bank profitability. This finding is in line with Berger and DeYoung's (1997) *skimping* hypothesis, which suggests that a bank electing to maximise long-term profits may decide to decrease costs over the short term by being more frugal and cost conscious with regard to the resources allocated to assessing loan performance (Suffan & Habbibullah, 2009).

2.2.1.2. Capital strength

Capital strength was included in the study to consider the relationship between a bank's capitalisation and its overall profitability. Capital strength has been examined in numerous international bank profitability studies. For the purpose of this study, capital strength is measured by the EQAS ratio, computed as the book value of shareholders equity as a fraction of total assets (Sufian, 2011).

The EQAS ratio has previously been used as a measure of capital strength in the work of Sufian and Habbibullah (2009) for the Bangladeshi banking sector; Dietrich and Wanzenried (2011) for the Swiss banking sector; Gul et al. (2011) for the Pakistani

banking sector; Acaravci and Calim (2013) for the Turkish banking sector; and Gharaibeh (2015) for the banking sector of Bahrain. The EQAS ratio provides an indication of capital adequacy and overall financial strength with regard to a bank's ability to endure losses and efficiently manage risk exposure (Dietrich & Wanzenried, 2011).

Sufian and Habbibullah (2009) argue the importance of a bank's capitalisation in explaining its profitability, and also acknowledge the ambiguity in the financial literature around the significance of capitalisation on bank profitability. These sentiments are shared in the work of Dietrich and Wanzenried (2011), who indicate that the effect of a bank's capitalisation on profitability is indefinite, and needs to be examined through empirical investigation.

Banks with lower EQAS ratios are perceived to be higher risk as compared to banks that are better capitalised (Dietrich & Wanzenried, 2011). When one considers the traditional risk-return hypothesis, this implies an inverse relationship between capitalisation and bank profitability (Dietrich & Wanzenried, 2011). However, Gul et al. (2011) present a converse view. A bank with a higher capital ratio can more easily conform to regulatory capital standards so that surplus capital can be lent out and used to increase overall profitability (Gul et al., 2011). Dietrich and Wanzenried (2011) additionally discuss that banks with a higher capital ratio may enjoy lower costs of capital as a result of the lower perceived risk, which may serve to increase overall bank profitability. A similar view is stated in the work of Sufian and Habbibullah (2009).

2.2.1.3. Operational efficiency

Operational efficiency was included in this study to examine the effect of operational costs on overall bank profitability. The effect of operational efficiency on bank profitability has been examined in numerous international bank profitability studies. For the purpose of this study, operational efficiency was measured by the cost to income ratio as previously used by Dietrich and Wanzenried (2011) for the Swiss banking sector; Alexiou and Sofoklis (2009) for the Greek banking sector; and Pasiouras and Kosmidou (2007) in a commercial banking sector study of the European Union.

The cost to income ratio can be defined as operating expenses (expenditure pertaining to administration, staff salaries and property, excluding losses as a result of impaired or non-performing loans), divided by total revenue earned (Dietrich & Wanzenried,

2011). The cost to income ratio provides an indication as to the change in the expenses of a business relative to revenue or income generated (Wuite, 2009).

Pasiouras and Kosmidou (2007) further discuss that the cost to income ratio may also serve as a proxy for examining management efficiency, as expenses incurred in the production of income are examined. Athanasoglou et al (2008), Alexiou and Sofoklis (2009) and Dietrich and Wanzenried (2011), have all shown an inverse relationship between operating expenses and bank profitability. Pasiouras and Kosmidou (2007) share similar views, and additionally suggest that high cost to income ratios may provide an indication of inefficient management practices.

2.2.1.4. Liquidity

Liquidity is a highly important concern for banking institutions (Samad, 2004; Sufian & Habibullah, 2009). According to the work of Samad (2004:8) the liquidity of a bank can be understood as: 'how quickly a bank can convert its assets into cash at face value to meet the cash demands of the depositors and borrowers.' Wuite (2009) shares these sentiments and additionally explains liquidity as how well an enterprise is able to satisfy its debt obligations.

Alexiou and Sofoklis (2009) describe liquidity as a bank's ability to predict variations in its sources of funds and consequently being able to satisfy all financial obligations as they arise. The consequence of poor liquidity management may result in a run on a bank, which has crippled many financial institutions throughout financial history. Cash needs to be effectively managed to ensure that a bank is able to satisfy maturing financial liabilities, operational cash requirements, and the cash requirements of customers (Alexiou & Sofoklis, 2009).

In the current financial literature, many variables have been used to account for liquidity in various international banking studies (Samad, 2004; Alexiou & Sofoklis, 2009; Sufian & Habibullah, 2009; Francis, 2013). For the purpose of this study, liquidity is measured by the net loans to total assets ratio (NLTA) as previously used in the work of Samad (2004) for the commercial banking sector of Bahrain, Kumbirai and Webb (2010) for the commercial banking sector of South Africa, and Francis (2013) for a commercial banking study examining Sub-Saharan Africa. The NLTA can be calculated by dividing net loans by total assets. The lower the NLTA ratio, the more liquid a bank will be.

The effect of liquidity on bank profitability has been examined in numerous international bank profitability studies, with many studies reporting opposing views regarding the significance of liquidity on bank profitability. Sufian and Habibullah (2009) regard liquidity as being an important determinant of bank profitability. These views are shared in the work of Dawood (2014), who found liquidity to be a significant determinant of bank profitability for the commercial banking sector of Pakistan, and in Molyneux and Thornton (1992), for the European banking sector. Conversely, the work of Gharaibeh (2015) has found liquidity to be an insignificant determinant of bank profitability for the banking sector of Bahrain. These views are shared in the work of Haron (2004) in a study of Islamic banks and Pasiouras and Kosmidou (2007) in a study of Greek banks.

2.3 External determinants and bank profitability

The banking sector play a crucial role in the economic framework of a country (Demirgüç-Kunt & Huizinga, 1999). Greenberg and Simbanegavi (2009) share the views of Demirgüç-Kunt and Huizinga (1999), and further explain how the performance of a country's banking sector has been shown to have a direct relationship to the economic well-being of a country. Given the significant role that the banking sector play towards the overall well-being of a country, it becomes important to understand the determinants of profitability for the banks contained within a country's banking sector. Macroeconomic variables that are external to the bank become specifically significant, as the bank has no control over these factors.

A similar stance is adopted in the work of Demirgüç-Kunt and Detragiache (1998), who further discuss how problems within the systematic banking sector have surfaced consistently in many markets around the world, and assert the importance of better understanding the link between banking sector fragility and the economy. Demirgüç-Kunt and Detragiache (1998) further show that bank crises are more likely to occur in weaker macroeconomic environments and more specifically when GDP growth rates are low and the level of inflation is high.

This study has indicated that the real interest rate and balance of payments may play a part in issues that may arise within the banking sector. The significance of the effect of macroeconomic determinants for a bank has been further substantiated in many other studies within the current body of financial literature (Demirgüç-Kunt & Huizinga, 1999; Sufian & Habibullah, 2009; Gul, Irshad & Zaman, 2011; Francis, 2013). Based on the conclusions of this prior research, it becomes clear that a link between macroeconomic determinants and the banking sector may be established.

Given the link exhibited between the banking sector and the macro environment, the effect of macroeconomic determinants on bank profitability may be further examined. Sharma and Mani (2012) investigate the importance of macroeconomic determinants for bank performance. This study describes how a bank's income is mainly comprised of interest income and non-interest income. Interest income is earned from more traditional banking activities such as lending and borrowing money, whereas non-interest income is generally earned through banking service fees. The findings of this study indicated that banking business associated with the lending and borrowing of funds (interest income) were significantly affected by a country's macroeconomic determinants.

The views of Sharma and Mani (2012) are shared in the work of McLeay, Radia and Thomas (2014), who discuss how bank financial performance is significantly affected by macroeconomic determinants. Their views suggest that in order for a bank to remain profitable, it must receive a greater rate of interest on the loans (or other assets) it provides than on the rate it pays out on deposits (or other liabilities) it holds. The rate of interest on these assets and liabilities relies directly on the policy rate set by the central bank, which is influenced by macroeconomic determinants (McLeay, Radia & Thomas, 2014). The spread between these rates on a bank's assets and liabilities is used to pay for operational expenses and ultimately determines the bank's profitability (McLeay, Radia & Thomas, 2014). Therefore, based on the findings of Sharma and Mani (2012) and McLeay, Radia and Thomas (2014), it becomes clear that there is a link between macroeconomic determinants and bank's financial performance.

The above discussion has presented the overall significance of macroeconomic determinants to the performance of a country's banking sector. This was shown by highlighting the existing link between macroeconomic determinants and the banking sector as well as the link between macroeconomic determinants and actual bank profitability (Demirgüç-Kunt & Detragiache, 1998; McLeay, Radia & Thomas, 2014). Given the significant role that this sector is found to play toward the overall well-being of a country as established by Demirgüç-Kunt and Huizinga (1999) as well as Greenberg and Simbanegavi (2009), this study asserts that an investigation into the possible macroeconomic determinants that may have a significant effect on the banking sectors of South Africa will make a valuable contribution to the South African financial literature.

2.3.1 Macroeconomic external variables

The bank-specific internal variables examined in this study include measures of asset quality, capital strength, operational efficiency and liquidity. This section presents a review of the existing literature from the current sphere of economic and financial literature regarding these variables.

2.3.1.1. Economic Activity (GDP)

Gross domestic product (GDP) is a key macroeconomic external determinant regularly used to assess the state of a country's economy (Rao & Lakew, 2012). GDP is used as a proxy to account for the total economic activity within the borders of a country (Sufian, 2011). GDP may be formally defined as 'the total value of all final goods and services produced within the geographic boundaries of a country in a particular period' (Mohr, 2011: 20). GDP accounts for the upswings (increases in economic activity) and downswings (declines in economic activity) experienced in an economy.

The work of Sufian and Habibullah (2009) discusses that GDP may play a significant role in the aspects that affect the supply and demand of loans and deposits in a country. Constructive economic environments will positively affect the demand for and supply of banking services (Sufian, 2011). These views are shared in the work of Sharma and Mani (2012) who explain that when an economy grows at a favourable rate, households and businesses increase their demand for financial transactions.

The work of Dietrich and Wanzenried (2011) broadens this point and discusses that during times of economic upswings, the demand for lending increases which in turn increases overall bank profitability as banks experience increases in their number of loans issued. The opposite effect is seen during economic down turns. According to Francis (2013), as GDP growth declines, loan credit quality weakens and the number of loan defaults experienced increases. Therefore, this increase in defaults bears a negative impact on overall bank profitability.

When considering the relationship between GDP and bank profitability, the work of Gul et al. (2011) has shown a statistically significant positive relationship demonstrated within the Pakistani banking sector. This finding is consistent with the previous work of Sharma and Mani (2012) for the Indian banking sector and Acaravci and Calim (2013) for the

Turkish banking sector. Based on the current literature reviewed, a positive relationship between GDP and bank profitability has been established.

2.3.1.2. Annual Inflation

A country's rate of inflation is an important macroeconomic variable that affects both the income and expenditure of a bank (Sufian, 2011). Wuite (2009:207) define inflation as the 'persistent rise in the general level of prices or a persistent decrease in the quantity and quality of goods and services that can be purchased with a single currency unit'. The work of Alper and Anbar (2011) additionally explains that the annual rate of inflation accounts for the general increase in the Consumer Price Index (CPI) in percentage terms for all goods and services in a country. Therefore, inflation affects the real values of income and expenses (Alper & Anbar, 2011).

Early research surrounding the relationship between bank profitability and a country's level of inflation was introduced by Rovell (1979). The rate of increase of a bank's operating expenses relative to a country's inflation rate was found to directly affect the profitability of a bank (Rovell, 1979). These sentiments are shared in the work of Perry (1992).

According to the work of Perry (1992), the degree to which inflation affects the profitability of a bank is significantly influenced by the accuracy with which inflation is forecast by bank management. Therefore, the precision with which a bank is able to anticipate future inflation levels and control routine operating expenditure, the more profitable a bank will be. Francis (2013) supports these views and additionally notes that accurately forecast levels of inflation allow bank management to modify their interest rates. By modifying interest rates, a bank is better positioned to ensure that interest income earned outpaces increases in operating expenses. This in turn aids a bank to remain profitable.

The effect of inflation on bank profitability has been examined in numerous international bank profitability studies with many studies reporting contrasting views. The work of Pasiouras and Kosmidou (2007), Alexiou and Sofoklis (2009) and Gul et al. (2011) have all indicated the inflation rate to have a positive relationship with bank profitability. Conversely, the work of Sufian and Chong (2008), Sayilgan and Yildirim (2009) and Ali, Akhtar and Zafar (2011) have shown a negative relationship between the inflation rate and bank profitability. Therefore, inflation was included in this study to examine the

relationship between the rate of increase in the price of goods and services and the profitability of commercial banks in South Africa.

2.3.1.2. Level of Unemployment

According to the work of Mohr (2015) unemployment may be regarded as the most important economic problem in South Africa. Similar sentiments are shared in the work of Ifeacho and Ngalawa (2014) who further discuss that the level of unemployment hampers economic growth through the decrease in gross national income and aggregate demand. The work of Janse van Rensburg, McConnell and Brue (2015) describe unemployment as the failure of an economy to completely engage its labour force. The labour force of a country may be explained as individuals who are 16 years old or older who are not members of any institution; engaged in any form of employment or are unemployed and actively seeking work (Janse van Rensburg et al. 2015).

The relationship between the level of unemployment and bank profitability was included in this analysis based on the prior work of Ifeacho and Ngalawa (2014) and Abreu and Mendes (2001) who found a significant effect of unemployment on bank profitability. As a result of becoming unemployed, an individual suffers from a loss of income (Mohr, 2015). This resultant loss of income may place additional pressure on an individual to satisfy financial commitments such as mortgage or vehicle loan re-payments that are due to financial institutions such as banks.

The work of Louzis, Vouldis and Metaxas (2012) further discusses that increases in the unemployment rate was found to increase the level of non-performing loans for banks which ultimately decrease overall bank profitability. These sentiments are shared in the work of Abreu and Mendes (2001), Heffernan and Fu (2008) and Ifeacho and Ngalawa (2014). The level of unemployment was therefore included in this analysis to examine its effect on bank profitability for the banking sector of South Africa.

2.3.1.3. Real Interest

Bodie, Kane and Marcus (2011:146) define an interest rate as a ‘promised rate of return denominated in some unit of account (dollars, yen euros, or even purchasing power units) over some time period (a month, a year, 20 years, or longer)’. Interest rates are commonly presented in nominal or real terms. The nominal interest rate is a term used to describe the growth rate of money and does not take into account inflation or the actual purchasing

power of money (Bodie et al. 2011). When considering the effect of inflation, the real interest rate needs to be taken into account.

The real interest rate may be defined as 'the rate of return that has been adjusted for inflation. This is the amount by which the actual/nominal interest rate exceeds the rate of inflation' (Wuite, 2009: 321). The real interest rate represents the effective rate that depositors or investors will require in return for relinquishing the use of their funds (Wuite, 2009). The real interest rate may also be understood as the rate of interest expressed in terms of real goods that has been adjusted to remove the effects of inflation (Brealey, Myers & Allen, 2011). Bodie et al. (2011) further discusses that the real interest rate measures the growth of the actual purchasing power of money over time. The real interest rate is calculated using the Fisher Equation (Wuite, 2009).

The real interest rate is significant for a bank as it provides an indication of a bank's general cost of funds (Abreu & Mendes, 2001). A primary business activity of a bank concerns the provision or lending of funds in the form of loans to borrowers (Sharma & Mani, 2012). The work of Garcia-Herrero et al. (2009) further discusses that the repayment ability of a bank's borrowers is affected by the real interest rate. Therefore, any variation in a borrower's ability to repay bank loans may pose a significant effect to overall bank profitability. These views are further supported in the work of Ifeacho and Ngalawa (2014).

The work of Aburime (2009) has found a statistically significant positive relationship between the real interest rate and bank profitability. These findings are shared in the work of Alper and Anbar (2011) and are further in line with the previous research of Molyneux and Thornton (1992) and Demirgüç-Kunt and Huizinga (1999) who showed a significant positive relationship between interest rates and bank profitability. Conversely, the work of Naceur (2003) reports a statistically significant negative relationship between bank profitability and interest rates. Vong and Chan (2009) have found the real interest rate to be a statistically insignificant determinant of bank profitability. Based on the literature consulted, it becomes apparent that the relationship between the real interest rate and bank profitability is ambiguous and needs to be further examined. These sentiments are shared in the work of Aburime (2009).

2.4 Review of International bank profitability studies

The work of Pasiouras and Kosmidou (2007) investigated the determinants of bank profitability of foreign and domestic commercial banks operating in fifteen EU countries over the period 1995 to 2001.This study found both bank-specific internal and external factors to be significant determinants of profitability for the EU banks, with varying relationships being displayed. Internal factors included measures of capital strength, operational efficiency (cost to income ratio), liquidity and bank size. Liquidity was found to be statistically significant and showed a positive relationship with profitability for domestic banks and a negative relationship with profitability for foreign banks. Capital strength was found to have a statistically significant positive relationship with profitability for both foreign and commercial banks. Operational efficiency and bank size variables were found to have a statistically significant negative relationship with bank profitability, both for foreign and commercial banks. Macroeconomic external variables considered included the level of inflation and GDP. Inflation and GDP were both statistically significant, and showed a positive relationship with domestic bank profitability and a negative relationship with foreign bank profitability.

Sufian and Chong (2008) investigated the determinants of bank profitability for a sample of commercial banks from the Philippines by means of a panel data analysis. The sample period of this study began in 1990 and ended in 2005. The findings of their study indicated that bank-specific factors (internal factors that are affected by bank-level management) as well as macroeconomic external factors were significant determinants of bank profitability. Significant internal determinants included bank size, credit risk, operational efficiency, business mix (income diversification) and capital strength. Bank size, credit risk (asset quality) and operational efficiency were found to display negative relationships with bank profitability. However, capital strength and a diversified business mix were found to be positively related to bank profitability for the sample of Philippine banks. Macroeconomic factors considered included economic growth, stock market capitalisation and money supply. Of these macroeconomic determinants, only the inflation rate was found to be statistically significant, and displayed a negative relationship to bank profitability for the sample of Philippine banks considered.

Alexiou and Sofoklis (2009) investigated the determinants of bank profitability of commercial banks within the Greek banking sector while following a panel data methodology. The findings of this study indicated that bank-specific factors as well as macroeconomic external factors were significant determinants of bank profitability for the Greek banking sector. Significant internal determinants included bank size measured by total assets, credit risk (asset quality),

operational efficiency, and liquidity. Bank size was found to display a positive relationship to bank profitability while asset quality, operational efficiency and liquidity were found to display negative relationships to profitability among the sample of Greek banks considered. With regard to macroeconomic factors, the inflation rate, private consumption and GDP were considered. Among these macroeconomic variables, only the inflation rate was found to be a statistically significant determinant for the panel of Greek banks included in the sample, which displayed a positive relationship to bank profitability.

