

**VARIABLES DETERMINING SHAREHOLDER VALUE OF
INDUSTRIAL COMPANIES LISTED ON THE
JOHANNESBURG STOCK EXCHANGE**

by

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VERANDERLIKES WAT AANDEELHOERS WELVAART BEPAAL VAN NYWERHEIDSMATSKAPPYE GENOTEER OP DIE JOHANNESBURGSE AANDELEBEURS

Dit is 'n algemeen aanvaarde beginsel dat die primêre doelwit van 'n onderneming die maksimering van aandeelhouers welvaart is. 'n Verhoging in welvaart lei tot verhoogde nutsbevrediging van enige deelnemer in finansiële markte, in dié geval die aandeelhouers van 'n onderneming.

In bestuur se pogings en besluitnemingsaksies om aandeelhouers welvaart te verhoog, word die veranderlikes wat aandeelhouers welvaart bepaal, voortdurend beïnvloed. Om aandeelhouers welvaart op die mees doelmatige wyse te verhoog, is dit nodig om te **kwantifiseer** welke effek elkeen van hierdie veranderlikes op aandeelhouers welvaart uitoefen.

Indien die waardetoevoeging van die kapitaal onder beheer van bestuur verbeter moet word, lê deel van die oplossing in die bepaling van daardie veranderlikes wat aandeelhouers welvaart bepaal, en om gevolglik bestuur se fokus op daardie veranderlikes te vestig. Die doelwit van hierdie studie is dus om 'n kwantifiseerbare verwantskap tussen hierdie veranderlikes en aandeelhouers welvaart te ontwikkel.

In die literatuur gedeelte van hierdie studie val die klem op die onderskeid wat getref word tussen die rekeningkundige metodes om aandeelhouers welvaart te bepaal, in teenstelling met die sogenaamde ekonomiese gebaseerde metodes. Daar word getoon dat die ekonomiese gebaseerde metodes, en in die besonder ekonomiese waarde toevoeging (in Engels, "Economic value added" , of "EVA"), besondere voordele het bo enige ander metode om die waarde wat bestuur toegevoeg (of vernietig) het, te bepaal.

Terwyl EVA as interne maatstaf van aandeelhouers welvaart dien, is markwaarde toevoeging (in Engels "Market value added" of "MVA") die eksterne of markgedrewe metode om waarde te bepaal.

Nadat die veranderlikes wat aandeelhouders welvaart soos verteenwoordig deur EVA bepaal is, is die navorsings metodologie, insluitend die statistiese tegnieke wat gebruik is sowel as die bepaling van die steekproef, behandel. Die resultate van die empiriese analise is bespreek en vergelyk met die teoretiese beginsels.

Die korrelasie tussen MVA en (verdiskonteerde) EVA was die hoogste en was selfs groter wanneer inflasie aanpassings aan die data gemaak was. Laer positiewe korrelasies is gevind tussen MVA en die meer tradisionele maatstawwe ter bepaling van aandeelhouders welvaart soos opbrengs op totale bates, opbrengs op aandeelhouders fondse, verdienste per aandeel en dividend per aandeel.

Nadat daar bewys is dat EVA die beste aanwyser is van waarde wat deur bestuur geskep of vernietig is, is dit nodig om EVA te analiseer in terme van sy veranderlikes of komponente.

Indien EVA as afhanklike veranderlike en 'n aantal onafhanklike veranderlikes by wyse van 'n stapsgewyse regressie analise ontleed word, is dit verskeie inkomste staat verhoudingsgetalle wat die beste verduideliking (soos verteenwoordig deur r^2) van aandeelhouderswelvaart gee. Geen betekenisvolle resultate kon van verskeie balansstaat verhoudingsgetalle verkry word nie.

Met hierdie resultate as basis word verskeie aanbevelings aan bestuur gemaak oor die bestuur en toevoeging van waarde vir aandeelhouders op die mees doelmatige wyse.

Die beoefening van waardemaksimering is nie maklik nie, maar EVA en sy veranderlikes kan die taak vergemaklik.

VARIABLES DETERMINING SHAREHOLDER VALUE OF INDUSTRIAL COMPANIES LISTED ON THE JOHANNESBURG STOCK EXCHANGE

It is widely accepted that the primary objective or goal of a firm is to maximise the value of its shareholders' equity. An increase in wealth increases the satisfaction of any financial market participant, or in this case, of any shareholder.

In management's attempts and decision-making to increase shareholder value, they continuously influence, directly or indirectly, those variables that affect shareholder wealth. In order to increase shareholder wealth in the most efficient way, it becomes necessary to **quantify** the effect that each of these relevant variables has on shareholder wealth.

If the value created from the assets under the control of management is to be improved, the answer lies partly in determining the real drivers of value and focusing management attention on these. The objective and value of this study lies in the fact that a meaningful mathematical relationship between these variables and shareholder value is developed.

In the literature part of this study, the main emphasis fell on drawing a distinction between the accounting-based and the economic-based models of determining shareholder value. It has been demonstrated that the economic-based models, and Economic value added (EVA) in particular, have distinct advantages in determining value created (or destroyed) by the management of a company.

Whilst EVA is the best internal measure of shareholder value creation, Market value added (MVA) is the external method of determining shareholder's wealth.

After the variables that can determine shareholder value as represented by the EVA of a company had been identified, the research methodology, including the statistical techniques as well as the boundaries of the sample used, were set out. The results of the empirical analyses were reported and compared with the theoretical principles.

The correlation between MVA and (discounted) EVA was the highest of all the variables and was at its most positive when inflation adjustments to the data had been made. Slightly lower positive correlations were also obtained from more traditional measures such as return on assets (ROA), return on equity (ROE), earnings per share (EPS) and dividends per share (DPS).

Once it has been determined that EVA is arguably the best indicator of value that has been created or destroyed by management, it is necessary to analyze EVA in terms of its variables or components.

If one turns to the stepwise regression analyses done with EVA as dependent variable with a number of independent variables, various income statement ratios provided the best explanation (as represented by r^2). No meaningful results were obtained from a number of balance sheet ratios.

Using these results as a basis, recommendations to management on managing and creating shareholder wealth in the most efficient way is made.

Practising value maximization is not easy, but EVA and its variables can be the answer.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION AND PROBLEM STATEMENT

It is widely accepted that the primary objective or goal of a firm is to maximise the value of its shareholders' equity. While there may be legitimate differences of opinion as to whether this is the sole motivation of a firm's management, it should without a doubt be a dominant variable in management's decisions.

This objective manifests itself especially when capital budgeting and investment decisions are undertaken. An increase in wealth increases the satisfaction of any financial market participant, or in this case, of any shareholder.

In management's attempts and decision-making to increase shareholder value, they continuously influence, directly or indirectly, those variables that affect shareholder wealth.

It is thus of the utmost importance that those variables that influence shareholder value are stimulated in the best positive way in order to increase shareholder value to the highest possible value.

The value drivers which influence shareholder wealth can be identified from an initial literature study. Management should know what these variables entail. However, in order to increase shareholder wealth in the most efficient way, it becomes necessary to **quantify** the effect that each of these relevant variables has on shareholder wealth.

In the business world where the actions and decisions of the managers are judged and evaluated using terms such as "productive", "effective" and "efficient", it is demanded of managers to adhere to the objective of the firm in a manner that will satisfy the shareholders (owners) of the firm.

1.2 JUSTIFICATION OF THE STUDY

If the value created from the assets under the control of management is to be improved, the answer lies partly in determining the real drivers of value and focusing management attention on these. The objective and value of this study lies in the fact that a meaningful mathematical relationship between these variables and shareholder value is developed.

Some models have already been developed in South Africa which calculate and present the value of a firm's Economic value added (EVA) as well as methods to rank firms which have had the biggest increases in EVA, but no one has as yet attempted to **quantify** just from **where** has that EVA originates.

The importance of this study is thus that it is the first attempt in South Africa to identify and **quantify** those variables that result in a firm's EVA.

The benefits of this study includes its provision for managers of an indication of which variables may provide the largest change in a firm's EVA. In other words, the study provides guidance which managers can use in their decision-making in order to provide their shareholders with the most efficient increase in value.

1.3 RESEARCH OBJECTIVES

The main objective of this study is to provide guidelines to help the decision-makers in a firm to maximise the value of shareholder equity. The results of the study therefore provide a tool which management can use in order to attain the goal of the firm, i.e. the wealth maximization of the shareholders.

As a starting point, the theoretical background of the historic methods of determining shareholder value is illustrated. This lays the foundation for the concept of EVA. The study demonstrates that EVA is arguably a superior method of determining shareholder value.

EVA is then "analyzed" in order to identify and classify those variables that determine and influence EVA, and hence shareholder value.

Whilst the value drivers might be relatively straightforward, the problem is to turn these value drivers into a meaningful and predictive mathematical relationship. Hence, this is the primary goal of this study: a stepwise regression analysis of those variables that determine shareholder value in order to, *inter alia*, quantify and establish a relationship between management's actions and shareholder value.

1.4 FRAMEWORK OF THE STUDY

The concept of creating shareholder value is not new and has been well documented in literature over the past decades.

The problem arises that the views in the traditional or accounting-based methods of determining shareholder value contrast with the so-called economic-based methods of determining shareholder value.

The first accounting-based approach is the use of the balance sheet. The simplest balance sheet valuation procedure calculates the values of the company's assets less liabilities and divides then by the number of issued shares to get a book value per share. The drawback of this approach is that it reflects the **historical** values of assets and liabilities as recorded by accountants. Because book and market values frequently diverge, appraisers typically adjust balance sheet entries in order to be able to approximate market values more accurately.

The second accounting-based method is to estimate the value of a company by summing the market values of its assets and liabilities. Its theoretical foundation is the efficient market hypothesis, which states that the prices of public traded securities accurately reflect the true underlying value of a company.

The third accounting-based approach is to appraise a company by comparing it with comparable companies whose value is known. It consists of calculating ratios such as market value to earnings (the P/E ratio) for the comparable companies and then multiplying the ratio by the appraisal target's earnings. This seemingly straightforward procedure, which is widely used in practice, raises a host of thorny valuation issues.

The fourth accounting-based approach to appraisal is to project the future cash flows that a company will earn for its shareholders and then to discount those cash flows to present value. This approach is based on the assumption that a shareholder invests in a company's shares because a future return (dividends or earnings) is expected as a result of holding on to these shares. The more cash is expected to be received, and the sooner the cash is expected to be received, the more highly investors will value the company's shares.

Traditionally, earnings per share is regarded as an essential accounting measure of performance.

As long ago as October 1974, the *Wall Street Journal* proclaimed in an editorial that "a lot of executives apparently believe that if they can figure out a way to boost earnings per share, their stock prices will go up even if the higher earnings do not represent any underlying economic change".

Rappaport (1986) contends that earnings per share and related accounting ratios and methods as discussed above have a number of shortcomings as standards by which to evaluate company performances. These above traditional measures of company performance are inadequate for the job in the sense that none of them isolate the most important concern of shareholders, namely is management adding or subtracting value from capital? There has to be a better way.

According to Fruhan (1979:7), managers create economic value by undertaking investments which produce returns in excess of capital costs. This process is

ongoing and if the performance of the company is perceived to be optimal, the market price of its shares should react favourably. It is generally accepted that as long as a company places itself above the cost of capital line, economic value that will be created as a result thereof will benefit all the shareholders.

Copeland, Koller and Murrin (1994) as well as Weston and Copeland (1991) call their attempts to explain and quantify value, value-based management. With their approach, value is defined as the present value of a future stream of benefits, but the approach takes into consideration:

- a) maximising the difference between the return on invested capital (ROIC) and the weighted average cost of capital (WACC)
- b) the amount of the investment; and
- c) the time span for which $ROIC > WACC$.

Various combinations of these variables as well as sub-variables work together to create value.

The measure of financial performance that this study concentrates on is Economic Value Added (EVA) as developed by a New York based consulting firm, Stern Stewart.

In his book, *The quest for value*, Stewart (1986) maintains that EVA is the one measure that accounts properly for all the complex trade-offs involved in creating value. In essence, EVA is calculated by taking the spread between the rate of return on capital and the cost of capital and multiplying that by the **total** capital committed to the business:

$$EVA = (\text{rate of return} - \text{cost of capital}) \times \text{capital}$$

EVA is residual income, or operating profits, less a charge for the use of capital:

$$\text{EVA} = \text{operating profits} - \text{a capital charge.}$$

The above equations are a short way of describing what EVA entails. From the literature study, it is clear that EVA is arguably a superior model to determine whether shareholders benefit in the form of value created by the managers of a firm or not.

The next phase of this study calls for an analysis of the variables or drivers that determine a firm's EVA. It became clear that these variables can be classified in two groups, as "external" and as "internal" to the firm. Whilst one must recognize that both types of variables do have an influence on a firm's EVA, some **external** variables (such as a country's macro economic and political outlook, regulations, free trade regulations, inflation rate, exchange rate, economic growth rate, etc.) can only be quantified using considerable numbers of assumptions and must therefore be **excluded** from the statistical analysis. (A more in-depth discussion of these factors, as well as the reason for their exclusion, is provided in the study).

The **internal** variables, however, must be included in the statistical calculations, due to the fact that they can be quantified relatively easily. These variables can be identified from the firm's published annual financial statements. They are the variables that determine a company's EVA, and therefore shareholder value.

At this stage in the study, the empirical analysis is included, a data base is set up, the relevant statistical techniques are applied and the results are interpreted.

1.5 RESEARCH DESIGN AND METHOD

One of the problems in undertaking this study was to limit the field of the study and the volume of the data to be processed, in order to produce a relevant, meaningful and useful model to predict changes in shareholder value.

The following limitations are placed on the data to be gathered:

- a) only the top 200 listed industrial companies on the Johannesburg Stock Exchange (as indicated by the latest *Financial Mail* survey) are used in the initial sample;
- b) the company must have been listed for at least ten years; and
- c) thinly traded shares are excluded from the sample.

After identifying those variables that influence EVA from the literature study, EVA values of the chosen sample can be obtained from the data base of the Bureau of Financial Analysis at the University of Pretoria. Correlation and stepwise regression analyses are used in the analysis of the data. The output from the latter analysis provides the answers that are needed to reach the objective of this study. Meaningful predictions can then be made.

1.6 STRUCTURE OF THE STUDY

The study follows a logical path discussing the various models that determine shareholder value, then identifying the variables of the models and finally making recommendations based on the empirical results.

In **Chapter 2**, accounting-based methods or models to determine shareholder value are discussed. The book value approach the equity and debt approach and the use of price earnings ratios depend in the main on the accountants' figures as set out in the financial statements. The use of dividends in different scenarios to place an intrinsic value on the firm's share is also dealt with. The chapter concludes with an evaluation of two of the most used tools to indicate shareholder wealth or share price, namely earnings per share (EPS) and return on equity (ROE).

Chapter 3 introduces the economic-based methods of determining shareholder value. Firstly, a number of factors which can distort accounting data are discussed

to finally put the accounting-based methods to rest. Three economic-based methods are discussed before the reader is in **Chapter 4** pointed towards arguably the best method, namely Economic Value Added (EVA). This method is analyzed in detail and illustrated with examples. Market value added (MVA), which is closely related to EVA, is also discussed. The chapter is concluded with a discussion of some criticism of EVA as well as the benefits of the EVA system.

After an evaluation of the various models to determine shareholder wealth, **Chapter 5** identifies the various variables that these models are made up of. The variables are firstly classified either as external (not under the control of management) or as internal to the firm. The internal variables are those that management can influence, change or manage to affect a change in shareholder wealth. In conclusion, the variables that determine EVA are identified. It is these variables (some of which, of course, can also be found in other models to determine shareholder value) that are used in the statistical analyses that follow.

Chapter 6 sets out the research methodology, stating how the data was collected and the final sample selected. A correlation analyses and a stepwise regression procedure are used to obtain the results to test the hypotheses.

Chapter 7 deals with the results obtained from the statistical analyses. The results of the various statistical runs are compared, not only to each other, but also to the theoretical principles involved. Where the empirical results are confirmed by the theory, this is noted. On the other hand, where a divergence from the theory is found, possible explanations are advanced.

In the last chapter, **Chapter 8**, the topic of value-based management is addressed. The results from the statistical analyses are used in a value-based management system to make recommendations as to how management can manage the variables that determine shareholder value in order to increase the wealth of the shareholders in the most efficient way.

CHAPTER 2

ACCOUNTING-BASED METHODS TO DETERMINE SHAREHOLDER VALUE

2.1 INTRODUCTION

There are many ways or methods to determine shareholder value. There is also an ongoing debate on exactly how to express or what to measure as shareholder wealth. These topics are addressed in this study.

All the methods that are deployed to measure shareholder wealth created or destroyed by a firm's management can be classified under two headings: accounting-based methods and economic-based methods. The accounting-based methods are addressed in this chapter, and the economic-based methods in Chapter 3 and Chapter 4. It is impossible to cover all the methods and their variations, but a discussion of a few well-known methods or variations is sufficient to show that the accounting-based methods differ substantially from the economic-based methods.

The first accounting-based method of calculating shareholder value is the book value approach, where the balance sheet forms the basis of the calculations. Certain adjustments can be made to the balance sheet amounts to reflect replacement cost or liquidation value, and although these adjustments can be subjective, they do have a use in some cases.

The equity and debt approach is another accounting-based method and an important new dimension, namely that of market values is introduced. Using the efficient market hypothesis as well as price earnings ratios are two further ways of calculating shareholder value.

Another way to place a value on shareholder interest is to apply the principle that

the value of an asset is the present value of all future cash flows which will be received from that asset. The discounted cash flow models use a number of variations in dividends to calculate the intrinsic value of a share.

Finally, two frequently used methods to indicate shareholder value, namely earnings per share (EPS) and return on equity (ROE), are investigated. These two methods are revealed to be full of accounting flaws and to be inferior to the more prudent economic-based methods.

2.2 THE BOOK VALUE APPROACH

One of the easiest ways to value a company is to use the information contained in the company's balance sheet. Two methods can be used to appraise a company by means of the balance sheet. Both methods rely on the fact that the value of a company is the sum of the values of all the claims that shareholders have on a firm. First, the book values of investor claims, including debt preference share capital and ordinary shareholder's interest can be added up directly. Second, the net assets can be added and liabilities other than investors' claims can be deducted.

The obvious weakness of the balance sheet approach is that the book values of the assets and liabilities as reported in the balance sheet by accountants may not equal their market values. Because book values are based on historical costs, they fail to take into account factors such as inflation and obsolescence that cause book values to differ from market values. In addition, the **synergy effect** of the combination (or organization) of the firm's assets and liabilities cannot be accounted for in the balance sheet. According to Cornell (1993:15) **organization capital** represents the value created by bringing employees, customers, suppliers and managers together in a cohesive unit and, in so doing, creating an asset that is not reflected in a company's balance sheet.

The most striking evidence of the weakness of an unadjusted balance sheet

shareholders' interest and the market value per share of ordinary shares for most listed (industrial) companies.

In spite of factors such as inflation and obsolescence, it is not always necessary to abandon the book value approach. In some situations, book values can be adjusted so that they reflect market values more accurately. The most common adjustments involved replacing the book values of a company's assets by estimates of the replacement cost or liquidation value of those assets. Such adjustments also have their drawbacks, namely, firstly that the **adjusted book values** may not be accurate estimates of the **market value**, and, secondly, that the adjustment process does not take assets, that do not appear on the balance sheet, into account properly.

Appraising a company purely based on unadjusted book values literally amounts to merely reading and interpreting a balance sheet.

From the balance sheet, the value of the firm can be calculated directly, by adding up the book values of the shareholders' claims, or indirectly, by adding up net assets and subtracting current liabilities (other than debts owed to shareholders) and deferred taxes. Both methods, the **shareholder's claims** approach and the **asset-liability** approach, are illustrated using the balance sheet information from South African Breweries Limited for the financial year ending 31 March 1996:

Shareholder's claims approach

	Rm
Ordinary share capital	59.3
Non-distributable reserves	3 399.2
Distributable reserves	3 252.9
LESS: Intangible assets	<u>36.6</u>
Ordinary shareholder's interest	6 675.1
Minority interest	2 247.7
Preference share capital	<u>226.1</u>
Total shareholder's interest	9 150.9
Total long-term debt	2 416.9
Interest-bearing short-term debt	<u>1 998.4</u>
TOTAL VALUE	R13 566.2

Asset-liability approach

	Rm
Total net fixed assets	8 480.0
Total long-term investments	1 836.3
Current assets	<u>10 667.6</u>
Total assets	20 993.9
LESS Current liabilities	9 426.1
Interest-bearing short-term debt	<u>1 998.4</u>
TOTAL VALUE	R13 566.2

The deficiencies of the book value approach are most easily observed by looking at the indirect calculation of value. Because current liabilities have short maturities, their book value is close to their market value. From the above, it is clear that the accuracy of a book value appraisal depends on how well the net book values of the assets approximate their market values.

