Measuring value added: The case of the South African banking sector

Hennie Fouché

12330582

Mini-dissertation submitted in partial fulfilment of the requirements for the degree Masters in Business Administration at the Potchefstroom Business School, Potchefstroom Campus of the North-West University

Promoter: Prof. I. Nel

November 2012
Abstract

Companies all over the world attempt to create value for their owners. This is done by delivering profits over an extended period of time. South Africa is no different and has become a major emerging economy. The South African financial system has been much acclaimed in the international arena as one of the best in the world, second only to Canada. Therefore it is very important for banks in particular to ensure the ability to create shareholder value.

If the goal of a company is to create value then the company needs measures to track performance. Traditional accounting measures have been used for a long time to indicate how much profit has been made in the financial period. These measures have been used in businesses around the world since the early 1900’s. Since the 1980’s however more and more concerns have been raised over these measures. One of the main issues seen with traditional accounting performance measures is that they do not take into consideration the cost of investment. Value-based management (VBM) was proposed to fill this gap of taking into consideration the cost of capital invested. VBM in theory involves two steps. A company first has to adopt an economic profit metric as a key measurement of performance, and secondly tie this measure to executive compensation. VBM metrics such as Economic Value Added (EVA), Economic Profit (EP) and Cash-flow Return on Investment (CFROI) have gained popularity since the late 1980’s. Managing for value has become of utmost importance for most executives around the world.

The main goal of this study was to test what factors can be used to indicate how much value has been created in South African banks. In order to do this a quantitative study was performed on the banks listed in the McGregor BFA database. Regression models were run on the data for these banks over the period 2001 to 2010 to see the impact of specified metrics on value creation. The measures selected for value creation were the growth in Economic Value Added (EVA), the growth in Shareholder Value Analysis (SVA) and EVA/Invested Capital. The independent variables selected were Return on Equity (ROE), growth in assets, the impairment ratio and the growth in operating income per employee. Added to this was a dummy variable which indicated whether the bank outperformed the bank
index (the proxy for industry performance) in the particular year. And finally an autoregressive term was added because of the nature of the data being a time series.

The results clearly indicate that the chosen metrics works for half of the banks and fails for the other half. It was also found that the growth in EVA performed best as indicator for value creation. The independent variables which were most consistent were ROE, the impairment ratio and the growth in operating income per employee. The fact that the bank had outperformed the bank index was inconsistent, being significant in some cases but not always.

The results indicate that value creation is dependent on the particular bank that is considered. When using the results care should be given to which bank is being analysed. Further studies can be performed using even more measures for the different banks. It is therefore recommended that each company find what is working for them, in particular, when searching for a value creation measure.
Acknowledgements

Firstly, I would like to thank God for His grace in enabling me to complete this dissertation.

I would like to acknowledge the emotional support provided by my immediate family. I would like to thank my wife Marilie and my parents and brother Pieter, Elize and Arno Fouché.

I am indebted to my supervisor, Prof. Ines Nel of the Potchefstroom Business School for the guidance provided during the completion of this dissertation.

Thank you to Mrs. Christien Terblanche for the language editing.

And finally to my MBA group members for the help and support throughout the three years.
# TABLE OF CONTENTS

Abstract ................................................................................................................................. ii

Acknowledgements .............................................................................................................. iv

List of Tables ........................................................................................................................ iii

List of Figures ........................................................................................................................ iv

Table of Abbreviations ......................................................................................................... v

CHAPTER 1 .............................................................................................................................. 1

1.1 BACKGROUND .............................................................................................................. 1

1.2 PROBLEM STATEMENT ............................................................................................... 6

1.3 RESEARCH OBJECTIVES ............................................................................................. 6
  1.3.1 Primary objectives .................................................................................................... 6
  1.3.2 Secondary objectives ............................................................................................... 6

1.4 RESEARCH METHODOLOGY ..................................................................................... 7
  1.4.1 Literature study and theoretical review .................................................................... 7
  1.4.2 Empirical research .................................................................................................. 7

1.5 SCOPE OF THE STUDY ............................................................................................... 8

1.6 LIMITATIONS OF THE STUDY .................................................................................. 8

1.7 LAYOUT OF THE STUDY ............................................................................................. 8

CHAPTER 2 .............................................................................................................................. 9

2.1 INTRODUCTION ........................................................................................................... 9

2.2 SHAREHOLDER VALUE ............................................................................................... 10

2.3 VALUE-BASED MANAGEMENT .................................................................................. 11
  2.3.1 History of value-based management ...................................................................... 11
  2.3.2 The value-based management framework .............................................................. 12
  2.3.3 The principles of value-based management ............................................................. 16
2.3.4 The advantages of value-based management................................................. 23
2.3.5 The disadvantages of value-based management........................................... 25

2.4 VALUE-BASED MANAGEMENT METRICS ..................................................... 26
2.4.1 Discounted Cash Flow (DCF)........................................................................ 26
2.4.2 Free Cash Flow (FCF).................................................................................... 26
2.4.3 Market Value Added (MVA)............................................................................ 27
2.4.4 Cash Flow Return on Investment (CFROI)...................................................... 27
2.4.5 Shareholder Value Analysis (SVA)................................................................. 29
2.4.6 Economic Profit (EP)..................................................................................... 30
2.4.7 Total Business Return (TBR)........................................................................... 32

2.5 METRICS FOR MEASURING VALUE CREATED............................................... 33
2.5.1 Influence of external factors on value creation ............................................ 34
2.5.2 Shareholder value creation ......................................................................... 38
2.5.3 Shareholder value creation in South Africa................................................... 44
2.5.4 Shareholder value creation in banks .............................................................. 45
2.5.5 Shareholder value creation in South African banks ..................................... 49

2.6 SUMMARY....................................................................................................... 51

CHAPTER 3 ............................................................................................................. 52
3.1 INTRODUCTION.............................................................................................. 52
3.2 RESEARCH METHODOLOGY ....................................................................... 53
3.2.1 Data collection............................................................................................. 53
3.3 EMPIRICAL FRAMEWORK .............................................................................. 54
3.3.1 Model specifications .................................................................................... 55
3.3.2 Empirical results ......................................................................................... 57
3.4 SUMMARY....................................................................................................... 77

CHAPTER 4 ............................................................................................................. 78
4.1 INTRODUCTION.............................................................................................. 78
4.2 RESULTS AND CONCLUSION OF THE MAIN GOAL .............................................. 78
   4.2.1 Results ........................................................................................................ 79
   4.2.2 Interpretation of results ................................................................................ 79
4.3 RESULTS AND CONCLUSION OF THE SUB-OBJEVTIVES ...................... 80
   4.3.1 Results ........................................................................................................ 80
   4.3.2 Interpretation of results ................................................................................ 81
4.4 RECOMMENDATIONS ...................................................................................... 81
4.5 SUGGESTIONS FOR FUTURE RESEARCH .................................................. 82
BIBLIOGRAPHY ...................................................................................................... 83
List of Tables

Table 2.1 - Calculating Free cash flows ................................................................. 29
Table 3.1 - Absa: Testing for outliers and influential points ................................ 58
Table 3.2 - FNB: Testing for outliers and influential points ................................. 59
Table 3.3 - Nedbank: Testing for outliers and influential points .......................... 59
Table 3.4 - Standard Bank: Testing for outliers and influential points ................... 60
Table 3.5 - Correlations between dependent and independent variables .......... 61
Table 3.6 - Correlations between independent variables ................................. 63
Table 3.7 - Variance inflation factors per bank and model .................................. 64
Table 3.8 - Durbin-Watson statistics ..................................................................... 70
Table 3.9 - Shapiro-Wilk test results ...................................................................... 71
Table 3.10 - Test for homoscedasticity ................................................................. 72
Table 3.11 - Regression output: Absa and FNB .................................................... 73
Table 3.12 - Regression output: Nedbank and Standard Bank ............................. 74
Table 3.13 – Regression output: Mercantile and Capitec ..................................... 75
Table 3.14 - Goodness of Fit test results ............................................................... 76
List of Figures

Figure 1 - Value-based Management Framework .................................................. 13
Figure 2 - Absa: Residuals vs. Time .................................................................. 66
Figure 3 - FNB: Residuals vs. Time ................................................................. 67
Figure 4 - Nedbank: Residuals vs. Time ............................................................ 67
Figure 5 - Standard Bank: Residuals vs. Time .................................................. 68
Figure 6 - Mercantile: Residuals vs. Time ......................................................... 68
Figure 7 - Capitec: Residuals vs. Time ............................................................... 69
# Table of Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABC</td>
<td>Activity-based costing</td>
</tr>
<tr>
<td>APS</td>
<td>Average price per share for the last month before financial year end</td>
</tr>
<tr>
<td>BV</td>
<td>Book value</td>
</tr>
<tr>
<td>CEO</td>
<td>Chief executive officer</td>
</tr>
<tr>
<td>CFO</td>
<td>Chief financial officer</td>
</tr>
<tr>
<td>CFROI</td>
<td>Cash flow return on investment</td>
</tr>
<tr>
<td>CVA</td>
<td>Cash value added</td>
</tr>
<tr>
<td>DCF</td>
<td>Discounted cash flow</td>
</tr>
<tr>
<td>DERO</td>
<td>Discounted equity risk option</td>
</tr>
<tr>
<td>EBDIT</td>
<td>Earnings before depreciation, interest and tax</td>
</tr>
<tr>
<td>EBIT</td>
<td>Earnings before interest and tax</td>
</tr>
<tr>
<td>EBITDA</td>
<td>Earnings before tax, depreciation and amortization</td>
</tr>
<tr>
<td>EP</td>
<td>Economic profit</td>
</tr>
<tr>
<td>EPS</td>
<td>Earnings per share</td>
</tr>
<tr>
<td>EVA</td>
<td>Economic value added</td>
</tr>
<tr>
<td>FCF</td>
<td>Free cash flow</td>
</tr>
<tr>
<td>FIFO</td>
<td>First in first out</td>
</tr>
<tr>
<td>GAAP</td>
<td>General accepted accounting principles</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross domestic product</td>
</tr>
<tr>
<td>GOA</td>
<td>Group operating assets</td>
</tr>
<tr>
<td>LIFO</td>
<td>Last in first out</td>
</tr>
<tr>
<td>MVA</td>
<td>Market value added</td>
</tr>
<tr>
<td>MVE</td>
<td>Market value of equity</td>
</tr>
<tr>
<td>NDA</td>
<td>Non-depreciating assets</td>
</tr>
<tr>
<td>NOPAT</td>
<td>Net operating profit after tax</td>
</tr>
<tr>
<td>NOPLAT</td>
<td>Net operating profit less taxes</td>
</tr>
<tr>
<td>NPV</td>
<td>Net present value</td>
</tr>
<tr>
<td>OCF</td>
<td>Operating cash flow</td>
</tr>
<tr>
<td>OCFD</td>
<td>Operating cash flow demanded</td>
</tr>
<tr>
<td>Acronym</td>
<td>Term</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>OLS</td>
<td>Ordinary least squares</td>
</tr>
<tr>
<td>PE</td>
<td>Price earnings</td>
</tr>
<tr>
<td>PV</td>
<td>Present value</td>
</tr>
<tr>
<td>R²</td>
<td>R-squared</td>
</tr>
<tr>
<td>RI</td>
<td>Residual income</td>
</tr>
<tr>
<td>ROA</td>
<td>Return on assets</td>
</tr>
<tr>
<td>ROCE</td>
<td>Return on cash employed</td>
</tr>
<tr>
<td>ROE</td>
<td>Return on equity</td>
</tr>
<tr>
<td>ROI</td>
<td>Return on investment</td>
</tr>
<tr>
<td>ROIC</td>
<td>Return on invested capital</td>
</tr>
<tr>
<td>SVA</td>
<td>Shareholder value analysis</td>
</tr>
<tr>
<td>TBR</td>
<td>Total business return</td>
</tr>
<tr>
<td>TSR</td>
<td>Total shareholder returns</td>
</tr>
<tr>
<td>VBM</td>
<td>Value-based management</td>
</tr>
<tr>
<td>VIF</td>
<td>Variance inflation factors</td>
</tr>
<tr>
<td>WACC</td>
<td>Weighted average cost of capital</td>
</tr>
</tbody>
</table>
CHAPTER 1
INTRODUCTION

1.1 BACKGROUND

South Africa has become a popular emerging market economy for investors and it is of great importance that South African businesses ensure that they can prove their ability to create maximum shareholder value. The South African financial system has been much acclaimed in the international arena as one of the best in the world, second only to Canada. Therefore it is very important for banks in particular to ensure the ability to create shareholder value.

Executives have new approaches to management on their radars at any point in time. Up until the mid-1990’s we saw a great number of new management approaches (Koller 1994: 87). These approaches included for example: Total Quality Management (TQM), flat organisations, empowerment, continuous improvement, re-engineering, kaizen, team building and so on (Koller 1994: 87). Many of these have succeeded and many have failed. Value-based management (hereafter VBM) burst onto the scene in the mid 1990’s (Benson-Armer, Dobbs & Todd 2004:16). According to Ryan & Trahan (1999: 47) VBM refers to management adopting a corporate strategy for maximising shareholder value. VBM is, in theory, comprehensive and includes corporate strategy, management compensation issues, and detailed internal control and reward systems, all to link employee performance to shareholder value.

Wang, Zhang & Man (2006:35) state that value-based management appeared in the USA in the eighties and was consequently used extensively in the western world throughout the 1990’s by such companies as Microsoft, Intel, Coca-Cola and Siemens. Wang et al. (2006:35) define VBM as an enterprise management mode that stresses the key position of enterprise value. The authors also state that the main problem with current dividend policies is that it is based on accounting profit.
alone and puts the claim on amount of profit and not the amount of enterprise value. This dissertation will attempt to create a measure that can show how much value has been added. The act of pursuing only the maximum accounting profit is unfavourable to the enterprise’s long-term development (Wang et al. 2006:36). The goal should therefore be the maximization of shareholder wealth. This goal fits in perfectly with the VBM framework and the definitions of VBM given below. The problem arises when an attempt is made to measure the value that has been added, as will be explained later.

VBM (2012) gives two definitions of value-based management. The first definition states that it is the management approach that ensures that corporations are consistently run on value. VBM therefore includes all of the following:

- Creating value (ways to actually increase or generate maximum future value);
- Managing for value (governance, change management, organisational culture, communication, leadership); and,
- Measuring Value (valuation).

This definition relates to that of Wang et al. (2006:36) in the sense that it speaks to the concept of creating value. The second definition supplied by VBM (2012) is as follows:

Definition 2: Value-based Management aims to provide consistency with regard to:

- the corporate mission (business philosophy);
- the corporate strategy (courses of action to achieve the corporate mission and purpose);
- corporate governance (who determines the corporate mission and regulates the activities of the corporation);
- the corporate culture;
- corporate communication;
- organisation of the corporation;
- decision processes and systems;
- performance management processes and systems; and,
- reward processes and systems.
This consistency also has to involve the corporate purpose and values a corporation wants to achieve (normally maximising shareholder value). Again this definition is an expansion of what Wang et al. (2006:36) say about VBM. It adds the elements that need to be managed with a mindset of creating value. This dissertation conforms to these definitions of VBM, with the main element being the focus on creating shareholder value.

Koller (1994:89) states that VBM can best be understood as a marriage between a value creation mindset and the management of processes and systems that are necessary to translate that mindset into action. A value creation mindset in short means that senior management are fully aware of the ultimate objective of maximising shareholder value, that the company have rules as to when other objectives outweigh this imperative and that it has a solid analytical understanding of which performance variables drive value (Koller 1994:89). This dissertation will focus on the key value drivers that should be analysed and managed in order to ensure maximising of shareholder value.

Rappaport (2006:3) supplies ten principles along which to manage a company in order to create shareholder value. These principles will be discussed in greater detail in the coming chapters. For now attention is drawn to principle 6, which states that a company should reward CEO’s and other senior executives for delivering superior long-term returns. In the discussion of this principle Rappaport gives an indication of why standard stock options might not be the ideal way to reward top level executives. The article suggests that companies should rather look at indexed options. These options reward executives only when the company’s share price outperforms the index of the company’s peers. This study will attempt to determine a variable that indicates if a company has outperformed its peers and test its significance.

Share prices are affected by some factors that are within the control of the company and some that are not, for example regulatory requirements (especially the Basel accord for banks), the economic environment and the political environment. If one assumes though that these factors have an impact on the banking industry as a whole, then only VBM measurements that correlate with a “new measure”, or a created measure that shows how the company is performing against the industry
should be considered. In other words a measure should be tracked that indicates how one particular bank performs against the rest of the banks or against the banking industry average. Rappaport (2006:10) further mentions that the bulk of a typical company’s share price reflects expectations for the future growth of current business. If companies meet those expectations shareholders will earn a normal return, therefore a market average. In order to deliver superior long-term returns - that is to grow the share price faster than competitors’ share price - management must either repeatedly beat market expectations from its current business or develop new value-creating businesses. This dissertation will use the concept of growing faster than competitors as one of the indicators that can measure the value added when compared to peers.

Various studies (Fourie 2010:1, Beneke 2007:1) have attempted to correlate the different financial metrics supplied to measure value in the VBM framework with the share price of companies. Fourie (2010:1) focuses his study on the banking sector, while Beneke (2007:1) only looks at companies that are non-mining and non-financial companies. Both these studies found that popular measures such as Economic Value Added (EVA), Shareholder Value Analysis (SVA), Economic Profit (EP) and Cash Flow Return on Investment (CFROI) are not correlated that well with movements in the share prices. Other traditional accounting measures tested include Group Operating Assets (GOA), Price/Earnings ratios (P/E ratios), Net Operating Profit after Tax (NOPAT) and Earnings per Share (EPS). The results show in both cases that the EPS correlates better with movements in share price. This can to some degree be explained by the fact that share price movements are influenced by a number of factors that are within the control of the company, but also by some that are not within the control of the company. The factors that are not within the control of the company will be discussed further on.