Sufian and Habibullah (2009) investigated the determinants of bank profitability among 37 commercial banks in Bangladesh between 1997 and 2004. This study considered both bank-specific internal and macroeconomic external variables. The bank-specific internal variables considered included measures of liquidity, bank size, asset quality (credit risk), non-interest income, operating expenses and capital strength. Of these internal variables, liquidity and asset quality were found to be statistically significant, and showed a positive relationship with bank profitability for the panel of Bangladeshi banks. Results pertaining to bank size and operating expenses were significant, but the relationship was found to be inconclusive. The macroeconomic external variables considered included economic activity as measured by GDP, and the inflation rate. Of these variables, only the level of inflation was found to be a significant determinant, and displayed a negative relationship with bank profitability for the Bangladeshi banking sector.

Alper and Anbar (2011) investigated the determinants of bank profitability for 10 commercial banks in Turkey between 2002 and 2010, while following a panel data methodology. This study indicated that both internal and external factors were significant determinants of bank profitability. Bank-specific internal determinants considered included bank size, capital adequacy, asset quality, liquidity, total deposits and the banks' income to expense structure. Of these internal variables, bank size and the income to expense ratio showed a statistically significant positive relationship with bank profitability. Asset quality indicated a statistically significant negative relationship to bank profitability. All other internal variables were found to be statistically insignificant. Macroeconomic external determinants considered included economic activity (GDP), inflation and the real interest rate. Of these external variables, only the real interest rate was found to be statistically significant and indicated a positive relationship to bank profitability.

Gul et al. (2011) investigated the determinants of bank profitability for the Pakistani banking sector between 2005 and 2009 while following a panel data methodology. The findings of this study indicated that both bank-specific internal factors as well as macroeconomic external

factors were significant determinants of profitability for the banking sector of Pakistan. Internal determinants included measures of bank size, capital strength, liquidity and total deposits. Bank size, liquidity and total deposits were found to be statistically significant, and displayed a positive relationship with bank profitability. With regard to the macroeconomic external variables, GDP and the inflation rate were considered in the study. The GDP growth rate and the inflation rate were both significant determinants of profitability, and both indicated a positive relationship with profitability for the Pakistani banks included in the sample.

Zhang and Dong (2011) investigated the determinants of bank profitability for the U.S. banking sector between 2000 and 2008 by means of a regression analysis. The findings of this study indicated that both bank-specific internal and macroeconomic external factors were significant determinants of profitability for the U.S. banking sector. Internal determinants included measures of bank size, capital strength, liquidity and the total deposits to total assets ratio. Capital strength, liquidity and total deposits were found to be statistically significant and displayed a positive relationship to bank profitability. With regard to bank size, results were found to be inconclusive. With regard to macroeconomic external variables, GDP and interest rates were considered and both found to be statistically significant. GDP indicated a positive relationship, whereas interest rates indicated a negative relationship to bank profitability for the sample of U.S. banks.

Rao and Lakew (2012) investigated the determinants of bank profitability for Ethiopian banks while utilising a panel data methodology for the period 1999 to 2008. This study considered both bank-specific internal and macroeconomic external determinants. Bank-specific internal determinants included capital adequacy (capital strength), liquidity, operational efficiency, diversification, bank size and asset quality (credit risk). Capital strength and bank size were found to be statistically significant and displayed a positive relationship to bank profitability. Operational efficiency and liquidity were found to be statistically significant and displayed a negative relationship to bank profitability. Asset quality (credit risk) was found to be statistically insignificant. With regard to macroeconomic external determinants, economic activity (GDP) and the inflation rate were included in this study. Both these macroeconomic variables were found to be statistically insignificant determinants of bank profitability for the sampled banks in Ethiopia.

Acaravci and Calim (2013) investigated the determinants of bank profitability of commercial banks in the Turkish banking sector while following a cointegration test approach for the period 1998 to 2011.The findings of this study indicated that bank-specific factors as well as macroeconomic external factors were significant determinants of bank profitability for the

Turkish banking sector. Bank-specific internal determinants included measures of asset quality, total deposits, liquidity, income structure, expense structure, capital strength and total assets. Significant internal determinants included asset quality, total deposits, liquidity, income to expense structure and capital adequacy. With regard to the macroeconomic factors, only real GDP was found to be a significant determinant of bank profitability. Relationships between the significant explanatory variables and bank profitability appeared to be in line with the literature, but differed based on the ownership structure of the banks included in the sample. Therefore, mixed results were reported in this study.

Francis (2013) examined the determinants of commercial bank profitability for 216 commercial banks across forty-two countries within Sub-Saharan Africa. A panel data methodology was followed for the period 1999 to 2006. This study indicated that both bank-specific internal and macroeconomic external factors were significant determinants of bank profitability for the African banks considered. Bank-specific internal variables included measures of capital adequacy, operational efficiency, growth in bank assets, growth in total deposits and liquidity. Of these internal variables, capital adequacy and growth in bank deposits were found to have a statistically significant positive relationship to bank profitability. Growth in bank assets, liquidity and total assets, however, were found to show a statistically significant negative relationship to bank profitability. Macroeconomic external variables considered included measures of GDP and inflation. Both GDP and the inflation rate were found to have a statistically significant negative relationship to bank profitability for the panel of African banks considered.

Ongore and Kusa (2013) investigated the determinants of bank profitability for commercial banks in Kenya between 2001 and 2010 while following a panel data methodology. Both bank-specific internal and macroeconomic external variables were considered in this study. The bank-specific internal variables included measures of capital adequacy, asset quality, management efficiency and liquidity. Capital adequacy, asset quality and management efficiency were found to be statistically significant determinants of bank profitability. A positive relationship was found for capital adequacy and management efficiency, whereas a negative relationship was observed between asset quality and bank profitability. Macroeconomic external determinants examined included the level of inflation and GDP. Both of these external variables were found to be statistically insignificant determinants of bank profitability for the Kenyan banking sector.

Gharaibeh (2015) investigated the determinants of profitability for the commercial banking sector of Bahrain between 2006 and 2013 while following a panel data methodology. Both

bank-specific internal and macroeconomic external variables were considered in this study. The bank-specific internal variables included measures of capital adequacy, operational efficiency, capital strength, bank size and liquidity. Capital adequacy was found to be statistically significant and showed a negative relationship to bank profitability. Capital strength was found to be statistically significant and showed a positive relationship to bank profitability. Operational efficiency (cost to income ratio), bank size and liquidity were found to be statistically insignificant determinants of bank profitability. Macroeconomic external variables considered included GDP, the inflation rate, level of interest and a proxy for the exchange rate of Bahrain. GDP, exchange rates and the inflation rate were found to be statistically insignificant determinants of bank profitability in Bahrain. The level of interest rates, however, was found to be statistically significant and exhibited a negative relationship to commercial bank profitability in Bahrain.

Statistically significant determinants of bank profitability and the relationships indicated in prior research as discussed above, are presented in Table 2.1.

Table 2.1: Summary depicting statistical significance and relationships observed of determinants of bank profitability in the international literature

Region	Author	Statistically significant determinants	Relationship to profitability
European Union	Pasiouras and Kosmidou (2007)	• Capital strength • Operational efficiency • Inflation • GDP	• Positive • Negative • Positive • Positive
Philippines	Sufian and Chong (2008)	• Bank size • Asset quality • Operational efficiency • Income diversification • Capital strength • Inflation	• Negative • Negative • Negative • Positive • Positive • Negative
Greece	Alexiou and Sofoklis (2009)	• Bank size • Asset quality • Operational efficiency • Liquidity • Inflation	• Positive • Negative • Negative • Negative • Positive
Bangladesh	Sufian and Habibullah (2009)	• Liquidity • Asset quality • Inflation	• Positive • Positive • Negative
Turkey	Alper and Anbar (2011)	• Bank size	• Positive

		• Operational efficiency • Asset quality • Real interest rate	• Positive • Negative • Positive
Pakistan	Gul et al. (2011)	• Bank size • Liquidity • Total deposits • GDP • Inflation	• Positive • Positive • Positive • Positive • Positive
U.S.A	Zhang and Dong (2011)	• Capital strength • Liquidity • Total deposits • GDP • Level of Interest rates	• Positive • Positive • Positive • Positive • Negative
Ethiopia	Rao and Lakew (2012)	• Capital strength • Bank size • Operational efficiency • Liquidity	• Positive • Positive • Negative • Negative
Sub-Saharan Africa	Francis (2013)	• Capital adequacy • Growth in deposits • Total assets • Liquidity • GDP • Inflation	• Positive • Positive • Negative • Negative • Negative • Negative
Kenya	Ongore and Kusa (2013)	• Asset quality • Capital adequacy • Management efficiency	• Negative • Positive • Positive
Bahrain	Gharaibeh (2015)	• Capital adequacy • Capital strength • Level of interest rates	• Negative • Positive • Negative

Source: *Researcher's compilation*

2.5 Bank profitability in South Africa

2.5.1 Overview of the South African banking industry

The banking sector is a critical component of a country's economic framework, the importance of which has been noted in many prior studies (Demirgüç-Kunt & Huizinga, 1999). According to Greenberg and Simbanegavi (2009), the performance of a country's banking sector has been shown to have a direct relationship to the economic well-being of a country.

With regard to the South African economy, the banking sector play a critical role, contributing in excess of 20% towards the South African GDP (Ifeacho & Ngalawa, 2014). In addition, the South African banking sector is responsible for more than 10% of overall employment in the country (Ifeacho & Ngalawa, 2014). The banking sector therefore play a vital role within the South African economy.

The South African banking sector can be viewed as being oligopolistic in nature (Ifeacho & Ngalawa, 2014). These sentiments are shared in the work of Erasmus and Makina (2014), who discuss that five financial institutions, namely Absa, FirstRand Limited, Nedbank, Standard Bank and Capitec Bank, dominate the South African banking sector. From a structural perspective, the South African Reserve Bank noted that approximately 89.2% of total banking assets were held by the five largest banks in South Africa (SARB, 2015). Local branches of international banks account for 7.3% of total assets and the remaining 3.5% of assets are held by other smaller banks and financial institutions (SARB, 2015). These figures are further depicted in Figure 2.1.

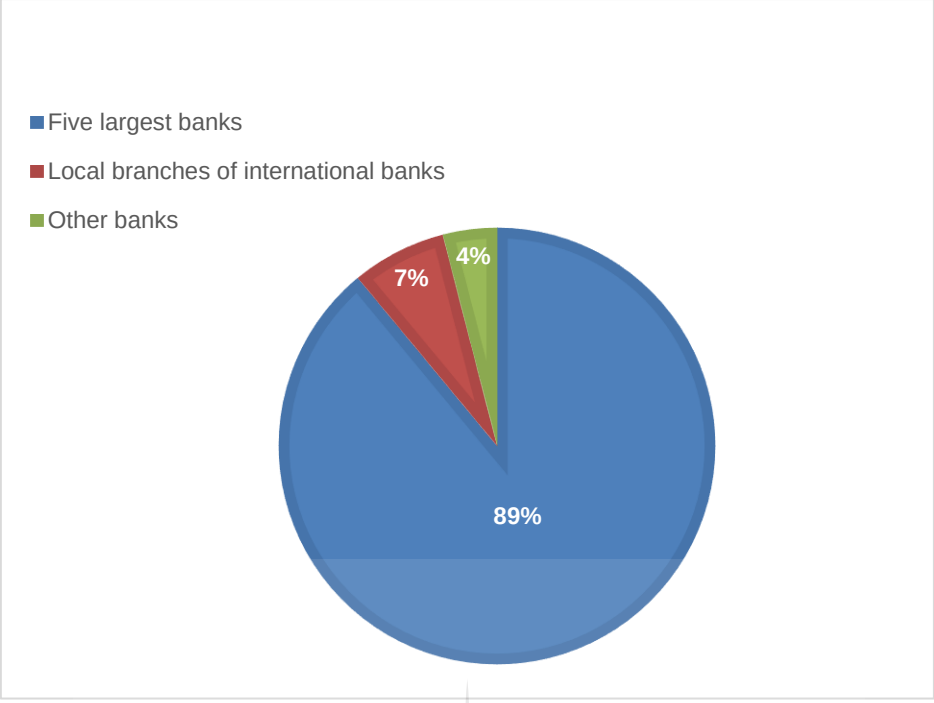

Figure 2.1: Banking Assets held by local and international banks in South Africa as at December 2015

***Source**: SARB (2015) and author's compilation*

2.5.2 Current findings

Research pertaining to bank performance in South Africa has been regarded as being limited (Kumbirai and Webb, 2010). Kumbirai and Webb (2010) propose that research by both scholars and industry specialists in the area of bank performance is justified and welcomed in the face of recent rises in global bank failures following the global financial crisis. The existing literature examining the South African banking industry pertaining to this research is further discussed below.

Ifeacho and Ngalawa (2014) investigated South African bank profitability for the period 1994 to 2011 while utilising a panel data methodology. Findings of the study indicated that bank-specific factors (internal factors that are affected by bank-level management) as well as macroeconomic external factors were significant determinants of bank profitability. Bank-specific factors examined included measures of capital adequacy, asset quality, management quality and liquidity.

In this study, asset quality, management quality and liquidity were found to be statistically significant and showed positive relationships with bank profitability (Ifeacho & Ngalawa, 2014). Though statistically significant, capital adequacy displayed mixed relationships among the

models considered. Macroeconomic external variables considered included GDP, the real interest rate, the unemployment rate and the inflation rate. The real interest rate and the unemployment rate were found to be statistically significant determinants of bank profitability, with the real interest rate displaying a positive relationship and the unemployment rate displaying a negative relationship with bank profitability. The other macroeconomic variables considered were found to be statistically insignificant.

Kumbirai and Webb (2010) examined the performance of the South African commercial banking sector over the period 2005 to 2009 by means of a descriptive financial ratio analysis. This study focused solely on bank-specific internal variables and excluded an analysis of macroeconomic external variables. Variables considered included measures of liquidity and asset credit quality through an examination of various financial ratios that served as a proxy for these measures. The relationship between lower levels of liquidity, poorer asset credit quality and lower levels of bank profitability experienced in the commercial banking sector of South Africa was noted. The importance of better understanding bank-specific internal variables within the context of South African commercial banks was therefore highlighted.

2.5.3 Alternative banking

According to Bankseta (2013), there are currently seven classes of microfinance service providers in South Africa. These include micro-enterprise lenders, cooperative financial institutions, salary-based micro lenders, affordable housing finance suppliers, retailers, alternative banks and primary banks. Alternative banks may be described as banking institutions which target the entry-level or lower-income markets, such as Capitec Bank (Bankseta, 2013).

It has been argued in the literature that the current structure of the South African banking industry has, to an extent, alienated the poor by not catering to their specific banking needs (University of Pretoria, 2009). This is made evident by the rise in popularity of the alternative banking sector in South Africa, which caters more to low income earners (University of Pretoria, 2009). Between the period 2009 to 2013, Capitec Bank showed an increase in total assets of more than 600%, from a reported R5 billion to R38.3 billion (Bankseta, 2013). Morduch (1999) highlights the importance of microfinance institutions such as these alternative banks, as they provide financial services to low-income households that may be excluded from the more formal banking sector. Morduch (1999) further discusses how many

of these low-income households use the opportunities provided by microfinance institutions to finance entrepreneurial activities and become self-sufficient.

The findings of Mordoch (1999) are shared in the later work of Kai and Hamori (2009), who further discuss how microfinance institutions provide the poor with lower rate finance and access to financial services that allows them to make investments or diversify their businesses. Green, Kirkpatrick and Murinde (2006) additionally explain that the increase in financial access provided by microfinance institutions can directly lead to a reduction in overall poverty in a country. The rise in asset values of alternative banking institutions such as Capitec are testament to the importance of the microfinance industry in the economy of South Africa, as alternative banks are more involved in microfinance than mainstream commercial banks.

The microfinance and alternative banking industry therefore play a key role in the development of a country, as this access to finance allows the poor to engage in entrepreneurial activities that may lower unemployment, reduce poverty and increase economic growth (Morduch, 1999; Green, Kirkpatrick & Murinde, 2006; Kai and Hamori, 2009). Given the extraordinary increase in popularity and asset size of an alternative bank such as Capitec in recent years, an investigation into the possible determinants that may have a significant effect on a more conclusive sample of South African banks will make a valuable contribution to financial literature.

2.6 Measures of financial performance

Financial performance is a primary concern within a business context. A key objective of a bank's management is to ensure the profitability of their respective institutions (Acaravci & Calim, 2013). Selecting an appropriate measure to evaluate profitability is thus critical in enabling management to make effective and efficient decisions. In the literature on bank performance, several measures are used to quantify bank profitability. Commonly used measures include return on assets (ROA); return on equity (ROE; return on average assets (ROAA); and return on average equity (ROAE). These measures are used either individually or in combination depending on the nature of the study at hand, and the availability or consistency of data.

This research utilises the ROAA ratio as a measure of bank profitability in line with the previous work of Golin (2001), Pasiouras and Kosmidou (2007), Dietrich and Wanzenried (2011), Rao and Lakew (2012) and Francis (2013). According to the work of Rao and Lakew (2012), an issue associated with the use of ratios such as ROE and ROA stems from the fact that the

total value of a bank's assets and liabilities fluctuates throughout the reporting period. Utilising only the closing balance for a specific year may lead to inaccuracies (Rao & Lakew, 2012). In order to address this issue, average figures of successive closing balance sheet figures may be utilised (Rao & Lakew, 2012). Therefore, average assets are used to account for any differences in asset composition present during the financial reporting period.

ROAA can be described as net profit expressed as a percentage of average total assets (Pasiouras & Kosmidou, 2007). ROAA was selected as it provides an indication of the profit earned per Rand of assets held, and therefore illustrates how effectively a bank's assets are being utilised to generate income. The work of Golin (2001) regards ROAA as a key measure when evaluating bank profitability. These sentiments are shared in the work of Pasiouras and Kosmidous (2007) and Dietrich and Wanzenried (2011), who utilised ROAA as their key determinant of bank profitability in their respective research.

The work of Dietrich and Wanzenried (2011) further discusses the superiority of ROAA as a measure of bank profitability by comparing it to the ROAE ratio commonly used in the literature. When considering ROAE, a bank with a lower gearing (higher equity to debt) generally reports a lesser ROAE, but a greater ROAA. ROAE, however, neglects the greater risk related to high levels of leverage and the effect of greater regulation on a bank's leverage ratios (Dietrich and Wanzenried, 2011). Therefore, this research regarded ROAA as being a more appropriate measure of profitability for the research at hand.