There are three reasons why the book value of a company's assets commonly diverge from their market value. Firstly, inflation drives a wedge between the market value of an asset and its historical cost, less depreciation. Secondly, technological change renders some assets obsolete before their depreciable life ends. Thirdly, assets may be combined in such a way that their value as part of a going concern exceeds the sum of their values as individual assets. Each of these points is fundamental to understanding valuation theory and is worth exploring in some detail (Cornell 1993:18).

2.2.1 Inflation

Inflation is measured by the rate of increase in a price index such as the consumer price index (CPI) or the producer price index (PPI). People naturally associate inflation with widespread **increases** in the cost of goods and services. But this is the wrong way to think about inflation. Instead, inflation represents a **decline** in the value of one set of goods: the Rand. When the value of the Rand declines, the prices of all other goods and services rise, because those prices are measured in terms of Rands.

One weakness of historical cost accounting and, therefore, of valuation techniques based on historical cost, is that it ignores the impact of changes in the purchasing power of a Rand. The value of the assets on the balance sheet is presented in terms of nominal Rands for the year in which the assets were purchased.

It is, however, important to note that data from the financial statements can be adjusted to take inflation into account. The database of the Bureau of Financial Analysis (BFA) at the University of Pretoria makes provision for inflation adjustments of other fixed assets as well as their depreciation. This is done by calculating the average age of the assets (accumulated depreciation divided by depreciation for the year) and applying this to the inflation index of machinery, non-electrical, as published by the Central Statistical Services of South Africa. The adjustment to depreciation is done in a similar way: an additional amount must be subtracted from the book value of the other fixed assets in order to provide for the

higher replacement value.

It is important to note that the impact of inflation extends beyond the adjusted book value approach to valuation. For instance, the discounted cash flow approach is based on the forecast of cash flows to be earned in future years. Cash flows received in future years are stated in different Rand values, so account must be taken of inflation. In addition, inflation affects interest rates on debt and required returns on equity and thereby alters the cost of capital.

2.2.2 Obsolescence

Because of technological change, some assets become obsolete before the end of their depreciable lives. This phenomenon is an important factor in industries subject to rapid changes in technology, such as the electronics industry and computer companies. Copper wiring may be made obsolete by optical fibre lines, and analog switches can be made obsolete by digital switches, and so on.

The most direct way to measure obsolescence is to observe the difference between the market value of an asset and its net book value. Unfortunately, this is not possible in many cases, because there might not be an active market for the company's assets.

The fact that obsolescence and inflation may have a significant impact on the valuation process may not be evident from a simple examination of book values, due to the fact that the two forces tend to offset each other. Whereas inflation causes book values to understate the market value, obsolescence causes book values to overstate the market value. However, it is beyond the scope of this study to discuss these factors and their possible effects in greater detail.

2.2.3 Organizational capital

Modern finance teaches that corporate investment decisions should be based on a simple common sense rule: buy an asset if the value of that asset exceeds its

cost. So, for example, if calculations show that a machine that costs R1m will produce benefits with a present value of R1.5m to the company, the company should buy the machine.

For a corporation to create value for its shareholders, the value of its assets as part of an ongoing concern must exceed the value of the assets in isolation. Cornell and Shapiro (1987:5-14) call that which creates this added value "organizational capital".

Organizational capital, which includes intangible assets such as goodwill, takes a variety of forms. Some key components of organizational capital include:

- a) long-term relationships between managers and employees that allow them to work together effectively and do their jobs efficiently;
- b) the company's reputation with its customers and suppliers, including the very important link between customers and a specific brand name, which makes it easier to sell products;
- c) the company's opportunities for profitable investment that grow out of the specialized skills of its management, its work force and relationship with its customers (these opportunities, which are sometimes referred to as investment options or growth options, can account for a significant fraction of a company's value); and
- d) a network of suppliers, distributors, and repairmen that know the company's products and are willing to support and enhance them.

An important attribute of a firm's organizational capital is that it is difficult to separate it from the firm as a going concern. The value of a brand name is typically not reflected in the replacement cost or liquidation value of the fixed assets. The value of the brand name like the value of most other forms of

organizational capital, can be estimated only by examining the earning power of the company. Nevertheless, it has been said that if Coca Cola burns to the ground, banks will, on the strength of the brand name lend the company \$60 Billion to rebuild.

By focusing on the balance sheet entries as individual items, the adjusted book value approach ignores organizational capital (or non-quantifiable variables). In some cases, the resulting error can be huge. The issue of these non-quantifiable variables is dealt with in more detail in Chapter 5 of this study.

2.2.4 Adjusting book value to reflect replacement cost

The earning power of an asset is unlikely to be a function of the net historical cost of the asset. It is more likely related to the current replacement cost.

Thus, one way to adjust the balance sheet entries is to substitute estimates of replacement cost for the net book value of the assets. Unfortunately, there is some disagreement among appraisers and economists about how to measure replacement cost. Using a price index in order to inflate the book value to replacement cost, fails to take into account obsolescence. It also fails to reflect changes in the prices of specific (especially imported) assets.

A better approach, therefore, is to adjust each asset separately to reflect its own replacement cost today. If done properly, such an adjustment would take into account both inflation and obsolescence, as both these factors influence the cost of replacing assets today. Unfortunately, this process is, to a great extent, problematized by the subjectivity of the appraiser, with its disadvantages.

The greatest deficiency of the replacement cost approach is that it ignores organizational capital. Appraisals based on replacement cost, even when replacement cost is measured perfectly, ignore this value-creating synergy.

2.2.5 Adjusting book value to reflect liquidation value

A better way of determining the market value of the assets on a company's balance sheet, than the book value method, is to determine what they would sell for if the company were to be liquidated today. The appraiser must attempt to estimate the hypothetical price at which the assets could be sold in the market. Often he would have to rely on management's estimates of liquidation value. However, appraising the liquidation value of the assets is difficult even for senior managers, because they focus on the value the assets produce as part of a going concern. In most cases, therefore, it is not worth the time and expense to estimate the liquidation value of all of a company's assets independently, unless the appraisers are convinced that liquidation value provides a valid indication of market value.

The key deficiency of the liquidation value approach is that, like the replacement cost approach, it ignores organizational capital (Cornell 1993:31). Instead of valuing the firm as a going concern, it values the firm as a collection of assets to be sold piecemeal.

It is worth noting that there are situations in which the liquidation approach can be combined successfully with other appraisal methods. Consider, for example, a conglomerate firm consisting of a variety of loosely related subsidiaries. If each of the individual subsidiaries has significant organizational capital, then an approach that takes account of a subsidiary's earning power is required to appraise each of the subsidiaries separately. If the corporate headquarters only add a little organizational capital, the value of the firm can be calculated by estimating the value of each of the subsidiaries and adding the values as if the subsidiaries are individual assets that can be liquidated.

2.2.6 Concluding remarks

Only in rare situations can the **unadjusted book value** be a reasonable value

indicator. Its main use is comparisons, where the book value is compared, for example, with the market value to determine a market value premium to book value (net asset value). **Adjusted book values** are more useful. If replacement cost or liquidation value can be accurately estimated, **and** if there is reason to believe that the earning power of the company's assets is tied to their replacement cost or liquidation value, then the adjusted book value will be approximately equal to the market value.

Book value approaches to appraisal are particularly inappropriate for any industry or company that uses a reasonable level of technology in its processes, or for firms that derive much of their value from organizational capital. The only way to assess the impact of this synergy effect is to determine how effectively a company's assets work together as part of a going concern by examining the **earning power** of the company or by comparing the performance of the company with comparable firms in the same line of business. But in each case, that requires an altogether different approach to valuation.

Thus, in most practical situations, the book value approach to valuation should be given little weight by appraisers.

2.3 THE EQUITY AND DEBT APPROACH

2.3.1 Introduction

When a listed company is appraised, there is a straightforward valuation procedure: add up the market values of the equity and the debt. This technique is also referred to as the **market approach** because it is based on the observation of the market prices of the firm's shares.

Consider the following example of South African Breweries for the financial year ending 31 March 1996:

Market value of equity and debt

	Number of shares issued	296 400 000
multiplied by	JSE price at financial year end	<u>R 133.75</u>
		R'000
	MARKET VALUE OF EQUITY	R3 964 350
	Minority interest	R2 249 700
	Preference share capital	R 226 100
	Total long-term debt	R2 416 900
	Interest bearing short-term debt	<u>R 1 998 400</u>
	MARKET VALUE OF DEBT AND EQUITY	R10 855 450

Although the equity and debt approach is straightforward, debate has arisen over what prices to use in the valuation procedure, particularly with regard to **equity**. The relationship between the information possessed by investors and share prices, is the subject of the **efficient market hypothesis**.

2.3.2 The efficient market hypothesis

The efficient market hypothesis (EMH) is one of the foundations of modern finance. Because of the central role it plays in both the equity and debt approach as well as in the general principles on which valuation theory is based, a few comments regarding the EMH are necessary.

According to the most widely accepted definition, **an efficient market is a market in which the price of a share reflects all publicly available information**. It is thus the best possible estimate, on the basis of public information, of the share's true value.

It is important to distinguish between market efficiency and market clairvoyance. The EMH maintains that the market processes publicly available information as well as any professional investor can; it does not say that the market processes

information **perfectly** or that it can predict the future without error. Highly valued companies have, on occasion, performed very poorly, to the surprise (and dismay) of many. The EMH recognizes that both markets and well-informed investors can make mistakes, but it predicts that, on average, market forecasts and market valuations are **at least** as accurate as those produced by individual investors and appraisers.

2.3.3 The EMH and appraisal practice

The efficient market hypothesis has two important implications for appraisal practice. First and most importantly, it is connected to the equity and debt approach: in situations where the equity and debt approach can be used, this approach will produce the most reliable indicator of value. This does not mean that the sum of the market values of a company's shares represents a fair value of the firm. Some investors perceive the current (market) price as too high, while others believe it is too low and this difference in perceptions is the very reason for trading.

The EMH states that the market assessment of value is, on average, more accurate, than the subjective view of any individual appraiser. For this reason, appraisers should not substitute their own judgement for that of the market, even if it is not uncommon for appraisers to reject the market's opinion when it conflicts with their own views.

The EMH also implies that a firm's shares should be valued at market prices prevailing on the **lien date** (the day on which the appraiser is attempting to estimate value). Despite this implication, some appraisers, when calculating equity and debt values, average share prices over periods ranging from a month to a year preceding the lien date of the appraisal.

The efficient market hypothesis states that such averaging yields inaccurate estimates. Share price fluctuations, including movements in interest rates, result

from the arrival and discounting of new information. The correct price to use in an appraisal is the price that reflects all available information on the lien date. According to the EMH, that price is the market price on the lien date. Averaging earlier prices, which are based on past information, reduces the accuracy of the appraisal.

2.4 THE DIRECT COMPARISON APPROACH

2.4.1 Introduction

It is commonly held economic knowledge that assets of a similar nature **should** sell (trade) at similar prices. Based on this principle, a straightforward way to value an asset is to find an identical, or at least closely comparable, asset that has traded recently. This principle implies that the value of the asset being appraised should be comparable to that of the other (traded) asset.

According to Cornell (1993:56) the direct comparison approach involves two quantities: a **value indicator** and an **observable variable** that is related to value. For direct comparisons to be possible, data on both the value indicator and the observable variable must be available for the comparable asset, and data on the observable variable must be available for the appraisal target.

The direct comparison approach can also be expressed mathematically, which provides further insight into how the method works and the assumptions on which it depends. The **value indicator** is defined as **V** and the **observable variable** as **x**. The ratio of V to x for the company to be appraised must be approximately equal to the ratio of V to x for comparable firms:

$$\frac{V (\text{Target})}{x (\text{Target})} = \frac{V (\text{Comparables})}{x (\text{Comparables})}$$

This equation can be rewritten to solve the one unknown variable, the value indicator for the company to be appraised, as follows:

$$V (\textit{Target}) = x (\textit{Target}) * \frac{V (\textit{Comparables})}{x (\textit{Comparables})}$$

A critical step in applying the direct comparison approach is choosing observable variables x that have a consistent relation to value, V . In the case of a company, variables such as cash flows and earnings are good choices because the ultimate sources of value is the net benefits received by shareholders.

One way to apply the direct comparison approach is to calculate the average price-earnings ratio (P/E ratio) for a sample of comparable firms and multiply this average P/E ratio by the earnings (or **expected** earnings) of the firm to be appraised.

2.4.2 Selecting comparable companies

There are two main obstacles to overcome when one attempts to value companies by direct comparison. Firstly, it could be difficult to find comparable companies to serve as a basis for comparisons. Second, the concept of a **comparable** company is nebulous. Corporations are complex entities characterized by a wide variety of traits. What (and how many) characteristics of companies must be similar in order to make a meaningful comparison possible?

The first problem can be overcome by using published data for listed companies. Shares in these companies are traded on a daily basis, and using this publicly available information, the P/E ratios are calculated on a daily basis by a variety of institutions.

Regarding the second problem, one common solution is to rely on industry classifications. The assumption behind this approach is that if companies are in the

same industry, many of their characteristics should be the same. In the case of the Johannesburg Stock Exchange (JSE), industrial classification alone provides only a rough estimate of comparability. Companies within any given sector vary considerably in terms of their size, capital structures, ability to produce and sell different products, distinct management philosophies, and markedly disparate corporate histories.

One excellent source regarding information on comparability is found in research reports compiled by stockbroking firms. Reports prepared by leading firms, in addition to offering a wealth of data about the target company, often contain a detailed list of comparable firms. Furthermore, in some cases, the list of comparables is accompanied by a discussion of the factors which led the analysts to conclude that these specific companies were considered comparable. Relying on independent information such as analyst reports and studies produced by investment research companies can also add credibility to an appraisal.

Finally, financial ratio analysis can also be applied to assess comparability. Suppose a number of companies have been selected on the basis of their industry classification, an examination of analyst reports, and discussions with management. Presumably, these companies should have financial ratios similar to those of the company to be appraised. If a financial ratio analysis (with the normal liquidity, solvability, leverage and profitability ratios) indicates that one or two comparables are found to differ significantly from the target company, they can be deleted from the sample.

2.4.4 An application of direct comparison : the use of P/E ratios

As mentioned previously, one of the most common and widely used applications of the direct comparison approach is the valuation of the equity of a firm on the basis of an analysis of P/E ratios. This method is frequently used by investment banks when they are evaluating potential acquisitions, spin-offs or restructurings.

$$\text{P/E ratio} = \text{Market price per share/Earnings per share}$$

therefore: $\text{Market price per share} = \text{P/E ratio} \times \text{Earnings per share}.$

In order to use this method for valuing the equity of a firm, one needs to have the P/E ratios of the specific sector in which the company is listed, or the P/E ratios of similar companies. The P/E ratio, together with the expected earnings per share of the firm, can then give an indication of what the firm's **intrinsic** market price should be, which in turn can be compared with the **actual** market price per share.

Although the use of P/E multiples provides one illustration of the direct comparison approach, it is not the only or necessarily the best way in which direct comparisons can be developed. In many situations, price per share might not be the best value indicator, nor might earnings per share be the appropriate financial variable.

In the P/E analysis presented above, the value of the equity was used as the value indicator. Consequently, the result of the analysis is a valuation of the **equity** of the firm, and not of the **total value** of the firm. The value of the **debt** and **preferred stock**, if any, must also be calculated in order to arrive at the total value of the firm.

However, the subject and scope of this study is focused on the value for the **ordinary shareholder** (and the ways to measure this), and not so much on the total value of the firm. It is therefore unnecessary to diverge into further discussions of P/E ratios.

2.4.5 Adjusting the financial data

For the direct comparison approach to produce relevant and usable outputs, the ratios and the financial data to which the ratios and data are going to be applied, must be carefully calculated. The inputs into the valuation process must be sound, otherwise the outputs will be unusable.

There are basically two reasons why a firm's financial data as published in the annual financial statements should sometimes not be used in this specific valuation process. Firstly, a company may use accounting practices or procedures that differ from those used by another company, even if the compilation of financial statements is regulated by a central body or guidelines, as is the case in South Africa. Secondly, short-term economic conditions may be such that the current earnings do not reflect the true (underlying) earning power of the company.

Procedures for adjusting financial data in order to make provision for inequalities, fall into two categories. One type of approach is the application of statistical techniques. For instance, five-year averages of a particular amount to be used in calculations are commonly calculated. The second type of approach involves studying the financial statements of the firm and then making selected adjustments according to pre-set guidelines.

It is this second approach that is employed in this study, due to the fact that the data used originated from the data bases of the Bureau of Financial Analysis (BFA) of the University of Pretoria. Certain figures in the financial statements of a firm are adjusted when the BFA compiles its databases.

2.4.6 Concluding remarks

It is possible to extend the concept of direct comparison valuation by using other value indicators and additional financial variables. The temptation to use a shotgun approach must, however, be avoided. It is better to select a limited group of variables that financial analysis suggests should produce accurate appraisals.

In closing, it is worth reiterating that **comparability** is the key to the successful use of the direct comparison approach. It is, however, in the search for comparability that the drawback of the direct comparison approach lies. Extensive manipulation of the data can create an illusion of comparability when, in fact, it does not exist. According to Cornell (1993:99), even highly dissimilar companies can be made to

appear similar if the data are "massaged" enough. Thus, the fewer the adjustments to the data, the greater the confidence (and value) possible in a direct comparison approach.

2.5 DISCOUNTED CASH FLOW MODELS

2.5.1 Introduction

During the mid 1950s, Gordon and Shapiro established the principle that the price or value of a share must be equal to the discounted present value of the cash flows that shareholders expect to receive (Franks, Broyles & Carleton 1985:228).

The discounted cash flow approach is, in many ways, an improvement on the methods discussed above. One of the biggest differences lies in the fact that **cash flow** (in the form of dividends) is now being introduced into the valuation process.

A number of problems may arise when one tries to apply the discounted cash flow approach for valuation purposes. The benefits to the shareholders must be defined. At this stage, one can safely say that this entails the cash flow from their shareholding, namely dividends and capital gains. It is, however, the **estimation** or **forecasting** of these inputs that is difficult and subject to subjectivity.

Unlike bonds and preferred shares, where the cash flows are contractually stated, much more uncertainty surrounds the future stream of returns connected with ordinary shares.

A rate must also be selected for discounting the predicted cash flows. Cornell (1993:101) states that the selection of the discount rate is complicated by a combination of two facts. Firstly, the cash flow forecasts are uncertain, so that the disbursements to investors are risky; and, secondly, investors demand a premium for risk. Moreover, different investors demand different risk premiums.

The dividend discounted cash flow approach to corporate valuation is conceptually identical to the investment decision based on net present value. In the context of the valuation of shareholders wealth, this approach can be regarded as the present value rule applied to the share. The value of an ordinary share can thus be viewed as the discounted value of all expected future dividends provided by the issuing firm for the time span that the investor (shareholder) wants to hold on to that share. This can be expressed by means of the following formula:

$$\begin{aligned}
 V &= \frac{D_1}{(1 + k_e)} + \frac{D_2}{(1 + k_e)^2} + \dots + \frac{D_n}{(1 + k_e)^n} \\
 &= \sum_{t=1}^{\infty} \frac{D_t}{(1 + k_e)^t}
 \end{aligned}$$

where

- V = the value of the share;
- D_t = the cash dividend at the end of time period t ; and
- k_e = the investor's required rate of return, or discount rate for this equity investment.

An important feature of ordinary shares is that they have no fixed maturity. If the shareholder/investor plans to own the share for only two years, the model becomes:

$$V = \frac{D_1}{(1 + k_e)} + \frac{D_2}{(1 + k_e)^2} + \frac{P_2}{(1 + k_e)^2}$$

where

- P_2 = the expected selling price of the share at the end of the second year.

Equation 2.2 assumes that future investors will be willing to buy the share two years from now. These future investors will base their judgements of what the share is worth on their expectations of future dividends and a future selling price

(in this case in the second year) (Van Horne & Wachowicz 1995:74).

Note that, as explained above, it is the **expectation of future dividends** and a **future selling price** (which itself is based on expected future dividends), that gives value to the share. Cash dividends are the only reward that shareholders receive from the issuing company and therefore the foundation for the valuation of ordinary shares must be dividends. This model was first developed by Williams, and in his 1938 book, *The Theory of Investment Value*, he aptly put the principle into verse:

"A cow for her milk
A hen for her eggs
And a stock, by heck
for her dividends" (Van Horne & Wachowicz 1995:73).