According to Wang et al. (2006:36) the weakness of having the goal of maximising shareholder wealth is that the maximum of shareholder wealth is related to the maximum of the market value of the stock. Factors that influence the change in stock price not only include the enterprise’s business performance, but also investor psychology expectations, economic policies and political situations. In fact, these external factors can be grouped under four main headings. They are:
- economic environment;
- political environment;
- technological environment; and
- the regulatory environment.

Fortunately, because this study is limited to the banking sector in South Africa, one can assume that these factors influence all banks in a similar way. The assumption is therefore made that the changes in the regulatory environment, such as changes from Basel I to Basel II (and soon Basel III), will affect all banks. In other words, all banks will have to hold more capital to cover risk losses. The same assumption applies for the macro-economic environment, where a change in prime rate will affect all banks. When the prime rate starts increasing, all banks have increases in bad debts for example. The fact that the prime rate goes up or down is beyond the banks’ control, but the way in which the institution manages the business to create value in these times falls within a particular bank’s control. When the prime rate goes up, all banks have increases in the bad debt ratios, but the bank that manage these increases in bad debts the best will have the smallest impact on its income statement. This should translate into a better expected cash flow and therefore a better share price. It is the goal of this dissertation to attempt to measure how much more value one bank has created compared to its peers.

From the explanations above it can be seen that there are several widely used measures for the process of VBM. Various analyses have been conducted by taking a single or more than one of these measures and correlating them with the share price of various companies. The main idea in this dissertation is to see if a measure can be created that indicates how a particular bank is doing in relation to the industry, and secondly to look at which of these mentioned measures (or some form of a derivation of them) correlates best with this comparison to the industry measurement.
1.2 PROBLEM STATEMENT

South African banks have to ensure that they track, measure and enforce the correct measures to give shareholders the maximum value. The problem is that a multitude of possible measures exist that are supposedly better than the traditional accounting profit measures. In addition to the variety of measures available, there are a number of studies that show that the correlation between these VBM measures (EVA, EP, SVA, FCF, DCF, etc.) and the share price is often not very strong.

The question therefore is how to measure whether a company has been more efficient in creating value than its peers. This will answer Rappaport’s (2006:6) question on how much faster the company grew than its peers. In order to do this, ideal VBM or financial measures are needed with which to track and manage the value that has been created. In doing this an attempt is made to exclude all factors that are not within the control of the company, such as the macro-economy.

1.3 RESEARCH OBJECTIVES

1.3.1 Primary objectives

The main objective of this study is to determine if VBM measures that measure efficient management in the banking sector are related to share price movements in relation to peers.

1.3.2 Secondary objectives

The secondary objectives of the study are the following:

- To determine which VBM measure correlates best with the value creation variable;
To explore what extent movements in traditional performance measures affect the value creation variable;

To supply a model that can be used to show the impact of these performance measures on the value creation variable.

1.4 RESEARCH METHODOLOGY

The research methods that will be used in this study include the following:

1.4.1 Literature study and theoretical review

A literature study will be conducted with regard to the concept of VBM. The literature study will focus on the following:

- VBM principles;
- The concepts of the different VBM measures such as EVA, FCF, DCF, SVA, etc. and their link to VBM;
- The selection of a value creation variable;
- Advantages and disadvantages of VBM;
- VBM and its monitoring;
- Selection of a value creation variable.

1.4.2 Empirical research

The empirical research will be conducted by means of a quantitative study that will include a statistical data analysis.

The quantitative study will be done on the major banks listed on the JSE from 2001 to 2010. Historical data will be obtained and used to determine the variables EVA, EP, CFROI, SVA, FCF, and used to see what the impact is on value creation.
Statistical data analysis will be used to determine the impact that changes in these variables have on changes in the dependent variable. The dependent variable shows how much more or less value the particular bank has created.

1.5 SCOPE OF THE STUDY

The field of study for this research is financial management. The research focuses on how potential investors can use VBM to determine corporate performance, as well as share price movements. Only banking companies listed on the JSE were considered in this study.

1.6 LIMITATIONS OF THE STUDY

The biggest limitation of the study is that it focuses only on the banking sector in South Africa. This implies that companies from all other sectors are left out, including other companies from the financial industry such as insurance agencies and asset management companies. Another limitation is that the South African banking sector is slightly skewed towards the big four banks (Absa, First National Bank (FNB), Nedbank and Standard Bank). However, there are smaller players such as Capitec and Investec who are making in-roads in the banking sector. Also, African Bank Investments Limited (ABIL) is excluded as it is not a traditional deposit taking bank like the others.

1.7 LAYOUT OF THE STUDY

Chapter 2 of the dissertation presents the literature study review and the empirical research. The main VBM measures are discussed, as well as their impact on the creation of value. Chapter 3 presents the results of the analysis. Chapter 4 contains the conclusions and recommendations.
CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

The goal of any company is to manage assets in such a way that it will create a profit for the owners of the company. The owners need a measure (or measures) that will give them an indication of how much profit has been made in the financial period. Historically companies have been using accounting measures to fill this gap. These traditional accounting performance measures started to appear in the early 1900’s and have been used ever since (Maditinos, Sevic & Theriou 2009:183). Maditinos, Sevic & Theriou present a very brief history of traditional accounting measures, from discounted cash-flow to shareholder value (SHV). The point they make is that investors are becoming more sophisticated in valuing a company, so that the traditional balance sheet and income statements just do not offer adequate information on which to base their decisions. One of the main issues seen with traditional accounting performance measures is that they do not take into consideration the cost of investment.

Value-based management (VBM) was proposed to fill this gap of taking into consideration the cost of capital invested. VBM in theory involves two steps. A company first has to adopt an economic profit metric as a key measurement of performance, and secondly tie this measure to executive compensation (Haspeslagh, Noda & Boulos 2001:65). VBM measures, such as Economic Value Added (EVA), Economic Profit (EP) and Cash Flow Return on Investment (CFROI), have gained popularity since the late 1980’s (Maditinos et al. 2009:183). Managing for value has become of utmost importance for most executives around the world. Managerial accounting has evolved into a more strategic approach that emphasizes the identification, measurement and management of key financial and operational drivers of shareholder value (Ittner & Larcker 2001:350).

In essence then VBM is the principle of incorporating the cost of investment into traditional accounting measures, such as profit after tax, in order to manage for the
maximum shareholder value. This implies that a company that uses the VBM principles needs to identify those measures that are closely related to creating shareholder value, and incorporate them into strategic decision making.

2.2 SHAREHOLDER VALUE

Shareholders become the owners of a company by buying a small piece of the company. This is done by buying shares in a company for a market determined price. This is an asset for the shareholder and he or she expects the value of the asset (his/her piece of the company) to grow. A shareholder bears risk because the company can fail and the investor stands to potentially lose the entire investment in the company. Companies aim to use assets to generate revenue. This revenue is used to pay expenses that were incurred to generate the revenue, and what is left is the profit. The profit of a company is the amount left after deduction of all expenditure. This amount may either be retained for re-investment into profitable projects or distributed to shareholders.

The value of any asset is the present value of all the future benefits accruing to the owner/s of the asset (Meggison, Smart & Graham 2010:112). The future benefits of shares come in the form of dividend payouts and the increase in the share’s value. The value of a share can be calculated by determining the value of the company and then dividing this by the number of shares in issue. The value of the company is the present value of all the future cash flows:

\[
\text{Value} = \sum_{i=1}^{n} \frac{FCFi}{(1+\text{Discount rate})}
\]

here the discount rate is given by the Weighted Average Cost of Capital and FCFi is the Free Cash Flow in period i (Megginson et al. 2010:142).
2.3 VALUE-BASED MANAGEMENT

Defining value-based management (VBM) will be the first task in this literature review. What follows in this sub-section is an overview of the history of VBM, the principles of VBM and its advantages, as well as shortcomings.

2.3.1 History of value-based management

Ittner & Larcker (2001:351) provide us with an historic view of the evolution of managerial accounting practices. They classify the development of managerial accounting practices in four stages. The first stage starts prior to 1950 where the focus of managerial accounting was cost determination and financial control, through the use of budgeting and cost accounting systems. The 1960’s put the spotlight on management information for planning and control in which the focus was on ensuring the effective and efficient use of resources.

By the 1980’s managerial accounting started to shift away from a strict focus on planning and control towards reduction of waste in business processes (Ittner & Larcker 2001:352). The 1980’s saw the introduction of such techniques as quality management programs, measurement of the cost-of-quality, activity-based costing, process value analysis and strategic cost management (Ittner & Larcker 2001:352).

In the 1990’s the focus shifted once more to include not only planning and control and waste reduction, but also a strategic emphasis on creation of firm value (Ittner & Larcker 2001:352). The authors state that this should be accomplished through the identification, measurement and management of drivers of customer value, organizational innovation and shareholder returns. This fourth stage of evolution places the focus on value creation and various value creating techniques are introduced.

(2004:16) seconds this claim by stating that VBM burst onto the scene in the 1990’s with the revolutionary promise that companies that traded traditional management approaches in favour of VBM could align its aspirations, mind-set and management processes with everyday decisions that add shareholder value.

VBM became very popular in the 1990’s and early in the 21st century as a management tool. Ryan & Trahan (1999:46) showed in their study that 87 percent of 186 CFO’s surveyed indicated that they are familiar with VBM. According to Ryan & Trahan (1999:47) VBM refers to adopting a corporate strategy of maximising shareholder value. In order to implement VBM, a company would need at least a metric that is aligned to shareholder value creation. In their article Ryan & Trahan (1999:47) review some of the popular metrics used in the 1990’s. These metrics include Discounted Cash Flow (DCF), Cash Flow Return on Investment (CFROI), Return on Invested Capital (ROIC) and Economic Value Added (EVA). The measures used in the VBM framework will be discussed in greater detail in a coming section.

2.3.2 The value-based management framework

The Value-based Management (VBM) system is an integrated framework for measuring and managing businesses with the explicit objective of creating superior long-term value for shareholders (Ittner & Larcker 2001:352). The authors completed a comprehensive assessment of research on VBM and provide a conceptual framework with six basic steps. These steps are as follows:

1. Choose specific internal objectives that lead to shareholder value enhancement.
2. Select strategies and organizational designs consistent with the achievement of the chosen objectives.
3. Identify the specific performance variables, or “value drivers”, that actually create value in the business given the organization’s strategies and organizational design.
4. Develop action plans, **select performance measures**, and set **targets** based on priorities identified in the value driver analysis.

5. **Evaluate** the success of action plans and conduct organizational and **managerial performance evaluations**.

6. **Assess** the ongoing **validity** of the organization's internal objectives, strategies, plans and control systems in light of current results and **modify** them as required.

These six steps are summarised in the following flow chart adapted from Ittner & Larcker (2001:353).

---

**Figure 1 - Value-based Management Framework**
Athanassakos (2007:1397) defines VBM as a management philosophy that uses analytical tools and processes to focus an organization on the single objective of creating shareholder value. This includes an alignment of corporate strategy, performance reporting and incentive compensation, and aids to bring all staff together to act like shareholders, making decisions to maximise value. The similarities of this definition and the framework above are clear. The focus is on aligning the company’s strategies to create the maximum shareholder value. In essence VBM seeks to have every employee in the company act as though they were the owner (shareholder) of the company. This is done in order to ensure that the creation of shareholder value is always foremost in the mind of all employees.

Ryan & Trahan (2007:4) explains that literature on property rights and agency theory maintains that different incentives lead to conflicts between shareholders and managers of a firm, which could lead to loss in value. VBM therefore provides an integrated management strategy and financial control system designed to mitigate these agency costs and increase shareholder value. It furthermore provides a set of tools to, at least in theory, identify which strategies create and destroy value. In addition VBM links these measures of success to management compensation plans, which ultimately should lead to managers acting like owners.

Starovic, Cooper & Davis (2004:3) sees the definition of VBM as having two components. On the one hand it is the goal of creating value for shareholders. On the other hand it is a management approach, or even a philosophy, characterised mainly by the metrics used to measure performance. According to this study most UK companies believe that they are in the business of maximising shareholder value. The question raised by Starovic et al. (2004:3), as well as in this dissertation, is how value is defined and measured? Despite all of these differing definitions the one common thread is that VBM takes into consideration both the profit made and the cost of the capital employed to generate it (Stratovic et al. 2004:5).

The error that most accountants make is that they treat equity capital as a free resource (Stratovic et al. 2004:5). This means that companies can report profits when they are destroying value. VBM is an attempt to get back to value creation by taking into account the cost of capital (Stratovic et al. 2004:5).
Understanding value drivers and the impact of shareholder value is the hardest part of developing a strategy (Stratovic 2004:7). The author states the results of a PwC survey that found that 69 percent of executives in the sample reported that they had attempted to show an empirical cause-and-effect relationship between value drivers and value created. This might be due to various factors that are not fully understood by the executives. Factors such as the wrong value drivers and the wrong value-creation variable are just some of the possible causes for this lack of empirical evidence. Furthermore, of the 69 percent of executives who attempted to prove an empirical relationship, less than a third felt they had succeeded (Stratovic 2004:7). Only 10 percent of these executives felt they had empirical proof of the value created and the other 60 percent said they had at least made a modest attempt.

VBM attempts to provide a single governing objective in order to simplify this process (Stratovic 2004:7). The goal set out by the VBM process implies that there is no need for trade-off decisions between objectives as all objectives are measured and the one that adds the most value is selected. However, the decision might seem to go against common wisdom, for example it might allow for a reduction in market share, which might be seen as a negative (Stratovic 2004:7). Lloyds TSB are one of the companies that have successfully implemented VBM. Based on their results they decided to divest in a multitude of their overseas businesses (Stratovic 2004:7).

Stratovic (2004:7) further states that one of the key requirements for VBM is good quality information. This is a relatively simple step in the process of planning. The risk according to Stratovic is that approaching strategic planning with such an analytical framework might lead to information overload. In other words, strategic planning becomes too big and the company spends more time planning, and not enough time in executing their core business.

In conclusion, the basic idea of VBM is that traditional accounting profits are not enough to give an indication of value created for the shareholder. The core idea is that one needs to take into consideration the cost of the capital that was employed to create the profits. The goal of VBM is therefore to select only those projects that create shareholder value.
2.3.3 The principles of value-based management

Rappaport (2006:2) states that the pursuit of shareholder value is responsible for the ills besetting corporate America. The reality, however, is that the pursuit of shareholder value should be seen over a long period of time. Currently executive incentives focus on the short term horizon. It is fashionable these days to incentivise top executives with stock options with the idea that they will manage the company in such a way as to grow the share price as fast as possible. This would mean that top management has the interest of shareholders at heart. Top executives could argue, though, that shareholders these days hold shares on average for less than one year as opposed to about seven years in the 1960’s, so there is no need to manage for the long term (Rappaport 2006:3). This logic is flawed because what matters is not the holding period, but rather the valuation horizon of the market (Rappaport 2006:3). That is the number of years of expected cash flow required to justify the stock price (Rappaport 2006:3). Rappaport notes that previous studies suggest that it takes more than ten years of value-creating cash flows to justify the stock prices of most companies. One of the common measures used to indicate the number of years a company has to earn current cash flows is the Price/Earnings (P/E) multiple. It indicates the number of years it will take for the company to pay back the original investment by the investor in capital growth.

Rappaport (2006:3) asks the question what companies have to do if serious about creating value. He then draws on his vast experience as a consultant to give the ten basic governance principles for value creation that help companies realize value along with a sound, well-executed business model. These ten principles are discussed in brief below.

**Principle 1: Do not manage earnings or provide earnings guidance**

Companies that fail to embrace this first principle are almost sure to fail the rest of the set of principles (Rappaport 2006:3). Unfortunately almost all companies play the earnings expectations game. A 2006 National Investor Relations Institute study
found that 66% of 654 surveyed companies give regular profit guidance updates to Wall Street analysts. A 2005 survey of 401 financial executives by Duke University’s John Graham and Campbell R. Harvey, and University of Washington’s Shivaram Rajgopal, reveals that companies manage earnings with more than just accounting gimmicks. A startling 80% of respondents said they would decrease value-creating spending on research and development, advertising, maintenance and hiring in order to meet earnings benchmarks (Rappaport 2006:3). More than 50% would delay a new project even if it means sacrificing value.

What is so bad about focusing on earnings? First, accounting profit (or bottom line) approximates neither the company’s value nor its change in value. Second, organizations compromise value when they invest at a rate below the cost of capital or forgo investment in value-creating activities in order to make short term earnings targets. Third, the practice of presenting good earnings in the short term via value destroying operating decisions, eventually catches up with companies. A classic example of this is the Enron case (Rappaport 2006:3).

**Principle 2: Make strategic decisions that maximize expected value, even at the expense of lowering near-term earnings**

Because most companies are managing for short term earnings (see principle 1), it is sure that most companies will break this principle. In fact, most companies evaluate and compare strategic decisions in terms of the estimated impact on earnings when they should be measuring against the expected incremental value of future cash flows instead. Expected value is the weighted average value for a range of possible scenarios (Rappaport 2006:3).

Rappaport (2006:4) states that a sound strategic analysis by a company’s operating units should produce informed responses to three questions: First, how do alternative strategies affect value? Second, which strategy is most likely to create the greatest value? Third, for the selected strategy, how sensitive is the value of the most likely scenario to potential shifts in competitive dynamics and assumptions
about technology life cycles, the regulatory environment, and other relevant variables?