2.7 Summary

This chapter provided a review of the specific theoretical framework supporting the research question posed in this study. This research aims to identify the bank-specific internal and macroeconomic external determinants of profitability within the banking sector of South Africa. In light of the research question and research objectives of this study, relevant bank performance research contained in the current body of financial literature was presented and examined.

Various determinants of bank profitability from a multitude of studies conducted in various financial markets globally were presented and argued. Commonly used measures of financial performance in research of this nature were presented, and reasons for supporting the use of ROAA as a superior measure of bank profitability were given. Bank-specific internal and macroeconomic external variables that were found to be statistically significant determinants for these banking sectors, as well as existing findings within the South African context, were examined. Determinants considered included measures of asset quality, capital strength,

operational efficiency, liquidity, economic activity (GDP), annual inflation, level of unemployment and the real interest rate.

Based on the literature examined, it was found that the banking sectors of different countries exhibited varying sets of statistically significant bank-specific and macroeconomic determinants of profitability. In addition, the relationship of statistically significant determinants varied per region. The following chapter sets out the specific methodology utilised to investigate the research question when attempting to achieve the various research objectives outlined by this study.

Chapter 3

Research methodology

3.1 Introduction

The previous chapter delivered a review of the determinants of bank profitability contained in the current economic and finance literature. The significance of various determinants of bank profitability from a multitude of studies conducted in various financial markets globally were presented and argued.

This chapter sets out the specific methodology utilised to investigate the research question and attempts to achieve the various research objectives targeted by this research study. Aspects pertaining to the research methodology, sampling strategy, variables considered and model specifications are a few of the key aspects covered in detail in this chapter.

3.2 Research question and objectives

The research question addressed by this research study is stated as follows:
What are the internal and external determinants of profitability within the commercial banking sector of South Africa?

According to the work of Zikmund (2003), research objectives describe what the research study aims to accomplish in quantifiable or measurable terms. This study aims to achieve the following objectives:

- Determine which bank-specific internal and macroeconomic external factors are statistically significant determinants of South African bank profitability by means of a panel regression analysis in order to better enable bank management to respond to these identified factors, thereby mitigating the risk of poor financial performance and potential bank failure in the future.

- Determine the relationships observed (either positive or negative) between the statistically significant internal and external determinants and bank profitability for the South African banking sector.
- Allow for the examination of a more conclusive sample of the South African banking population from internal (bank-specific) and external (macroeconomic) perspectives, by collectively examining the commercial and alternative banking sectors of South Africa.

3.2.1 Research design

According to Saunders et al. (2012), research design can be described as an ultimate plan detailing how one goes about solving the research question. A focused research design highlights the objectives of a study, based on the research question. Any constraints faced while pursuing the specified research objectives such as sourcing the data and data analysis, are addressed by the research design and methodology (Saunders et al., 2012). This study aimed to identify the bank-specific internal and macroeconomic external determinants of profitability within the commercial banking sector of South Africa.

According to the work of Hopkins (2008), quantitative research allows one to determine the relationship between independent and dependent variables. All variables utilised in this study were quantitative in nature, and the relationships between these quantitative variables were investigated. Thus, a quantitative research design was deemed the most appropriate to satisfy the research objectives of this study.

3.2.2 Research paradigm

A research paradigm is the overall perspective from which a research problem is viewed by the researcher (Patton, 1990). This research study adhered to a positivist quantitative research paradigm. A positivist philosophical framework can be described as one that is scientific in nature and where there is only one singular objective reality (Quinlan, 2011). Under this philosophical framework, it is possible to answer a research question and satisfy the research objectives by using quantitative numerical data (Quinlan, 2011). This research aimed to investigate the significance of the various independent (macroeconomic external and bank-specific internal) variables on the dependent variable bank profitability for a sample of banks, using quantitative numerical data. Therefore, this research conforms to a positivistic quantitative philosophical framework.

3.3 Research methodology

According to the work of Quinlan (2011), research methodology provides a description of how the research was implemented and what philosophical assumptions support it. The research was conducted using only secondary data that was quantitative in nature. Secondary data can be described as data that already exists, that can be sourced from organisations, libraries or various databases (Quinlan, 2011). This paper conducted an empirical analysis using panel data techniques in order to establish the most significant determinants of bank profitability for commercial and alternative banks in South Africa over the past 10 years (2006-2015).

Panel data regression models are based on panel data, which are observations on identical cross-sectional units, spanning over multiple time periods (Gujarati, 2011). Using panel data, various regression models and model specifications (such as a pooled OLS model, fixed effects model and random effects model) were developed for the purpose of ascertaining what internal (bank-specific) and external (macroeconomic) factors most significantly affected the profitability of the sample banks. This was done with a view to better enable strategic-level bank management to respond to these factors as quickly and efficiently as possible.

The panel data technique was selected for this study due to its ability to capture the dynamic behaviour of the specific model parameters (Brooks, 2008). Referring specifically to a sample of banks, Hoffman (2011), explains that the panel data technique is advantageous as it facilitates the overcoming of constant, unobservable and heterogeneous characteristics that each bank included in the sample may demonstrate. Further substantiation for the appropriateness of the selected research design stems from the fact that many other similar research studies adopted a similar research design involving the use of panel data techniques. These include banking sector studies for international markets such as Bangladesh, Brazil, Jordan, Korea, Nigeria, Pakistan, the Philippines and Switzerland (Alfanasief et al., 2002; Sufian & Chong, 2008; Aburime, 2009; Sufian & Habibullah, 2009; Dietrich & Wanzenried, 2011; Gul et al., 2011; Javaid et al. 2011; Ramadan, 2011; Sufian, 2011).

Furthermore, meaningful conclusions to the respective research questions posed in the above-mentioned research studies were able to be drawn for each international market through the use of a similar research design and panel data techniques. Thus, based on the above discussion, the panel data technique was selected to perform the empirical analysis as it was deemed the most appropriate to investigate the research question and satisfy all research objectives.

3.4 Sampling strategy

A sampling strategy is a procedure that involves the use of a small quantity of a broader population to enable the researcher to draw conclusions regarding the entire population (Zikmund, 2003). The identified population for this study included the commercial and alternative banking sectors of South Africa. From this population, the sample of banks was selected by applying a judgemental sampling strategy. A sampling strategy can be understood as the process and reasoning behind the researcher's sample selection. According to Saunders et al. (2012: 237), 'judgemental sampling enables you to use your judgment to select cases that will best enable you to answer your research question(s) and to meet your research objectives'. This strategy was deemed appropriate as it allowed the researcher to select the sample of relevant banks based on their capacity to inform the research and make a valuable contribution to the overall objectives and purpose of this dissertation.

3.4.1 Sample size

A sample is a specific subset of a broader population (Quinlan, 2011). The sample selected for this study can be considered representative of the commercial and alternative banking sectors of South Africa, as the four commercial banks included in the study (ABSA, Standard Bank, FirstRand Bank and Nedbank) jointly account for more than 70% of South Africa's banking assets (Ifeacho & Ngalawa, 2014).

Due to lack of availability of other alternative bank data in South Africa, only Capitec Bank was considered in this study. However, Capitec Bank experienced the largest growth in assets within the alternative banking sector between the period 2009 to 2013 (Bankseta, 2013). For this five-year period, Capitec Bank's assets increased by more than 600% from a reported R5 billion to R38.3 billion and represented the largest assets under management within the sector in 2013 (Bankseta, 2013). Therefore, based on the rising popularity of this alternative banking institution within the alternative banking sector, Capitec's significant assets under management, and the lack of available data for other alternative banking institutions, this study regarded Capitec Bank as being sufficiently representative of the alternative banking sector within South Africa.

3.4.2 Data collection

This study solely utilised secondary data for all analysis. Research variables included return on average assets (ROAA); the asset quality ratio; the capital strength ratio; the operational efficiency ratio; the liquidity ratio; the real interest rate; the inflation rate; the real GDP growth rate; and the unemployment rate. These variables were examined in detail in the previous chapter, and are further specified in the following section. Data pertaining to bank-specific internal factors for all the commercial and alternative banks observed during the specified sample period, was obtained from the Bankscope database (Bankscope, 2016). Independent variables pertaining to the macroeconomic external variables were obtained from the World Bank database (World Bank, 2016) with the exception of the unemployment rate for 2015, which was sourced from the Inet BFA database (Inet BFA, 2016).

The sample period utilised in this study extended from December 2006 to December 2015. December 2015 was selected as the endpoint of the sample, as data for all banks and macroeconomic determinants included in the study was available until December 2015. Consequently, January 2006 was selected as the starting point for the sample so that a full 10-year period could be considered and thus a large number of observations could be studied. As suggested by Ranjan and Agrawal (2011), using a large number of data observations increases the degree of freedom and variability of a study, which in turn contributes to the dependability of the results obtained. Annual data observations were utilised for all variables, as all the required data sets are available annually. This assisted in achieving uniformity in the study and reduced the risk of data imperfections such as mismatching quarterly GDP data with annual ROAA data.

3.5 Description of research variables

The dependent and independent variables utilised in this study are now discussed.

3.5.1 Dependent variable

The dependent variable is described as the variable being predicted or explained (Zikmund, 2003). Profitability as measured by the return on average assets (ROAA) of the respective banks, served as the dependent variable in this research study. Return on assets is an indicator of how effectively a bank utilises its assets to generate income (Davydenko, 2010). According to the work of Dietrich and Wanzenried (2011), bank profitability is usually measured by examining the return generated by the assets controlled by the bank. Golin

(2001) supports the views of Dietrich and Wanzenried (2011) as to the appropriateness of return on average assets as a measure of profitability. Furthermore, return on average assets has been consistently used as a measure of bank profitability in many prior studies of this nature (Pasiouras & Kosmidou, 2007; Acaravaci & Calim, 2013; Francis, 2013). Return on average asset data for the specified sample period was obtained from the Bankscope database for all banks observed, and was computed as net profit after tax divided by total average assets (Bankscope, 2016).

3.5.2 Independent variable

The independent variable is the variable predicted to influence the dependent variable (Zikmund, 2003). The macroeconomic external and bank-specific internal determinants included in the study served as independent variables in the regression equations, and were included based on the financial literature in other international banking sectors that have indicated these variables to be significant determinants of profitability. For each explanatory variable a corresponding proposition was made, outlining the expected relationship between the variables, as indicated in the prior literature. Zikmund (2003:740) defines a proposition as 'a statement concerned with the relationships among concepts; an assertion of a universal connection between events that have certain properties.' The independent variables included in this research as well as their corresponding propositions are now discussed.

3.5.3 Internal determinants of bank profitability

Internal determinants of bank profitability denote the respective bank-specific variables examined in this study and include the following:

3.5.3.1. Asset quality

Asset quality was included in the study to consider the overall health of the loans issued within a bank's asset portfolio, and can be measured by many financial ratios (Kumbirai & Webb, 2010). For the purpose of this study, asset quality for the commercial and alternative banks was measured by the loan loss reserve to gross loans ratio (LRGL), as previously used in the work of Kosmidou (2008) and Kumbirai and Webb (2010). The LRGL is calculated as follows:

$$LRGL\ ratio = \frac{loan\ loss\ reserve}{gross\ loans} \quad [1]$$

Where loan loss reserve refers to the total reserve allocated for potential loan losses and gross loans refers to total loans issued. The LRGL ratio was obtained from the Bankscope database for all commercial and alternative banking institutions observed (Bankscope, 2016). The work of Miller and Noulas (1997), Ahmad et al. (2007), and Athanasoglou (2008), found a statistically significant negative relationship between asset quality and bank profitability. Conversely, the work of Sufian and Habibullah (2009) found a statistically significant positive relationship between asset quality and bank profitability. This finding is in line with the prior work of Berger and DeYoung (1997). In light of the above discussion, the first proposition of this study is as follows:

P1: There is either a positive or negative relationship between asset quality and bank profitability.

3.5.3.2. Capital strength

Capital strength was included in the study to consider the relationship between a bank's capitalisation and its overall profitability. Capital strength has been examined in numerous international bank profitability studies. For the purpose of this study, capital strength was measured by the ratio of equity divided by total assets (EQAS), as previously used in the work of Pasiouras and Kosmidou (2007), Dietrich and Wanzenried (2011), Sufian (2011), Rao and Lakew (2012), and Gharaibeh (2015). The EQAS ratio provides an indication of capital adequacy and overall financial strength with regard to a bank's ability to endure losses and efficiently manage risk exposure (Dietrich and Wanzenried, 2011). The EQAS ratio is computed as follows:

$$EQAS = \frac{Shareholder\ Equity}{Total\ assets} \quad [2]$$

Where Equity refers to the book value of shareholder equity and Total Asset refers to the book value of total assets for each bank. The EQAS ratio was obtained from the Bankscope database for all commercial and alternative banking institutions observed (Bankscope, 2016). Sufian and Habbibullah (2009) argued the importance of capitalisation in explaining bank profitability, and also acknowledged the ambiguity present in the financial literature around the significance of capitalisation on bank profitability. Most of the literature consulted however, indicated a statistically significant positive relationship between capital strength and bank profitability. These included the works of Demirgüç-Kunt and Huizinga (1999), Pasiouras and

Kosmidou (2007) Javaid et al (2011), and Staikouras and Wood (2011). The second proposition of this study is therefore specified as follows:

P2: There is a positive relationship between capital strength and bank profitability.

3.5.3.3. Operational efficiency

Operational efficiency was included in this study to examine the effect of operational costs on overall bank profitability. The effect of operational efficiency on bank profitability has been examined in numerous international bank profitability studies. For the purpose of this study, operational efficiency was measured by the cost to income ratio in line with the work of Pasiouras and Kosmidou (2007), Alexiou and Sofoklis (2009), and Dietrich and Wanzenried (2011). The cost to income ratio is calculated as follows:

$$Cost\ to\ Income\ ratio = \frac{Operating\ Expenses}{Total\ Revenue} \quad [3]$$

Where Operating expenses represents expenditure pertaining to administration, staff salaries and property costs but excludes losses as a result of impaired or non-performing loans, and Total revenue represents total revenue earned for each commercial and alternative bank respectively (Dietrich & Wanzenried, 2011). The cost to income ratio was obtained from the Bankscope database for all commercial and alternative banking institutions observed (Bankscope, 2016). The work of Athanasoglou et al. (2008), Alexiou and Sofoklis (2009), and Dietrich and Wanzenried (2011) all showed a statistically significant negative relationship between operating expenses and bank profitability. Therefore, the third proposition of this study is:

P3: There is a negative relationship between operating cost and bank profitability.

3.5.3.4. Liquidity

Liquidity is included in this study to examine the relationship between a bank's ability to timeously satisfy all financial obligations and overall bank profitability. According to the work of Samad (2004:8), the liquidity of a bank can be understood as: 'how quickly a bank can convert its assets into cash at face value to meet the cash demands of the depositors and borrowers.' In the current financial literature, many variables are used to account for liquidity in various international banking studies. For the purpose of this study, liquidity was measured

by the net loans to total assets ratio (NLTA), as previously used in the work of Samad (2004), Kumbirai and Webb (2010), Rao and Lakew (2012) and Francis (2013) The NLTA may be computed as follows:

$$NLTA\ ratio = \frac{Net\ loans}{Total\ Assets} \quad [4]$$

Where Net Loans represents the total loan value of the bank and Total Assets refers to the book value of total assets for each commercial and alternative bank respectively. The NLTA ratio was obtained from the Bankscope database for all commercial and alternative banking institutions observed (Bankscope, 2016). The effect of liquidity on bank profitability has been examined in numerous international bank profitability studies, with many studies reporting opposing views regarding the significance of liquidity on bank profitability. The work of Molyneux and Thornton (1992) and Nisar, Susheng, Ahmed and Ke (2015) found a statistically significant negative relationship between liquidity and bank profitability. Conversely, the work of Bourke (1989) and Haron (2004) found a statistically significant positive relationship between liquidity and bank profitability. Therefore, the fourth proposition of this study is:

> *P4: There is either a positive or negative relationship between liquidity and bank profitability.*

3.5.4 External determinants of bank profitability

External determinants of bank profitability denote the respective macroeconomic variables examined in this study and include the following:

3.5.3.5. Economic activity (GDP)

GDP can be formally defined as 'the total value of all final goods and services produced within the geographic boundaries of a country in a particular period' (Mohr, 2011: 20). According to the work of Sharma and Mani (2012), GDP is a frequently used as a proxy to account for total economic activity in a country. Therefore, GDP was included in this study to examine the relationship between total economic activity and the profitability of commercial and alternative banks in South Africa.

The effect of GDP on bank profitability has been examined in numerous international bank profitability studies. The work of Sufian and Habibullah (2009) suggested that GDP may play a significant role on the aspects that affect the supply and demand of loans and deposits in a country. Sharma and Mani (2012) shared these sentiments and further discussed that the growth and profitability of a bank may be restricted by the GDP of a country.

For the purpose of this study, GDP was measured by the real GDP annual growth rate of South Africa, obtained from the World Bank database (World Bank, 2015). The work of Gul et al. (2011), Sharma and Mani (2012), and Acaravci and Calim (2013) found a statistically significant positive relationship between GDP and bank profitability. In light of this discussion, the fifth proposition of this study is:

P5: There is a positive relationship between economic activity and bank profitability

3.5.3.6. Annual inflation

According to the work of Alper and Anbar (2011:145), the annual inflation rate 'measures the overall percentage increase in the Consumer Price Index (CPI) for all goods and services. Inflation affects the real values of costs and revenues'. Therefore, inflation was included in this study to examine the relationship between the rate of increase in the price of goods and services and the profitability of commercial and alternative banks in South Africa. Sharma and Mani (2012) further discuss that the relationship between inflation and bank profitability can be explained through the effect of inflation on the interest rate and asset prices in a country.

For the purpose of this study, inflation in South Africa was measured by the total CPI in annual terms, in line with the work of Bourke (1989), Molyneux and Thornton (1992) and Alper and Anbar (2011). Annual CPI data were obtained from the World Bank database (World Bank, 2015). The effect of inflation on bank profitability has been examined in numerous international bank profitability studies, with many studies reporting opposing views. The work of Kosmidou et al. (2005), Alexiou and Sofoklis (2009) and Gul et al. (2011) indicated the inflation rate to have a positive relationship with bank profitability. Conversely, the work of Sufian and Chong (2008), Sayilgan and Yildirim (2009) and Ali et al. (2011) showed a negative relationship between the inflation rate and bank profitability. Therefore, the fifth proposition of this study is:

P6: There is either a positive or negative relationship between annual inflation and bank profitability

3.5.3.7. Real interest

Brealey, Myers and Allen (2011) describe the real interest as the rate of interest expressed in terms of real goods that have been adjusted to remove the effects of inflation. The real interest rate provides an indication of a bank's general cost of funds (Abreu & Mendes, 2001). As stated in the work of Sharma and Mani (2012), a primary business activity of a bank is the lending of funds in the form of loan provisions to borrowers. Garcia-Herrero et al. (2009) further discuss that the repayment ability of a bank's borrowers is affected by the real interest rate. Therefore, any variation in a borrower's ability to repay bank loans may pose a significant effect to overall bank profitability.