2.5.2 Dividend discount models

Dividend discount models are designed to calculate the intrinsic value of ordinary shares under specific assumptions with regard to the expected growth pattern of future dividends and the appropriate discount rate required by the investor. A number of variations are discussed below.

2.5.2.1 No growth in dividends

It is highly unlikely that ordinary shareholders would expect or receive no nominal growth in dividends, especially in an economy where there is inflation. It is, however, possible that a stable dividend is expected to be maintained for a long period of time. The present value of the share, according to the constant dividend model, is simply the current dividend divided by the discount rate:

$$V = \frac{D}{k_e}$$

Note that there is no subscript to the "D". That is because $D_0 = D_1 = D_2 =$ a constant dividend.

The model accurately describes the cash flow and valuation of preferred shares, as they pay a constant dividend and can thus be valued as a perpetuity. However, this model is too simplistic, because most companies often change the dividend that they pay.

2.5.2.2 Constant growth in dividends

Although the dividends that a company pays might vary from time to time, it might be more realistic to assume a constant growth rate in dividends over time. The constant growth in dividends model assumes that dividends grow at the same rate in each period. Ordinary shares that offer dividends that grow at a constant rate can be valued as a **constant growth perpetuity** (Chambers & Lacy 1993:152):

$$V = \frac{D_1}{k_e - g}$$

where

- D_1 = next year's dividend;
- k_e = the discount rate; and
- g = the constant growth rate in the cash flow.

This formula also provides an insight into the discount rate, or the shareholder's required rate of return. If one rewrites the above formula to make k_e the subject, one gets the following formula:

$$k_e = \frac{D_1}{V} + g$$

The first term of this formula is called the dividend return or dividend yield, and is readily available from historic information. The second part of the equation, g , the growth rate, is much more difficult to estimate. Whilst one can obtain information on the past performance in the growth rate, some analysts estimate future growth by using the following formula:

$$g = b \times \text{ROE}$$

where

b = the percentage cash flow retained and reinvested by the firm for future growth; and

ROE = the historic accounting rate of return on the firm's equity.

The above equation implies that future growth in dividends will be based upon the amount of funds reinvested or retained for growth purposes and the rate of return the firm earns on equity (Chambers & Lacy 1994:153).

Van Horne and Wachowicz (1995:75) developed this formula further. They did not base their valuation on dividends, but called it an **Earnings Multiplier Approach**. This approach is very similar to what we called the Direct Comparison Approach using P/E ratios in Section 2.4.4 above.

The idea is that investors often think in terms of how many rands they are willing to pay for a rand of future expected earnings. If b represents a constant retention rate, then the dividend-payout ratio would also be constant at $(1-b)$. Therefore,

$$(1 - b) = \frac{D_1}{E_1}$$

and

$$D_1 = (1 - b) * E_1$$

where

E_1 = the expected earnings per share in period 1.

If one substitutes the above formula into the constant growth model (equation 2.4 on the previous page), one obtains the following formula:

$$V = \frac{(1 - b) * E_1}{k_e - g}$$

The value is now based on the expected earnings in period 1 and not on the expected dividends *per se*.

One must, however, keep in mind that this alternative approach originated from the constant growth dividend discount model and therefore is not new, based on the same principals and with similar advantages and disadvantages attached to it.

2.5.2.3 Non-constant growth in dividends

The final dividend discount model considers the situation where there is a non-constant growth in dividends. Although one can apply the general dividend discount model (discounting each year), one can also assume that the dividends are expected to grow at an abnormal rate for a number of years, after which growth will taper off to a more normal rate.

The value of a share that experiences such growth can be expressed as follows:

$$V = \begin{matrix} \text{(PV of dividend} \\ \text{for each year} \\ \text{of abnormal growth)} \end{matrix} + \begin{matrix} \text{(PV of value} \\ \text{at end of period} \\ \text{of abnormal growth)} \end{matrix}$$

This can be illustrated by means of the following example:

Suppose that a firm's most recent dividends amounts to R2,00 per share. It is expected that the growth rate in dividends will be 25% per year for the next 3 years, after which the growth rate will drop back to a normal rate of 5% for the foreseeable future. The value of the share can be calculated for a shareholder who

has a required rate of return of 12%.

Year	Growth rate	Total dividends	PV factor @ 12% (k_e)	Total PV
1	25%	R2,50	0.893	2,233
2	25%	R3,13	0.797	2,495
3	25%	R3,91	0.712	2,784
4	10%	R4,30 ÷ (0,12 - 0,05) = R61,43	0.712	<u>43,738</u>
				51,250

The calculation is set out in the following formula:

$$\begin{aligned}
 V &= \sum_{t=1}^3 \frac{2(1,25)^t}{(1,12)^t} + \frac{1}{(1,12)^3} \times \frac{4,30}{(0,12 - 0,05)} \\
 &= 7,512 + 43,738 \\
 &= 51,250
 \end{aligned}$$

As the example demonstrates, the process of determining the value of shares where non-constant growth in the dividends occur, is greatly simplified by assuming constant growth in dividends from the third year onward. One can, however, generate much more plausible scenarios on a simple computer spreadsheet, bearing the general principle in mind.

2.5.2.4 Concluding remarks

The cash flows that an investor in ordinary shares will receive take on the form of dividends. Investors are able to value their shareholding by means of the dividend discount models. This involves discounting the expected cash flows by applying a discount rate that takes into account the cost of the equity funds invested, as well as a risk premium that reflects the investors' risk profiles.

Nagorniak (1985:13), however, caution investors against using this model. He states that, while the dividend model can be a useful tool for determining the relative attractiveness of shares, it is not a "black box" that ensures instant wealth. The dividend discount model can be used well or it can be used badly. It is especially the time horizon assumption and the risk-adjustment procedures that can cause problems or skewed results. A share's beta has very little to do with the structure of a typical dividend discount model.

Most of the issues raised above have been addressed in some form or another by practitioners. The scope of the study does not allow further discussion of these issues here.

2.6 THE RELEVANCE OF EARNINGS PER SHARE AND RETURN ON EQUITY

Many practitioners and managers of businesses still rely on earnings per share in order to explain value creation. Traditionally, earnings per share is regarded as an essential accounting measure of performance.

As far back as October 1974, the *Wall Street Journal* proclaimed in an editorial that "a lot of executives apparently believe that if they can figure out a way to boost earnings per share, their stock prices will go up even if the higher earnings do not represent any underlying economic change".

In order to contrast expected cash flows with earnings per share, Copeland, Koller and Murrin (1990:73) use the following example (overleaf) in Tables 2.1 and 2.2.

Consequently, sales less cash expenses and depreciation equals earnings before interest and tax (EBIT) which is then equal to net income (NI).

TABLE 2.1 PROJECTED INCOME STATEMENTS (Rm)

LONGLIFE COMPANY	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	TOTAL
SALES	1,000	1,050	1,100	1,200	1,300	1,450	7,100
CASH EXPENSES	(700)	(745)	(790)	(880)	(970)	(1,105)	(5,190)
DEPRECIATION	(200)	(200)	(200)	(200)	(200)	(200)	(1,200)
EBIT = NI	100	105	110	120	130	145	710

TABLE 2.2

SHORTLIFE COMPANY	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	TOTAL
SALES	1,000	1,050	1,100	1,200	1,300	1,450	7,100
CASH EXPENSES	(700)	(745)	(790)	(880)	(970)	(1,105)	(5,190)
DEPRECIATION	(200)	(200)	(200)	(200)	(200)	(200)	(1,200)
EBIT = NI	100	105	110	120	130	145	710

Source: Copeland, Koller and Murrin (1990:73)

To keep the example as simple as possible, we omit debt(interest) and taxes.

One can ask oneself which company has the better value-maximizing strategy? The answer is that it is impossible to make a correct decision or evaluation based only on the above information. There is obviously not enough information in the income statement alone to make value-based decisions. Both companies have exactly the same net income. Earnings or earnings growth are inadequate measures of performance because they ignore critical balance sheet information.

Consider the projected cash flows of the companies as given in the Tables 2.3 and 2.4 overleaf.

In the example in Tables 2.3 and 2.4, the cash flows are calculated by taking net operating income (after tax) plus depreciation, minus capital expenditures and allowing for changes in working capital. It is therefore the operating cash flows less cash flows needed to grow the balance sheet (Weston & Copeland 1992:705).

The key differences between Longlife and Shortlife companies are found in the balance sheet, where Longlife uses manufacturing equipment that must be replaced every three months, while Shortlife uses equipment that must be replaced every year but costs only one third as much. Also, Shortlife does a much better job of collecting its receivables. For simplicity's sake, the movements of no other balance sheet items were considered.

Tables 2.3 and 2.4 showing the net present values indicate that, assuming that the two companies are exposed to equal risk, anyone who has a 10% required rate of return would find *Shortlife* the superior company. This simple numerical example demonstrates why management should (can) not base valuation decisions on earnings (per share) or the growth thereof. The method does not take **risk** nor **cash flow** into consideration

TABLE 2.3 PROJECTED CASH FLOW (Rm)

LOGLIFE COMPANY	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	TOTAL
NET INCOME = EBIT	100	105	110	120	130	145	710
DEPRECIATION	200	200	200	200	200	200	1,200
CAPITAL EXPENDITURE	(600)	0	0	(600)	0	0	(1,200)
INCREASE IN RECEIVABLES	(250)	(13)	(13)	35	45	(23)	(219)
CASH FLOW	(550)	292	297	(245)	375	322	491
NPV @ 10%	(500)	241.32	223.14	(167.34)	232.85	181.76	211.73

TABLE 2.4 PROJECTED CASH FLOW (Rm)

SHORTLIFE COMPANY	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	TOTAL
NET INCOME = EBIT	100	105	110	120	130	145	710
DEPRECIATION	200	200	200	200	200	200	1,200
CAPITAL EXPENDITURE	(200)	(200)	(200)	(200)	(200)	(200)	(1,200)
INCREASE IN RECEIVABLES	(150)	(8)	(8)	(15)	(15)	(23)	(219)
CASH FLOW	(50)	97	102	105	115	122	491
NPV @ 10%	(45.45)	80.17	76.63	71.72	71.41	68.87	323.35

Another commonly used method to measure performance is that of return on equity (ROE). Weston and Copeland (1992:707) use the following example to demonstrate why ROE could differ from value-creating potential. Table 2.5 below shows the return on equity of four business units of a conglomerate.

TABLE 2.5 ROE and value-creation potential

BUSINESS UNIT	ROE	VALUE	VALUE CREATION	VALUE CREATION AS A % OF VALUE
STEEL COMPANY	10.6%	R510m	R163m	32%
BANK	41.1%	R787m	R 75m	10%
BUILDING MATERIALS	2.2%	R204m	R 24m	12%
DEVELOPMENT AND CONSTRUCTION	5.6%	R258m	R 82m	32%

If one were to use ROE as a measure to allocate resources to the different business units, then the bank will be the top candidate, a choice which is also supported by the fact that the bank has the biggest value. The correct approach, however, would be to evaluate the business units on the basis of **value creation** potential. A different picture emerges, with the steel company receiving top honours. This example also illustrates the fact that ROE and, in fact, any accounting-based value creation model, uses historical information as input, and therefore tends to be backward-looking.

Although we have focused on the most common accounting measures of performance, namely earnings per share and ROE, other measures are also flawed. Companies that use return on sales completely ignore the cash flow effects stemming from their balance sheets, for example, changes in working capital. Return on assets (ROA) is also a method subject to factors that may distort its

decision-making value. For example, the ROA for a business or business unit may be artificially high because the assets of the business unit are depreciating (at a high rate) or the business does not require many assets in the first place. This subject is discussed in more detail in the next chapter of this study.

2.7 CONCLUSION

In the sections above, various models that can measure and determine shareholder value are discussed. The methods discussed here are by no means all the options that are open to appraisers. As mentioned in the introduction to this chapter, these methods are the "traditional" methods. They are distinguished by means of a further common denominator, namely that they are all **accounting-based methods**.

Copeland, Koller and Murrin (1990:76) have developed a more sophisticated accounting model which improves on the above models in the sense that it adds investment and risk to the equation. This refined model (which is not discussed here) works fairly well in a simplified world, but, like the other models discussed above, it begins to break down once one adds real world complications. The following factors can cause the accounting models to be less than satisfactory as ways to determine shareholder value (a more detailed discussion of the economic models used to determine shareholder value follows in the next two chapters):

- a) companies use a differential accounting treatment for items such as stock, depreciation and assets. This makes it difficult to measure and to compare accounting ratios between companies consistently;
- b) very few companies practice inflation-accounting, and even if one adjusts the financial data in order to allow for inflation, the adjustment distorts the relationship of accounting earnings to cash flow;
- c) cyclicity is not dealt with by the accounting model, which attempts to capture an entire cycle in a P/E ratio;

- d) the pattern and returns of investments (and dividends) are not simple: investments are not made in one year and do not result in constant returns in all succeeding years; and
- e) the base level of earnings must be standardized in order to eliminate any abnormal or extraordinary items which might appear or re-appear.

To conclude the discussion of the relevance of earnings, it is possible to say that the market is not fooled by cosmetic earnings increases; only long-term earnings increases, that correspond with improved long-term cash flow, increase share prices. There is substantial evidence supporting the view that the market uses a sophisticated approach to assess accounting earnings. Copeland, Koller and Murrin (1990:79) classify this evidence into three classes:

- a) evidence that accounting earnings are not well correlated with share prices;
- b) evidence that earnings window dressing does not improve share prices; and
- c) evidence that the market evaluates management decisions based on their expected **long-term cash flow** impact, not on their short-term earnings impact.

As a detailed discussion of this evidence falls outside the scope of this study, the reader is referred to Copeland, Koller and Murrin's book.

This chapter on accounting-based methods has not only introduced the reader to these methods, but has exposed the shortcomings of these methods and set the scene for the economic-based models which are discussed in Chapter 3 and Chapter 4.

CHAPTER 3

MEASURING SHAREHOLDER VALUE THE ECONOMIC WAY - SUNDRY APPROACHES

3.1 THE ACCOUNTING MODELS VERSUS THE ECONOMIC MODELS

The previous chapter concluded by shortly pointing out some shortcomings of the accounting-based methods. Before starting the discussion on the economic-based models, a more in-depth discussion on the shortcomings of the accounting-based methods is not only appropriate, but sets the scene for the next two chapters.

3.1.1 Introduction

In answer to the question of what drives, determines or sets share prices, there are two competing answers.

The traditional accounting model of valuation contends that share prices are set when the stock exchange capitalizes a company's earnings per share (EPS) at an appropriate price/earnings ratio (P/E ratio). The appeal of this accounting model is its simplicity and apparent precision. The problem, however, is that the P/E ratio of a company changes all the time, due to possible acquisitions, changes in accounting policies or as investment opportunities arise (and/or disappear). This makes EPS a very unreliable measure of value (Stewart 1990:22).

The economic model of valuation holds that share prices are determined in essence by just two things: the cash to be generated over the life of a business and the risk associated with the cash receipts.

The accounting model relies on two distinct financial statements (the income statement and the balance sheet), whereas the economic model uses only sources and uses of cash. Whether a cash outlay is included in the income statement or

capitalized in the balance sheet makes a big difference to the earnings amount reported. In the economic model, **where** cash flows are recorded makes no difference, unless that affects taxes.

This conflict is further highlighted if a company is permitted to choose between alternative accounting methods. In other words, there are a number of factors where different accounting bases are recognised and which can have a substantial influence on the financial results in the financial statements. The following are examples:

- a) the depreciation of fixed assets;
- b) the amortization of intangible assets like research and development, goodwill and patents;
- c) inventory;
- d) long-term contracts;
- e) deferred tax;
- f) instalment transactions;
- g) the conversion of foreign exchange;
- h) consolidation policies;
- i) property development transactions; and
- j) product- and service guarantees.

These are not the only factors that can give rise to a different treatment of financial (accounting) data by accountants, as the list can be extended depending on the specific operations of a company (Vorster, Joubert & Koen 1996:5-24). A number of these factors are discussed below.

3.1.2 Inventory valuation – LIFO versus FIFO

In South Africa, a company is permitted to use either the LIFO (last in, first out) or FIFO (first in, first out) method of valuating inventory for accounting purposes. The company is, however, compelled to disclose the valuation on the **FIFO** basis. If a company, in a period of rising prices, switches from FIFO to LIFO, the switch will cause reported earnings to decrease, but the savings in taxes will cause an increase in cash. Stewart (1990:24) quotes research that shows that the market focuses on the increase in cash and not on the decline in book earnings.

An appraiser using accounting-based methods can be faced with earnings per share (EPS) on the "FIFO" or the "LIFO" method.

3.1.3 The amortization of goodwill

Goodwill can arise when one company acquires another company for a value or premium over the estimated book value of the seller's assets.

The amortization of goodwill in the accounting framework reduces reported earnings. However, because this is a non-cash, non-tax-deductible expense, the amortization of goodwill *per se* does not have an influence on the economic model of valuation.

Evidence shows that share prices are determined by the cash that is expected to be generated and not by reported earnings. A company's earnings explain its share price only to the extent that earnings reflect the cash embodied in the share price (Stewart 1990:28).

3.1.4 Research and development

Research and development (R & D) is another factor which reveals that earnings are an inappropriate measure of value.

Accountants can expense R & D outlays as if the potential R & D contribution to value is applicable only in the accounting period where the expense is incurred. One of the best examples of how the "misuse" of R & D causes a large discrepancy between the earnings and book value of a company and its economic value, is found among companies in the pharmaceutical industry. These companies spend vast amounts of money on R & D in order to obtain a substantial return over the long term for their investors. Expensing R & D over a shorter period than the period over which the expected (cash) benefits will arise is one of the reasons why these companies' earnings and book values can apparently understate the companies' value by a large margin. R & D should be capitalized onto the balance sheet and then amortized against earnings over the period of projected payoff from the successful R & D efforts.

One of the reasons why companies that invest heavily in R & D often enjoy sky-high share price multiples is the fact that their share prices capitalize an expected future payoff from their R & D, whereas their earnings are charged with an immediate expense (Stewart 1990:29).

3.1.5 Deferred tax

The aspects discussed above dealt with distortions that can affect **earnings**, therefore the income statement. However, balance sheet items are also subject to the accountants' mercy.

One of the items worth mentioning at this point is that of deferred tax. The question can be asked: is the deferred tax reserve which appears on the company's balance sheet debt or equity? It normally appears to be in a no-man's-

land between debt and equity on the balance sheet. Deferred tax is quite rightly considered by creditors to be a quasi-liability that uses up a company's capacity to borrow (Stewart 1990:33).

The entire character of the deferred tax reserve changes if one looks at it from the viewpoint of the shareholders. As long as the company remains a viable going concern the company's deferred tax reserve can properly be considered to be the equivalent of common equity and therefore does not have to be separated from net worth.

Furthermore, the year-to-year change in the reserve ought to be added to retained profits if the reserve is considered part of shareholders' equity. In this way, taxes are regarded as an expense only when they are paid (at which time they represent a cash flow), not when provided for by the accountants.

3.1.6 Earnings per share and return on net assets (RONA)

Some shortcomings and problems associated with earnings per share (EPS) were discussed in an example in Section 2.6. It is, however, such an important concept that it warrants further attention.

Consider an acquisition in which a company selling for a high price earnings (P/E) ratio buys a firm selling for a low P/E ratio by exchanging shares. Fewer of the high P/E shares are needed to retire all the issued low P/E ratio shares. Because fewer of the high P/E shares (from the buyer) are needed to retire all the issued low P/E shares, the buyer's EPS will always increase (Stewart 1990:35).

This transaction can also be conducted the other way round, i.e. the low P/E firm can buy the high-multiple company through a share exchange, in which case the buyer's EPS will always decrease.

Regardless of which company buys and which sells, the "merged company" will be the same ($H_i + L_o = L_o + H_i$) with the same assets, prospects, risks, earnings and value. Accounting earnings, however, suggests that the transaction is desirable only if it is consummated in one direction, $H_i + L_o$. In the economic model, what matters is the exchange of **value**, and not the exchange of earnings so popular with accounting enthusiasts.

As mentioned in the previous chapter, **earnings growth** is also a misleading indicator of performance. Consider two companies, X and Y, which have the same earnings and the same expected growth rate. The "sameness" would also probably result in identical share prices and P/E ratios. Suppose that X must invest more capital than Y to sustain its growth. Y will command a higher share price and P/E ratio because it earns a higher rate of return on the capital it invests (or, both companies earn the same, but Y does so on a smaller capital base). X invests to achieve the growth that Y achieves through a more efficient use of capital.