At the corporate level, executives must also address three additional questions: First, do any of the operating units have sufficient value-creation potential to warrant additional capital? Second, which units have limited potential and should therefore be candidates for restructuring or divestiture? Third, what mix of investments in operating units is likely to produce the most overall value?

Principle 3: Make acquisitions that maximise expected value, even at the expense of lowering near-term earnings

Companies typically create the most value through day-to-day operations, but a major acquisition can create or destroy value faster than any other corporate activity (Rappaport 2006:5). Companies and investment bankers usually consider P/E multiples for comparable acquisitions and the immediate impact of earnings per share (EPS) to assess the attractiveness of a deal. Whenever the acquiring company’s P/E multiple is greater than the selling company’s multiple, EPS rises. The inverse is also true. In neither case does EPS tell us anything about the long-term potential to add value.

Instead, decisions made about Mergers and Acquisition (M&A) deals should be based on prospects for creating value and not the immediate impact on EPS (Rappaport 2006:5). Management needs to identify clearly where, when, and how it can accomplish real performance gains by estimating the present value of the resulting incremental cash flows and then subtracting the acquisition premium.
**Principle 4: Carry only assets that maximise value**

The fourth principle takes value creation to a new level because it guides the choice of business model that value-conscious companies will adopt. There are two parts to the principle (Rapport 2006:5).

First, value-oriented companies regularly monitor whether there are buyers willing to pay a meaningful premium over the estimated cash flow value to the company for its business units, brands, real estate, and other detachable assets (Rappaport 2006:5). Second, companies can reduce the capital employed and increase value in two ways: By focusing on high value-added activities where they enjoy a comparative advantage and by outsourcing low value-added activities when these activities can be reliably performed by others at lower cost (Rappaport 2006:6).

**Principle 5: Return cash to shareholders when there are no credible value-creating opportunities to invest in the business**

Value-conscious companies with large amounts of excess cash and only limited value-creating investment opportunities return the money to shareholders through dividends and share buybacks (Rappaport 2006:6). Not only does this give shareholders a chance to earn better returns elsewhere, but it also reduces the risk that management will use excess cash to make value-destroying investments. Just because companies buy back shares does not mean they abide by this principle. Many companies buy back shares purely to boost EPS.

Value-conscious companies repurchase shares only when the company’s stock is trading below management’s best estimated value and no better return is available from investing in the business (Rappaport 2006:6). When a company’s shares are expensive and there is no good long-term value to be had from investing in the business, paying dividends is probably the best option.
Principle 6: Reward CEO’s and other senior executives for delivering superior long-term returns

Companies need effective pay incentives at every level to maximize the potential for superior returns (Rappaport 2006:6). Rappaport further states that stock options were once seen as evidence of a healthy value ethos. However, the standard option is an imperfect vehicle for motivating long-term, value-maximising behaviour. First, standard stock options reward performance well below superior-return levels. Second, the typical vesting period of three or four years, coupled with executives’ propensity to cash out early, significantly diminishes the long-term motivation that options are intended to provide. Finally, when options are hopelessly underwater, they lose their ability to motivate at all. Therefore if the value of the options moves out of the money and are not worth much, the options lose their motivating ability.

Value-conscious companies can overcome the shortcomings of standard employee stock options by adopting either a discounted indexed option plan or a discounted equity risk option (DERO) plan (Rappaport 2006:7). Indexed options reward executives only if the company’s shares outperform the index of the company’s peers and not simply because the market is rising. Companies can address the other shortcoming of standard options – holding periods that are too short – by extending vesting periods and requiring executives to hang on to a meaningful fraction of the equity stakes obtained from exercising options.

For companies unable to develop a reasonable peer index, DERO’s are a suitable alternative. The DERO exercise price rises annually by the yield to maturity on the ten-year U.S. Treasury note (the ten-year bond yield in South Africa) plus a fraction of the expected equity risk premium, minus dividends paid to the holders of underlying shares. However, the focus in this dissertation is on the banking sector in South Africa for which a peer index exists. Therefore we will not consider the DERO route. For smaller companies where a peer index does not exist the DERO route is applicable.
Principle 7:  Reward operating-unit executives for adding superior multiyear value

Stock options might be useful as incentive for corporate executives whose mandate is to raise the performance of the company as a whole, and thus ultimately the share price. This option will not suffice for operating-unit executives who have a limited impact on overall performance (Rappaport 2006:7). A stock price that declines because of disappointing performance in other parts of the company may unfairly penalize the executives of the operating units that are doing exceptionally well. The inverse is also true. Companies typically have both annual and long-term (three years) incentives based on targets for revenue, operating income and profit, as well as bonus incentives for beating the targets. The problem is that managers aim to set the targets as low as possible in order to exceed them easily.

When considering incentives for an operating-unit, companies need to develop metrics such as Shareholder Value Analysis (SVA). SVA can be calculated by applying standard discounting techniques to forecasted operating cash flows that are driven by sales growth and operating margins, and then subtracting the investment made during the periods (Rappaport 2006:7).

Principle 8:  Reward middle managers and frontline employees for delivering superior performance on the key value drivers that they influence directly

SVA would be too broad to provide much day-to-day guidance for middle managers and frontline employees, who need to know what specific actions should be taken to increase SVA (Rappaport 2006:8). For more specific measures companies can develop leading indicators of value, which are quantifiable, easily communicated current accomplishments that frontline employees can influence directly and that significantly affect the long-term value of the business in a positive way.
The process of identifying leading indicators can be challenging, but improving leading indicator performance is the foundation for achieving superior SVA, which in turn serves to increase long-term shareholder returns.

**Principle 9: Require senior executives to bear the risks of ownership just as shareholders do**

Many companies have adopted stock ownership guidelines for senior management. Minimum ownership is usually expressed as a multiple of base salary, which is then converted to a specific number of shares (Rappaport 2006:8). Top managers are further required to retain a percentage of shares resulting from the exercise of stock options until they amass the stipulated number of shares.

Companies seeking to better align the interests of executives and shareholders need to find a proper balance between the benefits of requiring senior executives to have a meaningful and continuing ownership stakes and the resulting restrictions on their liquidity and diversification. Without equity-based incentives, executives may become excessively risk averse to avoid failure or dismissal. If they own too much equity, however, they may also eschew risk to preserve the value of their largely undiversified portfolios (Rappaport 2006:8).

**Principle 10: Provide investors with value-relevant information**

The final principle governs investor communications, such as financial reports. Better disclosure not only offers an antidote to short-term earnings obsession, but also serves to lessen investor uncertainty and as a result potentially reduces the cost of capital and increases the share price. Rappaport (2006:10) suggests a corporate performance statement containing the following:
Separate out cash flows and accruals, providing a historical baseline for estimating a company’s cash flow prospects and enabling analysts to evaluate how reasonable accrual estimates are;

Classification of accruals with long cash-conversion cycles into medium and high levels of uncertainty;

Provision of a range and the most likely estimate for each accrual;

Exclusion of arbitrary, value-irrelevant accruals, such as depreciation and amortization;

Detailed assumptions and risks for each line item while presenting key performance indicators that drive the company’s value.

For most companies, value creating growth is the strategic challenge (Rappaport 2006:10). If they want to succeed companies must be good at developing new, potentially disruptive businesses, because the bulk of the typical company’s share price reflects expectations for growth of the current businesses (Rappaport 2006:10). Shareholders will only earn a normal return if the company meets its expectations. In order to deliver superior long-term returns a company needs to grow its share price faster than its peers.

2.3.4 The advantages of value-based management

Value-based management (VBM) on a high level involves two steps: First, adopt an economic profit measure as a key performance measure. Second, tie compensation on all levels to the target economic profit metric (Haseslagh et al. 2001:65). Stratovic (2004:3) states that the ultimate objective for companies is to create the maximum value for shareholders, which normally implies the aim of the highest possible share price. VBM is therefore a powerful tool that allows companies to strategically manage business in order to create maximum shareholder value. VBM means managing for shareholder value.

Stratovic (2004:16) describes the benefit of VBM in various aspects of an organization. The first aspect is the governance and ownership dichotomy. This is also known as the agency problem where managers sometimes act in their own
interest instead of the shareholders’ interest. The result is that there is sometimes a misalignment of goals for each of these parties (Stratovic 2004:16). VBM aims to eliminate this misalignment by ensuring executives manage the business as though they were the shareholders. The ten principles discussed above, especially principles 6 and 9, aims to incentivise executives to act as though they were the owners.

VBM further aims to align remuneration of managers on all levels to the goal of maximizing shareholder value. Remuneration policies often play a central role in the VBM framework (Stratovic 2004:17). This is another step toward the elimination of the agency problem. If the remuneration of top executives (and other managers) is aligned to the goal of maximizing shareholder value then managers should act as though they were the owners.

Because VBM is such an all-encompassing tool that covers the whole of the business and aims to shift the mindset of managers to maximizing shareholder value, significant culture changes needs to take place. VBM does not only involve selecting a strategic tool with a particular economic profit measure to track. It also involves the changing of the culture in the organisation from one that tracks short-term accounting profit measures, to one that is focused on long-term value creation. In some companies VBM begins and ends with changing performance measures (Stratovic 2004:19). However, in order to get employees to act on these measures a cultural shift needs to take place. VBM should contain an element of changing the culture of the organisation into one where all norms and ways of working are directed toward value creation.

VBM has such a large scope of impact that it is likely to also impact on the structure of the organization (Stratovic 2004:20). Structure should follow strategy and not the other way around. VBM is such a broad strategic enabler, and because of this fact it is natural that it will have some impact on the structure of the company. The issue of structure is about aligning different parts of the organisation with the overall strategic objectives (Stratovic 2004:20).

VBM involves not only the shareholders but all stakeholders involved in the business (Stratovic 2004:21). VBM aims to translate the strategic goals set by top management into operational targets for lower level management and employees.
Any type of business has customers without which the company cannot survive. Keeping customers happy so that they bring repeat purchases is a vital element of strategy. Customers and employees can be seen as other stakeholders apart from the traditional shareholders. The advantage of VBM is that it encompasses all stakeholders in the process of setting targets and managing these targets.

2.3.5 The disadvantages of value-based management

Only 30 percent of companies surveyed by Ernst & Young in 2003 claimed to use VBM extensively and roughly the same number have tried and rejected it (Stratovic 2004:22). One of the reasons supplied for this is that VBM is not an easy concept to implement. It is also not an easy practice in reality.

Another reason is that many companies find they lack the resources and commitment to make any real headway (Stratovic 2004:22). The cost of implementing VBM is usually high because most companies’ boards employ consultants to implement VBM, which is very costly. The fact that VBM has such a significant impact on the culture of the organisation can also be a drawback (Stratovic 2004:22). Changing a company-culture is a long-term and tedious process and can take up many resources to implement.

Companies sometimes lose focus on the VBM goals that were set and revert back to the tried and tested (Stratovic 2004:22). If the backing from the top-level executives for VBM is lacking, the process will fall flat with major repercussions. Sunk cost for implementation cannot be redeemed, more resources has to be utilised to fix the problem.

Walters (1997:709) states that another major drawback of VBM is the fact that most companies have had difficulties at middle-management levels when trying to set operational targets. Haspeslagh et al. (2001:66) also mentions the difficult task of choosing the correct economic profit measure to track.
2.4 VALUE-BASED MANAGEMENT METRICS

What follows is a short discussion of some of the most popular measures for measuring VBM. The list of measures we will discuss includes Discounted Cash Flow (DCF), Free Cash Flow (FCF), Cash Flow Return on Investment (CFROI), Economic Value Added (EVA), Shareholder Value Analysis (SVA), Market Value Added (MVA), Economic Profit (EP) and Total Business Return (TBR).

2.4.1 Discounted Cash Flow (DCF)

DCF is the present value of all expected future cash flows discounted back to the present at the company’s cost of capital (Ryan et al. 1999:47, Ryan & Trahan 2007:5). Alcar popularized DCF as a metric linked to shareholder value, and the notion that cash flows may be broken down into a number of value drivers.

Shareholder Value Analysis is a form of discounted cash flows. The cash flows are the Free Cash Flows (FCF’s), discounted to the present time by a discount rate (Starovic et al. 2004:10).

2.4.2 Free Cash Flow (FCF)

Free Cash Flow (FCF) is the amount of cash flow available to investors who are the providers of equity capital. It represents the net amount of cash flow remaining after the firm has met all operating needs and paid for investments, both long and short term (Meggison et al. 2010:34). Shareholder wealth is influenced by the usage of this FCF.
2.4.3 Market Value Added (MVA)

Keown, Martin, Petty & Scott (2002:621) define MVA as the value of the firm's assets minus the sum total of its invested capital. The MVA measure was also devised by Stern Stewart & Co. MVA (2012) defines MVA as the difference between the equity market valuation of a listed/quoted company and the sum of the adjusted book value of debt and equity invested in the company. The higher the MVA the better for the company in other words the more value was created.

2.4.4 Cash Flow Return on Investment (CFROI)

Cash Flow Return on Investment (CFROI) represents the cash flow a company generates in a given period as a percentage of the cash invested in the company's assets. Both the cash flow and assets are stated in current currency to adjust for inflation. The asset base is also adjusted to include the capitalization of operating leases. The cash flow to cash invested ratio is then converted to an internal rate of return measure over the normal economic life of the assets involved (Ryan et al. 1999:47, Ryan & Trahan 2007:5).

In essence, CFROI is a “real” rate of return measure, which identifies the relationship of cash generated to cash invested by a business (Starovic et al. 2004:13). The argument is that it is a measure free from potential accounting distortions relating to issues such as inflation and variation in asset ages.

In its more sophisticated form, CFROI incorporates the principles of the Internal Rate of Return (IRR) concept (Starovic et al. 2004:13). It provides the discount rate that discounts the future annual cash flows that are expected to arise over the average life of the firm’s assets back to current cash value. What follows is a short explanation of the calculation of CFROI, as well as the advantages and disadvantages of CFROI adapted from Starovic et al. (2010:13).
2.4.4.1 Calculating CFROI

The calculation of CFROI requires three stages. The first stage involves converting accounting profit into real cash flow for the period. This entails adjusting for non-cash profit and losses and non-operating items. The second stage involves converting the capital invested as per the balance sheet into an inflation-adjusted measure of investment. Finally, the annual cash performance as calculated in stage 1 is converted into an economic performance measure using the principles of IRR. This requires that we know the average life of the firm’s assets and the value of non-depreciating assets (such as land and working capital) so that they can be estimated. Once we have all the information we can calculate the discount rate \((r)\) that solves the following equation:

\[
\text{Gross operating assets (current price)} = \sum CF_i + NDA + \ldots + \sum CF_i + NDA
\]

Where \(CF_i\) represents the cash flow in year \(i\) and \(NDA\) represents the non-depreciating assets.

With this approach CFROI measures the cash profitability of a business for a specific year and represents the average projected rate of return from all of the business’ existing projects at a particular point in time (Starovic et al. 2010:13).

2.4.4.2 Advantages and Disadvantages CFROI

Claims that CFROI is a superior measure of performance, that provides the basis for more accurate business valuations, are justified in the literature with the argument that CFROI best resembles the way in which the stock market judges a company’s performance (Starovic et al. 2010:14). One of the advantages of CFROI is that it is not influenced by inflation or non-cash profits or losses such as depreciation.

The disadvantages of CFROI includes firstly that it is time consuming to calculate and costly to apply. Also, the calculation of the average life of assets can be very subjective.
2.4.5 Shareholder Value Analysis (SVA)

The shareholder value analysis (SVA) was developed by Alfred Rappaport in the 1980’s (Starovic et al. 2004:10). It can be used to estimate the value of the shareholder’s stake in the company or business unit, and can also be used as the basis for formulating and evaluating strategic decisions. The value of the operations of the business is determined by discounting the expected future free cash flows at an appropriate cost of capital (Starovic et al. 2004:10).

2.4.5.1 Calculating SVA

Free cash flow (FCF) can be derived as follows:

\[
\begin{align*}
\text{Sales} & \quad \times \\
\text{Less: Operating costs} & \quad (X) \\
\text{Equals: Operating profits} & \quad \times \\
\text{Add: Depreciation} & \quad \times \\
\text{Less: Cash tax on profits} & \quad (X) \\
\text{Equals: Operating profits after tax} & \quad \times \\
\text{Less: Investment in fixed capital} & \quad (X) \\
\text{Less: Investment in working capital} & \quad (X) \\
\text{Equals: Free cash flow from operations} & \quad \times
\end{align*}
\]

Table 2.1 - Calculating Free cash flows

In order to accurately value a company, FCF needs to be calculated for every year in the future existence of the company. In practice this is impossible because no one can accurately predict the future. Starovic et al. (2004:10) suggests a shortcut where one would divide the future cash flows into a planning period and beyond the planning period.

The FCF’s in the planning period can be calculated by making assumptions around growth on the seven drivers of FCF as shown in the table above. This implies that if for example one sets the planning horizon as three years, forecasts need to be made over this period for sales growth, operating margins, income tax rates, growth of
investment in fixed capital and working capital, as well as the cost of capital. When these forecasts have been finalised one can easily calculate the FCF’s per year over the planning period.

The FCF’s over the period beyond the planning horizon is often referred to as the terminal value or continuing value (Starovic et al. 2004:11). In this time period a company would usually calculate the long term growth rate in FCF’s and apply this growth rate to the FCF at the end of the planning period. These values are then discounted back to time zero along with the planning period FCF’s and the sum of these represent the value of the company at time zero.