These views are supported in the work of Ifeacho and Ngalawa (2014), who suggest that increasing interest rates are followed by increases in non-performing loans that ultimately decrease bank profitability. Conversely, Alper and Anbar (2011) found a positive relationship between the real interest rate and bank profitability. Therefore, the real interest rate was included in the study to examine this relationship for the commercial and alternative banks of South Africa, in line with the previous work of Garcia-Herrero et al. (2009), Vong and Chan (2009), Alper and Anbar (2011) and Ifeacho and Ngalawa (2014). Annual real interest rate data for South Africa was obtained from the World Bank database (World Bank Database, 2015). In light of this discussion, the sixth proposition of this study is:

P7: There is either a positive or a negative relationship between the real interest rate and bank profitability.

3.5.3.8. Level of unemployment

The level of unemployment in South Africa is a highly important economic problem that hampers economic growth through the decrease in gross national income and aggregate demand (Ifeacho & Ngalawa, 2014). The relationship between the level of unemployment and bank profitability was included in this analysis based on the prior work of Abreu and Mendes (2001) and Ifeacho and Ngalawa (2014), who found a significant effect of unemployment on bank profitability. The work of Louzis, Vouldis and Metaxas (2012) found that increases in the unemployment rate increase the level of non-performing loans for banks, ultimately decreasing overall bank profitability. These sentiments are shared in the work of Abreu and Mendes (2001), Heffernan and Fu (2008) and Ifeacho and Ngalawa (2014). The level of unemployment was therefore included in this study to examine its effect on the commercial banking sector of South Africa.

The level of unemployment was measured by the annual unemployment rate (the percentage of the total labour force that is without work, but available for and seeking employment) obtained from the World Bank database (World Bank, 2015). The work of Ifeacho and Ngalawa (2014) has shown a negative relationship between the unemployment rate and bank profitability. A similar result was obtained in the work of Abreu and Mendes (2001). Therefore, the eighth proposition of this study is:

> *P8: There is a negative relationship between bank profitability and the level of unemployment.*

The initial propositions of this study as discussed above are reiterated in Table 3.1.

Table 3.1: Summary of initial propositions

Number	Proposition
1	There is either a positive or negative relationship between asset quality and bank profitability.
2	There is a positive relationship between capital strength and bank profitability.
3	There is a negative relationship between operating cost and bank profitability.
4	There is either a positive or negative relationship between liquidity and bank profitability.
5	There is a positive relationship between economic activity and bank profitability
6	There is either a positive or negative relationship between annual inflation and bank profitability.
7	There is either a positive or a negative relationship between the real interest rate and bank profitability.
8	There is a negative relationship between bank profitability and level of unemployment.

Source: *Researcher's compilation*

A description of the research variables as discussed above are further summarised and presented in Table 3.2.

Table 3.2: Description of research variables

Nature of variable	Determinant	Abbreviation	Measure	Computation
Dependent	Bank profitability	ROAA	Return on Average Assets	Net profit/Total Assets
Independent	Asset quality	AQ	LRGL ratio	Loan loss reserves/ Gross loans
Independent	Capital strength	CAP	EQAS ratio	Shareholder Equity/Total Assets
Independent	Operational efficiency	OP	Cost to income ratio	Operating Expenses/Total Revenue
Independent	Liquidity	LIQ	NLTA ratio	Net Loans/Total Assets
Independent	Economic activity	GDP	Real annual GDP growth rate	N/A
Independent	Annual inflation	INF	Annualised CPI figures	N/A
Independent	Real interest	INT	Annual real interest rate	N/A
Independent	Level of unemployment	EMP	Annual unemployment rate	N/A

Source: *Researcher's compilation*

3.6 Data analysis

Data analysis can be described as the manner in which data is collected for the research being conducted. Panel data were utilised in this research study. Panel data refers to data sets that comprise both cross-sectional and time series components (Koop, 2009). Brooks (2008) discusses that in research involving financial modelling, panel data would be an appropriate data set as it is able to measure a specific quantity regarding a set of entities over time.

Therefore, panel data were deemed appropriate for use in this study as it would capture the effect of specific explanatory variables for a panel of cross sections over a specified period of time. A total of 190 pooled observations across five banks were included in the data set.

3.7 Model specification

Panel data refers to data sets that comprise both cross-sectional and time series components (Koop, 2009). Three panel data models were utilised to analyse the data and achieve the research objectives of this dissertation. These included the Pooled OLS (Ordinary Least Squares) Model, the Fixed Effects Model (FEM) and the Random Effects Model (REM). The empirical steps followed when conducting the analysis are now presented, followed by a description and specification of each panel data model utilised.

3.7.1 Pooled OLS Model

The Pooled Ordinary Least Squares (OLS) model, or constant co-efficient model, assumes that across time coefficients and cross-sectional analysis remains constant (Brooks, 2008). This model adheres to the classic assumptions of regression when investigating the relationship between dependent and independent variables (Brooks, 2008). According to the work of Brooks (2008), these assumptions can be described as follows:

- The error terms have a zero mean
- The error terms are normally distributed
- The variance of the error terms is constant and finite
- There is no correlation between the error term and the independent variables

An advantage in favour of the pooled OLS model resides in its simplicity in specification and interpretation relative to the fixed effect and random effect model specifications (Gujarati, 2011). A disadvantage of this model specification however, stems from the fact that the pooled OLS model operates under the assumption that no variances exist in the data of the cross-sectional dimension, and therefore denies the heterogeneity or individuality that may exist among the cross sections under study (Brooks, 2008; Ranjan and Agrawal, 2011). Therefore, this model assumes that the coefficients across time and cross sections remain constant, which may not be suitable for the study at hand (Gujarati, 2011). In the context of this study, this meant that the individuality of each bank employed in the analysis was denied when

following pooled OLS model estimation, and was accounted for by the error term of the analysis. The linear equation for the pooled OLS model can be stated as follows:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} \dots \beta_8 X_{8it} + u_{it} \quad [3.1]$$

where Yit denotes the dependent variable, β1 to β8 denotes the coefficients of the independent variables; X1 to X8 denotes the independent variables and ∝ denotes the constant term.

In the context of this study the pooled OLS model was specified as follows:

$$ROAA_{it} = \alpha + \beta_1 AQ_{it} + \beta_2 CAP_{it} + \beta_3 OP_{it} + \beta_4 LIQ_{it} + \beta_5 INT_{it} + \beta_6 INF_{it} + \beta_7 GDP_{it} + \beta_8 EMP_{it} + u_{it} \quad [3.2]$$

where:

$ROAA_{it} = Return\ on\ Average\ Assets\ for\ commercial\ and\ alternative\ banks$

$\beta_1 AQ = Asset\ quality$

$\beta_2 CAP = Capital\ strength$

$\beta_3 OP = Operational\ efficiency$

$\beta_4 LIQ = Liquidity$

$\beta_5 INT = Real\ interest\ rate$

$\beta_6 INF = Inflation\ rate$

$\beta_7 GDP = Real\ annual\ GDP\ growth\ rate$

$\beta_8 EMP = Unemployment\ rate$

$\alpha = constant\ term$

$t = time\ period\ (years)$

$u = \ error\ term$

3.7.2 Fixed Effects Model (FEM)

In order to overcome the denial of heterogeneity among cross sections as experienced in the pooled OLS model, the fixed effects model was estimated. The fixed effects model allows for heterogeneity or individuality to be expressed among the cross sections of the data by allowing each cross section to have its own intercept, where the unique attributes of each specific cross- section may be revealed (Gujarati, 2011; Ranjan & Agrawal, 2011). Therefore, this model specification provided the ability to differentiate between each commercial and

alternative bank included in the analysis, in contrast to the pooled OLS model, which was unable to account for the uniqueness of each bank. The introduction of a dummy variable to provide an individual intercept for each cross section is commonly referred to as the least square dummy variable (LSDV) approach (Brooks, 2008).

A key disadvantage of the fixed effects model is the fact that a degree of freedom is lost for every additional dummy variable utilised. Therefore, in a small data sample the introduction of too many dummy variables leaves too few observations and compromises the overall quality of the analysis (Gujarati, 2011). In order to counteract this issue, a fixed effect within-group (WG) estimator can be utilised, where group mean values of the dependent and independent variables are subtracted from their unique values (Gujarati, 2011). Therefore, the regression is estimated using mean-corrected variables (Gujarati, 2011). Due to the fact that the sample was small (containing only six cross sections), this study utilised a fixed effects within-group estimator.

Further disadvantages of the fixed effects model include the issue of multicollinearity induced by too many dummy variables when a sample is large and contains many cross sections (Gujarati, 2011). Multicollinearity can be understood as a high degree of correlation between the explanatory variables under examination (Koop, 2009). This will prevent the regression model from accurately determining which independent variables are influencing the dependent variables (Koop, 2009). Gujarati (2011) further discusses that under a fixed effects model specification, intercepts will not vary over time and therefore will be time invariant. Therefore, the fixed effects model cannot be used to estimate variables that do not change over time, such as the ethnicity or gender of a person (Gujarati, 2011). By altering equation (3.1) above, the linear equation for the fixed effects model can be stated as follows:

$$Y_{it} = \alpha + \beta_1 X_{it} + \beta_2 X_{it} + \beta_3 X_{3it} \ldots \beta_8 X_{it} + u_{it} \quad [3.3]$$

where Y_{it} denotes the dependent variable, β1 to β8 denote the coefficients of the independent variables, X1 to X8 denote the independent variables and where i in $\propto i$ denotes the intercepts values for each cross section.

In the context of this study, the fixed effects model is specified as follows:

$$ROAA_{it} = \alpha + \beta_1 AQ_{it} + \beta_2 CAP_{it} + \beta_3 OP_{it} + \beta_4 LIQ_{it} + \beta_5 INT_{it} + \beta_6 INF_{it} + \beta_7 GDP_{it} + \beta_8 EMP_{it} + u_{it} \quad [3.4]$$

where:

$ROAA_{it} = Return\ on\ Average\ Assets\ for\ commercial\ and\ alternative\ banks$

$\beta_1 AQ = Asset\ quality$

$\beta_2 CAP = Capital\ strength$

$\beta_3 OP = Operational\ efficiency$

$\beta_4 LIQ = Liquidity$

$\beta_5 INT = Real\ interest\ rate$

$\beta_6 INF = Inflation\ rate$

$\beta_7 GDP = Real\ annual\ GDP\ growth\ rate$

$\beta_8 EMP = Unemployment\ rate$

$\alpha = constant\ term$

$t = time\ period\ (years)$

$u = Composite\ error\ term$

3.7.3 Random Effects Model (REM)

Similar to the fixed effects model, the random effects model enables the use of diverse intercepts for each cross section (Brooks, 2008). The assumption of similarity between independent and dependent variables both temporally and by individual cross section is maintained under this model specification, as in the fixed effects model (Brooks, 2008). However, in contrast to the fixed effects model, the random effects model handles the constant terms of each group as random parameters rather than as fixed. As an alternative to allowing each cross section to have its own intercept (as in the FEM), this model specification assumes that intercept values are taken randomly from a greater population of individual cross sections. Ranjan and Agrawal (2011) further discuss that in a random effects model, the intercepts for each cross-sectional unit are deemed to exist from a mutual intercept plus the addition of a random variable that varies by cross section yet remains constant over time.

An advantage of the random effects model over the fixed effects model is its ability to estimate variables that are time invariant, such as the race or gender. A disadvantage of the random effects model is its inability to be used when variables are correlated with one another. If it is assumed that regressors are correlated with one another, then the fixed effects model is more appropriate to be utilised as an estimator in the regression analysis of the study (Gujarati, 2011). The complete derivation of the random effects model is beyond the scope of this study, however, the final linear model for the REM can be stated as follows:

$$Y_{it} = \alpha + \beta_1 X_{it} + \beta_2 X_{it} + \beta_3 X_{3it} \ldots \beta_8 X_{it} + W_{it} \quad [3.5]$$

Where Yit denotes the dependent variable, β1 to β8 denotes the coefficients of the independent variables, X1 to X8 denote the independent variables, Wit denotes the composite error term (showing the random variation between the individual intercept value and the average intercept value), and $\propto i$ denotes the mean intercept for all cross sections.

In the context of this study, the random effects model was specified as follows:

$$ROAA_{it} = \alpha + \beta_1 AQ_{it} + \beta_2 CAP_{it} + \beta_3 OP_{it} + \beta_4 LIQ_{it} + \beta_5 INT_{it} + \beta_6 INF_{it} + \beta_7 GDP_{it} + \beta_8 EMP_{it} + W_{it} \quad [3.6]$$

where:

$ROAA = Return\ on\ Average\ Assets\ for\ commercial\ and\ alternative\ banks$

$\beta_1 AQ = Asset\ quality$

$\beta_2 CAP = Capital\ strength$

$\beta_3 OP = Operational\ efficiency$

$\beta_4 LIQ = Liquidity$

$\beta_5 INT = Real\ interest\ rate$

$\beta_6 INF = Inflation\ rate$

$\beta_7 GDP = Real\ annual\ GDP\ growth\ rate$

$\beta_8 EMP = Unemployment\ rate$

$\alpha = mean\ intercept\ for\ all\ cross\ sections$

$t = time\ period\ (years)$

$W_{it} = Composite\ error\ term$

3.7.4 Empirical process followed

This section details the empirical process followed when conducting the data analysis. All models were specified and implemented using EViews statistical analysis software. The model specification found to be most suitable for the study's data were selected and used to perform the regression analysis in order to achieve the objectives of the study. The following steps were followed:

1. The pooled OLS model was first estimated by pooling together all included observations. ROAA served as the dependent variable of the study. Asset quality, capital strength, operational efficiency, liquidity, GDP, CPI, the real interest rate, and

the unemployment rate represented the independent variables respectively. The estimation output of this model was then viewed and recorded.

2. The fixed effects model was then estimated. ROAA served as the dependent variable of the study. Asset quality, capital strength, operational efficiency, liquidity, GDP, CPI, the real interest rate and the unemployment rate represented the independent variables respectively. In order to evaluate the appropriateness of the pooled OLS models and fixed effects models, a redundant fixed effects test was performed according to the hypothesis:

   Ho: $Fixed\ effects\ are\ redundant\ among\ cross\ sections$
   $H1$: $Fixed\ effects\ are\ not\ redundant\ among\ cross\ sections$

   The redundant fixed effects test provides an indication as to whether the cross sections under study are heterogeneous. If the p-values associated with the test statistics were found to be less than 5% (statistically significant), then the null hypothesis that fixed effects are redundant among cross sections would be rejected. This find would be indicative that the restrictions of the pooled OLS model are not supported by the data and that another model specification such as the fixed effects model or random effects model should be utilised. However, if the results from this test were greater than 5% on a 95% confidence level (statistically insignificant), then the null hypothesis would not be rejected. This implies that the pooled OLS model was appropriate for use, as fixed effects were redundant among the commercial or alternative banks investigated in this study.

3. The random effects model was estimated using EViews software. ROAA served as the dependent variable, with asset quality, capital strength, operational efficiency, liquidity, GDP, CPI, the real interest rate, and the unemployment rate representing the independent variables. The appropriateness of the random effects model and fixed effects models was then evaluated by performing the Hausman (1978) test in EViews according to the hypothesis:

   Ho: $Random\ effects\ are\ correlated$
   $H1$: $Random\ effects\ are\ not\ correlated$

   The most appropriate model was then be selected based on the outcome of the Hausman test. The Hausman test evaluates the significance of one estimator versus

an alternate estimator. This test was performed with the purpose of ascertaining which model demonstrated the least estimator bias of the fixed effects model and the random effects model. Under the Hausman test, if the p-value is indicated to be statistically significant (less than 5%) then the null hypothesis will be rejected as is this informs that the random effects model is most appropriate for use to analyse the data at hand. However, if the p-value was indicated to be statistically insignificant (more than 5%), the null hypothesis would not be rejected as this informs that the fixed effects model is most appropriate and will therefore be utilised to achieve the objectives of this empirical study.

4. The most appropriate model specification for the commercial and alternative banking sectors as determined by steps 2 and 3 above, was then be accepted as the best model to be used to generate the regression equation for this research study.

5. The significance of the respective coefficients and coefficient signs (either positive or negative) of the above selected model were then interpreted and the effects of these independent variables on the dependent variable profitability for the commercial and alternative banking sectors was analysed. In order to test the significance of each explanatory variable, the p-value was evaluated on a 95% confidence level as follows:

   $Ho: \beta > 0.05$ (Null Hypothesis)
   $H1: \beta \leq 0.05$ (Alternate Hypothesis)

   If the p-value of the respective independent variable was found to be less than 5%, the null hypothesis would be rejected as this independent variable was concluded to be statistically significant to the dependent variable profitability on a 95% confidence level. Should the p-value be greater than 5%, the alternative hypothesis would be rejected, as this indicates that the independent variable is statistically insignificant to the dependent variable profitability on a 95% confidence level.

3.7.5 Evaluating the selected model

The adjusted R-squared test and the Global test were used to evaluate the quality of the model utilised. The adjusted R-squared is a measure of the goodness of fit about the regression line measured on a scale from 0 to 1 (1 indicating a perfect fit and 0 indicating no fit). It explains the amount of variation in the dependent variable that can be explained and accounted for by the independent variables while taking into account the loss of degrees of freedom associated

with including additional variables in the analysis (Brooks, 2008).Therefore, higher values for adjusted R-squared are desired. The Global test as measured by the F-statistic indicates whether the independent variables jointly have explanatory power over the dependent variable under investigation. The F-statistic is measured by interpreting its significance on a 95% confidence level.

3.8 Validity and reliability of data

This section discusses aspects pertaining to the reliability and validity of the data utilised in this study.

3.8.1 Validity of measurement

According to Quinlan (2011), validity can be described as how robust, logical, truthful, meaningful and useful the research under consideration is. Research can therefore be considered valid if the research study investigates that which it set out to initially investigate. The internal and external determinants included in this study were selected based on economic and financial theory or prior research in other international banking sectors that indicated these variables to be significant determinants of banking profitability (Aburime, 2009; Sufian & Habibullah, 2009; Vong & Chan, 2009; Davydenko, 2010; Dietrich & Wanzenried, 2011; Gul et al., 2011; Sufian, 2011; Acaravci & Calim, 2013). Therefore, the validity of this study was assured by using previous research methodologies that successfully investigated significant determinants of bank profitability in various other international markets as a guide, and by further consulting experts on the subject.