Rapid growth can be a misleading indicator of added value because it can be achieved (or "bought") by simply pouring more capital into a business. Earning an acceptable rate of return on capital invested is essential in the value creation process. Growth adds to value only when it is accompanied by an adequate rate of return (Stewart 1990:40).

One of the "fathers" of the economic models of calculating shareholder value, Joel Stern, wrote as early as 1974 about the dangers of using EPS in an evaluation of corporate policies.

Apart from his acquisition analysis example set out on the previous page (where he said that the problem lies in the fact that the *pro forma* EPS does not determine the *pro forma* share price) as discussed above, Stern (1974:39) also identified two other interesting corporate factors where EPS can distort the decision-making process to the detriment of the shareholders.

Firstly, investment should not be confused with financing. There are many ways in which financing decisions can affect EPS, but investment decisions must be made independently of financing decisions. Since EPS is calculated by dividing the net profit attributable to ordinary shareholders by the number of issued shares, basing investment decisions upon its effect on EPS implies that a specific source of funds finances a specific use of funds, which is, of course, conceptually incorrect. EPS can lead the decision-maker to believe that bad investments are good investments: if he levers (finance) the firm sufficiently at the time the investment is undertaken, EPS can be manipulated (enhanced) to any level he desires (Stern 1974:40).

Secondly, an emphasis on EPS can lead to wrong conclusions or decisions about the proportions of debt and equity in a company's financial structure. Even though, in most cases, an increase in the amount of debt in relation to equity enhances EPS, the benefits to a company's share price derived from its financing policies has nothing to do with EPS. The real benefit of debt financing to ordinary shareholders is not the added EPS, it is the "government-tax-saving" (own inverted commas) (Stern 1974:42).

It should be clear at this stage that valuations based on a company's earnings have many pitfalls and disadvantages. Moreover, to judge by market behaviour, EPS is not the criterion that impresses the sophisticated investors that really determine share prices. These investors do not simply discount expected earnings. They rather discount anticipated cash flows net of the anticipated capital requirements of the business, the so-called "Free Cash Flow".

The disadvantages of return on equity (ROE) as a method had been discussed in Chapter 2. One can, however, highlight some other dangers of using this measure of corporate performance by illustrating what could happen if return on net assets (RONA) is used as a basis for evaluating and rewarding the managers of the business.

Firstly, if a company or division is currently earning sub-standard returns, managers can increase RONA by accepting projects with a rate of return higher than RONA, but is, at the same time, employing a rate which could still be inadequate in the sense that it could be lower than the cost of capital. These investments, as will be demonstrated in Chapter 4, reduce shareholder value.

At the other extreme, consider a company that currently earns 25% RONA and has a cost of capital of 15%. In such a case, a manager could be discouraged from accepting projects with a rate of return of less than 25% because that would lower the **average** RONA. The firm could thus be passing up value-adding investments (Stern 1994:49).

3.1.7 Dividends

3.1.7.1 *The theory on dividends*

Stewart (1990:43) claims that not only do earnings not matter; dividends do not matter either.

In the economic model of valuation, payment of dividends can be viewed as a sign that management is unable to find enough attractive investment opportunities to use all available cash. Once they have distributed attributable earnings in the form of dividends (instead of re-investing them), management have less capital to fund future growth opportunities. However, if investment opportunities have been exhausted, it would be better to pay dividends rather than to make unrewarding investments.

But what about the shareholders? Do they want dividends? Three theories of investor preference for dividends can be presented:

- a) Miller and Modigliani in Brigham & Gapenski (1993:481) argue that dividend policy is irrelevant; that is, dividend policy does not affect a firm's cost of

capital or value. A firm's value is determined by its asset investment policy and its risk class rather than by how earnings are split between dividends and retained earnings. These author's propositions were made with a number of assumptions or conditions, the discussion of which falls beyond the scope of this study. What is important however is the fact that Miller and Modigliani argue that a **clientele effect** exists: a firm will attract shareholders whose preferences in respect of the payment (quantity or amount) and stability of dividends correspond to the payment pattern and stability of the firm itself (Gitman 1994:539). In other words, investors who seek a certain cash income from their portfolio tend to hold shares which provide them with that income (a certain dividend amount), or they must invest in financial instruments which provide them with that desired income. Investors who need cash do not need to get it from every component of their portfolio. Investors who prefer capital gains instead, are attracted to growing firms which entertain a relatively large reinvestment rate. Since shareholders get what they expect, Miller and Modigliani argue that the value of a firm's stock is unaffected by its dividend policy. As long as there are a sufficient number of investors with sufficient income who are seeking capital gains instead, firms with a relatively low dividend payout ratio need not worry: their firm's shares will sell for their fair value, unaffected by the dividend thereon (Stewart 1990:54).

- b) Gordon and Lintner in Brigham & Gapenski (1993:482) disagree with Miller and Modigliani and argue that dividends are less risky than capital gains. Therefore firms should set high dividend payout ratios in order to maximize their value. Miller and Modigliani disagree, and claim that a bird in the hand (a dividend) is worth two in the bush (capital gains). Stewart (1990:53) argues that dividends paid mean certain capital gains lost. Dividends are in effect "subtracted" from the share price, never to be recouped. The dividends that are paid out can only make the residual capital gain more risky.

- c) Litzenberger and Ramaswamy in Brigham & Gapenski (1993:483) bring the tax effect into the debate. They argue that since dividends attract a higher tax rate than capital gains (which was the position in South Africa a number of years ago, but could change in the (near?) future), a firm should pay a low (or zero) dividend in order to maximize its value. This argument contrasts, of course, with Gordon and Lintner's theory, but complement the general viewpoint that dividends do not matter.

One can conclude by stating that it appears that there is just a correlation between dividend announcements and share price, but **not** a true causal relationship. It is helpful to turn to empirical evidence and research in order to see whether these support the arguments in favour of the economic models.

3.1.7.2 The evidence on dividends

One of the most decisive empirical studies conducted on the effects of dividend yield and dividend policy on share prices, was done in 1974 by Black and Scholes (Brigham & Gapenski 1993:483). Their analysis revealed that return to investors was explained by the level of risk of the firm and not by the dividend payout ratio. The shares in their sample were classified in different risk classes, and within these risk classes some shares paid low, some paid modest and some paid high dividends. All the shares, however, experienced the same rate of return over a period of time.

The following two important conclusions can be drawn from this study (Stewart 1990:55):

- a) investors should ignore dividends when they are choosing shares. Instead, they should consider factors like risk, tax and value; and
- b) corporate managers should not attempt to influence share prices, investors' wealth or returns by their dividend policy. They should set a dividend policy

within the context of the company's investment programme and financing policy; that is, a "residual dividend policy", where the first priority is to take care of all the acceptable investment opportunities, after which the residual (if any) of the attributable earnings can be distributed as dividends.

3.1.8 Concluding remarks

Earnings, earnings per share and earnings growth are misleading measures of corporate performance or shareholder wealth. The problem arises from the fact that earnings can (and must) be altered by means of book entries that have nothing to do with cash flow.

Value-building investments such as R & D are charged against earnings instead of taking the real earning power of the expected life span into consideration.

Paying out dividends may deprive worthwhile capital projects of capital or may force the company and its investors to incur unnecessary transaction costs.

Despite the impressive empirical evidence assembled in the academic community in favour of the economic model of value, many corporate managers, valuers and even investors still prefer accounting-based methods (often with earnings as the basis) in order to determine wealth created for the shareholders of a company.

3.2 INTRODUCTION TO THE ECONOMIC MODELS

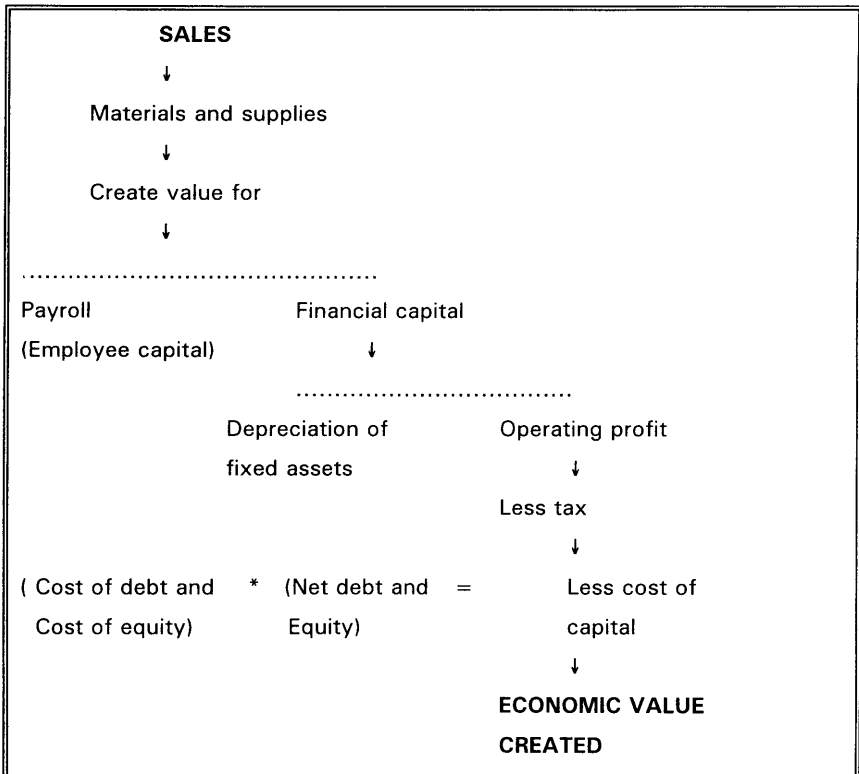
During the past three decades there has been a school of writers that have steadily begun to realize the shortcomings of measures such as earnings per share, return on assets and return on investment.

These traditional measures of company performance are inadequate for the job in the sense that none of them isolate the most important concern of shareholders: Is management adding or subtracting value from capital? There has to be a better

way.

The **economic methods** acknowledge that whilst it is crucial to generate and then measure a profit or return from a firm's operations, it is of equal importance to express that profit in relation to the **amount of capital** used to generate that profit. These methods then do have special ways (and definitions) to calculate a firm's **economic profit** and **economic capital**.

Economic value can also be presented schematically in the following way (Kay 1994:35):



This chapter contains a discussion of a number of sundry economic-based methods to determine shareholder value.

The build-up to the ultimate model begins with a discussion of the work of Fruhan (1979). A number of economic valuation-based principles were introduced by him. The main criticism of his work was that he used only return on **equity**, and not the return on total economic capital.

Another author that proposed an economic-based method was Rappaport (1981, 1986). His articles during the early 1980's were followed by his book towards the end of that decade.

By now, this new way of calculating shareholder value was well established and Copeland, Koller and Murrin (1990) called their method "the economic profit model".

3.3 USING ECONOMIC VALUE TO MEASURE SHAREHOLDER WEALTH - EARLIER MODELS

3.3.1 Introduction

One of the first writers to recognize that the pure accounting-based methods of determining shareholder value were not adequate, was Fruhan.

His book, *Financial Strategy. Studies in the creation, transfer, and destruction of shareholder value*, in 1979 was among the first to set out a number of principles regarding the economic method of calculating shareholder wealth.

Fruhan (1979:7) stated that managers create economic value for their firm's shareholders when they undertake investments that produce returns that exceed the cost of capital. Fruhan (1979: 11) identified three factors which determine the economic value of a firm's equity:

- a) the size of the percentage point spread projected to be earned on the common equity over the cost of the firm's common equity;
- b) the amount of future investment opportunities which will generate these excess returns (this is equal to the net profit attributable to ordinary shareholders); and
- c) the number of years for which these returns can be earned before returns will be driven down to the cost of equity.

This economic value can be expressed in relation to the book value of a firm in a **ratio** by means of the following formula:

$$\frac{\text{Economic value}}{\text{Book value}} = \left(\frac{1 + (ROE)(RET)}{1 + K_e} \right)^n + \frac{ROE(1-RET)}{K_e - (ROE)(RET)} \left[1 - \left(\frac{1 + (ROE)(RET)}{1 + K_e} \right)^n \right]$$

where

- ROE = the anticipated rate of return on equity;
- K_e = cost of equity;
- RET = the retention rate, the percentage of income attributable to ordinary shareholders that is re-invested by the company; and
- n = the projected number of years for which extraordinary returns on equity are expected to be earned.

Firms that are able to earn rates of return on equity that consistently exceed their equity capital costs, have most of the following important characteristics:

- a) barriers of entry that are high in a competitive industry (These barriers of entry can be due to **unique products** and protected from competition by patents, trade marks or persuasive advertising. **Scale economics** in the production and marketing of products is a further barrier to entry that allows

a firm a competitive advantage. **High capital requirements** by certain industries or firms can also keep competitors at bay);

- b) focused product lines and a high market share; and
- c) an ability to generate redundant cash, i.e. all cash and marketable securities less borrowed money.

3.3.2 Method of calculating shareholder value

Fruhan (1979:102) demonstrates how to calculate the value created for a company's shareholders. As only the principles and basic calculation methods are discussed here, readers who are interested in the detail are referred to Fruhan's work.

Consider the following hypothetical example. A company's return on equity (after adjustment for the replacement cost of inventory and fixed assets, and for the capitalization and amortization of research and development expenditure - a topic discussed in greater detail later in this chapter) amounts to 18,9%. The real cost of equity capital amounts to 11,0%, which means that the firm achieved a **real** return on equity that was 7,9 percentage points in excess of the firm's **real** cost of equity capital.

Fruhan then proceeds to show how the elimination of the firm's redundant capital **increases** the spread between the real rate of return and the real cost of equity capital. This data is then used in conjunction with the formula in Section 3.2.1 in order to calculate the economic-value/book-value ratios (Fruhan 1979:104). The value for the firm's shareholders can be estimated by subtracting the adjusted book value of the firm's equity from its market value.

3.3.3 Evaluation

Fruhan did pioneering work in recognizing that there must be as wide as possible a **spread** between the return that a firm generates on the invested capital and the cost of that capital. However, he still uses return on **equity** in his explanations and calculations. This is done for both the "return" and the "cost" aspects. It is demonstrated in the next few sections of this chapter that it is return on **invested capital** and the **weighted average cost of capital** that matters.

The primary objective of Fruhan's work was to demonstrate that thinking about methods to enhance shareholder value can produce significant benefits for shareholders. Nevertheless, no checklist designed to ensure enhanced performance for every firm emerged from his work. None was promised. The work posed a challenge to managers to consider carefully how they might conduct a systematic review of value enhancement opportunities.

Management should take into consideration the following factors when thinking about value enhancement:

- a) ability to command premium product prices - in order to increase profit;
- b) achievement of a lower than average cost structure - in order to increase profit;
- c) the ability to obtain debt and equity at lower than normal cost - in order to reduce the financing cost;
- d) the design of a capital structure that is more efficient than those of competitors - in order to reduce financing cost and to optimise the amount of equity; and
- e) the avoidance of actions which may result in value destruction.

3.4 SHAREHOLDER VALUE CREATION

3.4.1 Introduction

Another writer who recognised the shortcomings or limitations of the accounting-based methods was Rappaport (1981:140).

His "shareholder value approach" estimates the economic value of an investment by discounting the forecast cash flows by the cost of capital. He then goes on to calculate the present value of a business by discounting the anticipated after-tax operating cash flow by the weighted average cost of capital.

The next section demonstrates how he incorporates his so-called "value drivers" (sales growth rate, operating profit margin, income tax rate, capital investment and a time span) into his shareholder value calculations. The net result of these calculations is an absolute Rand value which indicates the present value increase in shareholder value.

3.4.2 The shareholder value approach to a business

As mentioned in Section 3.3.1, any investment's value can be determined by discounting the anticipated cash flows by the cost of capital.

While many companies use this discounted cash flow (DCF) analysis at **project** level, they fail to take the broader picture, that of the entire business (unit), into consideration. One can thus find a situation where capital projects regularly exceed the minimum acceptable rate of return, while the **business unit** itself creates little or no value for the shareholders (Rappaport 1981:141).

In order to extend the DCF approach to the entire business unit, the following sequential steps must be followed:

- a) calculate the **minimum pretax operating return** on incremental sales which is needed to create value for the business unit (or the entire company);
- b) compare the minimum acceptable rates of return on incremental sales with the rates realised historically **and** the rates predicted for the future;
- c) calculate the contribution to shareholder value of various alternative strategies; and
- d) evaluate the corporate objectives regarding anticipated growth on sales, capital investments, target capital structure and dividend policy in order to determine the best value-contributing strategy.

The fourth step above is the subject of both Chapter 5 and the Conclusion to this study. An example in Section 3.4.3 below illustrates how the first three steps are calculated.

3.4.3 Calculation of shareholder value created

3.4.3.1 Basic principles and models

The total economic value of a business is the sum of the values of its debt and equity.

$$\text{Corporate value} = \text{Debt} + \text{Shareholder value}$$

The present value of the equity claims or shareholder value is then the value of the company less the market value of currently outstanding debt. The value of the equity of a firm that expects **no further real growth in sales** and expects that annual increases in costs will be offset against increases in sales prices, can be expressed by the following formula:

$$E_t = \frac{P(1 - T)S}{k} - D_t + M$$

where

- E_t = the value of the equity at time t ;
 p = earnings before interest and taxes (EBIT) **divided** by sales (in order to arrive at the **operating profit margin**, see Step a) above);
 T = the income tax rate;
 S = sales;
 k = the weighted average cost of capital;
 D_t = the market value of debt outstanding at time t ; and
 M = marketable securities, which are not incorporated in the operating cash flows.

The above basic model needs not be illustrated by means of a numeric example. Instead, one can move on to a more realistic case where :

- a) provision is made for an **increase** in sales; and
- b) the **change** in shareholder value, that is value **created**, is measured.

The change in shareholder value (E) for a given level of sales increase(S) can be calculated by the following formula :

$$\Delta E_t = \frac{P_t(1 - T) \Delta S_t}{k} - \frac{(f_t + w_t) \Delta S_t}{(1 + k)}$$

where

- P_t = EBIT/ sales, the incremental operating margin on incremental sales;
- f = capital investment minus depreciation per rand of sales increase; and
- w = cash required for net working capital per rand of sales increase.

The change in equity or shareholder value is the difference between the after-tax operating perpetuity and the required investment outlay for fixed and working capital. Since all cash flows are assumed to occur at the end of the period, the outlays for working capital and fixed assets are discounted by $(1 + k)$ to obtain the present value (Rappaport 1981:149).

3.4.3.2 The threshold margin

One of the basic principles on which the economic methods of valuation are based is that of the spread between the cost of and return on capital invested.

Rappaport (1986:69) calls his explanation of this concept, the "threshold margin".

The threshold margin represents the minimum operating profit margin that a business must maintain in order to maintain shareholder value. It represents that operating profit margin at which the business earns exactly its minimum acceptable rate of return, its cost of capital.

The threshold margin can be expressed in two ways:

- a) the margin required on total sales, the threshold margin; or
- b) the margin required on incremental sales, the **incremental** threshold margin.

The incremental threshold margin can be derived from the formula which expresses the change in shareholder value above, in Section 3.4.3.1. This formula can also

be expressed in words as follows:

Change in shareholder value	=	(Present value of incremental cash flow before new investment)	-	(Present value of investment in fixed and working capital)
	=	(Incr sales) * (Operating profit margin on incremental sales)		* (1-T)
		Cost of capital		
	-	(Incr sales) * (Incremental fixed plus working capital rate)		
		(1 + Cost of capital)		

While the first term represents the present value of the firm's inflows (assumed to occur from period 1 to perpetuity), the second term represents the present value of the investment (outflows) necessary to generate these inflows (Rappaport 1986:72).

There is neither an increase nor a decrease in shareholder value for a specified sales increase if the value of the inflows is identical to the value of the outflows:

$$\frac{P_t (1 - T)}{k} = \frac{(f_t + w_t)}{(1 + k)}$$

The incremental threshold margin is the operating profit margin on incremental sales that equates the present value of the cash inflows to the present value of the outflows. This margin represents the break-even operating return on sales or the minimum pretax operating return on incremental sales (p_{\min}) needed to create value for shareholders and is derived as follows (Rappaport 1981:149) :

$$p_{\min} = \frac{(f + w) k}{(1 - T) (1 + k)}$$

An important fact that emerges from this equation is that when a business is operating at the threshold margin, sales growth does **not** create shareholder value.

Shareholder value creation is determined by the product of three factors :

- a) sales growth;
- b) an incremental threshold spread, that is, profit margin on incremental sales less the minimum pretax operating return on the incremental sales needed to create value for shareholders; and
- c) the time span of a positive threshold spread (Rappaport 1986:74).