2.4.5.2 Advantages and Disadvantages of SVA

The SVA method can be used to value a business pre- and post-implementation of certain projects (Starovic et al. 2004:11). The breakdown of FCF into its seven value drivers lends this method to sensitivity analysis as well. Analysts will also be able to break down the seven value drivers even further into their respective value drivers to do more detailed sensitivity analysis (Starovic et al 2004:11). The major problem with SVA is the fact that assumptions have to be made on future performance, which can lead to subjectivity in the forecasts.

2.4.6 Economic Profit (EP)

Economic Profit (EP) is another way to determine shareholder value. Another name for EP is sometimes “residual income” and is used as a means of measuring divisional performance (Starovic et al. 2004:11). The concept of EP has been around for a long time and was first reported by Alfred Marshall in the 1890’s. EP describes the surplus cash earned by a business in a period after the deduction of all expenses, including the cost of using investor’s capital in the business (Starovic et al. 2004:11). The accounting profit does not take into consideration the cost of
capital as EP does. Economic Profit is the difference between the return made on capital and the cost of capital. The calculation of EP can be done in two ways:

\[
EP = \text{Invested Capital} \times (\text{return on capital} - \text{WACC}) \quad \text{or,}
\]

\[
EP = \text{Operating profits after tax less a capital charge.}
\]

In the first equation WACC represents the cost of capital calculated as the weighted average cost of capital.

### 2.4.6.1 Economic Value Added (EVA)

EVA is a metric that was made popular by consulting firm Stern Stewart & Co., and is a residual income type measure of economic profit (Ryan et al. 1999:47, Ryan & Trahan 2007:5). O’Byrne (1996:116) defines EVA as net operating profit after tax (NOPAT), minus charge for all capital invested in the business. Megginson et al. (2010:697) defines EVA as the difference between NOPAT and the cost of funds, which is the same as the O’Byrne definition. In this dissertation we will use the definition as in Megginson et al. (2010:697).

Economic Value Added (EVA) is effectively a refined version of the basic EP approach (Starovic et al. 2004:12). The calculation of EVA is as follows:

\[
\text{EVA} = \text{Adjusted invested capital} \times (\text{adjusted return on capital} - \text{WACC});
\]

\[
\text{EVA} = \text{Adjusted operating profit after tax less capital charge};
\]

\[
\text{EVA} = \text{adjusted operating profits after tax less (adjusted invested capital} \times \text{WACC}).
\]

Stern Stewart, who popularized the EVA concept, suggests that the basic EP calculation is undermined by three distorting factors (Starovic et al. 2004:11). These are the effect of:

- Non-cash, accruals-based bookkeeping entries, which tend to conceal the true “cash” profitability of a business;
• The fundamental accounting concept of prudence, which tends to lead to a systematic conservative bias affecting the relevance of reported accounting numbers;
• “Successful efforts accounting” where companies write off costs associated with unsuccessful investments, which tends to understate the “true capital” of a business (Starovic et al. 2004:11).

In an effort to overcome these distortions Stern Stewart advocates up to 164 adjustments to the measure of operating profits and capital on which EVA is based.

2.4.6.2 Advantages and Disadvantages of EVA

The EVA approach possesses all of the key advantages of the basic EP approach so that it can be used to evaluate strategic decisions. It is relatively straightforward and easy to calculate before the adjustments. The major disadvantage of EVA is the recommended adjustments that can be time consuming.

2.4.7 Total Business Return (TBR)

Total Business Return (TBR) is the internal equivalent of the external total shareholder returns (TSR) measure, which considers capital gains and dividends received by shareholders (Starovic et al. 2004:14). The TBR approach is said to overcome the principal weaknesses of other short-term measures such as EVA, EP, cash flow and CFROI. It is said to incorporate the long-term effect on the value of the business of decisions and actions taken in a particular period (Starovic et al. 2004:14).

Effectively TBR represents an internal rate of return measure that equates the beginning value of a business with the net free cash flows arising in the period, plus the value of the business at the end of the period (Starovic et al. 2004:14). The accuracy of the TBR measure depends on the accuracy of the valuation of the business at the beginning and end of the time period.
2.4.7.1 Advantages and Disadvantages of TBR

The key justification of the TBR approach is that, by incorporating the effect of changes in value as well as delivered performance in a period, it represents the closest measure of true economic performance (Starovic et al. 2004:14). The main problem is the subjective approach to measuring the value of the business at the beginning and end of the period.

From the explanations above we can see that there are various popular measures for measuring the process of VBM. Various analyses have been done by taking a single or more than one of these measures and correlating them to the share price of various companies. The main idea in this dissertation is to analyse if a measure can be created that will show how a particular bank is doing in relation to the industry, and secondly to look at which of these mentioned measures (or some form of a derivation of them) correlates best with creating value.

2.5 METRICS FOR MEASURING VALUE CREATED

This sub-section offers a discussion of the various metrics used to approximate the value created by companies. The aim of the study is to analyse which factors influence a company’s ability to create value. In order to do this we need to identify a variable which can be regressed against independent variables. Rappaport (2006:10) states that a company needs to outperform an index of performance for its peers in order to create long-term value. The aim here is to identify a particular variable that can be used to indicate the value created, but which is not influenced by factors not within the control of the company, such as macro-economic variables. The independent variables will be the popular measures of value-based management (VBM) discussed in the previous section.

When researchers test the effectiveness of VBM metrics such as EVA, they test it against movements in the share price. Movements in the share price are an indication of value, but various other factors also influence the movement in the share price. Wang et al. (2006:36) indicates that factors such as investor psychology
and expectations, economic policy and the political situation have an influence on the markets’ view of the company. Add to this also the effect of the regulatory environment and its impact on banks.

The key therefore is to create or calculate a variable that will remove the effect of these external factors. Also, the variable should indicate the value created or destroyed by the company in relation to its peers.

2.5.1 Influence of external factors on value creation

Athanassakos (2007:1398) attempts to determine which Canadian companies have embraced VBM, identifies the characteristics of these companies and assesses the impact of VBM on these companies’ stock prices. Previous studies have shown that five-year changes in earnings explained only 24 percent of the variation in market value. The focus of these previous studies is on the use of EVA as metric for VBM and they show that various studies have different conclusions on the validity of VBM.

Some studies show that EVA is highly correlated to accounting variables (Athanassakos 2007:1398). This is not surprising as EVA is calculated using current profit after tax, cost of capital and current invested capital. Athanassakos (2007:1398) further shows that EVA explains more variation in ten-year stock returns than do changes in earnings. The author also cites studies showing that EVA is a lagging indicator and that it provides no indication of the company in the future.

Athanassakos (2007:1399) used a survey that was sent to CEO’s of firms in Canada. The list of companies represents the 300 largest publicly-owned Canadian firms. The aim of the survey was to see if the firm was familiar with the VBM concept, and also to investigate the use of VBM including the area of use, scope of use, time of adoption, employee education and if compensation was related to VBM.

Athanassakos (2007:1405) uses a logit model to determine amongst other variables the impact of better share prices on the probability of VBM adoption. In other words, they test to whether companies with a higher likelihood of VBM adoption also have better stock prices. The result shows that share prices are in fact negatively related
to EVA and that the coefficient is not statistically significantly different from zero. This highlights the importance of excluding those variables that influence share prices, but are not within the direct control of the company.

Oxelheim & Wihlborg (2001:105) presents a study on how to remove the effects of macro-economic fluctuations in VBM. They recognize the fact that VBM is a strategic tool used to maximise shareholder value. Their research states that the most popular VBM metrics such as EVA, SVA, Cash Value Analysis (CVA) and CFROI does not make the distinction between changes in cash flows caused by management actions and those caused by change in the firm’s macro-economic environment.

Oxelheim & Wihlborg (2001:105) indicates that a firm’s competitive position may be attributed to its specific management skills in relation to the market and competitors. This is confirmed by Rappaport (2006:10) who indicates that the calculation of value created or destroyed needs to be in relation to the company’s peers. Oxelheim & Wihlborg (2001:105) states though, that short-term fluctuations especially, are often caused by macro-economic fluctuations such as changes in exchange rates, interest rates and aggregate price levels both locally and internationally. These factors are not within the direct control of the firm. They therefore make the suggestion of filtering out the effects of fluctuations in the macro-economy.

The ten principles discussed in Subsection 2.2.3, specifically principle 6, explains that top management’s incentives and bonuses must be linked to the creation of value. Therefore it makes sense to attempt to exclude those fluctuations that are not within the control of management. Such filtering allows management to estimate the firm’s performance in a neutral macro-economic scenario (Oxelheim & Wihlborg 2001:105).

The importance of this filtering can be seen when companies need to decide on the viability of a project based on the estimated cash flows it will generate (Oxelheim & Wihlborg 2001:105). The project might show a false positive of cash flows that is due to macro-economic factors and not due to the project itself. The inverse is also true. A project might be rejected because it is thought to generate negative cash flows, but this might be due to macro-factors and not the project. The consequences of selecting a project that is in fact not profitable can be severe. If the decision to go ahead results in large capital outlays or large numbers of employees that need to be
employed, the company will suffer the consequences for a long period of time. This then has a detrimental effect on value created, which eventually will have an effect on shareholder value.

Oxelheim & Wihlborg (2001:106) provides an additional argument for filtering out macro-economic effects in that they represent a possible explanation for large observed differences between economic values as measured by EVA for example and market values. The differences might be due to the market value analyst taking a view on the value of the company by incorporating macro-economic factors. EVA for example only looks at company specific values, and only looks at historical values. It is therefore not forward looking and only company specific.

Macro-economic fluctuations affect cash flows of companies as well as the market values (Oxelheim & Wihlborg 2001:117). Changes in cash flows can be influenced by as much as management can forecast macro-economic developments. Generally this is a very difficult task with not many firms able to accurately forecast macro-economic variables beyond the current year. Also, VBM dictates that management compensation needs to be aligned to shareholder value. Shareholder value is measured by share price returns and dividends and therefore it is important to exclude factors that impact cash flows which are not in the firms control such as macro-economic fluctuations.

Ndako (2010:74) studies the relationship between the stock market and the state of the economy while controlling for the effects of the banking system for the South African market. He cites studies concluded for developed countries such as the USA, UK, France, Germany and Japan where the relationship was tested between the stock market and the economy. These studies indicated that some countries exhibit bidirectional causality between stock markets and economic growth. Other countries exhibit unidirectional causal relationships between stock markets, banks and economic growth.

Ndako (2010:88) finds that in South Africa in the long-run there is evidence of bidirectional causality between financial development and economic growth. When only stock market variables are studied, the results indicate unidirectional causality from economic growth to the stock market. Therefore the study indicates that the macro-economy has an impact on the stock market in general in South Africa.
Dumitriu & Stefanescu (2009:440) study the effect of systemic risk on financial institutions, and in particular banks in Romania. The study indicates that factors such as government intervention in the global financial crisis of 2007-2009 affected systemic risks of companies and perceptions for the sector as a whole. This is critical in our analysis as companies might be doing badly, but the view of analysts might be that the company will not fail because of their perception about the market as a whole.

Dumitriu & Stefanescu (2009:440) studies systemic risk by using the Capital Asset Pricing Model (CAPM) given by the equation below:

\[
E(R_i) = R_f + \text{Beta} [E(R_m) - R_f]
\]

Where

- \(E(R_i)\) is the expected return of an asset \(i\)
- \(R_f\) is the risk-free rate of return
- \(E(R_m)\) is the expected return of the market
- \(\text{Beta}\) is a coefficient that reflects the sensitivity of the expected return of the asset to the difference between the expected return of the market and the risk-free rate of return.

Dumitriu & Stefanescu (2009:441) cite studies that conclude that Beta might be dependent on market conditions. This implies that a company can have a different Beta in a bull market than in a bear market. They conclude that there are significant asymmetrical behaviours of share prices in the case of bull and bear markets.

Athanasoglou, Brissimis & Delis (2008:121) studies the impact of bank-specific, industry-specific and macro-economic variables on the profitability of banks. The study suggests that previous literature does not include a thorough investigation on the impact of macro-economic variables on profitability. It investigates industry-specific variables that are defined as not within managements’ control, but specific to the industry. Bank profitability is pro-cyclical and therefore asymmetrical due to the business cycle. The interesting conclusion is that industry specific variables are not influential on profitability, but this may be due to the selection of variables.
The variables normally used to test the effect of the macro-economy on bank profitability are the inflation rate, the long-term interest rate and/or the growth rate of money supply (Athanasoglou et al. 2008:124). The effect of inflation comes in the form of increases in wages and operating expenses and whether these increases are above inflation or not. The question now becomes how accurately inflation rates can be forecasted (Athanasoglou et al. 2008:124).

Athanasoglou et al. (2008:126) selects Return on Assets (ROA) and Return on Equity (ROE) as the variables indicating the value created. The inflation rate (or long-term interest rate) and the deviation of actual output from the segmented trend is used as the macro-economic variables. The results of the study indicate that the bank specific variables such as labour productivity and operating expenses are strongly linked to the profitability of banks.

The important result sprouting from this study is that the macro-economic factors selected do affect the profitability of banks in Greece. Overall, Greek banks’ profitability is affected by both bank variables (which are within control of management) and macro-economic factors, which are not within the control of management.

2.5.2 Shareholder value creation

Petre & Bunea-Bontas (2009:769) studies the most popular metrics of value added and supplies another economic profit measure as a possibility. One of the measures that are covered in their study is Market Value Added (MVA), calculated as follows:

\[ \text{MVA} = V - K, \]

Where:

V is the value of the firms' shares; and

K is the Invested Capital.

This is not an ideal measure for calculating the value added by the company because MVA does not take into consideration the distribution of dividends. Apart
from this the following reasons can be given as well. The value of the firms’ shares (V), which is the general markets view of the company, is influenced by various external factors as was described above. The value of invested capital (K) is the difference between total assets and total debt according to the traditional accounting equation. This means that the MVA can change without a change in K. The view of the market can change due to economic circumstances, which in effect will change V, but K might remain the same. This will change MVA, but it will be the result of drivers not within the control of the company.

Petre & Bunea-Bontas (2009:780) prove that the calculation of EVA can show that a company can make an accounting profit, but be EVA neutral. Growth in annual Earnings per Share (EPS) and increases in Return on Equity (ROE) have been used by managers and shareholders as the best approximations of maximising shareholders’ wealth (Petre & Bunea-Bontas 2009:780). However, many studies have shown a weak link between these traditional accounting measures and increases in share prices (Petre & Bunea-Bontas 2009:780). The value of a company’s shares will only increase if management can earn a higher rate of return on new investments than the returns investors expect to earn by investing in alternative, equally risky, companies. They propose the following economic profit measure:

\[ EP = EVA - WACC^*K, \]

where EP is economic profit and WACC is the Weighted Average Cost of Capital. This is equivalent to subtracting WACC*K twice from Net Operating Profit after Tax (NOPAT). This EP measure is used as the metric for value creation or destruction. If the company has a positive EP it means that value was created and if EP is negative, it means that value was destroyed. The EP metric derived in their contribution is simply a modification of the standard EVA metric, where they subtract the cost of capital twice instead of only once.

Jalaja (2008:1) uses various accounting measures as well as economic value measures to test value creation in certain Indian companies. The objective of the study was to form a general picture of measures for value creation and then to
measure shareholder value creation using the Pablo Fernandez model. The accounting measures used are EPS, book value (BV), ROE, ROA and ROIC. The economic value measures used are EP, EVA, MVA, SVA, CFROI, Total Shareholder Returns (TSR), TBR and the balanced scorecard.

The study employs the Pablo Fernandez model to calculate shareholder value creation. The model starts by calculating the equity market value, which is the number of shares in issue multiplied by the current share price. The next step is to calculate the shareholder value, which is done as follows:

\[
\text{Increase in Equity Market Value} + \text{Dividends paid during the year} + \text{Other payments to shareholders} - \text{Outlays for capital increases, exercise of options and warrants} - \text{Conversion of convertible debentures} = \text{Shareholder value.}
\]

The next step is to calculate the shareholder return as Shareholder value/Equity market value. The shareholder value is the value added at the end of the year, and the equity market value is the value at the beginning of the year. The final calculation is the required return on equity. Jalaja (2008:13) calculates the required return on equity as the sum of the long-term treasury rates plus a risk premium. The CAPM model should be sufficient for calculating this rate as well. The company has created shareholder value when the shareholder return exceeds the share cost or required return on equity.

The conclusion that Jalaja (2008:13) makes is that the companies ranked according to market capitalization do not indicate whether they have created shareholder value. In other words, if the company is big (as rated by market capitalization) then it does not necessarily mean the company creates value for shareholders. This is a fairly obvious conclusion as what matters more is the return as a ratio of investment and not the absolute number. The problem with the Pablo Fernandez model as used by Jalaja (2008:12) is that it is dependent on a market view of the company. As stated
above, the factors that determine the view of the company from the general market is influenced by certain factors that are not within the control of the company.

Ryan & Trahan (2007:1) studies the relationship between the adoption of VBM and the economic performance of the company five years after adoption. The study focuses on companies in the industrial and non-financial sectors of the USA. The findings show amongst other things that large firms have smaller increase in economic performance when compared to smaller companies. The study also found that industry- and performance-adjusted residual income (which is equivalent to EVA in the study) divided by invested capital increases by over seven percentage points for the five years period after adoption of VBM.

Studies by consultants show that there are positive relationships between EVA and share price performance (Ryan & Trahan 2007:5). Other studies show that EVA explains the variation in share price performance no better than earnings (Ryan & Trahan 2007:5). It is suggested that changes in share prices is not the objective measure to use and that change in expectations be used instead.