Throughout the literature consulted, different relationships were observed between internal and external determinants and bank financial performance in different international banking sectors. For example, the work of Gul et al. (2011) found the GDP growth rate and inflation rate to be the only significant determinants of banking profitability for the Pakistani banking sector, whereas a study by Sufian and Habibullah (2009) found the inflation rate and not the GDP growth rate to be a significant determinant of bank profitability for the Bangladeshi banking sector. Similar outcomes were observed in various other studies in markets such as Ukraine, Turkey and the Philippines (Sufian & Chong, 2008; Davydenko, 2010; Acaravci & Calim, 2013). Therefore, every international banking sector responds individually to different macroeconomic external and bank-specific internal determinants and needs to be examined bearing these sentiments in mind.

3.8.2 Reliability of measurement

According to Quinlan (2011:482) reliability can be defined as ‘‘the dependability of the research, to the degree to which the research can be repeated while obtaining consistent results.’ Saunders et al. (2012) support this view and additionally discuss how reliability should also provide transparency as to how sense was made from the raw data gathered.

The reliability of the study was addressed by stating in detail all steps followed in performing the research, and the various statistical tests that were conducted to ensure that results were reliable and accurate. Additionally, all data were collected from reliable statistical databases and credible institutions well renowned for providing quality data that had been used extensively in prior financial research. This ensured the accuracy of the results. Independent variables pertaining to the bank-specific internal factors for the specified sample period were obtained from the Bankscope database for all commercial and alternative banking institutions observed (Bankscope, 2016). Independent variables pertaining to the macroeconomic external variables were obtained from the World Bank database (World Bank, 2015).

3.9 Ethical considerations

According to the work of Quinlan (2011: 480) the term ethics can be defined as the ‘moral principles governing the conduct of an individual, a group, or an organization’. Saunders et al. (2012) describes research ethics as the conduct of the researcher and the standards upheld when considering the rights of the parties involved in a research project. All data utilised was collected from credible sources with all necessary permissions granted to ensure judicious moral standards and that the rights of all entities considered were not infringed upon. Additionally, all ideas referred to from another individual’s work was duly acknowledged and ethically considered when completing this dissertation.

3.10 Anonymity and confidentiality

In adhering to anonymity and confidentiality principles, all data utilised for the research was obtained with necessary permissions granted. Furthermore, data pertaining to bank-specific internal variables was based on information contained in publicly available financial statements for the commercial and alternative banks concerned. As stipulated by the International Financial Reporting Standards (IFRS), these financial statements are publicly available and therefore no consent from the included banks was deemed necessary.

3.11 Limitations

This research study includes an analysis of four major South African commercial banks and two South African alternative banking institutions. Private banking institutions were omitted from this research due to the fact that private banking is a specialised field within the South African banking industry that specifically targets high income and/or high net worth individuals. By nature, private banks target a very small percentage of the South African population and are out of the scope of this research, as can be seen when considering the commercial and alternative banks included in the study account for over 70% of South African banking assets (Ifeacho & Ngalawa, 2014).

When investigating the banks' financial performance, the literature suggests that determinants of bank profitability are generally categorised by internal and external factors (Acaravci & Calim, 2013). Within these categories three main sub-categories are usually identified in order to assess bank profitability. These include macroeconomic external factors, industry-specific external factors and bank-specific internal factors (Francis, 2013). Francis (2013) further discusses that bank-specific and macroeconomic determinants have been explicitly shown in previous studies to significantly affect the profitability of a bank; however, results pertaining to the effects of industry-specific factors are varied, and in most studies, show an insignificant effect on bank profitability. Therefore, industry-specific external factors were omitted from this research study.

A further limitation of the study is the omission of the explanatory variable bank size as measured by total assets. This variable has been indicated to be a significant determinant of bank profitability in numerous international bank profitability studies. Bank size has been omitted from this study due to the lack of available data for the alternative banking institutions included in the sample.

3.12 Summary

This chapter provided a discussion of the specific methodology that was utilised to investigate the research question and achieve the outlined research objectives. This research aimed to identify the bank-specific internal and macroeconomic external determinants of profitability within the commercial banking sector of South Africa.

A quantitative research design was developed under a positivist research paradigm. The four largest commercial banks in South Africa (Absa, FirstRand Bank, Nedbank and Standard Bank) and one alternative banking institutions (Capitec Bank) was included in the analysis. A panel regression framework was followed with ROAA serving as the dependent variable, while

independent variables included the bank-specific internal and macroeconomic external variables in the model. The best panel model found was selected to analyse the data. Only secondary data were utilised in this study, with annual data observations from December 2006 to December 2015.

Data pertaining to bank-specific internal factors for the specified sample period was obtained from the Bankscope database for all commercial and alternative banks observed (Bankscope, 2016). Independent variables pertaining to the macroeconomic external variables were obtained from the World Bank database (World Bank, 2015). The following chapter presents a discussion on the results and findings of the research conducted.

Chapter 4

Results and findings

4.1 Introduction

The previous chapter set out the specific methodology utilised to investigate the research question and satisfy the various research objectives of this study. The methodology discussed in Chapter 3 is applied in Chapter 4, which delivers an empirical analysis of the determinants of bank profitability for the commercial banks of South Africa. The chapter comprises two main sections. The first section critically examines the data series employed in this study by means of a trend and a descriptive statistics analysis. The second section outlines the results obtained from the panel data models as specified in Chapter 3, which examined the effects of bank-specific internal and macroeconomic external variables on the profitability of South African banks.

4.2 Descriptive statistics

Descriptive statistics can be defined as 'the study of how data can be summarized effectively to describe the important aspects of large data sets' (Defusco, McLeavey, Pinto, & Runkle, 2007: 63). Saunders et al. (2012) discuss that descriptive statistics enable one to describe and compare variables numerically. Therefore, descriptive statistics were analysed to provide a deeper, more meaningful understanding of the data being utilised in this study. Examples of descriptive statistics include summary statistics such as the mean, range, and standard deviation (Quinlan, 2011).

The descriptive statistics analysed in this study included the mean, range and standard deviation for the data sets utilised in this study. The mean represents the arithmetic average of the data set (Quinlan, 2011). The range of a data set is represented by the difference between the maximum and minimum values of each data set (Quinlan, 2011). Standard deviation accounts for the spread or dispersion of the data around the arithmetic mean of each data set (Quinlan, 2011). A low standard deviation implies that the values of a specific data set are concentrated close to the arithmetic mean of the data. A higher standard deviation

implies that the values of a specific data set are dispersed far from the arithmetic mean of the data. The descriptive statistics for each bank included in this study over the sample period considered (2006 to 2015) are presented below.

Table 4.1 below details the descriptive statistics observed for Absa Bank.

Table 4.1: Descriptive statistics for Absa (%)

	AQ	CS	LIQ	OE	ROAA
Mean	1.981	14.490	71.890	56.877	1.170
Median	2.191	14.350	70.939	57.800	1.150
Maximum	2.532	17.500	81.597	60.621	1.501
Minimum	1.181	12.300	66.548	52.025	0.815
Std. Dev.	0.474	1.557	4.721	2.753	0.208

Source: *Bankscope (2016) and author's deductions*

As presented in Table 4.1, a mean asset quality value of 1.981% with maximum and minimum values of 2.532% and 1.181% was indicated for Absa over the sample period. Furthermore, a standard deviation of 0.474% was observed for the AQ ratio, signifying low volatility. The capital strength ratio exhibited a mean value of 14.490% with maximum and minimum values of 17.500% and 12.300% respectively. In addition, CS displayed a standard deviation of 1.557, indicating low volatility over the sample period.

The average liquidity value for Absa was observed as 71.890% with maximum and minimum values of 81.597% and 66.548% respectively. A standard deviation of 4.721 was observed for liquidity, indicating high levels of volatility in this ratio. The operational efficiency ratio had a mean value of 56.877% with maximum and minimum values of 60.621% and 52.025% respectively. Furthermore, a standard deviation of 2.753% was indicated for the OP ratio, signifying low volatility for the period under study.

The mean observed for the ROAA ratio of Absa was indicated to be 1.170%. A maximum ROAA of 1.501% and a minimum ROAA of 0.815% was achieved for the period. Standard deviation for Absa ROAA was indicated as 0.208 signifying low volatility for the period under study.

Table 4.2 below details the descriptive statistics observed for Standard Bank.

Table 4.2: Descriptive statistics for Standard Bank (%)

	AQ	CS	LIQ	OE	ROAA
Mean	2.232	14.111	44.511	56.929	1.239
Maximum	2.968	15.290	47.220	63.882	1.541
Minimum	1.207	11.600	42.099	53.148	0.858
Std. Dev.	0.547	1.148	1.467	3.834	0.203

Source: *Bankscope (2016) and author's deductions*

As presented in Table 4.2, Standard Bank exhibited a mean asset quality value of 2.232% with maximum and minimum values of 2.968% and 1.207% respectively for the sample period considered. Furthermore, a standard deviation of 0.547% is observed for the AQ ratio, signifying low volatility. The capital strength ratio exhibited a mean value of 14.111% with maximum and minimum values of 15.290% and 11.600% respectively. In addition, a standard deviation of 1.148 was observed for the capital strength ratio, indicating low volatility over the sample period considered.

The average liquidity value for Standard bank was observed as 44.511% with maximum and minimum values of 47.220% and 42.099% respectively for the sample period considered. A standard deviation of 1.467 was observed for liquidity, indicating low levels of volatility in this ratio. The operational efficiency ratio had a mean value of 56.93% with maximum and minimum values of 63.882% and 53.148% respectively. Furthermore, a standard deviation of 3.834 is indicated for the OP ratio signifying low volatility for the period under study.

The mean observed for the ROAA ratio of Standard Bank was indicated to be 1.239% for the sample period considered. A maximum ROAA of 1.541% and a minimum ROAA of 0.858% was achieved. Standard deviation for Absa ROAA was indicated as 0.203, signifying low volatility for the period under study.

Table 4.3 below details the descriptive statistics observed for FirstRand Bank.

Table 4.3: Descriptive statistics for FirstRand Bank (%)

	AQ	CS	LIQ	OE	ROAA
Mean	1.573	16.180	69.523	55.096	2.238
Maximum	1.697	16.700	72.544	58.933	2.790
Minimum	1.473	14.700	66.568	52.969	1.951
Std. Dev.	0.091	0.770	2.130	2.179	0.314

Source: *Bankscope (2016) and author's deductions*

As presented in Table 4.3, FirstRand Limited exhibited a mean asset quality value of 1.573% with maximum and minimum values of 1.697% and 1.473% respectively for the sample period considered. Furthermore, a standard deviation of 0.09 was observed for the AQ ratio, signifying low volatility. The capital strength ratio exhibited a mean value of 16.180% with maximum and minimum values of 16.700% and 14.700%. In addition, a standard deviation of 0.770 was observed for the capital strength ratio, indicating low volatility over the sample period.

The average liquidity value for FirstRand Bank was observed as 69.523% with maximum and minimum values of 72.544% and 66.568% respectively. A standard deviation of 2.130 was observed for liquidity, indicating low levels of volatility in this ratio. The operational efficiency ratio had a mean value of 55.096% with maximum and minimum values of 58.933% and 52.969% respectively. Furthermore, a standard deviation of 2.179 was indicated for the OP ratio, signifying low volatility for the period under study.

The mean observed for the ROAA ratio of FirstRand was indicated to be 2.238% for the sample period considered. A maximum ROAA of 2.790% and a minimum ROAA of 1.951% was achieved. Standard deviation for FirstRand ROAA was indicated at 0.314, signifying low volatility over the period.

Table 4.4 below details the descriptive statistics observed for Nedbank.

Table 4.4: Descriptive statistics for Nedbank (%)

	AQ	CS	LIQ	OE	ROAA
Mean	2.026	14.087	71.945	56.917	1.196
Maximum	2.393	15.700	76.810	59.865	1.451
Minimum	1.681	11.800	68.242	53.744	0.871
Std. Dev.	0.255	1.359	2.879	1.704	0.178

Source: *Bankscope (2016) and author's deductions*

As presented in Table 4.4, Nedbank exhibited a mean asset quality value of 2.026% with maximum and minimum values of 2.393% and 1.681% respectively for the sample period considered. Furthermore, a standard deviation of 0.255 was observed for the AQ ratio, signifying low volatility over the period. The capital strength ratio exhibited a mean value of 14.087% with maximum and minimum values of 15.700% and 11.800% respectively. In addition, a standard deviation of 1.359 was observed for the capital strength ratio, indicating low volatility over the sample period.

The average liquidity value for Nedbank observed as 71.945% with maximum and minimum values of 76.810% and 68.242% respectively. A standard deviation of 2.879 was observed for liquidity, indicating low levels of volatility in this ratio. The operational efficiency ratio had a mean value of 56.917% with maximum and minimum values of 59.865% and 53.744% respectively for the sample period. Furthermore, a standard deviation of 1.704 was indicated for the OP ratio, signifying low volatility for the period.

The mean observed for the ROAA ratio of Nedbank was indicated as 1.196% for the sample period considered. A maximum ROAA of 1.451% and a minimum ROAA of 0.871% was achieved for the period. Standard deviation for FirstRand ROAA was indicated as 0.178, signifying low volatility for the period under study.

Table 4.5 below details the descriptive statistics observed for Capitec Bank.

Table 4.5: Descriptive statistics for Capitec Bank (%)

	AQ	CS	LIQ	OE	ROAA
Mean	9.086	37.586	64.345	44.507	5.279
Maximum	12.342	42.510	74.127	58.596	8.267
Minimum	6.821	33.900	54.863	32.669	3.942
Std. Dev.	1.801	2.931	6.591	9.672	1.212

Source: *Bankscope (2016) and author's deductions*

As presented in Table 4.5, Capitec Bank exhibited a mean asset quality value of 9.086% with maximum and minimum values of 12.342% and 6.821% respectively for the sample period considered. Furthermore, a standard deviation of 1.801 was observed for the AQ ratio, signifying low volatility over the sample period. The capital strength ratio exhibited a mean value of 37.586% with maximum and minimum values of 42.510% and 33.900% respectively. In addition, a standard deviation of 2.931 was observed for the capital strength ratio, indicating low volatility over the sample period.

The average liquidity value for Capitec was observed to be 64.345% with maximum and minimum values of 74.127% and 54.863% respectively. A standard deviation of 6.59 was observed for liquidity, indicating high levels of volatility in this ratio for the period under study. The operational efficiency ratio had a mean value of 44.507% with maximum and minimum values of 58.596% and 32.669% respectively. Furthermore, a standard deviation of 9.672 was indicated for the O.E. ratio, signifying high volatility for the period under study.

The mean observed for the ROAA ratio of Capitec was indicated as 5.279% for the sample period considered. A maximum ROAA of 8.267% and a minimum ROAA of 3.942% was achieved for the period. Standard deviation for Capitec ROAA was indicated as 1.212, signifying low volatility for the period under study.

Table 4.6 below details the descriptive statistics pertaining to the macroeconomic external determinants included in this study.

Table 4.6: Descriptive statistics for macroeconomic determinants (%)

	EMP	GDP	CPI	INT
Mean	23.933	2.759	6.349	3.592
Maximum	25.100	5.585	11.537	5.783
Minimum	22.300	-1.538	4.262	2.202
Std. Dev.	1.073	2.015	2.091	1.069

Source: *Bankscope (2016) and author's deductions*

The unemployment rate exhibited a mean value of 23.933% with maximum and minimum values of 25.100% and 22.300% respectively for the sample period. Furthermore, a standard deviation of 1.073 was observed for the unemployment rate, signifying low volatility. GDP exhibited a mean value of 2.759% with maximum and minimum values of 5.585% and -1.538%. In addition, a standard deviation of 2.091 was observed for GDP, indicating high volatility over the sample period considered.

Average CPI was observed to be 6.349% with maximum and minimum values of 11.537% and 4.262% respectively for the sample period. A standard deviation of 2.091 was observed for CPI, indicating high levels of volatility in this ratio. The real interest rate had a mean value of 3.592% with maximum and minimum values of 5.783% and 2.202% respectively. Furthermore, a standard deviation of 1.069 was indicated for the real interest rate signifying high volatility for the period.

4.3 Trend analysis

A trend can be defined as a long-term pattern of movement in a particular direction' (Defusco et al., 2007: 538). It is important to analyse the trend of the research variables in order to identify patterns within the data. This facilitates a deeper understanding of the respective variables included in this analysis, and provides further insight as to the association between the explanatory variables and bank profitability. A trend analysis was performed for all explanatory variables for each respective bank, and included return on average assets (ROAA); asset quality (AQ); capital strength (CS); operational efficiency (O.E); liquidity (LIQ); economic growth (GDP); the real interest rate (INT); the level of inflation (CPI); and the level of unemployment (EMP).

4.3.1 Return on Average Assets (ROAA)

As previously discussed, return on average assets (ROAA) was the dependent variable in this study and served as the primary measure of bank profitability. Figure 4.1 depicts the trend observed for ROAA for the sample period under study (2006 to 2015).

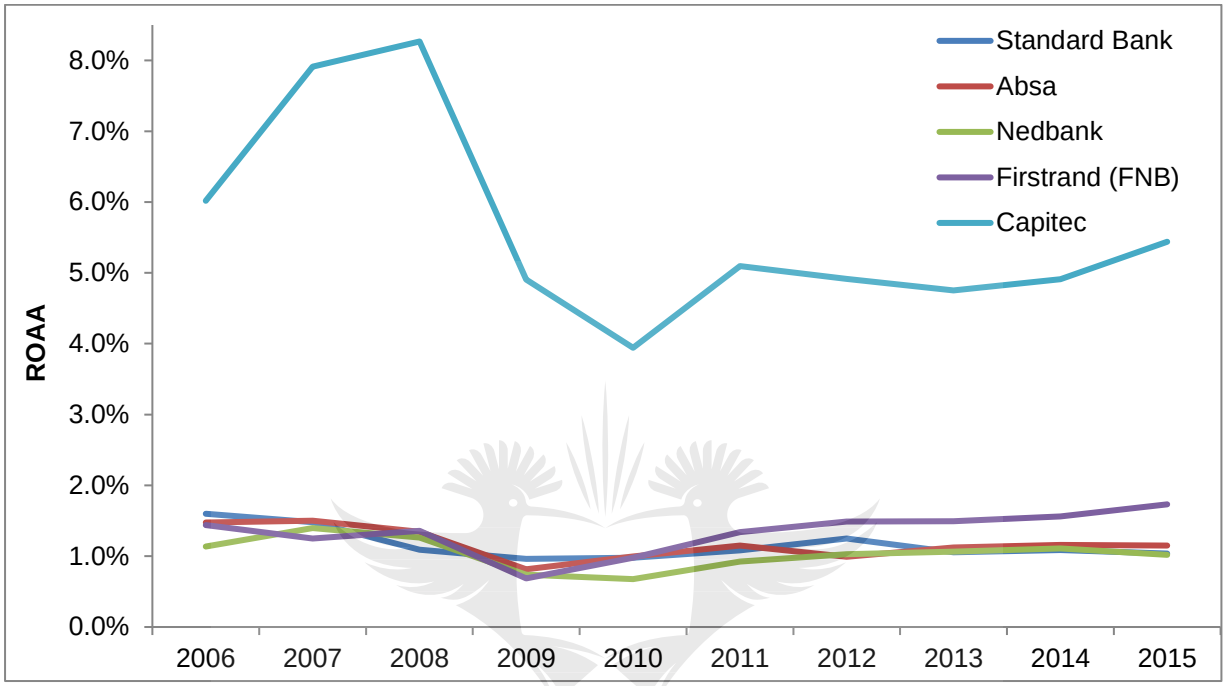

Figure 4.1: The trend of Return on Average Assets (ROAA)

Source: *Bankscope (2016) and author's deductions*

Capitec Bank and Nedbank displayed an increasing trend in ROAA between 2006 and 2008, peaking at 8.267% and 1.397% respectively for the sample period under study. Absa remained relatively constant, while FirstRand and Standard Bank displayed a downward trend in ROAA over the same period. All banks showed a downward trend in ROAA between 2008 and 2010, with Capitec showing the greatest drop from a high of 8.267% in 2008 to a low of 3.942% in 2010. All banks saw increases in ROAA during 2011, which resulted in a positive trend in ROAA. Between 2012 and 2014 Absa, FirstRand and Nedbank displayed a slight positive trend in ROAA with a slight decline being reported in 2015. Standard Bank showed an overall negative trend between 2012 and 2015, while Capitec displayed an overall positive trend for the same period.