In other words, it is the after-tax capitalized value of the difference between the minimum acceptable operating return on incremental sales. The change in shareholder value for time t is then given by the following equation :

$$\Delta E_t = \frac{(P_t - P_{t \min}) (1 - T_t) \Delta S_t}{k(1 + k)^{t-1}}$$

3.4.3.3 Calculation example

To illustrate the above principles and formulas as developed by Rappaport, consider the following hypothetical case:

- a) A business forecast the following sales amounts for the next 4 years:

	19x0	19x1	19x2	19x3	19x4
Rm	100	115	125	145	160

- b) Pretax operating margins on incremental sales amount to 14% for the first

2 years after which they will increase to 15%.

- c) Working capital per Rand of sales = 20%.
- d) Capital investment per Rand of sales = 30%.
- e) Weighted average cost of capital = 12%.
- f) Tax rate = 35%.

Answer

In the first place, the minimum return on incremental sales (P_{\min}) must be calculated, as this input is necessary for the calculation which determines the increase in shareholder value.

$$\begin{aligned}
 P_{\min} &= \frac{(f + w)k}{(1 - T)(1 + k)} \\
 &= \frac{(0.3 + 0.2) * 0.12}{0.65 * 1.12} \\
 &= 8.24\%
 \end{aligned}$$

The present value of increase in shareholder value in **19x1** is the following:

$$\begin{aligned}
 \Delta E_t &= \frac{(P_t - P_{t \min})(1 - T_t) \Delta S_t}{k(1 + k)^{t-1}} \\
 &= \frac{(0.14 - 0.0824) * (1 - 0.35) * 15}{0.12 * (1.12)^0}
 \end{aligned}$$

= R4,68m

Using the same formula, but applying the relevant inputs as they occur in each year (**pretax operating margin** as well as **sales change**), the present value of increase in shareholder value is calculated as follows:

19x1	R4,68m
19x2	R2,79m
19x3	R5,84m
19x4	<u>R3,91m</u>
TOTAL	R17,22m

To summarise: Over a four year future period, total sales of R545m (with incremental sales of R60m) will result in a present value increase in shareholder value of R17,22m, taking into consideration the other variables (minimum operating margin, fixed and working capital levels, the cost of capital and the tax rate) as specified.

3.4.4 Concluding remarks

Because this study concentrates on another method of calculating shareholder value, only a simplified example of the model of Rappaport has been demonstrated. Interested readers are referred to the work by Rappaport, *Creating shareholder value* as indicated above.

This method of calculating the present value of shareholder wealth increase, as proposed by Rappaport, is actually aimed at a future **forecast** period, which does have definite advantages if a new investment strategy and its effects are to be

evaluated by management.

However, this method can also be used to calculate the increase in shareholder wealth in the current year or any other year in the past. All that is needed, of course, are the relevant inputs in the formulas, which can be obtained from the (adapted) financial statements.

One of the advantages of this method is its clear indication and identification of the inputs (value drivers) in the formula in order to determine shareholder wealth (a topic that is discussed in Chapter 5 of this study).

Although certain variables in the formulas in the example above were kept constant during the four year period, they can, of course, be varied in order to represent a more realistic scenario.

The model is easy to use, as well as easy to understand. It is compared and contrasted with other models at the end of this chapter.

3.5 THE ECONOMIC PROFIT MODEL

3.5.1 Introduction

Copeland, Koller and Murrin (1990:75) also recognise that there are fundamental problems with the use of accounting-based methods in determining the value of a company.

They propose a discounted cash flow (DCF) model which calculates the value of a company by factoring the capital investment and the other cash flows required to generate the earnings. This approach is based on the principle that an investment adds value if it generates a return that is higher than returns earned on investments of similar risk. For a given level of earnings, a company that earns more on its investments than its competitors can, needs to invest less capital in the

business and will generate higher cash flows and higher value.

Valuing a business by determining the present value of its expected cash flows, leaves unanswered a number of practical questions such as how to determine the cash flow, investment, or discount rate.

Although these concepts are used in the examples below illustrating these approaches, a detailed discussion is left for the latter part of this chapter, where variables that are used as inputs in the models as mentioned, are used in other models as well.

In this section, firstly certain valuation principles are examined, after which the Economic Profit Model proposed by Copeland, Koller and Murrin (1990:149) is illustrated.

3.5.2 Economic valuation principles

The value of a business can be seen as the discounted value of the expected future free cash flow. Free cash flow is equal to the after tax operating earnings of the company, plus non-cash charges (for example, the "cost" of depreciation), less investments in fixed and working capital (Copeland, Koller & Murrin 1990:139). Free cash flow **excludes** any financing-related cash flows such as interest or dividend payments. These free cash flows are then discounted with the firm's weighted average cost of capital (WACC) in order to arrive at a present value for the **forecasted** period.

However, an additional issue in valuing a business is its infinite life. The value of the business can be divided over two time periods, namely the value **during** the forecast period and the value **after** the forecasted period.

The value **after** the forecast period is called the **continuing** value. There are various

methods of calculating the continuing value. One approach is to calculate it as a perpetuity by means of the following formula:

$$\text{Continuing value} = \frac{\text{Net operating profit less adjusted taxes}}{\text{Weighted average cost of capital}}$$

The value of a company's **debt** is deducted from the value of operations as calculated above. The value of the debt equals the present value of the cash flow to the debt holders, discounted at a rate that reflects the riskiness of that flow (Copeland, Koller & Murrin 1990:141). Future borrowing can be ignored, as one can assume that the inflows from these debts will be equal to the outflows (repayments).

The above valuation of a company can be illustrated by means of the following hypothetical example overleaf:

YEAR	FREE CASH FLOW Rm	DISCOUNT FACTOR @ 15%	PRESENT VALUE OF FCF Rm
19x1	250	0.8696	217
19x2	285	0.7561	215
19x3	315	0.6575	207
19x4	310	0.5781	179
19x5	325	0.4972	162
CONTINUING VALUE	6,300	0.4972	<u>3,132</u>
Value of operations			4,112
Add: value of non-operating investments			<u>0,270</u>
Total entity value			4,482
Less: Value of debt			<u>(0.750)</u>
Equity value			<u>3,732</u>

The equity value calculated above can now also be divided by the number of ordinary shares issued in order to arrive at a value per share.

Once the above calculation had been done, there are still a number of unanswered questions or issues that have to be addressed; for example, how does this valuation compare with the company's value history or with the value of other companies? Moreover, how can the economics of the business be expressed in a way that helps the managers to understand what factors could increase or decrease the value of the business?

The issue of variables determining shareholder value will be addressed in Chapter 5 of this study. However, it has been established that since value is based on discounted free cash flow, the underlying value drivers of the business must also

be the drivers of free cash flow (Copeland, Koller & Murrin 1990:141). The two key drivers of free cash flow and ultimately value are, firstly, the **rate** at which a company can increase its revenues, profits, and capital base, and, secondly, the **return** on invested capital. A company that earns higher profits on every Rand invested than its competitors is worth more than a company that does not have such a high return. The same applies for a company that grows faster than another and both earn the same return on invested capital.

It can thus be seen that it is not only the **absolute** amount of the profit that matters, but also the amount of **capital invested** to generate that profit.

Copeland, Koller and Murrin (1990:142) express this concept by means of the following formula:

$$\text{ROIC} = \frac{\text{NOPAT}}{\text{Invested Capital}}$$

where

ROIC = the operating profits of the company divided by the amount of capital invested in the company;

NOPAT = net operating profits after adjusted taxes; and

Invested Capital = operating working capital + net fixed assets + other assets.

It is beyond the scope of this study to use numerical examples to illustrate the following two facts, but they nevertheless need to be mentioned:

Firstly, a higher return on invested capital (ROIC) results in a higher free cash flow (and thus higher value), given the same growth rate in operating profit; secondly,

an increased growth rate in NOPAT results in lower free cash flows during the initial years (due to the higher amount of net investment), but later the free cash flows become much larger and result in greater value.

As long as the return on invested capital (ROIC) is greater than the weighted average cost of capital (WACC) used to discount the cash flow, higher growth generates greater value. The core idea is thus that the key drivers of value are **return on invested capital** (relative to WACC) and **growth** (Copeland, Koller & Murrin (1990:146).

In Chapter 5 of this study there is a discussion of how these variables must interact with one another and other variables in order to create value.

3.5.3 The economic profit model

Another model, which Copeland, Koller and Murrin (1990:149) call the **Economic Profit Model**, calculates the value of a company by taking the amount of capital invested and adding to that a premium which represents the present value of the value created for each future year.

As far back as 1890, Alfred Marshall recognised the concept of economic profit and stated that the value created by any company must take into account not only the expenses recorded in the financial statements, but also the opportunity cost of the capital employed in the business. This means, *inter alia*, that not only interest on debt must be accounted for when calculating economic profit, but also the required rate of return of the ordinary shareholders, which must appear as a "cost" in the calculations of shareholder value.

One of the **advantages** of the economic profit model over the discounted cash flow models is that economic profit is a useful measure for understanding a company's performance in any **single year**, while free cash flow is not. One cannot track a company's progress by comparing actual and projected free cash flow, as this

performance of a company is determined by highly discretionary investments in fixed and working capital. Management could thus easily manipulate investment decisions (delaying or under-investing) in order to improve free cash flow in a given year (bearing in mind that free cash flow equals NOPAT less Investment). Such manipulation could be to the detriment of value creation (Copeland, Koller & Murrin 1990:149).

Economic profit measures the value created by a company in a single year and can be expressed as follows:

$$\text{Economic Profit} = \text{Invested capital} * (\text{ROIC} - \text{WACC})$$

In other words, the economic profit is calculated by multiplying invested capital by the spread between the return on invested capital and the cost of capital. If a company has invested total capital of R1,000, the return on invested capital is 18% and the WACC is 15%, the company's economic profit for the year is R30:

$$\begin{aligned}\text{Economic Profit} &= \text{R1,000} * (0.18 - 0.15) \\ &= \text{R1,000} * 0.03 \\ &= \text{R30.}\end{aligned}$$

Economic profit translates the value drivers discussed above into a single Rand amount.

Another way to express economic profit is that of after-tax operating profits of the company, less a charge for the **total** capital used by the company:

$$\begin{aligned}\text{Economic Profit} &= \text{NOPAT} - \text{Capital charge} \\ &= \text{NOPAT} - (\text{Invested capital} * \text{WACC})\end{aligned}$$

This alternative calculation gives the same value for economic profit as calculated above:

$$\begin{aligned}\text{Economic Profit} &= R180 - (R1,000 * 0.15) \\ &= R180 - R150 \\ &= R30.\end{aligned}$$

This approach illustrates the difference between accounting profit and economic profit: the economic profit takes into account not only the interest on debt, but on **all** capital.

A simple example will illustrate how economic profit can be used for valuations.

Assume that the hypothetical company in the example above has invested R1 000 in working capital and fixed assets in 19x1. Each year after that, the company earns R180 in NOPAT (therefore it has a 18% ROIC). If the net investment is zero, the free cash flow will also be R180 (R180 - 0) and the economic profit will be R30, assuming a WACC of 15%.

The economic profit approach states that the value of a company equals the amount of capital invested plus the present value of its projected future economic profit (Copeland, Koller & Murrin 1990:150).

$$\text{Value} = \text{Invested capital} + \text{Present value of projected Economic Profit.}$$

If a company earns exactly its WACC during every period (ROIC = WACC), then the discounted value of its projected free cash flow should equal its invested capital. In other words, the value of the company is that amount which was originally invested. The value of a company changes (positively or negatively, value is added or value is destroyed), if it earns more or less than its WACC (ROIC > or < WACC).

The value of the company above should equal R1 000 (its invested capital at the time of the valuation) plus the present value of its economic profit. Since economic profit remains at R30 to infinity, one can use a perpetuity value to calculate the

present value of the economic profit:

$$\begin{array}{rcl}
 \text{Present value of Economic Profit} & = & \begin{array}{r} \text{R30} \\ \text{-----} \\ 0.15 \end{array} \\
 & = & \text{R200.}
 \end{array}$$

The total value of the company is thus $\text{R1 000} + \text{R200} = \text{R1 200}$.

If the projected free cash flow of R180 per year is to be discounted, one arrives at the same value for the company, namely R1 200:

$$\begin{array}{rcl}
 \text{Present value of FCF} & = & \begin{array}{r} \text{R180} \\ \text{-----} \\ 0.15 \end{array} \\
 & = & \text{R1 200.}
 \end{array}$$

The above hypothetical example serves merely to illustrate the principles involved. One can now take a real life example and calculate the economic profit for a number of years. Thereafter the present value of the economic profit can be calculated in a similar way as the free cash flow. After the adjustments for non-operating investments and debt, the equity value will be the same under both methods.

As mentioned previously, the scope of the study neither allows nor necessitates detailed calculations and examples of the above models, as the model that is discussed next carries more weight than any other model discussed in this study.

3.5.4 Evaluation

The Economic Profit Model as developed and presented by Copeland, Koller and

Murrin (1990) takes all the principles of economic profit calculation into account. The model is not only easy to understand, but also give a very clear indication of value drivers (which are the subject of Chapter 5).

A comparison between models discussed in this chapter will be done at the end of Chapter 4. A detailed discussion of the last (and in the author's opinion, the best) model which can be used to calculate the value that a company can create for its shareholders is set out in Chapter 4.

3.6 CONCLUSION

During the 1970's, Stern started to write about the problems encountered with and disadvantages of the accounting-based methods. He was a firm believer in the economic-based methods. It was not, however, until 1986 that his partner, Stewart, in the consulting firm of Stern Stewart, published a book, *The quest for value*, in which his method of determining shareholder value was named "Economic value added (EVA)".

Although all of the models described above are discussed briefly, **EVA** is the method which is concentrated on in this study. It is also used in various ways to calculate the shareholder value created by management for the owners of a firm.

In the chapters that follow, where the various variables that determine shareholder value are analyzed, EVA is once again prominent. EVA will be discussed in the next chapter.

CHAPTER 4

MEASURING SHAREHOLDER VALUE THE ECONOMIC WAY - ECONOMIC VALUE ADDED

4.1 INTRODUCTION

Economic Value Added (EVA) is a measure of corporate performance developed, refined and popularized by Stern and Stewart of the New York based consulting firm, Stern Stewart & Co over almost 20 years of working together.

Stern (1994:46) admits that the financial concepts which underlie EVA were, of course, not invented at Stern Stewart & Co. Economists since Adam Smith have concluded that the goal of any firm and its managers should be to maximize the firm's value for its owners. Nobel laureate Merton Miller refocused this goal as the goal of maximizing Net Present Value (NPV). Whilst NPV is primarily a long-term capital budgeting tool, EVA is an attempt to break this concept down into annual (or even monthly) instalments which can be used to evaluate the performance of corporate managers and their businesses.

Most companies use discounted cash flow analysis for capital budgeting evaluations, but, when it comes to measuring overall corporate performance and communicating with investors, companies use measures such as earnings, earnings per share, return on equity (ROE) and the like (Stern 1994:51).

The "Du Pont Formula" or return on investment (ROI) is used by many companies when they wish to evaluate operating performance and capital expenditure. The ROI calculation can be broken down into more manageable components such as profit margins, sales turnover and then these components are analyzed even further. The outcome of this Du Pont analysis has been a proliferation of financial measures.

Why is it important to have only one measure? Corporate managers in large listed companies can acquire more capital in order to spend and grow the empire.

Internal competition for capital - where different yardsticks are used in the evaluation - then arises in the company. There are no real trustworthy financial management system which provides consistent results constantly for operating heads to choose only those projects that will increase value (Stern 1994:52).

An EVA financial management system is designed to eliminate the above problem. EVA is a financial management **system**. It is a framework for all aspects of financial decision-making that are anchored by an incentive compensation plan.

4.2 CONCEPTS UNDERLYING EVA

Corporate managers have capital provided by the owners of the business at their disposal. Capital is a scarce resource and therefore it should be assigned to those undertakings that offer the highest returns. To increase the company's share price, managers must earn rates of return on capital that exceed the returns offered by other companies. In this way, they add value to the capital, which is often reflected in the share price.

Of the factors that account for a company's market value and that are discussed in detail in Chapter 5, two factors (which flow from the discussion in Chapter 3 above) stand out. These two, the relation between the rate of return and the cost of capital, often account for a large portion of a company's market value (Stewart 1990:71). This now raises the question: What is the best way to measure a company's rate of return?

Some problems with regard to return on equity (ROE) have been discussed in Chapter 2. In addition, ROE is based on the same accounting earnings (with all their problems, disadvantages and distortions) as discussed in Section 3.1.

EVA adjusts reported accounting earnings to eliminate distortions encountered when measuring true economic performance. Stewart (1994:73) states that, in defining and redefining the EVA measure, a total of 164 performance measurement

factors, including methods of addressing shortcomings in conventional General Accepted Accounting Practice (GAAP) accounting, has been identified. These factors include those addressed in Section 3.1 of this study. No single company is likely to encounter all 164 factors. In practice as few as five to ten key adjustments are actually made. Adjustments can be made only in those cases that meet four criteria:

- a) Is it likely to have a material impact on EVA?
- b) Can the managers influence the outcome?
- c) Can the operating people understand it?
- d) Is the required information relatively easy to track or derive?

The point is that, for any one company, the definition and calculation of EVA is highly customized in order to strike a practical balance between simplicity and precision (Stewart 1994: 74).

4.2.1 The rate of return on total capital

Instead of using ROE, the rate of return on **total** capital can be used as the yardstick to assess corporate performance. This can be computed by dividing a firm's net operating profit after taxes (NOPAT) by total capital employed in the business. This may now be compared directly with the company's cost of capital in order to determine whether value is being created or destroyed (Stewart 1990:86).

$$r = \frac{\text{NOPAT}}{\text{capital}}$$

Capital is the sum of all cash invested in the business over time and in any form or by any name whatsoever. NOPAT is the profit derived from operations, after tax, but before financing charges (interest, dividends) and other non-cash items (e.g. depreciation).

The rate of return on capital may be computed either from a financing or from an operating perspective. Because of the importance of EVA in this study, both these methods are discussed below in Section 4.2.2 and Section 4.2.3.

4.2.3 The rate of return from a financing perspective

The rate of return (r) is, from a financing perspective, free from any distortions which debt (leverage) can inflict upon the standard ROE.

Consider the following calculation of the rate of return:

$$r = \frac{\text{NOPAT}}{\text{capital}}$$

where

NOPAT

- = Income attributable to ordinary shareholders
- + Interest payments after tax savings

Capital

- = Common equity
- + Debt

The NOPAT return on capital is what the return on equity would be, assuming that only equity financing has been employed (Stewart 1990:87). The return (r) is thus free from any financial leverage actions. The benefit of debt manifests itself in the weighted average cost of capital (c) against which the return (r) is compared.

In order to illustrate this important principle, consider the following hypothetical example:

	COMPANY A ----- ALL EQUITY -----	COMPANY B ----- R10,000 DEBT -----
Earnings before interest and tax	10 000	10 000
Interest	0	1 800
	-----	-----
Net profit before tax	10 000	8 200
Less Tax @ 40%	4 000	3 280
	-----	-----
Net profit after tax	6 000	4 920
Debt	0	10 000
Equity	20 000	10 000
	-----	-----
Capital	20 000	20 000
Net profit after tax	6 000	4 920
Equity	20 000	10 000
ROE	30%	49.2%
Net profit after tax	6 000	4 920
Interest	0	1 800
(Taxes saved)	0	(720)
	-----	-----
NOPAT	6 000	6 000
Capital	20 000	20 000
r	30%	30%

As can be seen in the above example, NOPAT, as well as NOPAT return on capital (r), remains **unchanged** by leverage. What matters is the amount of capital employed, and not in what form that capital has been obtained.

The next step to improve the rate of return is to eliminate other financing distortions. This is done by taking into account preferred shareholders interest as well as minority investors.

$$r = \frac{\text{NOPAT}}{\text{capital}}$$

where

NOPAT

- = Income attributable to ordinary shareholders
- + Preferred dividend
- + Minority interest provision
- + Interest payments after tax savings

and

Capital

- = Common equity
- + Preferred share capital
- + Minority interest
- + Debt

Note that for every adjustment to NOPAT, there is a corresponding adjustment to capital. The NOPAT as calculated above is the amount available to all providers of capital to the business (Stewart 1990:90).

The final step in adjusting the rate of return (r), is the elimination of accounting distortions. Equity equivalents (EE) convert the standard accounting book value to the so-called economic book value, which is a more accurate reflection of the cash that investors have risked in the firm and on which they expect a return.