The novelty of the study is that it tracks the changes in the firms’ economic performance five years after the adoption of VBM (Ryan & Trahan 2007:7). This is an indication of the time lag that is present when indicating the effect of value creation. Ryan & Trahan (2007:10) argue that the ideal measure is to look at VBM adoption and what happens to the share price. However, market analysts might not be aware of the fact that the company has adopted a VBM framework and therefore the results might not show in the share price immediately. Ryan & Trahan (2007:10) use a residual income measure, which is calculated by subtracting a capital charge (invested capital*cost of capital) from net income plus after-tax interest (interest expense times 1-tax rate).

Ryan & Trahan (2007:29) conclude that the adoption of VBM significantly improves residual income. They also conclude that it is the entire composition of residual income that drives the change, and not one component (net income, invested capital or cost of capital). However, this analysis does not indicate how the residual income adds to shareholder value created.
Venanzi (2010:1) provides a thorough review of financial performance measures and their relationship with value creation. The choice of performance measures in VBM is one of the most critical challenges for organizations (Venanzi 2010:7). After providing a very thorough review of the popular VBM metrics including EVA, CFROI and SVA, the study focuses on the measurement of value added. Many studies use increases in share prices or market value added as measures for value creation (Venanzi 2010:16). In other words studies try to correlate the VBM measure of choice, for example EVA, with the increase/decrease in share price or the increase/decrease in the difference between the market value (share price times number of shares outstanding) and book value of equity.

However a strong statistical correlation with the stock returns, it does not constitute managers adding value (Venanzi 2010:16). Share prices can be noisy and thus be a misleading indicator of value added (Venanzi 2010:16). Venanzi highlights the fact that companies attempting to measure value added should select a performance measure that is highly correlated to shareholder wealth. The use of share price returns or MVA changes is the general indicator used for shareholder wealth. Some studies use abnormal or unexpected returns as the indicator for shareholder value created (Venanzi 2010:17). Companies will therefore have to calculate when it has achieved abnormal or unexpected returns. One way to do this would be to calculate the market expectation using the CAPM model and subtracting that rate from the actual return on share prices. This will give a metric which, if negative, indicates the company has performed below expectations (value was destroyed), and if positive, the company has out-performed expectations (value was created). The one element missing from this methodology is what Rappaport (2006:10) explains as the comparison to the company’s peers. This metric will only compare the company’s expected performance to the company’s actual performance.

Empirical evidence about the relationship between economic value measures and share price performance are mixed and not definitive (Venanzi 2010:17). Some studies report good relationships and other report weak relationships (some even weaker than traditional accounting measures). In a meta-analysis of previous studies it was found that roughly 6 out of 10 showed a significant relationship between EVA and share price performance for example.
Weaver & Weston (2003:1) attempts to provide a unifying theory of VBM. One of the tests conducted in the analysis is the correlation of MVA and shareholders returns. The conclusion is that there is virtually no correlation between MVA and shareholders returns. The lag effect of the economic value measure (such as MVA) and the market’s view of the company (share price) can be influential as the market expectations sometimes run ahead of intrinsic value measures (Weaver & Weston 2003:22).

Hejazi & Oskouei (2009:21) studies the relationship of Cash Value Analysis (CVA), P/E ratios and share price returns in Iranian companies. The study states that CVA pinpoints the ability of value creation and performance measurement from an internal view. The P/E ratio is included as a stock valuation model and gives an external viewpoint (Hejazi & Oskouei 2009:22).

CVA is a net present value model that classifies investments into two categories, namely strategic and non-strategic investments (Hejazi & Oskouei 2009:24). CVA only includes cash items, in other words EBIDT adjusted for non-cash charges, working capital movement and non-strategic investments. The result of this is the Operating Cash Flow (OCF), which is then compared to the Operating Cash Flow Demand (OCFD). The OCFD represents the cash flow needed to satisfy investors’ requirements, which is the cost of capital (Hejazi & Oskouei 2009:24). The difference between OCF and OCFD is the cash value added.

Hejazi & Oskouei (2009:27) performs a regression analysis where the stock returns are the dependent variables and CVA and P/E ratios are the independent variables. The results show that CVA explains only 4.5% of variation in stock returns and P/E only 4.2%.

An interesting deviation from the normal performance measures is supplied in Calandro (2007:37). In 1968 New York University Professor Edward I. Altman introduced his Z-score as a tool to determine the likelihood of a company going bankrupt (Calandro 2007:37). Altman used discriminate analysis to create his financial distress model by using basic financial ratios as inputs. The input ratios are working capital/total assets, retained earnings/total assets, EBIT/total assets, market value of equity/book value of equity and sales/total assets. The result is a score for
which intervals were defined by Altman, giving indications of the probability of financial distress (Calandro 2007:38).

Calandro (2007:38) provides an example of a company that was in distress and subsequently improved after the new CEO started tracking the Altman Z-score. The Z-score can be used to track performance by calculating the probability that the company will become bankrupt. Altman’s Z-score needs a review of coefficients though. The original model was developed in the 1960’s, which could mean the coefficients are redundant. However, the logic of the model is useful.

2.5.3 Shareholder value creation in South Africa

De Wet & Du Toit (2007:59) brings the analysis closer to home by analysing the relationship between ROE, EVA and stock returns. In this study stock returns are used as proxy for shareholder value created. When comparing the impact of ROE, EVA and EPS on stock returns by means of a meta-study they find that EVA explains almost twice the variance that ROE and EPS do. This is based on previous studies done on international companies.

De Wet & Du Toit (2007:59) states that a business that has a positive EVA and therefore have earned more than its cost of capital, only creates value if it earns more than expected. In other words if a company has a cost of capital of 15% and is expected to earn 30% but only earns 25%, have destroyed value. This is a novel way of combining an economic value measure with expectations to calculate actual value created or destroyed.

De Wet & Du Toit (2007:64) focus on all companies in the South African market. They test the relationship of ROE, EVA/Invested Capital, EPS, DPS, Debt/Total Assets and cash flow from operations/Invested Capital to stock returns. The first set of results show that each of these variables individually are very weakly correlated to stock returns. DPS is the best at 11.7% and ROE and EVA/Invested Capital are almost negligible. They then ran stepwise regression models with ROE, EPS, DPS, Debt/Assets and Cash flow/Invested Capital as independent variables and stock returns as dependent variable. The results show only 14.5% of the variance in stock
returns is explained. The shocking result is that ROE did not even feature in the final model (De Wet & Du Toit 2007:65). A similar stepwise regression model with EVA/Invested Capital instead of ROE shows similar results with only 15.4% of the variance explained by this model.

This study provides us with a novel way of testing value added, which is to combine an economic value measure with an expectations measure. It also provides confirmation of previous studies with South African companies’ data. The problem with the study of De Wet & Du Toit (2007:65) is that they also look at stock returns as the value creation variable instead of comparing stock returns to some form of peer index. Given that the study looked at all companies in South Africa, it might be useful to look at company stock returns compared to the all share index returns.

### 2.5.4 Shareholder value creation in banks

Substantial research has emerged on bank efficiency and shareholder value, but this has mainly been done separately (Fiordelisi 2007:2151). Separate studies are usually performed that focus on methodological issues, estimates of efficiencies and comparisons of estimates of efficiency (Fiordelisi 2007:2152). Limited research has gone into combining the two focuses of bank efficiency and shareholder value with the results usually indicating a positive relationship between stock returns and efficiencies (Fiordelisi 2007:2152).

In general the goal of profit maximisation is superior to cost minimisation because it describes the economic goals of any company better (Fiordelisi 2007:2152). The relationship between these variables has not yet been clearly defined. Fiordelisi further proposes a new measure based on the shortfall ratio. The shortfall ratio is the difference between the market value of the company and its highest potential market value. He proposes his own measure of shareholder value efficiency, and uses stochastic frontier analysis to calculate this highest potential value of a bank. The key element for this study is that Fiordelisi uses the ratio of EVA/Invested Capital as the proxy for shareholder value created.
This measure of shareholder value efficiency shows how close a bank comes to earning the maximum shareholder value given specified output levels (Fiordelisi 2007:2153). Fiordelisi constructs a model which tests the effect of both cost and profit efficiency measures on shareholder value efficiency where the latter is defined as the ratio of EVA to invested capital. Economic value added is one of the most widely used measures of shareholder value (Fiordelisi 2007:2161). In order to minimise the heteroscedasticity and scale effects in the model, he standardises EVA by capital invested (Fiordelisi 2007:2161). The ratio of EVA to invested capital shows the value created per euro of capital invested. The results of the study show that there is in fact a positive relationship between efficiency measures and EVA/Invested Capital.

Fiordelisi (2007:2168) concludes that the banks included in the study are capable of producing 30% more value for shareholders. The study also finds that the relationship between the profit and cost efficiency measures and the shareholder value (EVA/Invested Capital) are very weak. An interesting result is that cost efficient listed banks do not significantly generate more value than non-listed banks (Fiordelisi 2007:2167). Fiordelisi concludes that listed banks that focus more on boosting profits or shareholder value efficiency are more likely to generate value added on invested capital than banks focused mainly on cost minimisation. The concept put forward by Fiordelisi is an interesting one and definitely worth testing. The task of selecting a highest potential shareholder value measure can vary between easy and very complex. The concept of comparing peers based on the difference between their stock returns and a potential return (which is constant for the banking industry) is one of the options suggested by Rappaport (2006:7) for example.

Fiordelisi & Molyneux (2007a:2, 2007b:1) examine the link between bank profitability and shareholder value creation respectively to certain bank specific metrics. Fiordelisi & Molyneux (2007a:2, 2007b:2) state that there are four major factors influencing profitability and shareholder value. These factors are the effect of bank efficiency, financial structure, market structure and risk exposure. The authors hypothesize that the four factors influence profitability and shareholder value differently.
Bank efficiency is calculated by looking at the profit efficiency and the cost efficiency of the bank Fiordelisi & Molyneux (2007a:4, 2007b:3). Risk exposure is measured for credit risk, market risk, liquidity risk and operational risk. The third major factor influencing profit and shareholder value is the financial structure, which is measured by using the leverage ratio (Fiordelisi & Molyneux 2007a:7). The findings show that higher leverage (or a lower equity-capital ratio) is associated with higher profitability. The final factor is the market structure. This is measured by the industry concentration and the individual market shares. Bank profitability is measured by means of the ROA and shareholder value creation is measured by the ratio of EVA/Invested Capital.

The findings of the study show that for European listed banks included in the sample, cost and profit efficiency have a positive influence on profitability (ROA). Only profit efficiency has a statistically significant influence on shareholder value (EVA/Invested Capital). For the risk exposure, interestingly, the credit and liquidity risk components showed no influence on bank profits and shareholder value. Market risk exposure had a positive influence on profitability, while operational risk exposure had a positive influence on shareholder value. Leverage (the ratio between the total amount of liabilities and equity capital) is found to be inversely correlated to shareholder value, suggesting that highly capitalised banks are more likely to generate profits and shareholder value (Fiordelisi & Molyneux 2007a:16, Fiordelisi & Molyneux 2007b:10). In other words the lower the leverage (so the higher the equity capital) the higher the likelihood to generate profits and value for owners. Finally, larger market shares have a positive relationship with shareholder value. This study supplies us with a number of major factors to test when calculating the shareholder value. The study used data from the European banking environment, which might not agree with data from the South African environment.

Fiordelisi & Molyneux (2010b:241) takes the analysis above further by looking for the relationship between shareholder value and change in total factor productivity. The bank efficiency measures are relative and incremental changes of a broad range of measures namely technical, allocative, scale, cost efficiency, total factor productivity changes and its components.
Fiordelisi & Molyneux (2010b:246) uses the Market Adjusted Returns (MAR) as the proxy for shareholder value creation for listed companies. The value of the MAR is calculated using the increment of equity market value and dividend per share paid, both standardised by market value of equity at the beginning of the period and net of expected rate of return. For unlisted companies EVA is used as metric for shareholder value. The study performs a regression analysis using the MAR/EVA as dependent variable.

Fiordelisi & Molyneux (2010b:247) uses cost efficiency and its components (technical, allocative and scale) and Total Factor Productivity (TFP) changes and its components (technological change, technical efficiency change, pure technical efficiency change and scale efficiency change) as independent variables. The data is made up of banks in the U.K., Germany, France and Italy between 1995 and 2002. The results of the study indicate that TFP changes are better at explaining shareholder value creation (as measured by MAR for listed companies and EVA for unlisted companies). Technological change was found to have higher value relevance than technical efficiency change. The relevance of this study is in the proposed selection of metric for shareholder value. The use of MAR can be considered especially, given the fact that we are only looking at listed companies in the South African bank sector.

Taufik, Isnurhadi & Widiyanti (2008:185) compares the effect of traditional accounting measures and EVA on bank data from the Jakarta Stock Exchange (JSX). The data used for the study is a sample of 23 banks whose shares are traded on the JSX for the time period between 2002 and 2005. The traditional accounting measures are represented by ROE and ROA. The study again used the stock returns as the shareholder value creation variable.

The study uses a cross sectional regression model to test the relevance of the three independent variables. It is found that these three variables explain only 28% of the variance in stock returns, which is in line with other studies. The study concludes that EVA should be adopted as it could create a better corporate culture of value creation. The negatives of this study are that it only used data between 2002 and 2005. This might prove to be too little data.
When analysing the profitability and shareholder value creation of banks the focus seems to be on the analysis of cost efficiencies (Gusman & Reverte 2008:2038). A number of studies have focused on the productivity changes as well (Gusman & Reverte 2008:2038). The purpose of Gusman & Reverte’s study was to prove or disprove that banks in the Spanish market with higher efficiency and productivity changes have higher shareholder value. The study uses data from Spanish banks between 2000 and 2004.

Gusman & Reverte (2008:2043) uses the total shareholder returns as the shareholder value creation variable. The use of Data Envelopment Analysis (DEA) requires the authors to identify input and output variables. As output variables total loans and interest income and commission received are selected. As input variables total deposits, interest expenses and commission paid and salary and administration expenses are selected. In order to measure the changes in efficiency and productivity the authors used the Malmquist non-parametric technique, which is calculated from the DEA linear programming approach. The results of their study confirm the hypothesis that banks with higher efficiency and productivity have higher shareholder value created.

The results from the study described above had too small a data sample due to the fact that they only used five years worth of data from 2000 to 2004. With that in mind, they make a useful contribution in the suggestion of independent variables to be used. The concept of using input and output variables are sound in any business analysis. The study also confirms to a certain degree that two of the most important drivers of profitability and shareholder value in banks are cost efficiencies and productivity.

**2.5.5 Shareholder value creation in South African banks**

Oberholzer & Van der Westhuizen (2010:29) uses Data Envelopment Analysis (DEA) to find efficiency ratios and then compares these to EVA for five major South African banks. The study relates to the studies performed on international banks by stating that the current research direction is to look at efficiencies of companies and
relate that to shareholder value. The two most widely used tools are Stochastic Frontier Analysis (SFA) and DEA (Oberholzer & Van der Westhuizen 2010:29).

The study contributes to the literature by building two separate DEA models. One uses only income statement variables and the other only balance sheet variables. DEA is a non-parametric linear programming technique that estimates the relative efficiency of a comparative ratio of outputs to inputs (Oberholzer & Van der Westhuizen 2010:31). The DEA technique is used to estimate four main types of efficiency namely technical, allocative, cost and scale efficiencies. The data used in the study was for five major banks in South African between 1998 and 2007. The banks included were ABSA, Nedcor, First National Bank, Standard Bank and Mercantile bank.

Oberholzer & Van der Westhuizen (2010:33) state that banks produce accounts of various sizes by processing deposits and loans while incurring capital charges and labour cost. This implies that the bank that can most effectively utilise the inputs it receives to form output should have the best profitability and shareholder value. It is exactly for this reason (the way in which banks uses inputs to form outputs) that they suggest using the DEA technique.

The results of the study of Oberholzer & Van der Westhuizen (2010:29) show that two of the five banks improved their relative EVA performance from the first five years to the second five. It is also shown that another two had completely the opposite behaviour. The last bank had a fairly consistent behaviour over the whole time period. This seems to show that EVA is extremely volatile (Oberholzer & Van der Westhuizen 2010:38). The summary of their results is that the relationship between EVA and the two DEA models are weak. The results of the four efficiency factors vary between the banks tested. Some of the banks showed negative relationships and some had positive relationships. The study confirms that the use of this analysis is limited as it seems that there are other factors that play a role in the profitability and shareholder value.

The main disadvantage of the study of Oberholzer & Van der Westhuizen (2010:29) is that it only uses EVA as the variable for shareholder value creation. They did standardise the EVA result in order to be able to compare the different banks to each other. However, as was described in the literature review above, EVA is only
successful to explain shareholder value in certain cases. The literature suggests that EVA is only 6 out of 10 times likely to explain variances in share prices better than traditional accounting measures. Add to this the fact that if EVA is a better variable to use, it generally explains less than 40% of the variance in share price movements.

2.6 SUMMARY

The goal of any company is to manage assets in such a way that it will create a profit for the owners of the company. The owners need a measure (or measures) that will give them an indication of how much profit was made in the financial period. Historically companies have been using accounting measures to fill this gap. Traditional accounting measures, such as profit after tax, have limitations when used to indicate value added by the company. The main problem with traditional accounting measures is that they do not incorporate the cost of capital employed to make the profit.

Advocates of Value-based management (VBM) argue that VBM measures are able to fill this gap. Measures such as Economic Value Add (EVA) subtract from profit after tax, the cost of capital. From the literature various popular VBM measures have been identified and defined. The most popular seem to be EVA, SVA, FCF, DCF, TBR, CFROI and MVA.