In summary, the overall trend of ROAA for the big four commercial banks appeared to be similar over the sample period, apart from minor deviations. Capitec Bank showed significantly higher ROAA figures relative to the big four banks with greater volatility in ROAA over the

sample period considered. A common observation for all banks was the downward trend observed between 2008 and 2009, which may be explained by the global financial crisis observed during that period.

4.3.2 Asset quality

As previously mentioned, asset quality (AQ) was an independent variable in this study, serving as an explanatory variable of bank profitability. Figure 4.2 depicts the trend observed for AQ for the sample period under study (2006 to 2015).

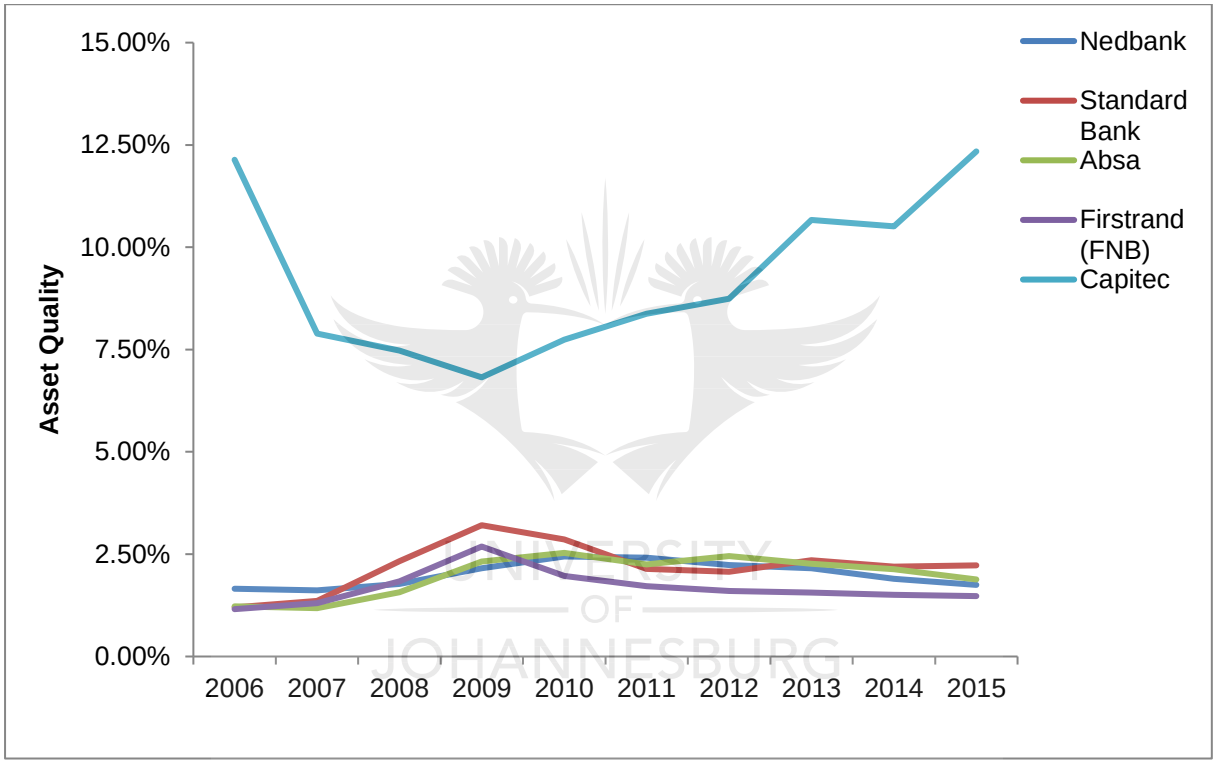

Figure 4.2: The trend of asset quality (AQ)

Source: *Bankscope (2016) and author's deductions*

Standard Bank, FirstRand, Absa and Nedbank displayed an overall increasing trend in AQ between 2006 and 2009, with Standard Bank and FirstRand peaking at 3.208% and 2.687% respectively for the period under study. Conversely, Capitec Bank displayed a significant decreasing trend over the same period, falling from 12.135% in 2006 to 6.821% in 2009. Despite appearing relatively flat, Nedbank, Standard Bank, Absa and FirstRand showed an overall negative trend in AQ between 2010 and 2015. Absa and Standard Bank displayed a slight increase in 2012 and 2013, but fell back into the negative trend for the remainder of the

sample period. Conversely, Capitec Bank displayed an overall positive trend in AQ between 2010 and 2015, peaking at a high of 12.342% for the period.

In summary, the overall trend of AQ for the big four commercial banks appeared to be similar over the sample period, apart from minor deviations. Capitec Bank showed significantly higher AQ figures relative to the big four banks, with greater volatility in AQ over the period. In addition, the AQ trend of Capitec was largely contrary to that of the big four banks. Capitec displayed a decreasing AQ trend in similar periods, where an overall increasing trend was observed for the big four banks and an increasing trend over a similar period, where the big four banks displayed an overall decreasing trend in AQ.

4.3.3 Capital strength

As previously noted, Capital Strength (CS) was an independent variable in this study, serving as an explanatory variable of bank profitability. Figure 4.3 depicts the trend observed for CS for the sample period under study (2006 to 2015).

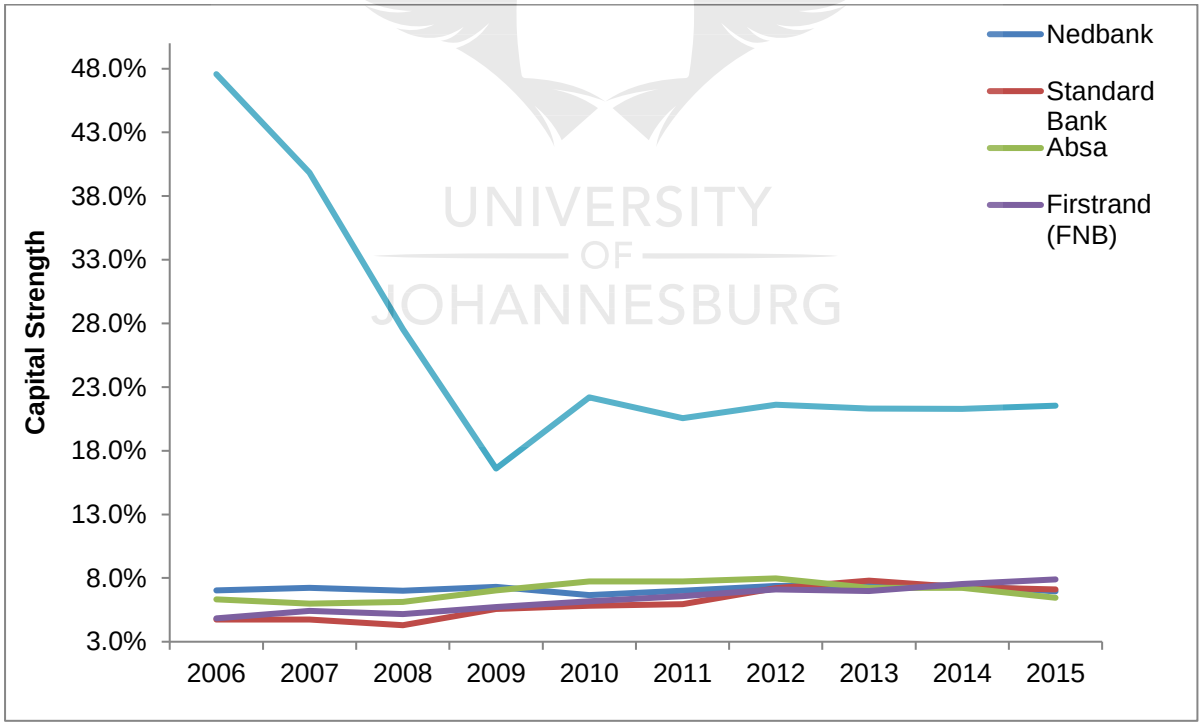

Figure 4.3: The trend of capital strength (CS)

Source: *Bankscope (2016) and author's deductions*

The trend of CS for Nedbank remained relatively flat, with only minor fluctuations relative to the other sampled banks. At the beginning of the sample period, Nedbank's CS was reported

to be 6.66%. It dropped slightly in 2010 and then tended back toward 7.006% at the end of the sample period. The trend of CS for Absa displayed an overall increasing trend between 2006 and 2012, ranging from 6.331% in 2006 to a peak of 7.974% in 2012 for the sample period. Between 2012 and 2015, Absa's CS began a downward trend and settled at 6.462% by the end of 2015. Standard Bank and FirstRand displayed an overall increasing trend in CS for the sample period. Both Standard Bank and FirstRand began at a level of approximately 4.800% and increased to 7.104% and 7.974% respectively. Capitec Bank displayed an overall decreasing trend in CS over the sample period. Capitec's CS was reported as 47.576% in 2006 and fell significantly to 16.601% by the end of 2009. Between 2009 and 2015, Capitec's CS exhibited an upward trend and ended off at a level of 21.529% by the end of 2015.

In summary, the overall trend of CS for Nedbank and Absa appeared to be similar. A comparable observation was made for Standard Bank and FirstRand Bank. Capitec Bank showed significantly higher CS figures relative to the big four banks with greater volatility in CS over the sample period considered. Most notably, Capitec displayed the largest drop in CS between 2006 and 2009.

4.3.4 Operational efficiency

As previously mentioned, operational efficiency (OE) was an independent variable in this study, serving as an explanatory variable of bank profitability. Figure 4.4 depicts the trend observed for OE for the sample period under study (2006 to 2015).

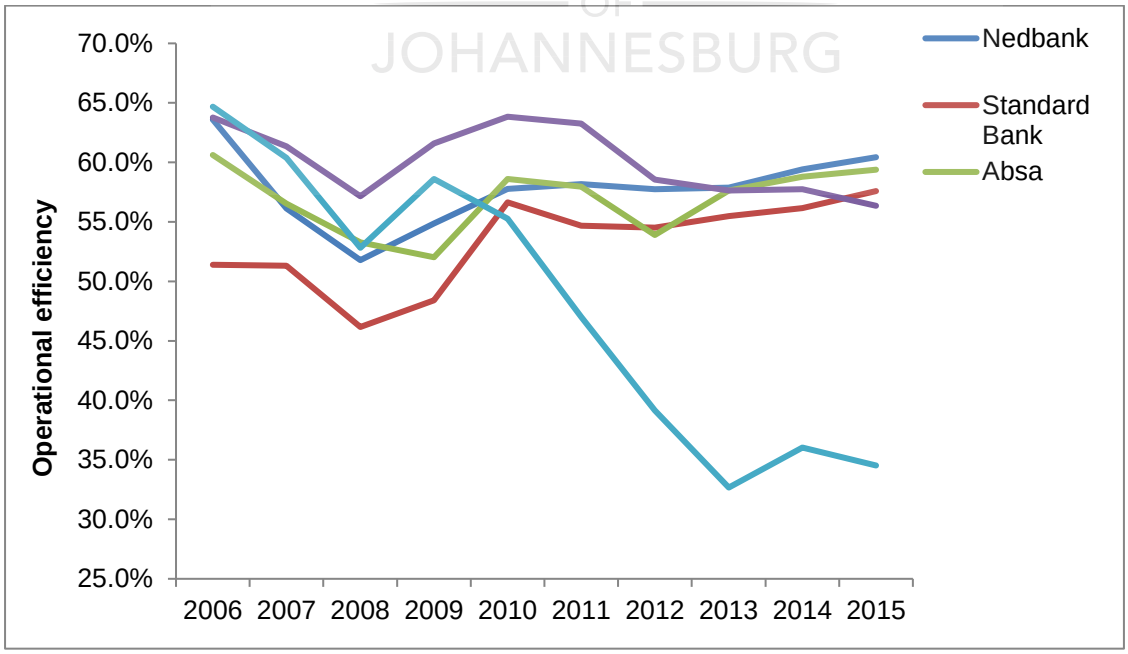

Figure 4.4: The trend of operational efficiency (OE)

Source: *Bankscope (2016) and author's deductions*

Between 2006 and 2008, all sampled banks exhibited a downward trend in O.E. However, in 2009 a change to an overall positive trend was exhibited for Nedbank, Standard Bank and Absa respectively that continued until 2015. FirstRand similarly displayed an increase in O.E. in 2009, however, this increasing trend ceased in 2011 and settled into a negative trend until 2015. Between 2009 and 2015, Capitec Bank exhibited an overall negative trend in O.E. An increase was observed during 2014, however, this settled back in line with the overall negative trend as depicted above.

In summary, all banks included in the sample with the exception of Standard Bank, exhibited lower O.E. ratios in 2015 compared to those observed at the beginning of the sample period in 2006. Capitec Bank exhibited the largest drops in O.E. over the sample period considered, falling from a high of 64.681% in 2006 to a low of 34.522% in 2015, and displayed greater volatility in O.E. relative to the other banks over the sample period considered.

4.3.5 Liquidity

As previously discussed, liquidity (LIQ) was an independent variable in this study, serving as an explanatory variable of bank profitability. Figure 4.5 depicts the trend observed for AQ for the sample period under study (2006 to 2015).

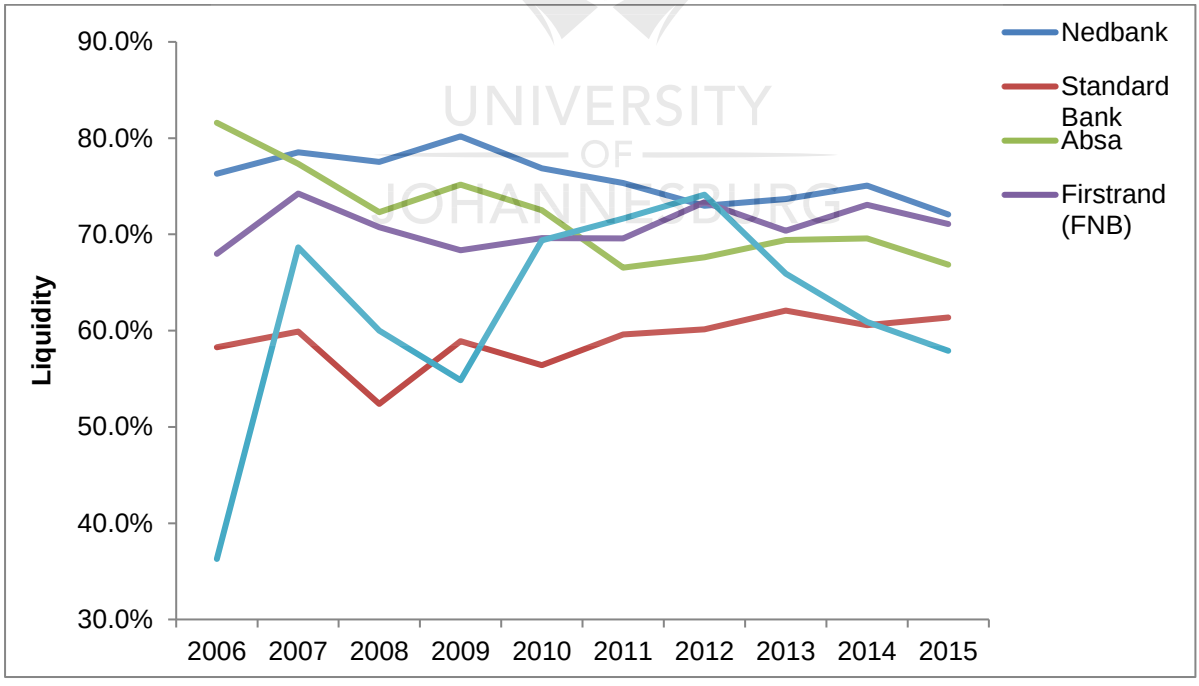

Figure 4.5: The trend of liquidity (LIQ)

Source: *Bankscope (2016) and author's deductions*

Nedbank and Absa displayed an overall negative trend in liquidity for the duration of the sample period. Absa showed the largest decrease in liquidity, falling from a period high of 81.597% in 2006 to a period low of 66.548% in 2015. Nedbank displayed a slight increase in liquidity from 2006, reaching a period high of 80.190% in 2009 before settling into an overall negative trend of 72.069% in 2015.

Conversely, Standard Bank, FirstRand and Capitec exhibited an overall positive trend in liquidity. Standard Bank displayed a decrease in liquidity between 2006 and 2008, reaching a period low of 52.394% before settling into an overall positive trend from 2009, reaching a liquidity level of 61.376% in 2015. Though positive overall, the liquidity level of FirstRand remained relatively stable over the sample period, beginning at a level of 67.981% in 2006 and reaching a level of 71.096% in 2015. Though positive overall, Capitec Bank displayed the most volatility in liquidity levels over the sample period, rising from 36.3% in 2006 to 57.9% in 2015. A sharp increase in liquidity can be observed between 2006 and 2007, rising from a level of 36.287% to 68.643%. This represented the largest change in liquidity of all banks during the sample considered.

4.3.6 Economic growth (GDP)

As previously mentioned, economic growth as measured by GDP was an independent variable in this study, serving as an explanatory variable of bank profitability. Figure 4.6 depicts the trend observed for GDP for the sample period under study (2006 to 2015).