Equity equivalents add back to capital such items as the deferred tax reserve, the cumulative amortization of goodwill, a capitalization of R & D (and other intangibles, such as the cost of designing and promoting new products) and other reserves such as the bad debt reserve, the stock obsolescence reserve and the deferred income reserve.

$$r = \frac{\text{NOPAT}}{\text{capital}}$$

where

NOPAT

- = Income attributable to ordinary shareholders
- + Increase in equity equivalents

ADJUSTED NET INCOME

- + Preferred dividend
- + Minority interest provision
- + Interest payments after tax savings

and

Capital

- = Common equity
- + Equity equivalents

ADJUSTED COMMON EQUITY

- + Preferred share capital
- + Minority interest
- + Debt

With the incorporation of equity equivalents into capital and NOPAT, the rate of return is an even more accurate indication of the yield earned by all the capital providers of the business.

4.2.3 The rate of return from an operating perspective

The rate of return on capital (r) can also be calculated from an operating perspective.

Capital can be defined as the net fixed assets (land and buildings, plant and equipment and other long-term capital necessary to run the business) plus current assets less non-interest-bearing liabilities (such as accounts payable and accrued expenses that arise as spontaneous sources of finance in the normal course of business).

To obtain the same measure of capital as the financing approach, adjustments must be made to assets for certain equity equivalent reserves (e.g. by adding the bad debt reserve to debtors, the cumulative amortization of goodwill to goodwill and the balance of capitalized intangibles to net fixed assets and so on)

(Stewart 1990: 93). This is the section of the balance sheet labelled "Employment of Capital". This section must of course balance with the section called, "Capital Employed".

From an operating perspective, NOPAT is, just as its name indicates, the net operating profit after tax. If one starts with net sales, from which all cash economic operating expenses including depreciation gets deducted, it leaves net operating profit from which cash taxes on this residual amount are deducted.

This cash tax amount can be approximated as follows: accounting provision for taxes **less** deferred tax not paid **plus** the tax on interest payments (which shelters operating profits from a bigger tax burden), plus taxes on dividends.

$$r = \frac{\text{NOPAT}}{\text{capital}}$$

where

NOPAT

- = Sales
- Operating expenses
- Taxes

and

Capital

- = Net working capital
- + Net fixed assets

4.3.4 Concluding remarks

A business that wants to add value to the capital it employs for its shareholders (investors), must earn a rate of return that exceeds the cost of capital of the business.

Measures such as ROE are a flawed measure of performance, due to distortions resulting from accounting conventions that make financial statements more useful for lenders than for shareholders.

The rate of return on **total** capital should be used to measure corporate performance. This can be obtained by dividing NOPAT by the capital employed in operations. Stewart (1990:111) called this an "after-tax cash-on-cash" yield earned in the business. It is a measure of the productivity of the capital employed in the business, irrespective of the method of financing used and free from accounting distortions arising from accrual bookkeeping entries.

It is the relationship between this rate of return (r) and the cost of capital that forms one of the EVA method.

4.3 EVA DEFINED

4.3.1 The theoretical model

As can be deduced from the introductory discussion above on the principles underlying EVA, in essence, EVA is a way of measuring the economic value (profitability) of a business after the **total** cost of capital - both debt **and** equity - has been taken into account. One must remember that most traditional (accounting-based) methods take only debt into account. The calculation of EVA also includes the often considerable cost of equity (Firer 1995:57).

The main shortcomings of other methods have been dealt with briefly. The key principle of EVA is that value is created when the return on an investment exceeds the total cost of capital that correctly reflects its investment risk. One can improve EVA (and thus shareholder value) as long as one accepts new projects on which the rate of return exceeds the cost thereof.

EVA is an **internal** performance measure of a company's operations on a year-to-year basis. It reflects the successes of the efforts of corporate managers to add value to the shareholders' investment.

EVA is the residual income left over from the operating profits after the total cost of capital has been subtracted. A **positive** EVA implies that the rate of return on capital **must** exceed the required rate of return. To the extent that a company's EVA is greater than zero, the firm is creating (adding) value for its shareholders (Stern 1994:49).

EVA is a kind of annual instalment of the multi-year Net Present Value (NPV) that is calculated by using the standard discounted cash flow capital (DCF) budgeting

technique. The similarity between EVA and NPV lies in the fact that they both measure the degree to which a firm is successful in earning a rate of return that exceeds the cost of capital. It is, however, demonstrated later in this chapter that EVA is a far better tool for the job than NPV or DCF, even though these methods, if properly applied, result in the same answers over an extended period of time.

EVA is arguably the only measure that properly accounts for all the complex trade-offs involved in creating value. It is computed by taking the spread between the rate of return on capital (r) (as calculated in Section 3.6.1.1) and the cost of capital (c) and then multiply this with the economic book value of the capital committed to the business (Stewart 1990:136):

$$\text{EVA} = (\text{rate of return} - \text{cost of capital}) \times \text{capital}$$

$$\text{EVA} = (r - c) \times \text{capital}$$

If, for example, NOPAT is R500, capital is R2 000 and c is 15%, then r (NOPAT/capital) is 25% and EVA is R200:

$$\begin{aligned}\text{EVA} &= (r - c) \times \text{capital} \\ &= (0.25 - 0.15) \times 2\,000 \\ &= \text{R}200\end{aligned}$$

Although there are countless individual actions in a business that employees can perform to create value, eventually they all fall in one of the three categories (r , c and capital) captured by EVA. EVA increases when operating efficiency is enhanced, when value enhancing investments are undertaken, and when capital is withdrawn from unrewarding activities.

To be more specific, EVA increases when:

- a) the rate of return (r) earned on the existing capital base improves; that is, the operating margin increases without investing more capital;
- b) additional capital is invested in projects that earn a rate of return (r) greater than the cost of capital (c); and
- c) capital is liquidated from unrewarding projects (where $r < c$).

These are the only ways in which shareholder value can be created, and EVA captures them all.

EVA can also be expressed in another way, by multiplying both r and c with capital:

$$\begin{aligned} \text{EVA} &= (r - c) \times \text{capital} \\ &= (r \times \text{capital}) - (c \times \text{capital}) \\ &= \text{NOPAT} - (c \times \text{capital}) \\ &= \text{operating profits} - \text{a capital charge} \end{aligned}$$

EVA is therefore residual income, or operating profits, less a capital charge. The company is in effect charged by its capital providers (which includes shareholders and debt providers) for the use of capital at an interest rate of c (cost of capital) (Stewart 1990:137).

The preceding example can also be presented in this format. Bear in mind that with an r of 25%, c of 15% and capital employed of R2 000, EVA was R200.

FORMERLY

$$\begin{aligned} \text{EVA} &= (r - c) \times \text{capital} \\ &= (0.25 - 0.15) \times 2\,000 \\ &= \text{R}200 \end{aligned}$$

NOW

$$\begin{aligned} \text{EVA} &= \text{NOPAT} - (c \times \text{capital}) \\ &= (r \times \text{capital}) - (c \times \text{capital}) \\ &= (0.25 \times 2\,000) - (0.15 \times 2\,000) \\ &= 500 - 300 \\ &= \text{R}200 \end{aligned}$$

From this, one can see that NOPAT = R500, and the capital charge, or interest, is R300. EVA represents the residual of R200.

According to Stewart (1990:138) the three EVA strategies can now be stated as follows:

- a) improve operating profit (or operating margin) without tying up any more capital;
- b) invest more capital, as long as the return on the additional capital is more than the capital charge to be paid ($r > c$); and
- c) reduce or disinvest capital whenever $c > r$, and the resultant earnings lost are more than offset by the savings on the capital charge.

These three value-creating strategies can be illustrated by means of numerical examples.

Base case:

The base case starts with a NOPAT of R500, capital of R2 000 and c of 15%. From this, r is calculated at 25% and EVA at R200:

$$\begin{aligned} \text{EVA} &= (r - c) \times \text{capital} \\ &= (0.25 - 0.15) \times \text{R}2\,000 \\ &= \text{R}200 \end{aligned}$$

Value-creating strategy (a): Improve operating efficiency

NOPAT increases to, say, R600 due to administrative savings or greater efficiency in the production process. Then r increases to 30% (R600/R2 000), and EVA increases to R300:

$$\begin{aligned} \text{EVA} &= (r - c) \times \text{capital} \\ &= (0.30 - 0.15) \times \text{R2 000} \\ &= \text{R300} \end{aligned}$$

Value-creating strategy (b): Achieve a profitable investment

A proposed new project requires a capital investment of R1 000 and is expected to earn a rate of return of 20% and thereby adding R200 to NOPAT. In this case, r is 23% (R700/R3 000) and EVA increases to R210:

$$\begin{aligned} \text{EVA} &= (r - c) \times \text{capital} \\ &= (0.23 - 0.15) \times \text{R3 000} \\ &= \text{R210} \end{aligned}$$

Note in this case that although the rate of return decreases from 25% to 23%, EVA increases from R200 to R210.

Value-creating strategy (c): Rationalize and curtail unproductive investments

(c)(1) Liquidate unproductive capital

R500 of excess working capital can be withdrawn from business operations without affecting NOPAT. This causes the rate of return to increase to 33% (R500/R2 000-R500) and EVA to R270:

$$\begin{aligned}\text{EVA} &= (r - c) \times \text{capital} \\ &= (0.33 - 0.15) \times \text{R1 500} \\ &= \text{R270}\end{aligned}$$

(c)(2) Curtail investment in unrewarding projects

Start with a completely new case. Assume that a company earns a NOPAT of R200 on R2 000 capital. With a return of only 10%, EVA is negative R100:

$$\begin{aligned}\text{EVA} &= (r - c) \times \text{capital} \\ &= (0.10 - 0.15) \times \text{R2 000} \\ &= -\text{R100}\end{aligned}$$

Suppose now that the company has the opportunity to undertake a new project with a capital investment of R1 000 and a return of 13%, therefore adding R130 to NOPAT. The consolidated return increases to 11% (R330/R3 000) but EVA declines further, to negative R120:

$$\begin{aligned}\text{EVA} &= (r - c) \times \text{capital} \\ &= (0.11 - 0.15) \times \text{R3 000} \\ &= -\text{R120}\end{aligned}$$

Although the rate of return increases, more value is destroyed for the shareholders.

In addition to the above cases, another value-creating option for a firm is mentioned briefly.

Value-creating strategy : Changing the cost of capital (c)

Starting with the first base case again, suppose that the company is able to substitute some of its high cost capital for lower cost capital (by increasing its debt ratio). This results in an interest bill saving of, say, R50 and a reduction in c to,

say, 12%. NOPAT now drops (remember that NOPAT = attributable income + interest expense after tax, and therefore a lower interest bill will lower NOPAT) with $R50 \times (1 - \text{Tax rate})$, say, a total of R30. The rate of return is now 24% ($(R500 - R30) / R2,000$) and EVA increases to R240:

$$\begin{aligned} \text{EVA} &= (r - c) \times \text{capital} \\ &= (0.24 - 0.12) \times R2\,000 \\ &= R240 \end{aligned}$$

These calculations demonstrate how the EVA of a company can be determined, as well as how changes in the three inputs in the formula bring about a change in the value created or value destroyed.

However, EVA must at this stage be put to another test. If EVA is a good performance measure, it ought to be able to set apart or distinguish between the value-creation efforts of competing companies.

Consider the following cases of Companies A, B and C:

	A	B	C
(r - c)	15% - 15%	17.5% - 15%	17.5% - 15%
x increase in Capital	R1 000	R 800	R2000
	-----	-----	-----
Incremental EVA	R 0	R 20	R 50

These calculations can now be presented on a more detailed year-to-year basis in order to illustrate the principle of an ongoing EVA calculation and comparison between companies:

EVA for companies A, B and C

	19x1	19x2	19x3	19x4
	-----	-----	-----	-----
<u>Company A</u>				
1. NOPAT/Beg capital r	15%	15%	15%	15%
2. WACC c	15%	15%	15%	15%
3. Spread r-c	0%	0%	0%	0%
4. x Beginning Capital	R10 000	R11 000	R12 100	R13 310
5. EVA	R0	R0	R0	R0
6. Increase in EVA		R0	R0	R0
<u>Company B</u>				
1. NOPAT/Beg capital r	17.5%	17.5%	17.5%	17.5%
2. WACC c	15%	15%	15%	15%
3. Spread r-c	2.5%	2.5%	2.5%	2.5%
4. x Beginning Capital	R8 000	R8 800	R9 680	R10 648
5. EVA	R200	R220	R242	R266
6. Increase in EVA		R20	R22	R24
<u>Company C</u>				
1. NOPAT/Beg capital r	17.5%	17.5%	17.5%	17.5%
2. WACC c	15%	15%	15%	15%
3. Spread r-c	2.5%	2.5%	2.5%	2.5%
4. x Beginning Capital	R8 000	R10 000	R12 500	R15 625
5. EVA	R200	R250	R313	R391
6. Increase in EVA		R50	R63	R78

EVA is obtained by multiplying the spread between r and c by the capital invested. Incremental EVA is determined by the increase in EVA, or the $r - c$ spread multiplied by the increase in capital.

Various scenarios have been presented above to illustrate the calculation of EVA. The possibilities are by no means exhausted and are dealt with in more detail in Chapter 5 of this study, which concentrates on the variables determining EVA.

At this stage, it should be clear that the EVA valuation procedure is not a far-fetched new method or theory of valuation; it is just a form of the discounted cash flow method. It is a mathematical truism that, for a given forecast, the value determined by discounting projected EVA and adding it to the current capital balance, equals the value computed by discounting the anticipated free cash flow to a present value (Stewart 1990:175).

The above hypothetical examples were used in conjunction with the theoretical principles to demonstrate the basic mechanics of Economic Value Added as a valuation and performance measurement tool.

One can now develop and expand the EVA method by introducing present value discounting into the process.

4.3.2 Explanatory calculations

The EVA valuation method calculates how much value has been and will be created (or destroyed). When a company's EVA is projected and discounted to a present value, EVA accounts for the market value that management has added or subtracted from the capital at its disposal:

$$\text{Value} = \text{Capital} + \text{Present Value of all future EVA}$$

Value is calculated in three steps. Firstly, the annual EVA-values are discounted to the present value. Secondly, one must provide for the period **beyond** the time span (T) under review. This is done by capitalizing the NOPAT achieved in the first year after T as a perpetuity and then discounting it to the present. Lastly, one adds current capital (in year 0, the beginning of the valuation period) to the discounted EVA values.

Normal capital budgeting techniques often assume that cash flows occur at the end of the period, and therefore do not adjust the discount factor or the cash flows for re-investing the cash flows at any time throughout the year. However, it makes more sense to assume that the cash flows that occur during the year can be re-invested at some rate.

For the purposes of the example below midyear discounting is used at the cost of capital and the discount factor is adjusted accordingly. This implies that the capital at the beginning of the period must be adjusted to midyear by adding half a year's interest at the cost of capital rate (discount rate).

The value of Company A will be determined by discounting its EVA:

	19x1	19x2	19x3	19x4
	-----	-----	-----	-----
<u>Company A</u>				
NOPAT	R1 500	R1 650	R1 815	R1 997
Beginning Capital	R10 000	R11 000	R12 100	R13 310
NOPAT/Beg capital r	15%	15%	15%	15%
WACC c	15%	15%	15%	15%
Spread r-c	0%	0%	0%	0%
x Beginning Capital	R10 000	R11 000	R12 100	R13 310
EVA	R0	R0	R0	R0
PV factor at 10%	0.9535	0.8668	0.7880	0.7131
PV of EVA	R0	R0	R0	R0
Cumulative PV of EVA	R0	R0	R0	R0
Capital				<u>R10 488</u>
Value				R10 488

With projected returns equal to required returns, no value is added to capital. Company A is worth the current capital employed and no more.

Next, consider the case of Company B:

	19x1	19x2	19x3	19x4
	-----	-----	-----	-----
<u>Company B</u>				
NOPAT	R1 400	R1 540	R1 694	R1 863
Beginning Capital	R8 000	R8 800	R9 680	R10 648
NOPAT/Beg capital r	17.5%	17.5%	17.5%	17.5%
WACC c	15%	15%	15%	15%
Spread r-c	2.5%	2.5%	2.5%	2.5%
x Beginning Capital	R8 000	R8 800	R9 680	R10 648
EVA	R200	R220	R242	R266
PV factor at 10%	0.9535	0.8668	0.7880	0.7143
PV of EVA	R191	R191	R191	R2 096
Cumulative PV of EVA	R191	R382	R573	R2 669
Capital				<u>R8 390</u>
Value				R11 059

The rate of return on capital is a steady 17.5% and it exceeds the cost of capital of 15% by a constant 2.5% per year. This causes EVA to increase at the rate at which capital invested grows, namely 10%. The discounted value of the EVA remains the same due to the fact that the growth rate in the EVA equals the discount rate. The present value of EVA of R266 as a perpetuity is estimated at R2 096, and the total accumulated value of EVA of R2 669 is the value created or added by management to the capital at their disposal. Adding this capital to the value created from it yields the total value of the company.

Finally, let us consider the valuation of Company C:

	19x1	19x2	19x3	19x4
	-----	-----	-----	-----
<u>Company C</u>				
NOPAT	R1 400	R1 750	R2 188	R2 734
Beginning Capital	R8 000	R10 000	R12 500	R15 625
NOPAT/Beg capital r	17.5%	17.5%	17.5%	17.5%
WACC c	15%	15%	15%	15%
Spread r-c	2.5%	2.5%	2.5%	2.5%
x Beginning Capital	R8 000	R10 000	R12 500	R15 625
EVA	R200	R250	R313	R391
PV factor at 10%	0.9535	0.8668	0.7880	7.880
PV of EVA	R191	R217	R247	R3 081
Cumulative PV of EVA	R191	R408	R655	R3 736
Capital				<u>R8 390</u>
Value				R12 126

Company C creates value as measured by its EVA at a higher rate than the other two contenders. Although its spread between r and c is similar to that of Company B, its growth rate in terms of NOPAT is very high at 25%. It is also interesting to note that the Free Cash Flow (FCF) of Company C (NOPAT less I , incremental capital) is negative.

4.3.3 Standardized EVA

Despite all the advantages of EVA as a performance measure, one could refine EVA more in order to use it for a comparison between companies or business units of different sizes. Also, certain industries are more capital intensive than others and

there is a need for a common basis for comparison. EVA can be standardized to reflect a common level of capital employed.

In order to standardize EVA, the **capital employed** needs to be standardized to a base year. The spread ($r - c$) is not affected by the scaling. The capital employed in the first year is divided by itself (the base year capital employed) and multiplied by 100. Thus, the standardized EVA in the first year of the analysis is always equal to the spread between that year's r and c multiplied by 100.

In the second year of analysis, that year's capital employed is divided by the base year's capital employed, multiplied by 100 and multiplied in turn by the spread in order to attain the standardized EVA of the second year. This process is repeated for every year for the entire period under review.

Standardized EVA increases if the spread ($r - c$) is increased, new capital is invested productively, or if capital is withdrawn from uneconomical activities.

Shortcomings, distinctions and comparisons between companies show up more clearly when EVA is standardized in this way. These characteristics are utilized in the empirical part of this study.

4.3.4 Concluding remarks

A detailed evaluation of EVA as a performance measure is done at the end of this chapter. However, at this stage, after the above hypothetical examples, one can mention a number of features of this model.

In the first place, EVA reduces all the ways in which a company can create value to only three: Measuring the efficiency of current operating activities, taking profitable growth into consideration and eliminating uneconomical activities (both in terms of operating and capital investment).

Secondly, when projected and discounted to a present value, EVA represents the net present value of all past and projected capital projects. Thus, maximizing EVA as a company objective is not only compatible with the overall goal of the firm, but such a step will ensure that the share price continues to grow as the stock market price exceeds the capital investment in the firm.

Although EVA yields the same value as discounting the free cash flow, EVA as a measure is better in the sense that it connects forward-looking valuation procedures with an evaluation of performance (Stewart 1990: 178).

4.4 MARKET VALUE ADDED

4.4.1 Introduction

Market value added (MVA) was also developed at the Stern Stewart consultancy firm. Although this is another method of determining the value of a company, it is dealt with under the heading of EVA, as there is a close relationship between these two concepts.

Companies can be ranked according to how much value they have added to, or subtracted from, their shareholder investment. Market value added is the difference between a company's fair market value, as reflected primarily in its share price, and the economic book value of capital employed. Readers are at this stage reminded of the difference between the economic book value and the accounting book value, as discussed in Sections 3.1 and 3.2 above, as well as in Chapter 2.

The economic book value is bound to be considerably larger than the accounting book value as indicated in the annual financial statements. Besides the conventional book equity (share capital, share premium, retained earnings and reserves) it also includes equity equivalent reserves (bad debt and LIFO reserves, the capitalization of R&D and deferred tax to name but a few) to provide a more accurate indication of the shareholders' total cash investment in the company (Stewart 1990 :180).