In the next chapter tests are performed to see which of these VBM measures correlate best with the popular traditional accounting measures, as well as some additional value-added measures proposed by the literature.
CHAPTER 3
EMPIRICAL STUDY

3.1 INTRODUCTION

The goal of any company is to manage assets in such a way that it will create a profit for the owners of the company. The owners need a measure (or measures) that will give them an indication of how much profit was made in any given financial period. Historically companies have been using accounting measures to fill this gap. These traditional accounting performance measures started to appear in the early 1900’s and have been used ever since (Maditinos et al. 2009:183). The problem with traditional accounting measures is that they do not consider the cost of capital employed to make the profit. Value-based management (VBM) was proposed to fill this gap of taking into consideration the cost of capital invested. VBM in theory involves two steps. Firstly, it adopts an economic profit metric as a key measurement of performance, and it secondly ties this measure to executive compensation (Haspeslagh et al. 2001:65). VBM measures such as Economic Value Add (EVA), Economic Profit (EP) and Cash-flow Return on Investment (CFROI) have gained popularity since the late 1980’s (Maditinos et al. 2009:183). Managing for value has become of utmost importance for most executives around the world.

In order to manage for value, a value metric needs to be selected. Popular metrics include EVA, Shareholder Value Analysis (SVA), EP and CFROI. Current literature suggests new measures such as EVA/Invested Capital. The analysis departs from the assumption that these metrics do measure value. Questions that should be considered are:

1. Which of the traditional accounting measures relate best to these value added metrics?
2. Does outperforming an index of your peers imply adding more value as was suggested by Rappaport (2006:7)?

The banks included in the study are Absa, First National Bank (FNB), Nedbank, Standard Bank, Mercantile and Capitec. Three dependent (value creating metrics)
where chosen and regressed against an autoregressive term, four measures from the income statement and balance sheet, and one measure indicating whether or not the bank outperformed the index of its peers.

3.2 RESEARCH METHODOLOGY

In order to test the relationship between Value-based Management (VBM) measures such as Economic Value Add (EVA), and the performance of certain traditional accounting measures, as well as the proposed measures of value added, a quantitative approach was followed. The historical data used in the study was obtained from the McGregor BFA database for the years 2001 to 2010. The data was used to test the relationship of traditional accounting measures and value added measures on VBM metrics.

3.2.1 Data collection

Data was collected for the McGregor BFA database for bank institutions listed on the Johannesburg Securities Exchange (JSE). McGregor BFA supplies real-time and historical financial information on South African listed companies, local and international economic information, as well as international financial indicators. McGregor BFA supplies standardised financial information and this information was used in this study. An additional income statement variable was obtained from the companies’ annual financial results. This variable is calculated as the growth in impairments written off in the income statement. The reason this value was included is because it has a great impact on banks, in particular in terms of profit.

Various income statement and balance sheet values were selected as independent variables. The independent measures were categorised into six categories. These categories were profitability, risk (which included mainly the impairment growth and impairment ratio), growth (growth in balance sheet items such as assets and liabilities), efficiency measures, investment into future profits, and finally, measures
of industry performance. A large number of independent variables were originally selected and then reduced to five. These five independent variables displayed the best relationship to the dependent variables and showed the least correlation amongst each other. The five independent variables selected included Return on Equity (ROE), impairment ratio (total impairments written off as a % of total loans), growth in assets, growth in operating income per employee and the value added measure. The value added measure was inspired by Rappaport (2006:7), who states that a company adds value only if it outperforms an index of its peers. Therefore the value added measure for this study was calculated as the difference between the particular banks’ growth in share price and the growth in the bank index. A dummy variable was then created, which was 1 if the bank outperformed the index and 0 if its performance was below the index.

Growth in EVA, SVA and EVA/Invested Capital was selected as the dependent variables. According to the literature these VBM measures will indicate whether a bank has created value. The test was to indicate the relationship between traditional accounting measures selected, the created value added measures, and these VBM measures.

Data was collected from 2001 to 2010 for the big four banks (Absa, First National Bank, Nedbank and Standard Bank). Data was collected for Mercantile Bank as well as Capitec Bank from 2003 to 2010. In the case of Mercantile various values were missing for the years 2001 and 2002, which is why data only starts in 2003. Capitec only had data from 2002 and because of the fact that the variables used are mostly year-on-year growth rates, data could only be used from 2003 onwards.

3.3 EMPIRICAL FRAMEWORK

The statistical software SAS ® was used for the purpose of this analysis. The data was presented as time series variables for individual banks. The six banks were isolated and individual regression models run to assess the impact of the independent variables. The variables were part of a time series, and for this reason
an autoregressive term was introduced as an independent variable. This was the one year lagged dependent variable.

The models were based on the assumptions of the Ordinary Least Squares (OLS) method. The aim was to find out if the value added measure had a significant impact on the VBM measures selected, as well as to see which of the three chosen VBM metrics was the most consistent performer amongst the banks.

### 3.3.1 Model specifications

Simple linear regression models use one numerical independent variable to predict the value of the dependent variable (Levine, Stephan, Krehbiel & Berenson 2008:572). Better predictions can be made by using more than one independent variable in a multiple regression model. The multiple regression models to be fitted to the individual banks are specified as follows:

\[
\begin{align*}
(i) \quad Y_{1t} &= \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} + \beta_6 Y_{1t-1} + \epsilon_1 \\
(ii) \quad Y_{2t} &= \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} + \beta_6 Y_{2t-1} + \epsilon_2 \\
(iii) \quad Y_{3t} &= \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} + \beta_6 Y_{3t-1} + \epsilon_3 
\end{align*}
\]

where

- \(Y_{1t}\) is the growth in EVA for the year \(t\);
- \(Y_{2t}\) is EVA/Invested Capital for the year \(t\);
- \(Y_{3t}\) is the growth in SVA for the year \(t\);
$\beta_{0t}$ is the $Y$ intercept;
$\beta_{1t} = \text{slope of } Y \text{ with the variable } X_1, \text{ holding all other variables constant};$
$\beta_{2t} = \text{slope of } Y \text{ with the variable } X_1, \text{ holding all other variables constant};$
$\beta_{3t} = \text{slope of } Y \text{ with the variable } X_1, \text{ holding all other variables constant};$
$\beta_{4t} = \text{slope of } Y \text{ with the variable } X_1, \text{ holding all other variables constant};$
$\beta_{5t} = \text{slope of } Y \text{ with the variable } X_1, \text{ holding all other variables constant};$
$\beta_{6t} = \text{slope of } Y \text{ with the variable } X_1, \text{ holding all other variables constant};$

$X_{1t} = \text{ROE for the year } t;$
$X_{2t} = \text{impairment ratio for the year } t;$
$X_{3t} = \text{growth in assets for the year } t;$
$X_{4t} = \text{growth in operating income per employee for the year } t;$
$X_{5t} = \text{dummy variable that indicates whether the index was outperformed or not for the year } t;$

$\epsilon = \text{random error in } Y.$

When using regression analysis certain assumptions need to be tested (Levine et al. 2008:529). The assumptions of a multiple linear regression are as follows:

(i) The relationship between the independent variables and dependent variables must be of a linear nature. If the relationship is not linear, the model will attempt to fit a straight line through curved data. In the case where the relationship is not linear, but it can be identified as for example quadratic, then quadratic models need to be applied.
(ii) The error terms need to be independent of each other. This assumption is particularly important when working with data that is collected over a time period.

(iii) The error terms need to be normally distributed at each value of $X$.

(iv) The error terms must have equal variance, or in other words be homoscedastic. Therefore tests need to be performed for constant variance in the errors for all values of independent variables.

(v) In addition to these assumptions tests need to be performed for multicollinearity. This happens when a strong relationship exists among the independent variables that might influence the model.

(vi) Tests need to be performed on the variables to see which variables are outliers, and of these, which are influential points. These are points that might have been collected incorrectly and also has a significant influence on the answer.

In the case of this study tests have to be included for the time series effect or autoregression. As mentioned above an autoregressive term was included in the regression model to test for this event.

### 3.3.2 Empirical results

The following sections shows the steps that were taken to test the objectives of the empirical study.

#### 3.3.2.1 Testing for outliers

When using regression analysis a data set might contain some outlying or extreme cases (Kutner, Nachtscheim, Neter & Li 2005:390). These values can have dramatic effects on the fitted model and it is therefore important to test for outlying points as well as their influence on the model.
The statistic that will be employed to test for outlying values is the studentized deleted residuals. As a rule of thumb, if the studentized deleted residual is larger than 2 in absolute value, then the variable might be an outlier. The next step is to test whether these points that are outliers, are influential on the model. In order to test of influential points the Difference Between Fitted Values or DFFITS test will be employed. Simply stated, this tests the difference between fitted values for all the observations, and fitted values where the \( i \)-th observation is deleted from the model. As a guideline for identifying influential cases it is suggested that an absolute value above 1 for the DFFITS statistic is used (Kutner et al. 2005:401).

Below is a table showing the studentized deleted residuals (RStudent) and the DFFITS values for the different banks.

<table>
<thead>
<tr>
<th>Absa</th>
<th>Output Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Growth_EVA</td>
</tr>
<tr>
<td></td>
<td>RStudent</td>
</tr>
<tr>
<td>1</td>
<td>-0.7148</td>
</tr>
<tr>
<td>2</td>
<td>-0.4795</td>
</tr>
<tr>
<td>3</td>
<td>1.6621</td>
</tr>
<tr>
<td>4</td>
<td>0.437</td>
</tr>
<tr>
<td>5</td>
<td>2.4441</td>
</tr>
<tr>
<td>6</td>
<td>-1.4116</td>
</tr>
<tr>
<td>7</td>
<td>3.0009</td>
</tr>
<tr>
<td>8</td>
<td>-2.3703</td>
</tr>
<tr>
<td>9</td>
<td>0.6025</td>
</tr>
<tr>
<td>10</td>
<td>-0.9665</td>
</tr>
</tbody>
</table>

Table 3.1 - Absa: Testing for outliers and influential points

In the case of Absa it can be seen that for the first dependent variable, Growth in EVA, observations 5, 7 and 8 might be outliers, but observations 2, 3, 5, 6, 7, 8, and 10 might be influential points. The rest of the table shows the studentized deleted residuals and DFFITS values for the other two dependent variables (EVA/Invested Capital and Growth in SVA). The data points that are in question are highlighted in yellow. The three tables below show the same statistics for the other banks. In the case of Capitec and Mercantile the outlier and influential point statistics could not be calculated due to a limited number of data points.
### FNB

#### Output Statistics

<table>
<thead>
<tr>
<th>Observation</th>
<th>RStudent</th>
<th>DFFITS</th>
<th>RStudent</th>
<th>DFFITS</th>
<th>RStudent</th>
<th>DFFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.1366</td>
<td>0.1401</td>
<td>-0.2688</td>
<td>-0.2909</td>
<td>0.6412</td>
<td>1.185</td>
</tr>
<tr>
<td>2</td>
<td>-2.412</td>
<td>-2.9774</td>
<td>-0.6648</td>
<td>-0.9917</td>
<td>3.7264</td>
<td>11.57</td>
</tr>
<tr>
<td>3</td>
<td>0.3106</td>
<td>0.4674</td>
<td>-2.3239</td>
<td>-3.1178</td>
<td>-0.6489</td>
<td>-0.6536</td>
</tr>
<tr>
<td>4</td>
<td>-1.7339</td>
<td>-2.1618</td>
<td>-0.9746</td>
<td>-1.1373</td>
<td>-0.1574</td>
<td>-0.1937</td>
</tr>
<tr>
<td>5</td>
<td>-1.3907</td>
<td>-7.4816</td>
<td>1.5431</td>
<td>1.5799</td>
<td>2.2209</td>
<td>1.7865</td>
</tr>
<tr>
<td>6</td>
<td>5.554</td>
<td>7.6587</td>
<td>3.2756</td>
<td>8.6302</td>
<td>-1.2869</td>
<td>-2.1535</td>
</tr>
<tr>
<td>7</td>
<td>0.8134</td>
<td>1.0151</td>
<td>0.653</td>
<td>0.9031</td>
<td>-1.2188</td>
<td>-1.4945</td>
</tr>
<tr>
<td>8</td>
<td>-0.0906</td>
<td>-0.2043</td>
<td>-0.342</td>
<td>-0.8373</td>
<td>0.2606</td>
<td>0.7621</td>
</tr>
<tr>
<td>9</td>
<td>-0.0035</td>
<td>-0.0112</td>
<td>2.6285</td>
<td>7.3252</td>
<td>0.5592</td>
<td>1.421</td>
</tr>
<tr>
<td>10</td>
<td>0.2656</td>
<td>0.3283</td>
<td>-0.1519</td>
<td>-0.2747</td>
<td>-0.6234</td>
<td>-1.0072</td>
</tr>
</tbody>
</table>

Table 3.2 - FNB: Testing for outliers and influential points

### Nedbank

#### Output Statistics

<table>
<thead>
<tr>
<th>Observation</th>
<th>RStudent</th>
<th>DFFITS</th>
<th>RStudent</th>
<th>DFFITS</th>
<th>RStudent</th>
<th>DFFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.5473</td>
<td>1.232</td>
<td>0.4037</td>
<td>0.7591</td>
<td>0.4357</td>
<td>0.5607</td>
</tr>
<tr>
<td>2</td>
<td>-0.0618</td>
<td>-0.4542</td>
<td>-0.2084</td>
<td>-1.0328</td>
<td>-0.4164</td>
<td>-1.39</td>
</tr>
<tr>
<td>3</td>
<td>-1.6648</td>
<td>-3.7703</td>
<td>-2.8353</td>
<td>-6.1875</td>
<td>1.7112</td>
<td>3.8125</td>
</tr>
<tr>
<td>4</td>
<td>0.2935</td>
<td>0.2563</td>
<td>0.764</td>
<td>0.6512</td>
<td>-1.5299</td>
<td>-1.3075</td>
</tr>
<tr>
<td>5</td>
<td>-0.0604</td>
<td>-0.0762</td>
<td>-0.5863</td>
<td>-0.7928</td>
<td>1.6523</td>
<td>2.7375</td>
</tr>
<tr>
<td>6</td>
<td>-1.8441</td>
<td>-1.7332</td>
<td>-1.2678</td>
<td>-1.3863</td>
<td>1.0748</td>
<td>2.8335</td>
</tr>
<tr>
<td>7</td>
<td>10.9026</td>
<td>13.0812</td>
<td>2.3342</td>
<td>2.6955</td>
<td>-1.4111</td>
<td>-1.7137</td>
</tr>
<tr>
<td>8</td>
<td>-2.7228</td>
<td>-28.5262</td>
<td>-0.1404</td>
<td>-0.4883</td>
<td>0.5367</td>
<td>0.6188</td>
</tr>
<tr>
<td>9</td>
<td>0.8709</td>
<td>1.4389</td>
<td>1.2807</td>
<td>2.6187</td>
<td>-1.1384</td>
<td>-2.077</td>
</tr>
<tr>
<td>10</td>
<td>-0.4327</td>
<td>-0.4481</td>
<td>-0.5176</td>
<td>-0.538</td>
<td>0.1312</td>
<td>0.1834</td>
</tr>
</tbody>
</table>

Table 3.3 - Nedbank: Testing for outliers and influential points
It is clear from the tables above that there are various potential problem data points. What is also clear is that the problem observations are not the same for each bank. There are various influential observations but not many outlier observations. After careful consideration of the accuracy of the source data it was decided to keep these data points.

### 3.3.2.2 Testing for a linear relationship between dependent and independent variables

Testing for a linear relationship amongst dependent and independent variables can be performed in many ways. In this study two tests were employed. The first test is using the coefficient of correlation to test the relationship between the independent and dependent variables. A measure of linear association between two variables $X$ and $Y$ is the coefficient of correlation (Kutner et al. 2005:76 & Levine et al. 2008:128). The values of the coefficient of correlation $\rho$, varies between -1 and 1. Perfect positive correlation exists when the coefficient is 1 and perfect negative correlation exists when the coefficient is -1.

The tables below indicate the coefficient of correlation between the dependent and independent variables.
### Table 3.5 - Correlations between dependent and independent variables

In the table above the linear relationships that are significant are highlighted in yellow. The table raises some concern over the fact that the chosen variables have very different relationships in terms of strength for the different banks. Also, some banks display no significant relationship according to the correlation coefficient.