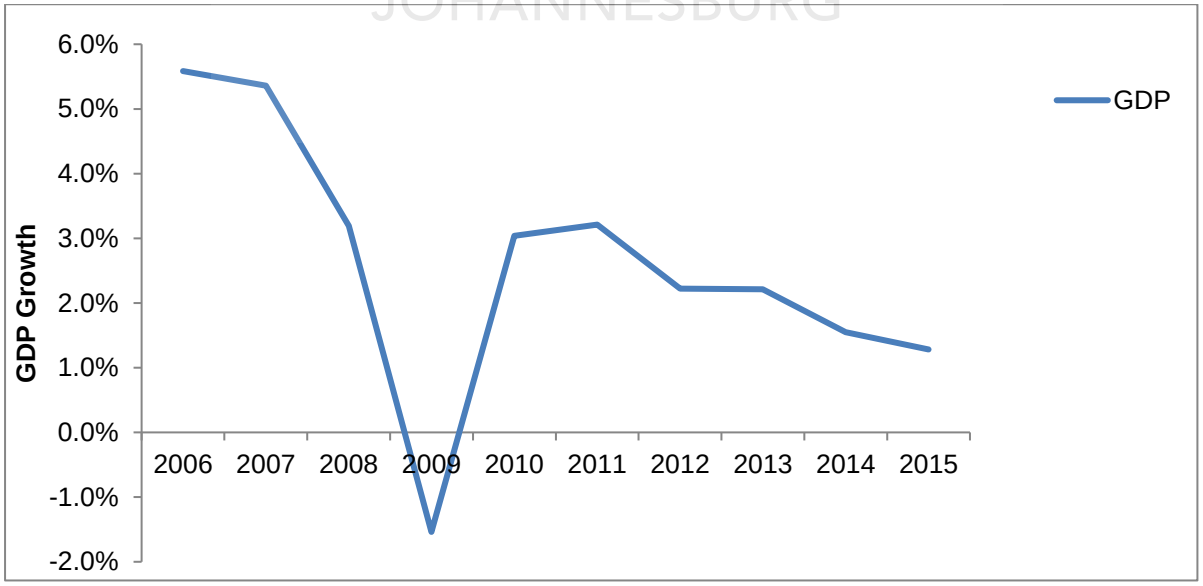

Figure 4.6: The trend of economic growth (GDP)

Source: *Bankscope (2016) and author's deductions*

Between 2006 and 2009, GDP fell from a period high of 5.585% to a period low of -1.538%. GDP then recovered sharply from this low observed in 2009, to a level of 3.212% by 2011. However, between 2011 and 2015 an overall negative trend was observed, as GDP declined to 1.283% by the end of 2015. Therefore, an overall negative trend in GDP was observed for the sample period under study.

4.3.7 Inflation

As previously noted, inflation as measured by CPI was an independent variable in this study serving as an explanatory variable of bank profitability. Figure 4.7 depicts the trend observed for CPI for the sample period under study (2006 to 2015).

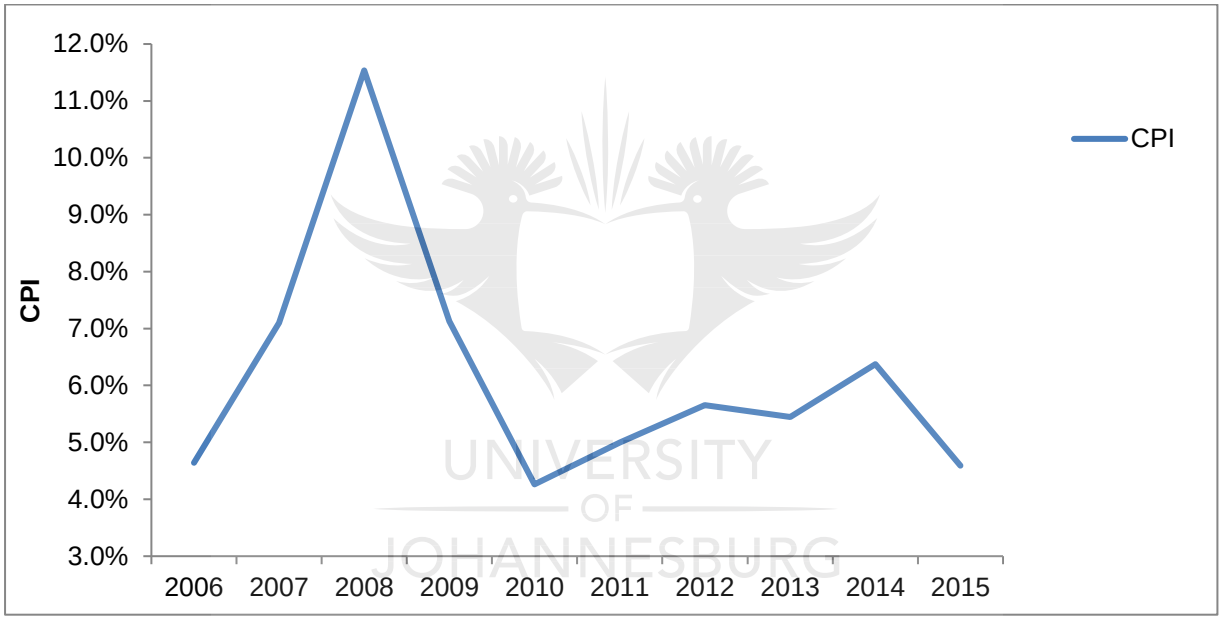

Figure 4.7: The trend of inflation (CPI)

Source: *Bankscope (2016) and author's deductions*

A sharp increase in CPI was observed between 2006 and 2008. For this period, CPI rose from 4.642% in 2006 to a period high of 11.536% in 2008. Between 2008 and 2010 a sharp decline in CPI was observed, as CPI fell from 11.536% to 4.262%. Between 2011 and 2015 CPI remained relatively stable and ended the sample period considered at a level of 4.588%.

4.3.8 Real interest

As previously mentioned, the real interest rate is an independent variable in this study serving as an explanatory variable of bank profitability. Figure 4.8 depicts the trend observed for real interest for the sample period under study (2006 to 2015).

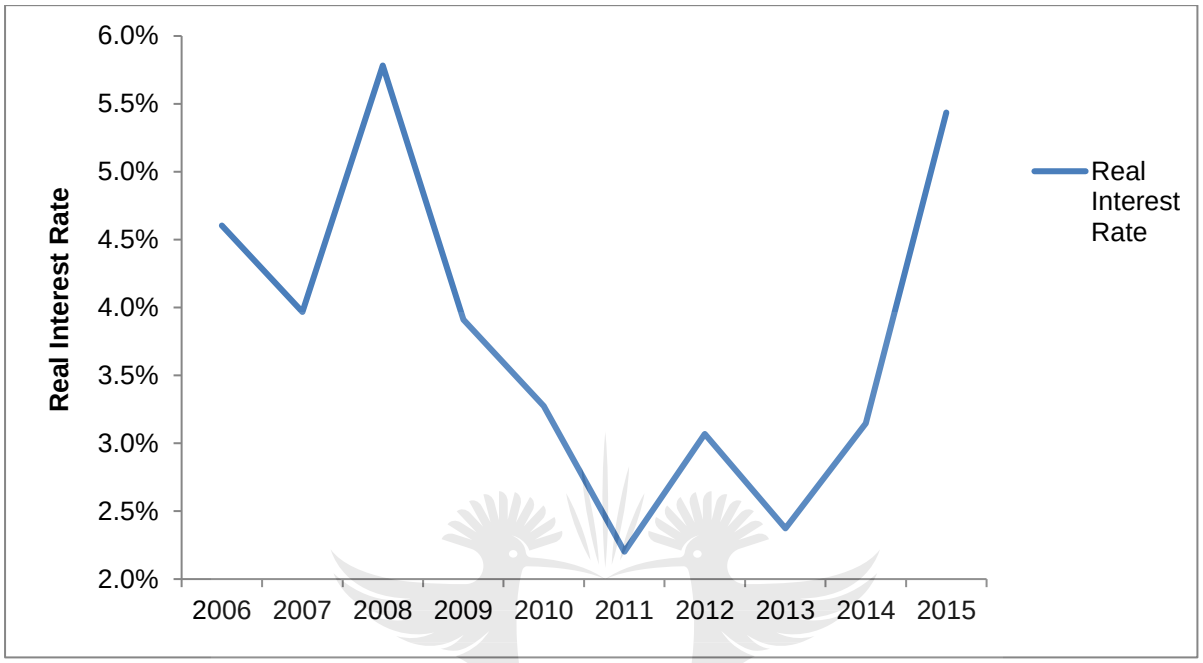

Figure 4.8: The trend of the real interest rate

Source: *Bankscope (2016) and author's deductions*

The real interest rate declined between 2006 and 2007 from 4.604% to 3.966%. During the course of 2007 to 2008 however, a sharp rise in trend to 5.783% was observed, representing the highest level of the real interest rate for the sample period. The real interest rate showed an overall negative trend between 2008 and 2011, falling to 2.202% during the course of this period. However, between 2012 and 2015 an overall positive trend was observed, with the real interest rate rising to 5.437% by the end of the sample period in 2015.

4.3.9 Level of unemployment

As previously discussed, the level of unemployment was an independent variable in this study, serving as an explanatory variable of bank profitability. Figure 4.9 depicts the trend observed for the level of unemployment for the sample period under study (2006 to 2015).

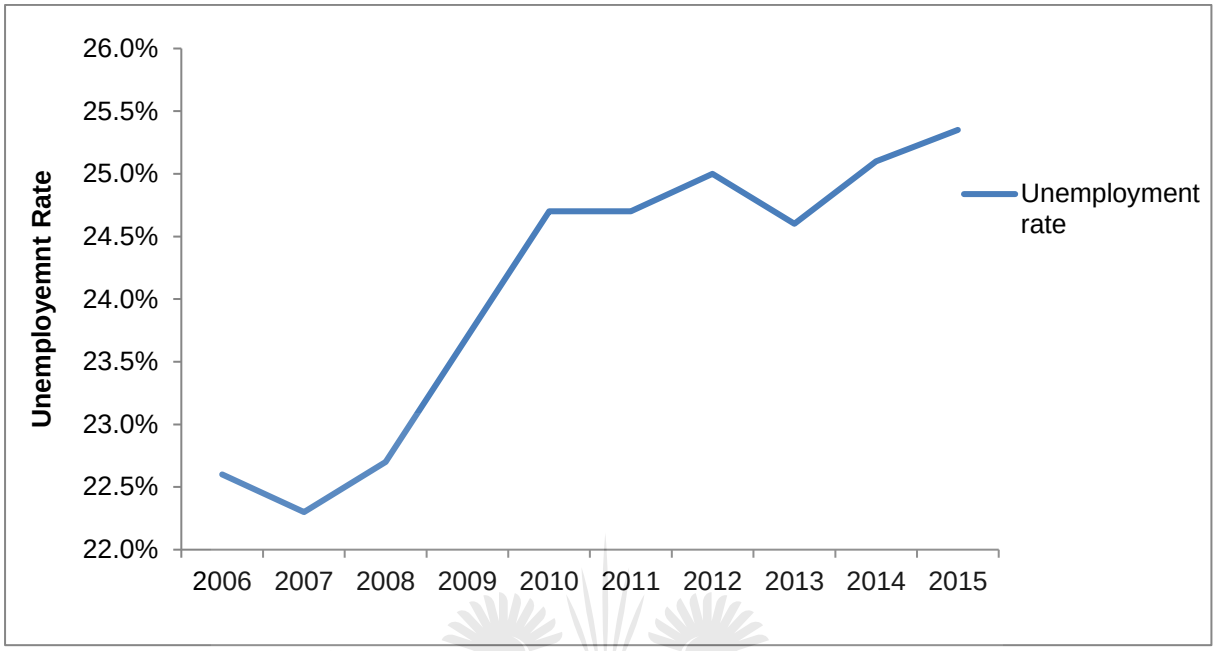

Figure 4.9: The trend of unemployment

Source: *Bankscope (2016) and author's deductions*

The unemployment rate remained relatively stable during the course of 2006 to 2008, with a range of 22.300% to 22.700% for this period. With the exception of 2010 to 2011 where the unemployment rate remained flat, and 2012 to 2013 where a decrease was observed, an overall upward trend in unemployment was observed after 2008 until the end of the sample period in 2015. For this period, the unemployment rate rose from 22.700% in 2008 to 25.350% in 2015. Therefore, the highest level of unemployment for the sample period considered was observed in 2015.

4.4 Data analysis

Data analysis can be described as the manner in which data were collected for the research being conducted. Panel data were utilised in this research study and refers to data sets that comprise of both cross section and time series components (Koop, 2009). In research encompassing financial modelling techniques, panel data would be an appropriate data set as it is able to measure a specific quantity regarding a set of entities over time. Therefore, panel data were deemed appropriate for use in this study as it would capture the effect of specific explanatory variables for a panel of South African banks over a specified period of time thereby achieving the research objectives of this study. A more detailed account of panel data

methodology is provided in Chapter 3. The remainder of this section sets out the empirical findings achieved by applying the panel data methodology previously outlined.

4.4.1 The pooled OLS model

The Pooled Ordinary Least Squares (OLS) model or constant co-efficient model assumes that coefficients across time and cross sections remain constant (Brooks, 2008). This model adheres to the classical assumptions of regression when investigating the relationship between dependent and explanatory variables (Brooks, 2008). A key disadvantage of this model specification however, stems from fact that the pooled OLS model operates under the assumption that no variances exists in the data of the cross-sectional dimension and therefore denies the heterogeneity or individuality that may exist among the cross sections under study (Brooks, 2008; Ranjan and Agrawal, 2011). Within the context of this study, this implies that the individuality among the South African banks included in the analysis will be denied and accounted for by the error term under this model specification. The linear equation for the pooled OLS model can be stated as follows:

$$ROAA_{it} = \alpha + \beta_1 AQ_{it} + \beta_2 CAP_{it} + \beta_3 OP_{it} + \beta_4 LIQ_{it} + \beta_5 INT_{it} + \beta_6 INF_{it} + \beta_7 GDP_{it} + \beta_8 EMP_{it} + u_{it} \quad [4.1]$$

Where $ROAAit$ denotes the dependent variable, β1 to β8 denotes the coefficients of the independent variables as shown; t denotes the time period, μ denotes the error term and $\propto$ denotes the constant term.

Table 4.7 below illustrates the results obtained while following the pooled OLS model specification for the five South African banks between 2006 and 2015.

Table 4.7: Results obtained from pooled OLS model specification

Explanatory Variable	Coefficient	P-value	Null Hypothesis on a 95% confidence level	Statistical Significance on a 95% confidence level
Asset quality (AQ)	0.192	0.001	Reject	Statistically significant

Capital strength (CAP)	0.137	0.000	Reject	Statistically significant
Operational efficiency (OP)	-0.017	0.142	Accept	Statistically insignificant
Liquidity (LIQ)	0.0143	0.013	Reject	Statistically significant
Economic activity (GDP)	0.068	0.025	Reject	Statistically significant
Annual inflation (INF)	0.120	0.000	Reject	Statistically significant
Level of unemployment (EMP)	0.0146	0.818	Accept	Statistically insignificant
Real interest rate (INT)	0.059	0.184	Accept	Statistically insignificant
Adjusted R-squared			0,877	
Prob (F-statistic)			0.000	

Source: *Bankscope (2016) and author's deductions*

The p-values as presented in Table 4.7 provide us with an indication of the explanatory power that each independent variable included in the analysis had over the dependent variable bank profitability in the analysis. The p-values were evaluated on a 95% confidence level. A p-value of less than 0.05 indicated that an independent variable was statistically significant and was able to explain changes in the dependent variable bank profitability on a 95% confidence level. Based on the results obtained from the pooled OLS model, asset quality, capital strength, economic activity, liquidity and annual inflation variables were all statistically significant. The independent variables' operational efficiency, level of employment and the real interest rate were found to be statistically insignificant. Therefore, a combination of both bank-specific internal and macroeconomic external variables were found to be statistically significant determinants of bank profitability for the South African banks under study.

4.4.2 The fixed effects model

The fixed effects model allows for heterogeneity or individuality to be expressed among the cross sections of the data by allowing each cross section to have its own intercept, where the

unique attributes of each specific cross section may be revealed (Gujarati, 2011; Ranjan & Agrawal, 2011). Under this model specification, the denial of heterogeneity among cross sections as experienced in the pooled OLS model was overcome. Thus, the individuality and unique attributes associated with each South African bank were made apparent and were not accounted for in the error term of the model. An in-depth discussion of the fixed effects model was provided in Chapter 3. The linear equation for the fixed effects model can be stated as follows:

$$ROAA_{it} = \alpha + \beta_1 AQ_{it} + \beta_2 CAP_{it} + \beta_3 OP_{it} + \beta_4 LIQ_{it} + \beta_5 INT_{it} + \beta_6 INF_{it} + \beta_7 GDP_{it} + \beta_8 EMP_{it} + u_{it} \quad [4.2]$$

Where $ROAAit$ denotes the dependent variable, β1 to β8 denotes the coefficients of the independent variables as shown; i denotes the intercept value for each cross section, t denotes the time period, μ denotes the error term and $\propto$ denotes the constant term. Table 4.8 below illustrates the results obtained while following the fixed effects model specification for the five South African banks between the periods 2006 to 2015**.**

Table 4.8: Results obtained from the fixed effects model (FEM) specification

Explanatory Variable	Coefficient	P-value	Null Hypothesis on a 95% confidence level	Statistical Significance on a 95% confidence level
Asset quality (AQ)	-0.402	0.000	Accept	Statistically significant
Capital strength (CAP)	0.120	0.000	Reject	Statistically significant
Operational efficiency (OP)	-0.040	0.000	Reject	Statistically significant
Liquidity (LIQ)	-0.011	0.119	Reject	Statistically insignificant
Economic activity (GDP)	0.053	0.004	Reject	Statistically significant
Annual inflation (INF)	0.048	0.021	Reject	Statistically significant
Level of unemployment (EMP)	0.055	0.159	Reject	Statistically insignificant

Real Interest rate (INT)	0.088	0.001	Accept	Statistically significant
Adjusted R-squared			0.954	
Prob (F-statistic)			0.000	

***Source**: Bankscope (2016) and author's deductions*

Based on the results obtained from the fixed effects model as presented in Table 4.8, the explanatory variables asset quality, capital strength, operational efficiency, economic activity, annual inflation and the real interest rate were all found to be statistically significant. The explanatory variables liquidity and level of unemployment were found to be statistically insignificant. Therefore, a combination of bank-specific internal and macroeconomic external variables were found to be statistically significant determinants of bank profitability for the South African banks under study. This is in line with the prior work of Alexiou and Sofoklis (2009), Francis (2013), and Gharaibeh (2015).