The concept of market value added can be expressed in a simple formula:

$$\text{Market value added} = \text{market value} - \text{capital}$$

If a company has a market value of R500m, but has capital to the worth of R600m invested, it has a **negative** MVA of R100m. However, if the same company only had R300m in invested capital, the managers of the company would have added R200m in value to the investors' capital at their disposal.

From the above, one can deduce that a company's MVA is the share market's assessment, at any given time, of how successfully the company has invested its capital in the past and how successfully investors expect the capital to be invested in future. Maximizing a company's MVA is thus synonymous to maximizing shareholder value, which is the goal of the firm.

MVA can also be calculated by multiplying the number of shares issued by the difference between the market price of the shares and the economic book value of the shares:

$$\begin{aligned} \text{MVA} &= \text{number of shares} * (\text{market price} - \text{economic book value per share}) \\ &= \text{share market value} - \text{economic book value (capital)} \end{aligned}$$

The economic book value consists of the economic capital as we defined it for the purposes of calculating a company's EVA. Adding equity equivalents to capital, adjusts MVA for the many distortions that can cause an overstatement of value created by capital intensive, high-tech or risky companies. These factors may be discounted in the share price at the left hand side of the above equation, and, unless is accounted for, on the other side of the formula, value (MVA) will also be overstated.

It is also important to note that it is not **total value** (market capitalization, the first term in the MVA calculation) that counts. This would be an incomplete

measurement of corporate performance, as it does not take into consideration the amount of capital used to create that value. A company can increase its total value by investing more capital (both by retaining earnings and raising new capital in whatever form). The efficient use of the shareholder's capital can only be measured according to **net** present values - that is, the total value **less** the total capital used, or the **increase** in value, less the **additional** new capital invested in the business (Stewart 1990:190).

Changes in the levels of MVA over a given period are bound to be as useful (if not more so) than the total levels of MVA itself. An increase in MVA is a sign that a company is producing higher rates of return on capital than the cost of that capital. The opposite happens when the return of capital is lower than the cost thereon: a negative MVA is accorded to a company, its managers and its shareholders.

The above argument indicate the link between EVA and MVA as two valuation concepts. It is this link that forms the subject of the discussion in the next section.

4.4.2 MVA and EVA

EVA can be viewed as that **internal** measure of performance that best reflects the company's success in adding value to the capital invested by shareholders. It is therefore strongly related to both the **level** and the **changes** in MVA over time.

As explained above, EVA is the residual income left over from operating income after the cost of capital has been deducted. According to Stewart (1990:192), EVA can also be thought of as the economic earnings that are capitalized by the market in arriving at a company's MVA. The MVA can therefore be regarded as the **external** or "market" measure of performance of a company's success. However, the link between a company's EVA and MVA goes further. It can, in fact, be expressed mathematically. A company's market value added at any point in time is equal to the discounted present value of all the EVA the company is expected to generate in the future.

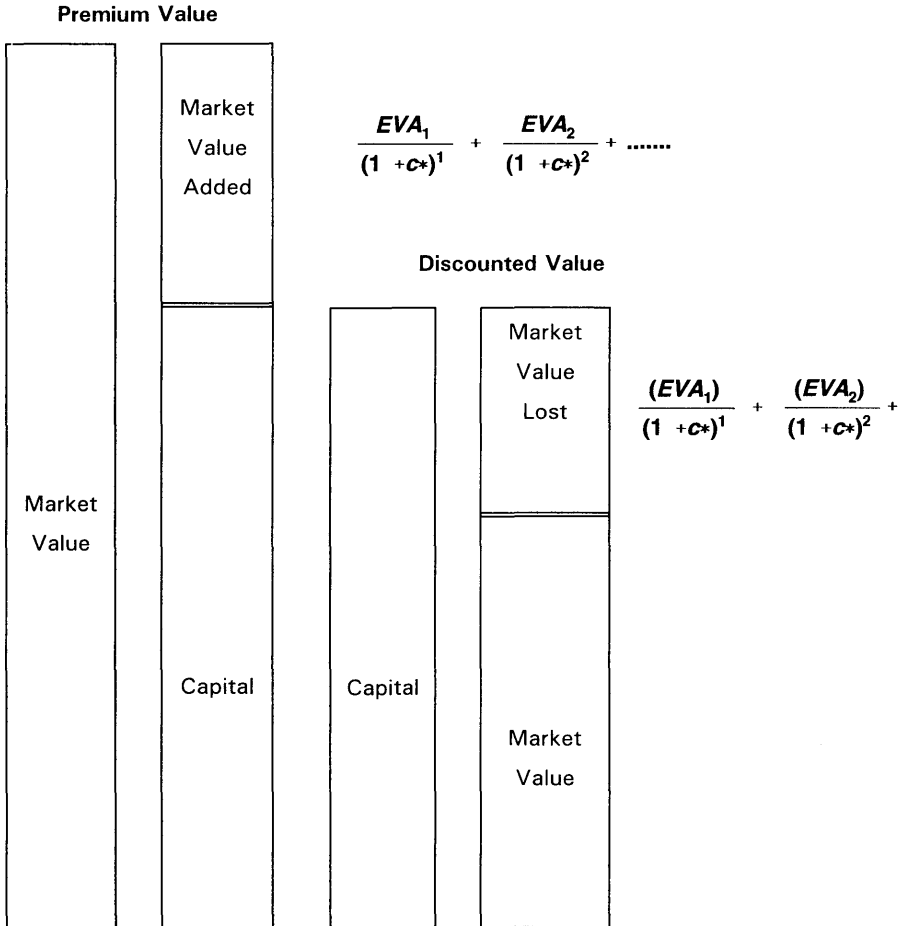
Thus, companies that earn exactly their cost of capital have an EVA of RO and sell at a market value equal to capital, and therefore have as MVA zero. Companies that earn in excess of their cost of capital are rewarded by the market with positive MVAs (in line with the positive EVAs that can be computed from their results).

MVA = market value - capital

MVA = present value of all future EVAs

Stewart (1990:153) describes a company's EVA as the fuel that fires its MVA. EVA is the internal measure which leads to the external consequence of building a premium or discount into the market value of a company. Diagrammatically, this can be expressed as follows:

The Relationship Between EVA and MVA



It is difficult to illustrate the calculation of a company's MVA by means of a hypothetical example as key variables also need to be estimated. In the following section, a real life example is used. However, as a run-up to this, consider the following illustration which is an extension of the calculations of EVA done in Section 4.3.1 above:

MVA FOR COMPANY C

(Data in Rm)	19x1	19x2	19x3	19x4
	-----	-----	-----	-----
1. NOPAT/Beg capital r	17.5%	17.5%	17.5%	17.5%
2. WACC c	15%	15%	15%	15%
3. Spread r-c	2.5%	2.5%	2.5%	2.5%
4. x Beginning Capital	R8	R10	R12.5	R15.625
5. EVA	R0.20	R0.25	R0.31	R0.39
6. Share Price	R10	R11	R13	R15
7. "Econ" B V/Shr	R3	R5	R6	R6
8. Price - Book	R7	R6	R7	R9
9. x No. Shares Issued	20	20.5	22	23
10. MVA	R140	R123	R154	R207

From these calculations, one can see that the variables that determine a company's MVA are, in essence, the share price, the economic book value per share and the number of shares issued. It is especially the last two variables that lead to the calculation of **total capital invested** as used in determining the EVA.

A company's MVA can thus be increased in the same three ways that the EVA is increased, namely (a) by increasing the efficiency of current operations and thereby increasing the spread between r and c ; (b) by increasing the amounts of capital invested in projects with positive spreads between r and c ; and (c) by withdrawing capital from projects or operations where the spread between r and c is negative. The share market tends to be forward-looking, and therefore changes in MVA often anticipate changes in EVA. Changes in EVA and MVA do not correspond exactly at any given point in time, but the general trend is more often than not the same with the MVA being the leading indicator and the EVA lagging behind. The

correlation between these two valuation concepts is discussed in Section 4.4.5 of this study.

4.4.3 Standardized MVA

The MVA can also be standardized and then related to EVA. Stewart (1990:173) standardizes the **number of shares issued** on the same principle as capital employed was standardized in the calculation of standardized EVA.

The actual number of shares issued is divided by the capital employed at the end of the first year (the base figure) and then multiplied by 100. This adjusted (standardised) amount of shares issued is multiplied by the difference between the market value and the book value per share in order to arrive at the standardized MVA.

In the second year, the actual number of shares issued is once again divided by the capital employed at the end of the first year, then multiplied by 100 to arrive at the standardized number of shares issued, and the rest of the calculations are completed to obtain the standardized MVA.

Note that in standardizing EVA, capital employed at the **beginning** of the first year is used, whilst in standardizing MVA, it is the capital at the **end** of the period that is used. The reason for this is twofold. Firstly, it takes time for capital to become fully productive and, secondly, MVA is calculated using the share price as it is reflected at the end of the year.

Standardized MVA is utilized extensively in the empirical part of this study.

4.4.4 The Q-ratio

There is another method very similar to the MVA method, namely the **Q ratio**. This ratio was developed in the 1960s by Nobel Prize winning economist James Tobin.

The ratio is calculated by adding the market value of a company's equity (both ordinary and preference shares), debt and other long-term liabilities together. This is expressed against the current value of the company's asset base (comprised of the net assets and working capital, adjusted for inflation) (Ryan 1994:16).

Companies with a ratio greater than one have been able to add value to the assets under their control, while those with a ratio of less than one have destroyed value.

Companies can improve their ratio by good asset management (for example by reducing stock levels), rationalisation (of both assets, costs or product range), restructuring and cost containment in order to improve margins.

From the above one can see the similarities with EVA and MVA more clearly. The same factors that influence EVA also come into play with the Q ratio. Stewart (1990:181), in elaborating on MVA, states that he focuses on the market value of a company's total debt and equity in relation to the capital employed in assets (though no mention is made of whether assets are adjusted for inflation or not). Managers are really managers of assets and not of equity.

This study, however, concentrates, *inter alia*, on MVA as a measure of shareholder wealth.

4.4.5 Concluding remarks

MVA is the absolute Rand spread between a company's market value and total capital invested. Unlike a rate of return, which reflects the outcome of one period, MVA is a cumulative measure of corporate performance. It is the wealth created by management over and above the total resources invested. MVA can also be regarded as the market's assessment of the quality of management (Stern 1994: 43).

The close relationship between a company's EVA and MVA originates from the fact that these measures are based on the same underlying principles, concepts and amounts. MVA, which is forward-looking, is closely associated with historical EVA.

If managers strive to maximize a company's EVA, MVA automatically follows, as does the improvement in shareholder value. Maximizing MVA should be the primary objective for the management of a company that is concerned about its shareholders' wealth (Stewart 1990:153).

4.5 EVA CALCULATION OF SASOL (LTD).

As an example, a calculation of the EVA of Sasol LTD is presented overleaf:

ECONOMIC VALUE ADDED (EVA) (1992/1993)

REFER NOTE

1. RETURN ON CAPITAL EMPLOYED (ROCE)

$$\frac{\text{Net Operating Profit after Tax (NOPAT)}}{\text{Beginning Capital}} \times \frac{100}{1}$$

$$\frac{1\ 614}{19\ 987} \times 100$$

$$= 8.1\%$$

2. SPREAD

Return on Capital employed - Weighted Average Cost of Capital **5***

$$= \text{ROCE} - \text{WACC}$$

$$= 8,1 - 18,1$$

$$= \underline{(10\%)}$$

3. ECONOMIC VALUE ADDED (EVA)

Beginning Capital x Spread

R19 987 million x (10%)

$$= \underline{\text{R1 998 million}} \text{ Shortfall}$$

MARKET VALUE ADDED (MVA)
(1992/1993 - FINANCIAL STATEMENTS)

	REFER NOTE	R'MILLION 1993	1992
1. ADJUSTED BOOK VALUE OF EQUITY			
Ordinary Shareholders' Interest	1	6 781	5 961
Cumulative extraordinary loss/gain (Note 17 - Cash flow statement: Adjustment for loss/(profit) on disposal of fixed assets)	CFS	(3)	(2)
LIFO reserve	2	343	311
Goodwill (Coal Mining assets at book value (Refer note 1))	B/S	1 582	1 403
Inflation adjustment - other fixed assets	3	<u>10 758</u>	<u>8 929</u>
Adjusted Book Value of equity		<u>19 461</u>	<u>16 602</u>
Minority interest	B/S	91	76
Total long-term capital		2 520	2 850
- Long-term liabilities	B/S	1 492	1 822
- Convertible debentures	B/S	1 028	1 028

Short-term borrowings	B/S	<u>578</u>	<u>459</u>
Non-equity components of Total Capital		<u>3 189</u>	<u>3 385</u>
TOTAL CAPITAL (Equity & Non-Equity)		<u>22 650</u>	<u>19 987</u>

2. MARKET VALUE

Market value of equity on
25 June 1993

= 566,1 million shares x daily average share price for June 1993			
= 566,1 x R18,76		10 622	9 073

Book value of non-equity components of capital		<u>3 189</u>	<u>3 385</u>
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Market value		<u>13 811</u>	<u>12 458</u>
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**3. MARKET VALUE ADDED
(MVA)**

Market value less Total
Capital (Equity & Non-Equity)

= 13 811 - 22 650		<u>(8 839)</u>	<u>(7 529)</u>
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REF	:	CFS = Cash flow statement
	:	B/S = Balance sheet
	:	I/S = Income statement

NOTE 1

**ORDINARY SHAREHOLDERS' INTEREST
(BALANCE SHEET FIGURES)**

	R'MILLION	
	1993	1992
Share Capital	1 375.6	1 369.9
Shareholders reserves	6 987.1	5 994.3
- Distributable reserves	4 987.7	4 171.2
- Tax equalisation reserve	100.0	-
- Provision for factory turnaround	210.0	133.6
- Deferred taxation	1 689.4	1 689.5
Coal mining assets at book value		
(Add Back: MVA calculation)	<u>(1 582.0)</u>	<u>(1 402.8)</u>
Ordinary Shareholders' Interest	<u>6 780.7</u>	<u>5 961.4</u>

NOTE 2

LIFO RESERVE

R'MILLION

	1992/93	1991/2
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1. ADJUSTMENT TO ASSET VALUE (MVA)

LIFO Value

- Crude oil and other raw materials	137.9	55.7
- Manufactured products	<u>453.4</u>	<u>369.2</u>
	591.3	424.9
FIFO Value	<u>934.1</u>	<u>736.1</u>
Increase in Stock Value	<u>342.8</u>	<u>311.2</u>

2. ADJUSTMENT TO PROFITS (NOTE 4)

- Adjustment 1991/92		311.2
- Adjustment 1992/93		<u>342.8</u>
Increase in profit 1992/93		<u>31.6</u>

NOTE 3

INFLATION ADJUSTMENT ON FIXED ASSETS

R'MILLION
1992/93

1. PLANT, EQUIPMENT AND VEHICLES

Depreciation for the year (excluding disposals)	<u>521.05</u>
Accumulated depreciation on 25 June 1993	<u>4 255.0</u>
Book value on 25 June 1993	<u>7 058.7</u>

2. AVERAGE AGE OF ASSETS

$$\frac{\text{Accumulated depreciation}}{\text{Depreciation for the year}} = \frac{4\,255.0}{521.5} \quad \underline{\underline{8.2 \text{ years}}}$$

**3. CURRENT VALUE OF ASSETS/
DEPRECIATION FACTOR**

Production Price Index: Machinery, non-electric trading goods for usage in South Africa

Formula for assets with an age of

$$8.2 \text{ years} = \frac{122.9}{48.7} = \quad \underline{\underline{2.524}}$$

4. CURRENT VALUE OF ASSETS/DEPRECIATION

R'MILLION

	ASSETS	DEPRE- CIATION FOR
	25/6/93	1992/93
Factor	<u>2.524</u>	<u>2.524</u>
Book value	7 059	522
Present value (2,524 x 7 059)	<u>17 817</u>	<u>1 317</u>
Adjustment	<u>10 758</u> (MVA)	<u>795</u> (EVA)
		(Note 4)

NOTE 4

**NET OPERATING INCOME AFTER TAX
(NOPAT)**

	REFER NOTE	R'MILLION
1. ADJUSTED EBIT-CALCULATION		
Net income before taxation	I/S	1 835.9
Plus: Interest paid		439.0
- Loans	I/S	350.3
- Convertible debentures	I/S	88.7
LIFO adjustment	2	<u>31.6</u>
		2 306.5
Less: Depreciation adjustment	3	(794.8)
Plus: Holding Gain	7	<u>608.0</u>
Adjusted EBIT		<u>2 119.7</u>
2. CASH INCOME TAX		
Taxation per income statement		347.9
Tax saving on convertible debenture interest		<u>(35.5)</u>
Net taxation for the year per income statement	6	312.4
Taxation on interest paid		(193.2)
Taxation on extra ordinary items		-
Cash tax		<u>505.6</u>
3. NET OPERATING PROFIT AFTER TAX		
Adjusted EBIT		
Cash tax		2 120
NOPAT (EVA)		<u>506</u>
		<u>1 614</u>

NOTE 5
**WEIGHTED AVERAGE COST OF CAPITAL
(WACC)**

	3 YEAR AVERAGE DEBT TO CAPITAL RATIO	AFTER TAX RETURN	WEIGHTED AVERAGE COST OF CAPITAL (WACC) %
Equity	85.72	19.76 (1)	16.9
Debt	14.28	8.12 (2)	1.2
	100.00		18.1

Notes:
1. Cost of equity %

Risk free rate (Government bonds)		14.00
Estimated risk premium	6%	
Sasol's beta	<u>0.96</u>	<u>5.76</u>
		<u>19.76</u>

2. Cost of debt

Cost of debt is estimated at 50 basis points over the risk free rate

After tax cost of debt = $14.5 \times 0.56 =$ **8.12**
 Tax rate (Note 6)

NOTE 6
TAXATION ON INTEREST PAID (1992/1993)
R'MILLION
1. EFFECTIVE TAX RATE

Net income before taxation	<u>1 836</u>
Taxation @ 40%	734
Taxation on dividends declared (15% of R487)	<u>73</u>
Tax liability	<u>807</u>

$$\text{Effective tax rate} \frac{807}{1\ 836} \times \frac{100}{1} = \underline{44\%}$$

2. INTEREST PAID

Interest paid (per income statement)	
- Loans	350.3
- Convertible debentures	<u>88.7</u>
	<u>439.0</u>

3. TAXATION ON INTEREST PAID (NOTE 4)

Interest paid x effective tax rate	
439 x 44% =	<u>193.2</u>

NOTE 7

HOLDING GAIN

1. AVERAGE INVESTMENT IN OTHER FIXED ASSETS	R' MILLION	
Book value	1993	1992
- Plant equipment & vehicles	7 058.7	5 854.6
- Capital work in progress	<u>816.5</u>	<u>1 096.7</u>
	<u>7 875.2</u>	<u>6 951.3</u>
Average investment	<u>7 413.2</u>	

2. WEIGHTED AVERAGE INFLATION RATE, FOR FIVE YEARS BASED ON THE NON-ELECTRIC MACHINERY PRICE INDEX

YEAR	PRICE INDEX	INFLATION %	WEIGHT	PRODUCT
1993	122.9	6.5	5	32.5
1992	115.4	7.6	4	30.4
1991	107.2	7.0	3	21.0
1990	100.2	11.0	2	22.0
1989	90.3	17.0	1	17.0
1988	77.2	-	-	-
			15	122.9

$$\text{Weighted average inflation rate} = \frac{122.9}{15} = 8.2\%$$

3. HOLDING GAIN (REFER NOTE 4)

$$\text{Average Investment} \times \text{Weighted average inflation rate} = 7\,413 \times 8.2\% = \underline{\underline{\text{R608 million}}}$$

4.5 CRITICISM OF EVA

Although EVA as a measure of corporate performance is the method which the various variables determining shareholder value in this study are derived from, it does have a number of shortcomings, as any such a system would have.

Many of the criticisms targeted against EVA are based on misconceptions about or ignorance of the subject. Other problems with EVA originate from a lack of management support (for whatever reason), whilst still other problems seem to have genuine grounds. The various criticisms or problems people have with EVA will be given simultaneously with explanations and clarification where applicable.