The second test for linearity is to plot the residuals on the vertical axis against the corresponding $X_i$ values of the independent variable on the horizontal axis (Levine et al. 2008:530). If the linear model is appropriate, there is no apparent pattern in this plot. The following graph show the scatter plots for the residuals against the independent variables for the model for growth in EVA for ABSA. The ideal for these graphs in this case is a random scatter around the 0 line.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Absa</td>
<td>0.8913</td>
<td>0.5111</td>
<td>0.1319</td>
<td>ROE</td>
<td>-0.1224</td>
<td>0.42742</td>
<td>0.24501</td>
<td>-0.03048</td>
<td>0.62759</td>
<td>0.44938</td>
<td>0.44145</td>
<td>0.49628</td>
<td>0.1775</td>
<td>0.37758</td>
<td>-0.33207</td>
<td>0.24305</td>
</tr>
<tr>
<td>FNB</td>
<td>-0.0716</td>
<td>-0.5023</td>
<td>0.59584</td>
<td>ROE</td>
<td>0.0717</td>
<td>0.39477</td>
<td>-0.4241</td>
<td>-0.39777</td>
<td>0.1778</td>
<td>-0.2927</td>
<td>0.30624</td>
<td>0.85248</td>
<td>0.49745</td>
<td>0.39725</td>
<td>-0.35252</td>
<td>0.29582</td>
</tr>
<tr>
<td>Nedbank</td>
<td>0.2744</td>
<td>-0.4988</td>
<td>0.2325</td>
<td>ROE</td>
<td>0.3987</td>
<td>0.34018</td>
<td>0.25784</td>
<td>0.28374</td>
<td>0.5902</td>
<td>-0.0632</td>
<td>-0.33333</td>
<td>0.04244</td>
<td>0.09729</td>
<td>0.10969</td>
<td>0.35951</td>
<td></td>
</tr>
</tbody>
</table>

**Pearson Correlation Coefficients**

Correlation coefficients between dependent and independent variables

<table>
<thead>
<tr>
<th>Bank</th>
<th>Growth EVA</th>
<th>EVA/Invested Capital</th>
<th>Growth SVA</th>
<th>Standard Bank</th>
<th>Growth EVA</th>
<th>EVA/Invested Capital</th>
<th>Growth SVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROE</td>
<td>-0.1224</td>
<td>-0.42742</td>
<td>0.24501</td>
<td>-0.03048</td>
<td>0.62759</td>
<td>0.44145</td>
<td>0.49628</td>
</tr>
<tr>
<td>Impairment ratio</td>
<td>0.42742</td>
<td>0.24501</td>
<td>-0.03048</td>
<td>0.62759</td>
<td>0.44145</td>
<td>0.49628</td>
<td>0.1775</td>
</tr>
<tr>
<td>Growth Assets</td>
<td>0.24501</td>
<td>0.62759</td>
<td>0.44145</td>
<td>0.49628</td>
<td>0.1775</td>
<td>-0.33207</td>
<td>0.24305</td>
</tr>
<tr>
<td>Operating Income per</td>
<td>0.1775</td>
<td>-0.33207</td>
<td>0.24305</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dummy variable</td>
<td>-0.33207</td>
<td>0.24305</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This graph along with the other residual graphs seems to display a random scattering of residuals around the 0 line for Absa. In the case of FNB there seems to be a slight increasing pattern for growth in assets in the first model. The rest of the residual plots seem to have a random scattering. For Nedbank there is concern raised for ROE in the first model and an impairment ratio in the third model. The variable ROE displays an increasing relationship and impairment ratio a quadratic relationship. The rest of the variable displays a fairly random scattering. In the case of Standard Bank the only real concern is with the impairment ratio in the second model. The rest of the variables show a fairly random scattering. The biggest concern in the case of Mercantile bank seems to be the dummy variable since there are definitely patterns in all three the models. In the case of Capitec there is also a concern around the differentiating ability of the dummy variable. Capitec has outperformed that bank index in almost every year, meaning that their dummy variable is almost always 1. There is consequently no added value of the dummy
variable. There is also some concern around one data point that seems to be an influential outlier. Because there is so little data for Capitec and Mercantile, it is difficult to leave out one data point.

3.3.2.3 Testing for multi-collinearity between independent variables

In order to test for multi-collinearity amongst the independent variables, two techniques were employed. The first technique is to draw a correlation matrix and analyse the correlation strength between the independent variables. The tables below show the correlation coefficients of the independent variables per bank.

<table>
<thead>
<tr>
<th>Pearson Correlation Coefficients, N = 10</th>
<th>Prob &gt;</th>
<th>under H0: Rho=0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p-value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impairment ratio</td>
<td>0.039</td>
<td>1</td>
</tr>
<tr>
<td>p-value</td>
<td>0.593</td>
<td>1</td>
</tr>
<tr>
<td>Growth Assets</td>
<td>0.039</td>
<td>1</td>
</tr>
<tr>
<td>p-value</td>
<td>0.593</td>
<td>1</td>
</tr>
<tr>
<td>Operating Income per empl.</td>
<td>0.6756</td>
<td>1</td>
</tr>
<tr>
<td>p-value</td>
<td>0.541</td>
<td>0.2288</td>
</tr>
<tr>
<td>Dummy variable</td>
<td>0.3401</td>
<td>0.6977</td>
</tr>
<tr>
<td>p-value</td>
<td>0.856</td>
<td>0.7912</td>
</tr>
<tr>
<td>Nedbank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p-value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impairment ratio</td>
<td>0.2089</td>
<td>1</td>
</tr>
<tr>
<td>p-value</td>
<td>0.178</td>
<td>1</td>
</tr>
<tr>
<td>Growth Assets</td>
<td>0.2089</td>
<td>1</td>
</tr>
<tr>
<td>p-value</td>
<td>0.178</td>
<td>1</td>
</tr>
<tr>
<td>Operating Income per empl.</td>
<td>0.5792</td>
<td>1</td>
</tr>
<tr>
<td>p-value</td>
<td>0.5792</td>
<td>0.7912</td>
</tr>
<tr>
<td>Dummy variable</td>
<td>0.5659</td>
<td>0.7324</td>
</tr>
<tr>
<td>p-value</td>
<td>0.5659</td>
<td>0.6225</td>
</tr>
</tbody>
</table>
| Table 3.6 - Correlations between independent variables

Table 6 above shows the p-values for testing the hypothesis that the correlation between two variables is zero, i.e.,
H0: ρ = 0 vs. HA: ρ ≠ 0

where ρ is the correlation coefficient between two variables. In other words, if the significance level is α = 0.10, then the null hypothesis that there is no correlation if the p-value in the table above is smaller than α is rejected. For example, the correlation between ROE and Impairment ratio is -0.62063 for Absa and the p-value is 0.0555, which means the null hypothesis that there is no correlation between these two variables is rejected. The variables where one would reject the null hypothesis are highlighted. As can be seen from the table the correlations amongst the independent variables vary per bank. Caution needs to be raised of multi-collinearity, especially between ROE, impairment ratio, growth in assets and growth in operating income per employee.

In order to further test the effect of multi-collinearity, the Variance Inflation Factor (VIF) will be used. As a rule of thumb a VIF of above 10 implies that the variable is of concern. The table below shows the VIF’s per bank and model.

<table>
<thead>
<tr>
<th>VIF</th>
<th>Absa</th>
<th>FNB</th>
<th>Nedbank</th>
<th>Standard Bank</th>
<th>Mercantile</th>
<th>Capitec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth EVA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AR1</td>
<td>1.68835</td>
<td>3.02375</td>
<td>2.00861</td>
<td>4.07521</td>
<td>12.67806</td>
<td>6.6501</td>
</tr>
<tr>
<td>ROE</td>
<td>3.96187</td>
<td>7.77818</td>
<td>1.4307</td>
<td>9.45827</td>
<td>63.43157</td>
<td>6.52562</td>
</tr>
<tr>
<td>Impairment ratio</td>
<td>1.73282</td>
<td>6.37413</td>
<td>2.08159</td>
<td>9.57663</td>
<td>79.97496</td>
<td>3.80666</td>
</tr>
<tr>
<td>Growth Assets</td>
<td>2.11509</td>
<td>3.44145</td>
<td>1.3806</td>
<td>14.66518</td>
<td>3.2741</td>
<td>4.49817</td>
</tr>
<tr>
<td>Operating Income per empl.</td>
<td>3.17799</td>
<td>2.81454</td>
<td>1.83229</td>
<td>15.36307</td>
<td>5.26119</td>
<td>9.45216</td>
</tr>
<tr>
<td>Dummy variable</td>
<td>2.35992</td>
<td>2.60062</td>
<td>1.27358</td>
<td>3.60653</td>
<td>11.08086</td>
<td>1.15576</td>
</tr>
<tr>
<td>EVA/Invested Capital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AR2</td>
<td>3.20533</td>
<td>2.78107</td>
<td>5.71308</td>
<td>1.83346</td>
<td>6.4316</td>
<td>2.36292</td>
</tr>
<tr>
<td>ROE</td>
<td>3.67138</td>
<td>10.70211</td>
<td>1.99736</td>
<td>4.07154</td>
<td>29.97031</td>
<td>9.10038</td>
</tr>
<tr>
<td>Impairment ratio</td>
<td>1.75759</td>
<td>7.72941</td>
<td>2.23993</td>
<td>3.62418</td>
<td>37.9324</td>
<td>3.36865</td>
</tr>
<tr>
<td>Growth Assets</td>
<td>1.7282</td>
<td>3.62902</td>
<td>1.42394</td>
<td>15.1373</td>
<td>2.13667</td>
<td>3.39571</td>
</tr>
<tr>
<td>Operating Income per empl.</td>
<td>3.46243</td>
<td>3.80219</td>
<td>2.04874</td>
<td>15.65689</td>
<td>6.20111</td>
<td>7.76553</td>
</tr>
<tr>
<td>Dummy variable</td>
<td>2.17735</td>
<td>3.32191</td>
<td>2.36885</td>
<td>2.97033</td>
<td>3.27227</td>
<td>1.15474</td>
</tr>
<tr>
<td>Growth SVA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AR3</td>
<td>2.92156</td>
<td>2.05444</td>
<td>1.25579</td>
<td>2.8148</td>
<td>1.9148</td>
<td>51.04768</td>
</tr>
<tr>
<td>ROE</td>
<td>3.77681</td>
<td>12.91768</td>
<td>1.49753</td>
<td>5.32268</td>
<td>45.32347</td>
<td>60.75269</td>
</tr>
<tr>
<td>Impairment ratio</td>
<td>2.02504</td>
<td>4.05188</td>
<td>1.55876</td>
<td>5.68314</td>
<td>54.7635</td>
<td>63.77742</td>
</tr>
<tr>
<td>Growth Assets</td>
<td>1.88677</td>
<td>4.78219</td>
<td>1.29655</td>
<td>15.38513</td>
<td>1.77521</td>
<td>115.29271</td>
</tr>
<tr>
<td>Operating Income per empl.</td>
<td>3.77224</td>
<td>3.17908</td>
<td>1.37493</td>
<td>12.60651</td>
<td>8.66884</td>
<td>120.42625</td>
</tr>
<tr>
<td>Dummy variable</td>
<td>2.51035</td>
<td>2.35747</td>
<td>1.16736</td>
<td>3.39653</td>
<td>4.05791</td>
<td>1.42087</td>
</tr>
</tbody>
</table>

Table 3.7 - Variance inflation factors per bank and model
In the case of the big 4 banks there is some multi-collinearity for FNB and Standard Bank. However, most of the multi-collinearity is displayed for Mercantile and Capitec.

3.3.2.4 Testing for independence in error terms

In order to test for independence of error terms the first test is to plot the residuals in the order or sequence in which the data was collected, which in this case is time (Levine et al. 2008:532). Data collected over periods of time sometimes exhibit autocorrelation among successive observations. If there is strong evidence of autocorrelation, a relationship between consecutive residuals will exist. The existence of such a relationship violates the assumption of independent error terms. The second formal test used in testing for autocorrelation is the Durbin-Watson statistic, D. If the value of the D approaches 0, there is evidence of positive autocorrelation. If D is close to 2 there is no autocorrelation and if the value of D approaches 4 there is evidence of negative autocorrelation.

Below the graphs are presented of the residuals over time per bank and per model. In the graphs Model1 is for Growth in EVA as dependent variable. Model2 represents EVA/Invested Capital as dependent variable and Model3 represents Growth in SVA as dependent variable.
The figures for Absa indicate that for the first two models growth in EVA and EVA/Invested capital might have some pattern in the first 5 years. The graph for growth in SVA shows a good random scattering.
Figure 3 - FNB: Residuals vs. Time

Figure 4 - Nedbank: Residuals vs. Time
Figure 5 - Standard Bank: Residuals vs. Time

Figure 6 - Mercantile: Residuals vs. Time
In the case of FNB there seems to be a slight pattern in the first model, but a clearer polynomial pattern in the second model. As with Absa the last model shows a fairly random pattern. The first two models for Nedbank display a slight increase in residuals as time moves from 2001 to 2010, which is problematic. The model for growth in SVA looks random. For Standard bank the pattern in the first model appears to be a seasonal pattern. The second model seems to be random, but the third again shows a polynomial type pattern. Mercantile displays a similar pattern where the residuals seem to increase over time. Capitec displays a similar pattern, but the residuals seem to decrease.

The second test is the Durnin-Watson test. Below is a table displaying the D-statistics per bank and per model.

Figure 7 - Capitec: Residuals vs. Time
The D-statistics for Absa, FNB and Standard bank are close to 2, except for the growth in SVA model where Absa displays some negative autocorrelation. Nedbank, Mercantile and Capitec display negative autocorrelation in all three models.

### 3.3.2.5 Testing for normality of error terms

The Shaprio-Wilk statistic was employed to test the assumption that the error terms are normally distributed. The null hypothesis of the test is that the residuals are normally distributed i.e.

\[
H_0: \text{Residuals are normally distributed}
\]

Vs.

\[
H_A: \text{Residuals are not normally distributed.}
\]

The results of the Shapiro-Wilk test are as follows for the different banks:

<table>
<thead>
<tr>
<th>Durbin-Watson D</th>
<th>Absa</th>
<th>FNB</th>
<th>Nedbank</th>
<th>Standard Bank</th>
<th>Mercantile</th>
<th>Capitec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth in EVA</td>
<td>2.225</td>
<td>1.982</td>
<td>3.004</td>
<td>1.458</td>
<td>2.658</td>
<td>2.797</td>
</tr>
<tr>
<td>EVA/Invested Capital</td>
<td>1.844</td>
<td>1.314</td>
<td>2.833</td>
<td>2.188</td>
<td>2.649</td>
<td>2.962</td>
</tr>
</tbody>
</table>

Table 3.8 - Durbin-Watson statistics
Table 3.9 - Shapiro-Wilk test results

The results indicate that if one employs a significance level $\alpha = 0.10$, one only rejects the null hypothesis for Standard Bank for the models with dependent variables growth in EVA and growth in SVA. These values are highlighted in yellow above.

### 3.3.2.6 Testing for homoscedasticity

The test for constant variance in the residual terms can be done by looking for any patterns in the plot of residuals against predicted values. A more formal test is the test of first and second moment specification. The null hypothesis is that the residuals are homoscedastic, therefore;

$H_0$: Residuals are homoscedastic

Vs.

$H_A$: Residuals are not homoscedastic.
The table below shows the results of the test.

<table>
<thead>
<tr>
<th>Test of First and Second Moment Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absa</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Growth in EVA</td>
</tr>
<tr>
<td>EVA/Invested Capital</td>
</tr>
<tr>
<td>Growth in SVA</td>
</tr>
<tr>
<td>FNB</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Growth in EVA</td>
</tr>
<tr>
<td>EVA/Invested Capital</td>
</tr>
<tr>
<td>Growth in SVA</td>
</tr>
<tr>
<td>Nedbank</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Growth in EVA</td>
</tr>
<tr>
<td>EVA/Invested Capital</td>
</tr>
<tr>
<td>Growth in SVA</td>
</tr>
</tbody>
</table>

Table 3.10 - Test for homoscedasticity

The null hypothesis is rejected at a significance level $\alpha = 0.10$. The table shows that none of the models reject the null hypothesis, and therefore one can assume that the residuals in all models have an equal or constant variance.

### 3.3.2.7 Individual regression output

The parameter estimates along with their p-values are displayed below. In all models the independent variables that were significant at $\alpha = 0.10$ was highlighted in yellow.
The table above displays the results for Absa and FNB. In the case of Absa the independent variables that are significant according to the p-value are highlighted in yellow. From the parameter estimates for the first model it is interpreted that a 1% increase in ROE leads to a 0.02795% increase in growth of EVA. Also, a 1% increase in the impairment ratio will lead to a 39.59% decrease in growth in EVA and a 1% increase in the growth of operating income per employee leads to a 0.71043% increase in growth in EVA. The parameter estimates of the other models are presented above. The interesting thing to note for Absa is that the dummy variable (i.e. whether or not the bank outperformed the index of its peers) was significant in the models for EVA/Invested Capital and Growth in SVA. Unfortunately the interpretation is contrary to what Rappaport states. When Absa outperformed the bank index, their EVA/Invested Capital was on average lower by 0.04926% and their

### Table 3.11 - Regression output: Absa and FNB

| Bank    | Parameter | Estimate | Pr > |t| | Parameter | Estimate | Pr > |t| |
|---------|-----------|----------|------|---|-----------|----------|------|---|
| Absa    | Intercept | -1.02457 | 0.024 | | Intercept | -4.52406 | 0.6052 |
|         | AR1       | -0.06844 | 0.6142 | | AR1      | -0.01713 | 0.9743 |
|         | ROE       | 0.02795  | 0.0221 | | ROE      | 0.0328  | 0.9205 |
|         | Impairment ratio | 39.5976 | 0.0374 | | Impairment ratio | 249.58459 | 0.3263 |
|         | Growth Assets | 1.04146 | 0.1616 | | Growth Assets | 4.31262 | 0.5273 |
|         | Operating Income per empl. | 0.71043 | 0.0859 | | Operating Income per empl. | 0.81052 | 0.8152 |
|         | Dummy variable | -0.1735 | 0.3211 | | Dummy variable | 0.72259 | 0.6335 |
| FNB     | Intercept | 0.00414  | 0.9016 | | Intercept | 0.14498 | 0.8171 |
|         | AR2       | 0.38558  | 0.1215 | | AR2      | 0.17114 | 0.8052 |
|         | ROE       | 0.00156  | 0.0382 | | ROE      | -0.00653 | 0.7978 |
|         | Impairment ratio | 4.07104 | 0.0147 | | Impairment ratio | 5.25183 | 0.7561 |
|         | Growth Assets | 0.03466 | 0.4131 | | Growth Assets | 0.025 | 0.955 |
|         | Operating Income per empl. | 0.09754 | 0.0191 | | Operating Income per empl. | -0.00737 | 0.9777 |
|         | Dummy variable | -0.04926 | 0.0164 | | Dummy variable | 0.04972 | 0.6578 |
| Absa    | Intercept | 0.70421  | 0.2762 | | Intercept | 0.14498 | 0.8171 |
|         | AR3       | -0.88063 | 0.0342 | | AR3      | 0.17114 | 0.8052 |
|         | ROE       | -0.02384 | 0.0768 | | ROE      | 0.28971 | 0.4999 |
|         | Impairment ratio | -35.19716 | 0.2759 | | Impairment ratio | -40.23178 | 0.8233 |
|         | Growth Assets | 4.70013 | 0.0281 | | Growth Assets | -9.92022 | 0.2475 |
|         | Operating Income per empl. | 3.1171E+03 | 0.0194 | | Operating Income per empl. | 0.8987 | 0.9799 |
|         | Dummy variable | -0.95927 | 0.0639 | | Dummy variable | 2.07704 | 0.1988 |
growth in SVA was on average lower by -0.95927% than when its share price performance was below the bank index.