4.4.3 Model selection

As previously discussed in Chapter 3, the appropriateness of the pooled OLS model versus the fixed effects model was evaluated by performing the redundant fixed effects test. This test provided an indication as to whether the cross sections under study were heterogeneous. The results obtained from the redundant fixed effects test are included in Table 4.9 and were run according to the hypothesis:

$$Ho: Fixed\ effects\ are\ redundant\ among\ cross\ sections$$

$$H1: Fixed\ effects\ are\ not\ redundant\ among\ cross\ sections$$

Table 4.9: Results obtained from the Redundant Fixed Effects Test

Redundant Fixed Effects Test	Statistic	P-Value
Cross section F	103.871	0.000
Cross section Chi-square	253.182	0.000

***Source**: Author's own deductions*

As presented in Table 4.9 the p-value from this test was indicated as 0.00 which is less than 5% on a 95% confidence level and was therefore statistically significant. Based on this test, we rejected the null hypothesis that fixed effects were redundant among the cross sections of the study. This p-value indicated that the restrictions of the pooled OLS model were not supported by the data. Consequently, the fixed effects model specification was considered most appropriate to model the data for the commercial banks of South Africa based on the existence of heterogeneity and individuality among the five South African banks included in the sample. The random effects model was found to be inappropriate for use in this study due to the number of coefficients being greater than the number of cross-sectional unit's present. This is a criterion for the computation of variance.

A detailed analysis of the results obtained from the fixed effects model specification is provided in the following section.

4.4.4 Analysis of the fixed effects model specification

As previously discussed, the fixed effects model specification was found to be the most appropriate to examine the bank-specific internal and macroeconomic external determinants of profitability for the South African banks included in this study. The results obtained from the fixed effects model as presented in Table 4.8 are now discussed in detail and contrasted against the findings of previous bank profitability research contained in the current body of economic and financial literature. The initial propositions of this study as discussed in Chapter 3 are reiterated in Table 4.10.

Table 4.10: Summary of initial propositions

Proposition	Supporting literature
P1: There is either a positive or negative relationship between asset quality and bank profitability.	Pasiouras and Kosmidou (2007), Dietrich and Wanzenried (2011), Sufian (2011) and Gharaibeh (2015)
P2: There is a positive relationship between capital strength and bank profitability.	Demirgüç-Kunt and Huizinga (1999), Staikouras and Wood (2003), Pasiouras and Kosmidou (2007), Javaid et al (2011).

P3: There is a negative relationship between operating cost and bank profitability.	Athanasoglou et al. (2008), Alexiou and Sofoklis (2009), Dietrich and Wanzenried (2011)
P4: There is either a positive or negative relationship between liquidity and bank profitability	Bourke (1989), Molyneux and Thornton (1992), Haron (2004), Nisar et al. (2015)
P5: There is a positive relationship between economic activity and bank profitability	Gul et al. (2011), Sharma and Mani (2012), Acaravci and Calim (2013)
P6: There is either a positive or negative relationship between annual inflation and bank profitability	Pasiouras and Kosmidou (2007), Sufian and Chong (2008), Alexiou and Sofoklis (2009), Sayilgan and Yildirim (2009), Ali et al. (2011) and Gul et al. (2011)
P7: There is either a positive or a negative relationship between the real interest rate and bank profitability.	Garcia-Herrero et al. (2009), Vong and Chan (2009), Alper and Anbar (2011), Ifeacho and Ngalawa (2014)
P8: There is a negative relationship between bank profitability and level of unemployment.	Abreu and Mendes (2001), Hefferman and Fu (2008), Louzis, Vouldis and Metaxas (2012), Ifeacho and Ngalawa (2014)

***Source**: Author's compilation*

The explanatory variable asset quality was found to be statistically significant on a 95% confidence level and exhibited a β coefficient of a -0.402. This implied a negative relationship between asset quality and bank profitability as measured by ROAA. Therefore, for every 1-unit increase in AQ, ROAA will decrease by approximately -0.402 units, *ceteris paribus*. This finding satisfied proposition 1 as indicated in Table 4.10, and was in line with prior work of Sufian and Chong (2008), Alexiou and Sofoklis (2009), Alper and Anbar (2011), Ongore and Kusa (2013).

The explanatory variable capital strength was found to be statistically significant on a 95% confidence level. CAP exhibited a β coefficient of 0.120. This implied a positive relationship between capital strength and bank profitability as measured by ROAA. Therefore, for every 1-unit increase in CAP, ROAA will increase by approximately 0.120 units, *ceteris paribus*. This finding satisfied proposition 2 as indicated in Table 4.10 and is in line with the prior work of Sufian and Chong (2008), Zhang and Dong (2011), Rao and Lakew (2012), Gharaibeh (2015).

The explanatory variable operational efficiency was found to be statistically significant on a 95% confidence level. OP exhibited a β coefficient of -0.040. This implied a negative relationship between operational efficiency and ROAA. Therefore, for every 1-unit increase in OP, ROAA will decrease by approximately 0.040 units, *ceteris paribus*. This finding satisfied proposition 3 as indicated in Table 4.10, and is line with the prior work of Pasiouras and Kosmidou (2007), Sufian and Chong (2008), Alexiou and Sofoklis (2009), Rao and Lakew (2012).

The explanatory variable liquidity was found to be statistically insignificant on a 95% confidence level, in line with the prior work of Alper and Anbar (2011) and Ongore and Kusa (2013). Though statistically insignificant, LIQ exhibited a β coefficient of -0.011. This implied a negative relationship between liquidity and ROAA and satisfied proposition 4 as indicated in Table 4.10.

The explanatory variable economic activity (GDP) was found to be statistically significant on a 95% confidence level. GDP exhibited a β coefficient of 0.053. This implied a positive relationship between economic activity and ROAA. Therefore, for every 1-unit increase in GDP, ROAA will increase by approximately 0.053 units, *ceteris paribus*. This finding satisfied proposition 5 as indicated in Table 4.10, and is line with the prior work of Pasiouras and Kosmidou (2007), Gul et al. (2011), Zhang and Dong (2011), Acaravci and Calim (2013).

The explanatory variable annual inflation was found to be statistically significant on a 95% confidence level. INF exhibited a β coefficient of 0.048. This implies a positive relationship between annual inflation and ROAA. Therefore, for every 1-unit increase in INF, ROAA will increase by approximately 0.048 units, ceteris paribus. This finding satisfies proposition 6 as indicated in Table 4.4 and is line with the prior work of Pasiouras and Kosmidou (2007), Alexiou and Sofoklis (2009) and Gul et al. (2011).

The explanatory variable real interest was found to be statistically significant on a 95% confidence level. INT exhibited a β coefficient of 0.088. This implies a positive relationship between the real interest rate and ROAA. Therefore, for every 1-unit increase in INT, ROAA will increase by approximately 0.088 units, ceteris paribus. This finding satisfies proposition 7 as indicated in Table 4.4 and is line with the prior work of Alper and Anbar (2011) and Ifeacho and Ngalawa (2014).

The explanatory variable level of unemployment was found to be statistically insignificant on a 95% confidence level for the sampled banks of South Africa. This finding is in contrast to the

prior work of Abreu and Mendes (2001) and Ifeacho and Ngalawa (2014) who found the level of unemployment to be a significant determinant of bank profitability. A possible reason for this discrepancy could stem from the fact that a different measure of bank profitability was utilised in these studies.

The results of the statistically significant determinants of bank profitability for the South African banking sector as well as the relationships observed are further summarised in Table 4.11.

Table 4.11: Summary of significant determinants of South African bank profitability

Determinant	Relationship to bank profitability	Supporting literature
Asset quality	Negative	Sufian and Chong (2008), Alexiou and Sofoklis (2009), Alper and Anbar (2011) and Ongore and Kusa (2013).
Capital strength	Positive	Sufian and Chong (2008), Zhang and Dong (2011), Rao and Lakew (2012) and Gharaibeh (2015).
Operational efficiency	Negative	Pasiouras and Kosmidou (2007), Sufian and Chong (2008), Alexiou and Sofoklis (2009) and Rao and Lakew (2012).
Economic activity (GDP)	Positive	Pasiouras and Kosmidou (2007), Gul et al. (2011), Zhang and Dong (2011) and Acaravci and Calim (2013).
Annual inflation (CPI)	Positive	Pasiouras and Kosmidou (2007), Alexiou and Sofoklis (2009) and Gul et al. (2011).
Real interest	Positive	Alper and Anbar (2011) and Ifeacho and Ngalawa (2014).

***Source**: Author's compilation*

4.5 Summary

This chapter applied the methodology presented in Chapter 3 and delivered an empirical analysis of the determinants of bank profitability for the commercial banking sector of South Africa. Descriptive statistics for each data series included in this study were computed and discussed, followed by a visual analysis of the trend of each variable. The analysis of descriptive statistics provided a deeper understanding of the data being utilised and allowed for each data series to be compared numerically. The trend analysis facilitated a deeper understanding of the association between the explanatory variables utilised and the dependent variable bank profitability.

With regard to data analysis, a panel data approach was deemed suitable for use as it would capture the effect of specific explanatory variables for a sample of banks over a specified period of time, thereby achieving the research objectives outlined. For the purpose of this study, bank profitability was measured according to the return on average assets ratio (ROAA). The fixed effects model was found to be most appropriate to analyse the data of the South African commercial banks included in this study.

The explanatory variable asset quality was found to be statistically significant on a 95% confidence level and displayed a negative relationship to bank profitability as measured by ROAA. For the purpose of this study, asset quality for the sampled banks was measured by the loan loss reserve to gross loans ratio (LRGL). The LRGL serves as an indication of expected loan losses where greater loan loss reserves provide an indication of poor loan portfolio quality expectations in the future (Ahmad et el., 2007). Based on the analysis conducted, it was determined that as the LRGL ratio increased, bank profitability as measured by ROAA displayed a corresponding decrease for the South African banks under study. Therefore, this finding was significant as it informs strategic-level bank management that bank profitability may be increased by closely monitoring asset quality and ensuring that expected loan losses are minimised.

The explanatory variable capital strength was found to be statistically significant on a 95% confidence level and displayed a positive relationship to bank profitability as measured by ROAA. For the purpose of this study, capital strength was measured by the equity to total assets ratio (EQAS) (Gharabei, 2015). The EQAS ratio provides an indication of capital adequacy and overall financial strength with regard to a bank's ability to endure losses and efficiently manage risk exposure (Dietrich and Wanzenried, 2009). Gul et al. (2011) discussed that better capitalised banks with a higher capital ratio can more easily conform to regulatory

capital standards so that surplus capital can be lent out and used to increase profitability. Based on the analysis conducted, it was determined that as the EQAS ratio increased, bank profitability as measured by ROAA displayed a corresponding increase for the South African banks under study. Therefore, this finding is significant as it informs strategic-level bank management that profitability may be increased by ensuring that South African banks are well capitalised at all times.

The explanatory variable operational efficiency was found to be statistically significant on a 95% confidence level and displayed a negative relationship to bank profitability as measured by ROAA. For the purpose of this study, operational efficiency was measured by the cost to income ratio (Dietrich & Wanzenried, 2009). The cost to income ratio provides an indication of the change in the expenses of a business relative to revenue or income generated (Wuite, 2009). Based on the analysis conducted, it was determined that as the cost to income ratio increased, bank profitability as measured by ROAA displayed a corresponding decrease for the South African banks under study. Therefore, this finding is significant as it informs strategic-level bank management that profitability may be increased by aiming to minimise expenses incurred relative to income produced.

The explanatory variable economic activity (GDP) was found to be statistically significant on a 95% confidence level and displayed a positive relationship to bank profitability as measured by ROAA. GDP plays a significant role on the aspects that affect the supply and demand of loans and deposits in a country (Sufian & Habibullah, 2009). During times of economic upswings the demand for lending increases, which in turn increases overall bank profitability as banks experience increases in their number of loans issued (Dietrich & Wanzenried, 2011). Based on the analysis conducted, it was determined that as economic activity increased, bank profitability as measured by ROAA displayed a corresponding increase for the South African banks under study. Therefore, this finding is significant as it informs strategic-level bank management that profitability may be increased in times of greater economic activity or positive economic growth. Constructive economic environments positively affect the demand for and supply of banking services, thereby increasing overall bank profitability (Sufian, 2011).

The explanatory variable annual inflation was found to be statistically significant on a 95% confidence level and displayed a positive relationship to bank profitability as measured by ROAA. Inflation as measured by the consumer price index (CPI) was included in this study to examine the relationship between the rate of increase in the price of goods and services and the profitability of the South African banks. Based on the analysis conducted, it was determined that as inflation levels increased, bank profitability as measured by ROAA

displayed a corresponding increase for the South African banks under study. Therefore, this finding is significant as it informs strategic-level bank management that profitability may increase in times of rising inflation levels. This finding could be due to the fact that banks are able to forecast more accurately and increase their income generated faster than the corresponding rise in the CPI.

The explanatory variable real interest was found to be statistically significant on a 95% confidence level and displayed a positive relationship to bank profitability as measured by ROAA. The real interest rate can be described as the rate of return that has been adjusted for inflation, and measures the growth of the actual purchasing power of money over time (Wuite, 2009; Bodie et al. 2011). Based on the analysis conducted, it was determined that as the real interest rate increased, bank profitability as measured by ROAA displayed a corresponding increase for the South African banks under study. Therefore, this finding is significant as it informs strategic-level bank management that profitability may be increased in times where the actual purchasing power of the Rand strengthens relative to prevailing inflation levels in the country.

The explanatory variables liquidity and level of unemployment were found to be statistically insignificant determinants of bank profitability as measured by ROAA for the South African banks under study. These findings were made based on a 95% statistical confidence level.
Based on the overall results obtained by this analysis, it becomes apparent that aspects such as asset quality, capital strength, operational efficiency, economic activity, annual inflation, and real interest most significantly affect the profitability of South African banks. It was found that asset quality and operational efficiency exhibited a negative relationship to bank profitability, and that capital strength, economic activity (GDP), annual inflation, and the real interest rate exhibited a positive relationship to bank profitability.

Chapter 5

Conclusion

5.1 Introduction

The performance of a country's banking sector has been shown to exhibit a direct relationship to the economic well-being of a country (Greenberg & Simbanegavi, 2009). Economies with a robust and profitable banking sector have been found to be better equipped to handle negative economic conditions and financial downturns (Alper & Anbar, 2011). Therefore, the performance of a country's banking sector plays a fundamental role within its economic framework (Demirgüç-Kunt & Huizinga, 1999).

Kumbirai and Webb (2010) describe how the South African banking sector as a whole is becoming ever more competitive, with expenses continually rising due to technological innovation, entry of foreign banks to the market, and regulatory requirements that are becoming progressively stringent. Against this dynamic backdrop, it is invaluable for strategic-level bank management to thoroughly understand the aspects that most significantly affect the profitability of their business.

Bearing these sentiments in mind, this research aimed to identify the bank-specific internal and macroeconomic external determinants of profitability within the commercial banking sector of South Africa. The four largest commercial banks in South Africa (Absa, FirstRand Bank, Nedbank and Standard Bank) as well as South Africa's largest alternative banking institution (Capitec Bank) were included in the analysis. A panel regression framework was followed, with return on average assets (ROAA) serving as the dependent variable and the measure of bank profitability. The independent variables of the model included the bank-specific internal and macroeconomic external variables, in line with the prior international bank profitability literature that has found these variables to be significant determinants of bank profitability.

5.2 Reason for undertaking the research

Kumbirai and Webb (2010) discussed how research pertaining to bank performance in South Africa is relatively limited, and proposed that research by both scholars and industry specialists in the area of bank performance is justified. Research of this nature becomes even more valuable against the backdrop of an increasingly competitive banking environment, rising costs and stricter regulatory controls.

The current body of financial literature contains a vast amount of research regarding the determinants of bank profitability in multiple international markets. The fact that similar research has been conducted and is perceived to make a valuable contribution in numerous other international markets, provided further substantiation for a similar line of research to be examined for the South African case.

Furthermore, it has been argued in the literature that the current structure of the South African banking industry has to an extent alienated the poor by not catering to their specific banking needs. This is made evident by the rise in popularity of alternative banking institutions such as Capitec Bank. Given the significant role played by the alternative banking sector towards the overall well-being of a country, it therefore becomes important to include these banking institutions when examining the determinants of South African bank profitability.

5.3 Discussion of findings and conclusion

Following the empirical analysis conducted in this study, this research concluded that both bank-specific internal as well as macroeconomic external variables are significant determinants of bank profitability in South Africa. This finding is in line with similar research previously conducted in various other international banking sectors.

With regard to bank-specific internal determinants, asset quality, capital strength and operational efficiency were found to be statistically significant determinants of South African commercial bank profitability on a 95% confidence level. The explanatory variable liquidity, was found to be statistically insignificant on a 95% confidence level. Asset quality and operational efficiency displayed negative relationships to bank profitability. The effect of capital strength was found to be positive. Furthermore, these relationships were in line with the initial propositions determined in this study.

With regard to macroeconomic external determinants, economic activity (GDP), annual inflation and the real interest rate were found to be statistically significant determinants of South African commercial bank profitability on a 95% confidence level. The explanatory variable level of unemployment was found to be statistically insignificant on a 95% confidence level. Economic activity, annual inflation and the real interest rate displayed positive relationships to bank profitability. Furthermore, these relationships were in line with the initial propositions determined in this study.

Based on the results obtained by this analysis, it became apparent that aspects such as asset quality, capital strength, operational efficiency, economic activity, annual inflation and real interest most significantly affect the profitability of South African banks. Specifically, this study found that strategic-level management may increase bank profitability by closely monitoring asset quality and ensuring that expected loan losses are minimised; ensuring that banks are well capitalised at all times, and by aiming to minimise expenses incurred relative to income produced. From a macroeconomic perspective, this study informs strategic-level bank management that bank profitability may increase in times of positive economic growth, rising inflation levels, and an increasing real interest rate.

Therefore, strategic-level bank management may optimise the profitability of South African banks by analysing and responding to these factors as quickly and efficiently as possible. Bank-specific internal variables such as asset quality, capital strength and operational efficiency are directly influenced by management and should therefore be addressed before macroeconomic external variables when attempting to optimise bank profitability.

5.4 Contribution of the study

This research contributes to the current body of financial literature by including an alternative banking institution alongside the big four commercial banks of South Africa. This facilitated a deeper understanding of how macroeconomic external and bank-specific internal determinants affect the profitability of a more conclusive sample of the South African banking sector. Based on the importance of a banking sector within the economic framework of a country, and more specifically a developing country such as South Africa, this research asserts that in examining a larger population of the South African banking industry the study assists in bridging the gap in the literature, and makes a positive contribution towards addressing this knowledge problem.

5.5 Recommendations for further research

This study limited external determinants to macroeconomic variables, and excluded industry-specific factors. Further research could examine the effect of industry-specific determinants on South African bank profitability. A larger sample of South African banks could be utilised to examine the alternative banking institutions or private banking institutions that have been omitted from this research. Furthermore, future research could utilise an alternate measure of bank profitability to examine the determinants for the South African case.

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