In the case of FNB none of the independent variables were considered as significant.

<table>
<thead>
<tr>
<th>Regression output per bank per model</th>
<th>Growth in EVA</th>
<th>Standard Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nedbank</strong></td>
<td></td>
<td><strong>Parameter</strong></td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.70897</td>
<td>0.7666</td>
</tr>
<tr>
<td>AR1</td>
<td>-0.27982</td>
<td>0.6347</td>
</tr>
<tr>
<td>ROE</td>
<td>-0.01472</td>
<td>0.9297</td>
</tr>
<tr>
<td>Impairment ratio</td>
<td>147.0046</td>
<td>0.7581</td>
</tr>
<tr>
<td>Growth Assets</td>
<td>0.39615</td>
<td>0.9569</td>
</tr>
<tr>
<td>Operating Income per empl.</td>
<td>11.02687</td>
<td>0.2188</td>
</tr>
<tr>
<td>Dummy variable</td>
<td>2.8876</td>
<td>0.3204</td>
</tr>
<tr>
<td><strong>EVA/Invested Capital</strong></td>
<td></td>
<td><strong>Parameter</strong></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.0013</td>
<td>0.9914</td>
</tr>
<tr>
<td>AR2</td>
<td>0.35471</td>
<td>0.6759</td>
</tr>
<tr>
<td>ROE</td>
<td>-0.00285</td>
<td>0.4313</td>
</tr>
<tr>
<td>Impairment ratio</td>
<td>7.36727</td>
<td>0.4159</td>
</tr>
<tr>
<td>Growth Assets</td>
<td>0.06423</td>
<td>0.6278</td>
</tr>
<tr>
<td>Operating Income per empl.</td>
<td>0.2976</td>
<td>0.7290</td>
</tr>
<tr>
<td>Dummy variable</td>
<td>0.04191</td>
<td>0.5180</td>
</tr>
<tr>
<td><strong>Growth in SVA</strong></td>
<td></td>
<td><strong>Parameter</strong></td>
</tr>
<tr>
<td>Intercept</td>
<td>2.93788</td>
<td>0.3536</td>
</tr>
<tr>
<td>AR3</td>
<td>-0.47849</td>
<td>0.3235</td>
</tr>
<tr>
<td>ROE</td>
<td>0.07978</td>
<td>0.4278</td>
</tr>
<tr>
<td>Impairment ratio</td>
<td>-309.12597</td>
<td>0.2561</td>
</tr>
<tr>
<td>Growth Assets</td>
<td>-1.5639</td>
<td>0.6979</td>
</tr>
<tr>
<td>Operating Income per empl.</td>
<td>-1.78215</td>
<td>0.6382</td>
</tr>
<tr>
<td>Dummy variable</td>
<td>-1.56216</td>
<td>0.3130</td>
</tr>
</tbody>
</table>

Table 3.12 - Regression output: Nedbank and Standard Bank

Nedbank displayed similar results to FNB where none of the variables were significant. In the case of Standard bank though there are some variables that were significant. In the model for growth in EVA the only variable that was significant was growth in assets. The interpretation is contrary to what is expected though, saying that a 1% increase in the growth of assets leads to an 11.82421% decrease in the growth of EVA. The assumption was made that the three dependent variables chosen are indicators of value creation as per the literature. The rest of the parameter estimates are presented above. A final observation for Standard Bank is that the model for growth in SVA shows that the dummy variable is significant.
Therefore, when Standard bank outperformed the bank index, their average growth in SVA was 1.45856% higher. This is contrary to the result for Absa.

<table>
<thead>
<tr>
<th>Regression output per bank per model</th>
<th>Mercantile</th>
<th>Capitec</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Growth in EVA</strong></td>
<td>Parameter Estimate</td>
<td>Pr &gt;</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.70759</td>
<td>0.067</td>
</tr>
<tr>
<td>AR1</td>
<td>0.31639</td>
<td>0.0863</td>
</tr>
<tr>
<td>ROE</td>
<td>-0.04283</td>
<td>0.067</td>
</tr>
<tr>
<td>Impairment ratio</td>
<td>-22.33331</td>
<td>0.0626</td>
</tr>
<tr>
<td>Growth Assets</td>
<td>1.41685</td>
<td>0.0845</td>
</tr>
<tr>
<td>Operating Income per empl.</td>
<td>0.49772</td>
<td>0.0225</td>
</tr>
<tr>
<td>Dummy variable</td>
<td>0.03518</td>
<td>0.774</td>
</tr>
<tr>
<td><strong>EVA/Invested Capital</strong></td>
<td>Parameter Estimate</td>
<td>Pr &gt;</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.04227</td>
<td>0.0422</td>
</tr>
<tr>
<td>AR2</td>
<td>1.22598</td>
<td>0.0059</td>
</tr>
<tr>
<td>ROE</td>
<td>-0.00484</td>
<td>0.0145</td>
</tr>
<tr>
<td>Impairment ratio</td>
<td>-4.07185</td>
<td>0.0084</td>
</tr>
<tr>
<td>Growth Assets</td>
<td>0.26885</td>
<td>0.0128</td>
</tr>
<tr>
<td>Operating Income per empl.</td>
<td>0.05782</td>
<td>0.0075</td>
</tr>
<tr>
<td>Dummy variable</td>
<td>-0.08468</td>
<td>0.0138</td>
</tr>
<tr>
<td><strong>Growth in SVA</strong></td>
<td>Parameter Estimate</td>
<td>Pr &gt;</td>
</tr>
<tr>
<td>Intercept</td>
<td>13.35401</td>
<td>0.4493</td>
</tr>
<tr>
<td>AR3</td>
<td>1.82408</td>
<td>0.2127</td>
</tr>
<tr>
<td>ROE</td>
<td>-0.37163</td>
<td>0.61</td>
</tr>
<tr>
<td>Impairment ratio</td>
<td>-185.99655</td>
<td>0.5953</td>
</tr>
<tr>
<td>Growth Assets</td>
<td>-14.12005</td>
<td>0.5971</td>
</tr>
<tr>
<td>Operating Income per empl.</td>
<td>-3.77895</td>
<td>0.4393</td>
</tr>
<tr>
<td>Dummy variable</td>
<td>3.54445</td>
<td>0.7327</td>
</tr>
</tbody>
</table>

Table 3.13 – Regression output: Mercantile and Capitec

The parameter estimates for Mercantile indicate that most of the variables in the models for growth in EVA and EVA/Invested Capital were significant. In the case of Capitec none of the variables were significant. The next test is for the goodness-of-fit for the individual models.
The table above presents the goodness of fit tests that were performed. The first test is the F-test for lack of fit. The table displays the F-value as well as the corresponding p-value used to test the null hypothesis that the model does not fit the data. Therefore, at a significance level $\alpha = 0.10$ the null hypothesis that the model does not fit the data is rejected. Only Absa, Standard Bank and Mercantile presents models that fit the data according to the F-test. These models are highlighted above in yellow.

The table also displays the R-square measure and adjusted R-square measure. Both of these indicate how good the model fits the data. A value of 1 indicates a perfect fit. The adjusted R-square measure is similar to the R-square measure, except that it penalises the model for more independent variables. The interpretation of the R-square values is the percentage of the variance in the dependent variable, which is explained by the chosen independent variables. For example, the model for growth

<table>
<thead>
<tr>
<th>Goodness-of-fit tests</th>
<th>Absa</th>
<th>Standard Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth in EVA</td>
<td>F Value</td>
<td>Pr &gt; F</td>
</tr>
<tr>
<td></td>
<td>21.27</td>
<td>(0.0148)</td>
</tr>
<tr>
<td>EVA/Invested Capital</td>
<td>F Value</td>
<td>Pr &gt; F</td>
</tr>
<tr>
<td></td>
<td>23.11</td>
<td>(0.0131)</td>
</tr>
<tr>
<td>Growth in SVA</td>
<td>F Value</td>
<td>Pr &gt; F</td>
</tr>
<tr>
<td></td>
<td>8.11</td>
<td>(0.057)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FNB</th>
<th></th>
<th>Mercantile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth in EVA</td>
<td>F Value</td>
<td>Pr &gt; F</td>
</tr>
<tr>
<td></td>
<td>1.58</td>
<td>0.3805</td>
</tr>
<tr>
<td>EVA/Invested Capital</td>
<td>F Value</td>
<td>Pr &gt; F</td>
</tr>
<tr>
<td></td>
<td>0.63</td>
<td>0.7097</td>
</tr>
<tr>
<td>Growth in SVA</td>
<td>F Value</td>
<td>Pr &gt; F</td>
</tr>
<tr>
<td></td>
<td>1.27</td>
<td>0.4559</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nedbank</th>
<th></th>
<th>Capitec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth in EVA</td>
<td>F Value</td>
<td>Pr &gt; F</td>
</tr>
<tr>
<td></td>
<td>0.69</td>
<td>0.6815</td>
</tr>
<tr>
<td>EVA/Invested Capital</td>
<td>F Value</td>
<td>Pr &gt; F</td>
</tr>
<tr>
<td></td>
<td>0.97</td>
<td>0.5551</td>
</tr>
<tr>
<td>Growth in SVA</td>
<td>F Value</td>
<td>Pr &gt; F</td>
</tr>
<tr>
<td></td>
<td>0.74</td>
<td>0.6583</td>
</tr>
</tbody>
</table>

Table 3.14 - Goodness of Fit test results
in EVA for Absa has an R-square of 0.977 or 97.7%, which indicates that the independent variables explain 97.7% of the variance in growth in EVA for Absa. In general the banks have vastly different levels of R-square for the different models. No constant picture is emerging amongst all the banks.

3.4 SUMMARY

The results of the multiple linear regression models per bank shows mixed conclusions. Three dependent (value creating metrics) where chosen and regressed against an autoregressive term, four measures from the income statement and balance sheet, and one measure indicating whether or not the bank outperformed the index of its peers. In the case of Absa, Standard Bank and Mercantile the models fitted showed that there is a relationship between the independent and dependent variables. In the case of FNB, Nedbank and Capitec the F-values indicated that the models are not good fits.

A significant result is that the variable indicating whether or not the bank outperformed the index of its peers was significant for Absa, Standard Bank and Mercantile. Unfortunately the interpretation of the regression coefficients indicates in the case of Absa that if Absa underperforms the index, they add more value, which is contrary to popular belief. There is no consistent message in the regression coefficients amongst the different banks. The factors that influence the value added the most are ROE, Impairment ratio and growth in assets. These three independent variables seem to feature the most. Also, their regression coefficients are the most consistent.

The overall results indicate that these selected value added metrics are not significant in explaining value added for all banks. Also, the notion of outperforming your peers does not seem to have an influence on these selected values adding metrics.
CHAPTER 4
CONCLUSIONS AND RECOMMENDATIONS

4.1 INTRODUCTION

This chapter explores the research findings and the link to the objectives set out in the first chapter. The evaluation of the findings will be correlated to the literature study. Through the evaluation, the research attempts to develop an understanding of the link between value creation and performance indicators for banks. Special attention is given to the link between value and industry performance.

The main objective of this study was to determine if Value-based Management (VBM) measures that measure efficient management in the banking sector are related to share price movements in relation to peers.

The secondary objectives of the study were the following:

- To determine which VBM measure correlates best with the value creation variable;
- To explore to what extent movements in traditional performance measures affect the value creation variable;
- To supply a model that can be used to show the impact of these performance measures on the value creation variable.

4.2 RESULTS AND CONCLUSION OF THE MAIN GOAL

This section will discuss the results of the tests that were performed to test the main goal of the dissertation.
4.2.1 Results

The main objective was to test if the movement of share prices of banks in relation to its peers outperform traditional income statement and balance sheet measures as predictors of value creation. The VBM measures chosen as dependent variables for the analysis were growth in Shareholder Value Analysis (SVA), growth in Economic Value Added (EVA) and EVA/Invested Capital. The analysis was performed for data between 2001 and 2010 for the banking sector as per the McGregor BFA database.

In order to test the link between performance in relation to peers and value creation, a dummy variable was created. This dummy variable was given the value 1 if the particular banks' growth in share price was higher than the growth in the bank index. The other selected independent variables were the Return on Equity (ROE), the impairment ratio (calculated as the total impairments in the income statement over total loans), growth in assets, and growth in operating income per employee. The final independent variable that was included was an Autoregressive term (which was the value of the dependent variable in the previous year). The three models were run per bank over the time period.

The results of the different banks for the main objective were inconsistent. In order to test the main objective, the p-values were considered for the dummy variable. In other words, the indication that the dummy variable was significant in the model indicated whether or not there is a strong enough link between the fact that the index was outperformed and value creation.

4.2.2 Interpretation of results

In the case of Absa, Standard Bank and Mercantile bank the p-values indicated in some of the models that there is a link between value creation and performance in relation to peers. In the case of FNB, Nedbank and Capitec the results could not be replicated. The fact that they outperformed the index did not have a significant influence on the fact that they created value. The results also indicated that the selection of VBM measures (dependent variable) played a significant role. In the
case of Absa for example the dummy variable was only significant for the VBM measures EVA/Invested Capital and growth in SVA, whereas for Standard Bank it was only growth in SVA and for Mercantile Bank only EVA/Invested Capital.

The conclusion can therefore be drawn that the fact that the index of its peers were outperformed, does not necessarily mean that the company has added value. It will consequently be worthwhile to test other VBM metrics against the fact that the bank index was outperformed. Another factor that might play a role here is that only a limited number of banks were included in the analysis.

4.3 RESULTS AND CONCLUSION OF THE SUB-OBJECVTIVES

4.3.1 Results

The results of the regression models indicate that it is not easy to select a best VBM measure that can be used for all the banks. Again, the results are very inconsistent. Only significant models could be found for Absa, Standard Bank and Mercantile Bank. When considering the F-test it was found that for Absa all three the models were significant, whereas for Standard Bank it was only the model for growth in EVA and growth in SVA, and for Mercantile it was only growth in EVA and EVA/Invested Capital. For these three banks one can say that growth in EVA does seem to be the best because it features in all three. However, the results for the other three banks indicate that none of the three models were significant.

The parameter estimates for the first model (growth in EVA) for Absa are interpreted as meaning that a 1% increase in ROE leads to a 0.02795% increase in growth of EVA. Also, a 1% increase in the impairment ratio will lead to a 39.59% decrease in growth in EVA and a 1% increase in the growth of operating income per employee leads to a 0.71043% increase in growth in EVA. The parameters for the growth in EVA model for Standard Bank shows that only growth in assets was a significant independent variable. Unfortunately the interpretation of the parameter estimate indicates that for every 1% decrease in growth in assets, there will be an increase in growth of EVA by 11.824%. This is contrary to popular belief that to add value a
company needs to grow its balance sheet. This result is limited to Standard Bank only. The results for Mercantile Bank show that for a 1% increase in ROE the growth in EVA decreases by 0.042%. Also, for every 1% decrease in the impairment ratio the growth in EVA increases by 22.333%, for every 1% increase in growth in assets the growth in EVA increases by 1.416% and for every 1% increase in growth in operating income per employee there is an increase of 0.49% in growth in EVA.

4.3.2 Interpretation of results

The sub-objectives indicate that it is not easy to select one VBM measure that will work for all the banks. Other metrics need to be tested for against the independent variables. The literature is very adamant about the VBM measures used in this study, but it seems to be working in selected cases only. The other factor to consider as well is the small number of banks in South Africa in relation to the rest of the world. This automatically leads to a small data sample, which can be problematic.

4.4 RECOMMENDATIONS

The results of this study should be used with careful consideration. The empirical models for Absa are the best and the interpretation of the parameters gives an indication of the links between the performance measures and the value creation metrics. In the case of Standard Bank only two of the models can be used, and then there has to be careful interpretation of the parameters as they are contrary to popular belief in some cases. The results for Mercantile Bank also indicate that only certain of the models can be used and also with careful consideration of the parameter estimates. The models for the rest of the banks give no comfort that they can be used to make decisions and it is suggested that they should not be used as such.
4.5 SUGGESTIONS FOR FUTURE RESEARCH

Suggestions for future research can be summarised in the following points:

- Repeat the exercise in different sectors of the JSE, especially where there are more companies in the particular sector. See if the same metrics produce a different result;
- Repeat the study for the banking sector again, but use different dependents of VBM metrics as value creation variables. The VBM measures selected for this study are not the only ones that can be used. Select different measures and test their relationships.
BIBLIOGRAPHY