Stewart (1995:81), one of the fathers of EVA, addresses the five main ways in which managers err in applying EVA. Firstly, EVA must be a way of life. One must adopt EVA and not merely calculate it. Secondly, most managers try to implement EVA too rapidly. Depending on the size, complexity or diversity of the organization, it could take from five months up to a year to implement EVA, starting from top management and then gradually pushing it down the ranks. Thirdly, there must be a process of selling EVA, but it should be sold with the idea that it is going to be bought by **everyone** in the organization. All the department heads must work together, driven by the EVA incentive plan (see Chapter 8 of this study) in order to make a success of the EVA system. Fourthly, it must be conveyed to the managers and all other employees that EVA will reward **all stakeholders** of the firm if it is correctly implemented. Lastly, the training of all employees in EVA is important, because even those who do the smallest jobs can help create value.

Another aspect that can create a problem for the management of a company is the fact that the share market is forward-looking. When one announces that one is going to adopt an EVA system, or that one is going to spin off or sell a subsidiary, the company's share price is likely to go up. Internally, though, one has not achieved that value yet. One has to spend the next two years or so achieving that

expected value just in order to keep the share price from falling. The solution to this problem is to use EVA as an **internal** measure of performance and to let MVA be the barometer of the market's expectations.

Another aspect of EVA that needs careful consideration is that of determining the cost of capital, or c , as it has been used in the calculations. This is particularly relevant in decentralized companies with various business units. The weighted average cost of capital (WACC) is not an output of the accounting system. Sub-optimal shareholder value may arise if the WACC is determined incorrectly (Best 1995:38). Calculating WACC is an important step in the EVA calculation, but what is more important is the fact that just charging managers for the use of **total** capital, and making their bonuses depend to a large extent on covering that capital charge, goes a longer way towards motivating efficiency than making subtle distinctions between levels of risk and cost of capital.

If one is going to hold people accountable for their performances on a year-to-year basis, one has a problem if one has large investments in time period zero whilst benefits might accrue only in the second, third, etc. years. Glasser (1996:42), the CEO of a company in the USA (GATX), contends that the EVA approach can penalize companies that utilize assets with long-term returns. Their investments generate a regular revenue stream during their life, and a lump sum when they are sold. The more such companies invest, the lower their EVA. When investments are restricted, EVA improves. Stern (1994:64) attempts to solve this problem by putting large capital expenditure items into a suspense account. Instead of being amortized on a standard depreciation schedule, they bear interest at the required rate of return. The company and its shareholders thereby avoid being penalized for investing large sums.

One must also remember that it is possible to get into a situation where a company can have a negative EVA due to a (continuous) big investment programme, but, if the returns are attractive ($r > c$), the market can realize this and the company may be rewarded accordingly by an increasing MVA. As Stewart (1990:124) strikingly puts it: "Happiness is a negative cash flow - so long as the returns are attractive".

Stewart (1994:79) also addresses the issue of depreciation by stating that it troubles some critics that EVA is measured **after** subtracting depreciation from the income statement and the balance sheet. It seems that the basis for confusion is the notion that depreciation cannot be an economic charge because it is a non-cash charge. Depreciation is, however, an economic charge, because it is a cash equivalent charge, in the sense that one pays for depreciation in cash if one leases the asset instead of owning it. But, taking a steady depreciation charge (straight-line depreciation) against a steady cash flow leaves steady earnings against an asset base that declines with depreciation. The problem is real, however the culprit is not EVA, but it is basing depreciation on an accounting basis instead of on an "economic" basis. One way to address this problem (in addition to the method mentioned in the paragraph above) is to implement a sinking-fund depreciation where little depreciation (and thus more earnings) is recorded early on and, more depreciation (and fewer earnings) towards the end of the project. EVA is therefore recorded over the life of the asset. In practice, however, one finds that the distortion is immaterial as long as a company has a reasonably steady capital spending programme which calls for continuous growth and replacement (Stewart 1994:81).

When a company manufactures a number of products in various divisions, one can allocate costs down to the cent and they will be right mathematically, but they do not tell one anything about the true economic profitability of producing a joint product. Neither EVA nor any other accounting system is set up to handle the kind of problem that arises from synergies. One can measure the EVA of an entire company, but when one tries and divide the EVA, one gets the classic "hamburger and hide" problem of allocating joint costs and benefits. In order to resolve this problem, one has to revert to some subjective judgement of cost or benefit allocations by top management.

Staying with the "accounting problems" of EVA, the question of whether EVA is based upon book values can arise. Stewart (1994:78) advances several interesting explanations for why it is more cost effective to use book values instead of market

values when one is calculating EVA. Firstly, adjusting and updating values to market values on a regular basis sometimes calls for subjectivity, in any case imposes large costs on any accounting system. Secondly, a way to circumvent the problem of historical costs has been found: managers can be rewarded, not for the absolute value of EVA, but for the year-to-year **changes** in EVA. If one rewards managers for improving EVA, it does not really matter what value one initially assign to the assets, because the three principal ways to increase EVA (see Section 4.3.1) have nothing to do with the existing asset base.

For an EVA system to be effective, one has to be willing to decentralize the firm and "empower" the operating managers. Not all the decisions can be made at the top of the organization. The problem that arises is that, in certain industries (stable, mature, low-tech industries facing no competition), decentralization is probably not ideal. The agency costs associated with delegating decisions to line managers in such cases probably outweigh the benefits (Stern 1994:68).

Sheenan (1994:86) does not criticise the EVA system *per se*, but he is doubtful that EVA is the **only** answer. The long-term success and survival of a company depends not only on the shareholders (or their wealth), but also on the benefits received by other stakeholders in the company. These can include customers, employees and suppliers of labour, technology and capital. Long-term shareholder wealth can only prosper when these factors combine in a synergy. EVA is a valuable tool in setting the right goals and objectives, but reaching those goals requires more than an inward look at capital, cash flows, cost of capital and compensation. It is also necessary to be outward-looking, facing customer needs and meeting customer demands more efficiently than the competition can.

In order for EVA to be successful, a company must ensure that its employees are inspired to change and head for superior performance, away from their conventional comfort zone. Sometimes sweeping organizational cultural changes are needed to ensure that the goals set by EVA can be met, and more often than not, one finds that convincing and moving employees to do just that can be one of the major obstacles in the path of the EVA system.

4.7 BENEFITS OF THE EVA SYSTEM

The EVA financial system forms one of the cornerstones of this study, which in itself could be an indication of the sound principles and advantages thereof.

The discussion, explanations and calculations of EVA above, should make EVA's advantages obvious. It is, however, appropriate to conclude this section on EVA with a short summary of EVA's unique advantages over other (economic) models of determining shareholder value.

EVA encourages managers, in fact all employees of a business, to look for profitable growth opportunities, while at the same time economizing on the use of capital. This is particularly relevant (and in fact necessary) in South Africa where businesses have to contend with high interest rates, and capital is a scarce resource.

A problem that arises all over the world is that many companies have become too big and complex to be managed from one central place, and therefore one needs to decentralize decision-making and controls. Empowerment through organizational structures means that one has to align the incentives of the operating managers with those of top management and shareholders. The EVA system can accomplish all of this, provided that commitment can be obtained from all the parties concerned.

EVA puts the emphasis in a company's performance on both profits **and** returns. Both the quantity and quality dimensions of earnings are taken care of. The right balance between profitability and growth is struck so that there is not just a push for ever-increasing revenues without a corresponding check on what it took (expenses and capital) to generate said revenues.

A strong selling point of EVA as a management tool is that it provides a clear statement of financial objectives which can be communicated to all levels of

management. EVA is also a good way of communicating, not only with shareholders, but also with institutional investors and analysts. It is an alternative accounting framework that should encourage more and better communication between management and shareholders and between shareholders themselves (Stern 1994:60).

Although the implementation of the EVA system can be difficult, it is important to remember that it provides, in essence, a simple measure or yardstick. It is the simplicity of the concept that can make employees in all levels of the company conscious of what they are doing and why they are doing it. If one rewards people on a clear and simple basis, one can impress shareholder wealth creation into their very being. Even if some individuals do not get it right at first, peer pressure alone should move most to behave as value-maximisers (Stern 1994:70).

In management's quest to manage a company in the best interests of the shareholders, one often finds that a number of performance measures are being used which the operating managers must adhere to. EVA is a **single** measure that embodies all the aspects of both the efficient application of company resources as and shareholder wealth creation. With EVA as the basis for capital budgeting calculations, performance evaluations and bonus determinations, managers tend to spend money as carefully as though it is their own, with accompanying benefits for the company and its shareholders (Stewart 1994:74). It comes as no surprise when, after EVA has been implemented as an operating measure, an "original" capital expenditure program is trimmed down, and, in some cases, a substantial reduction takes place. The reason for this is probably that on some extra or incremental funds, the cost of capital cannot be earned thereby adversely affecting not only company or division performance, but also the managers' bonuses. Remember that on performance measures such as return on investment, return on assets or earnings, investment projects can look attractive whilst they actually destroy wealth.

Managers of a company can have different goals from that of the shareholders of the firm. This conflict of interests is described as the **agency theory** (Jensen & Meckling 1976:305). A number of managerial incentives have been developed over the years in order to bridge this gap between the goals of managers and shareholders. These incentives include cash bonuses, performance shares and employee share option plans. It falls beyond the scope of this study to debate the merits of the different incentive schemes or even other possible solutions. However, it is relevant to this study that EVA provides shareholders with a solution to the agency problem. Whilst it is widely recognised that some form of incentive or reward (of whatever nature) is necessary to persuade managers to act in the best interests of shareholders, it is the **performance measures** utilised to determine the rewards of the managers that are under scrutiny. In the past, measures such as earnings per share, return on equity, sales or even years of service with the company were used. EVA provides a perfect solution to this problem, and, in fact, an increasing number of companies are implementing an **employee reward system** based on EVA, together with the EVA system itself. Managers are now rewarded if they increase shareholder wealth as measured by EVA.

Sheehan (1994:86) elaborates on the above ideas and states that actions such as those as described in the paragraph above attempt to reduce the agency problem by motivating managers to feel like business owners. Some economic rationality is found in some successful private companies that was not always present in public companies. Owners of private companies do not invest in projects with a negative return, nor do they manage their companies for accounting profits. Often one sees public companies undertake initiatives designed to increase short-term accounting earnings while reducing cash or economic returns.

Likewise, one seldom hears the owner of a private company saying that equity funding is "cheap", let alone ignoring a return thereon when tallying up the past year's financial performance. Equity capital is extremely valuable to a private owner. Managers who have little or no shareholding in the company and are compensated on a cash basis often do not see the sense of these arguments,

which demonstrates the existence of the agency problem in a slightly different form. A reward system based on EVA can change all of this.

Another sector where EVA can be applied with success is in the state or semi-state institutions. Stern (1994:70) describes the implementation of EVA at a government agency in South Africa a number of years ago. Four months were spent implementing the programme and conveying its contents, meaning, principles and goals to the more than 11 000 employees, 85% of whom did not have a matric. The programme was such a success that the EVA for the first six months exceeded five times the forecast for the entire year. There are however, a number of conditions which must be met and unique problems which must be overcome when one targets the semi-state sector. Firstly, there must be a measurable capital base as well as income or turnover (expenses are usually no problem). Secondly, determining the cost of capital, and more specifically the cost of equity, could be a thorny issue, although with certain assumptions these problems can be overcome. The moral of the story, however, remains that, in many cases, all one has to do to improve people's performance is to get them to understand how superior performance can help themselves.

To illustrate the above point, one can consider the fact that EVA is to be implemented at the United States Postal Service (Spinner 1995:93). The U.S. Postal Service had losses in 18 of the last 25 years. If the EVA programme is successful, the Postal Service could generate up to \$1 billion toward the end of the century. It is a capital-starved, labour-intensive, highly regulated government institution. Furthermore, faxes, e-mail and the advent of electronic banking threaten to make inroads into the traditional fields of services provided by the Postal Services. From a financial perspective, the Postal Service operates under constraints that would frustrate most private-sector financial executives. It does not have access to a bank line of credit; it must borrow at a rate most large corporations would not consider favourable. The Postal Service is also tied down by Senate and by public opinion. The reader can probably draw the parallels and see the similarities between the U.S. Postal Service and the South African post

office. Everything fits, especially the huge losses reported lately. Is it possible to implement EVA in such a scenario? Moreover, what are the chances of bringing about a positive change? Let us briefly consider this real test for EVA's capabilities.

In order to implement the EVA programme in an institution with characteristics such as those of the postal services, one needs to develop a method to calculate the contributions by various local offices or clusters of offices accurately and to reward employees for improvements. To measure whether a given cluster is adding value or not, a new method of allocating revenues must be developed. Revenues are usually allocated independently of the labour required to produce them. For example, the postage revenue from bulk-mail catalogues or accounts are received by one post office while other offices must do the actual processing, distribution and delivery.

To solve such problems and make it possible to generate meaningful EVA figures, the U.S. Postal Service developed a system of transfer pricing based on statistical analysis of samples of mail from various locations. These statistics can be accurate down to the cluster level. By allocating costs and revenues according to work load, employees' energies can be directed in more productively.

Whilst it can be difficult to calculate and allocate revenues as described above, an even more difficult issue can be that of determining the cost of capital, and more particularly the cost of equity. In the case of the U.S. Postal Service, it was decided to charge each performance cluster for capital, plant, machines, trucks, offices etc. at 12% (Spinner 1995:95). It was calculated that after deducting a cost of capital of 12%, break-even occurs, which in itself is a monumental achievement. Stewart himself said in one of Stern's articles (Stern 1994: 64) that when people ask him these days what the cost of capital is, he often tells them that it is 12%, because that is 1% per month. From this statement it should be clear where, one year later, the U.S. Postal Service derived their 12% cost of capital from. Recall also that in Section 3.6.5 above it was stated that just

charging managers for the use of capital motivates them and improves their efficiency. In the case of the postal services, the aim is to keep costs down and to provide quality service to the customers.

Furthermore, the head of the U.S. Postal Service recognises that EVA brings together all aspects of one business into one measure. It changes the focus from the traditional government culture. Revenues can be increased **only when** it is profitable, investment can take place **only when** it produces a return in excess of the cost of capital and costs can be reduced **only when** it does not impede on service to customers.

From the above, it can be seen that EVA's application and advantages can be stretched beyond the traditional (listed) companies. Semi-government institutions, and in South Africa's case, the postal services, can also reap the benefits of the EVA system or at least from applying its principles.

To conclude this section, one can say that EVA and its underlying "building blocks" are a dependable statement of performance, because the measure is free from the limitations of the nature and rules of accounting data. Comparability is made possible between divisions and between organisations. One can even go further and say that EVA provides global uniformity relating to the valuation and interpretation of shareholder wealth (Best 1995:38).

4.8 CONCLUSION

The last section of this chapter gives a brief "different" overview of Chapters 2, 3 and 4 in order to set the scene for the following chapter. Apart from illustrating how the evolution of (financial) management causes the need to arise for a different way of measuring shareholder value, attention is also given to a concept that has not been previously discussed, but which has played (and sometimes still does play) an important role in this whole process, namely the leveraged buy-out (LBO) that was so popular a number of years ago.

In the end, EVA proves to be not only the answer to many problems, but also overcomes many obstacles. It can also be used to analyse the variables or pillars on which it is built.

4.8.1 Evolution

With the ever-increasing change in technology and the information associated with that change, together with the rise of a global economy, brought about considerable changes in the structure and control systems of large companies. Centrally-directed economies are failing and state-owned enterprises all over the world are increasingly being privatised.

This change is also accompanied by a flattening of management hierarchies, with the responsibility for corporate decision-making being driven down the ranks to managers and employees closer to the company's operations and customers (Stern, Stewart & Chew 1995:32).

One of the questions or problems that now arises is that of correct decision-making and distinguishing between not only profitable or unprofitable capital investment projects, but any decision that may affect the wealth of shareholders. Is there an (accounting) system that can provide the correct answer **at the time** when the decision has to be made?

The answer lies, of course, not with a computer or accounting system of some sort, but with the experienced managers and employees working at the very centre of the company's operations.

The centralized top-down approach to managing large companies was well suited to the relatively stable business environment of the 1950s, 1960s and 1970s. Top management's challenge was to achieve economies of scale in manufacturing and marketing, mainly by identifying growth opportunities in similar industries. A budgeted profit per division provided for budgeted increases in profits and earnings

per share. As long as operating heads "negotiated" easy targets or estimates, "excess" profits could be banked for a rainy day by shifting revenues or costs. Buying companies with lower price/earnings ratios in share exchanges boosted reported EPS, but with no economic substance whatsoever.

These processes made easier life for the divisional heads and helped top management to produce smoothly rising EPS to satisfy shareholders. Thus, while divisional heads were "sandbagging" their estimates for head office, top management were, in a sense, sandbagging shareholders who seldom knew the true economic value or performance of their capital investment.

Donaldson (1994:55) argues that top management did not see their primary goal as maximising shareholder value, but rather as achieving a proper balance between the interests of the shareholders and the other stakeholders (such as employees, suppliers and local communities). Reporting steady increases in EPS was equivalent to giving shareholders their due.

During the early 1980s, however, the deficiencies of the top-down EPS-based system began to show in several ways. Conglomerates saw their share prices under-performing market averages, even as they were producing steady increases in EPS. As it became clear that large centralized conglomerates were worth far less than the sum of their parts, corporate raiders launched a "deconglomeration" movement (Stern, Stewart & Chew 1995:34).

One of the main reasons why the EPS-based control system failed, was its refusal to empower employees lower down in the company hierarchy and to let them feel that they are custodians of investor capital. This lack of ownership meant, *inter alia*, that business units were evaluated on the absolute amount of profit that they generated, irrespective of the amount of capital that it took to do so. Operating managers could achieve growth in profits by either improving the efficiency of existing operations or by investing more capital. Because most corporate measurement systems did not hold managers accountable for new capital, it did not

take managers long to recognize that it was easier to "buy" additional operating profits with additional capital investment.

This highly inefficient and uneconomical way of operating did not pass unnoticed. On the horizon, there appeared a new breed of business people who, with sound economic and business principles and with entrepreneurial flair, can take advantage of the situation.

4.8.2 The rise and fall of the leveraged buy-outs

As noted above, the widespread misallocation of corporate resources and waste of capital under the EPS-based system attracted the attention of corporate raiders during the 1980s (Jensen 1991:13). They used a performance measure that was quite different to EPS, namely a company's ability to generate operating cash flow (as opposed to earnings) as well as efficiency in the use of capital.

Bhide (1989:36) did research on "friendly" and hostile takeovers during the late 1980s. Whereas the friendly deals were mostly undertaken to take advantage of vaguely defined "synergies", the vast majority of hostile deals were motivated by profits resulting from cutting overheads, improving focus by selling unrelated business units and ending unprofitable reinvestment of profits and capital. Hostile targets were mainly low-growth, poorly performing and often highly diversified companies in which management had a negligible equity stake.

Leveraged buy-outs (LBO) were one of the success stories of the 1980s. One of the reasons for this is the characteristics of the takeover target: the lack of ownership by the managers. The head-office management of corporate conglomerates (which sometimes numbered thousands) were replaced by a small team of professionals. They were said to provide the same co-ordination and monitoring functions as their predecessors. However, the difference lay in the fact that, amongst other things, compensation and ownership plans substituted the direct monitoring and centralized decision-making of typical corporate bureaucracy.

The LBO provided greater decision-making autonomy and ownership incentives whilst at the same time accommodating more demanding performance targets.

Other differences between LBO firms and most public companies during the 1980s are also worthwhile mentioning, as some of these provide a direct link between what went wrong in these companies and the journey towards the EVA model of management and valuation.

Firstly, the new LBO company did not want (nor need) to report increased earnings. Instead, owner-managers concentrated on accounting methods to minimize reported earnings in order to pay as little tax as possible. They therefore effectively increased the after-tax cash flow.

What was more important, however, was the way investor capital was treated. Operating managers in many large companies treated investor capital as "free" goods. In the typical LBO company, with a debt ratio of 90% on average, a key concern was to produce sufficient cash flow to meet high interest payments. Failure to do so would result in a loss of the equity investment of the new operating managers. The cost of capital became highly visible and contractually binding. What was further significant was the fact that the traditionally forgotten (or "free", at least in the income statement) portion of the cost of capital, namely equity, weighed in with such a big portion now.

In a firm that is mainly equity-financed, management could (and more often than not did) allow much of the equity cushion to be eroded before taking the necessary corrective action. In a firm heavily burdened with debt, internal control mechanisms became very visible and effective, acting swiftly and decisively to restore the necessary order.

In the LBO company, managers provided (or were required to purchase) a significant equity stake. This ownership was designed to encourage managers to resist the temptation to take short-term decisions to increase profits at the expense

of long-term benefits. If managers are shareholders in the company, one can be confident that they will constantly attempt to balance short-term and long-term goals in creating value. The greater the level of productive investment undertaken by managers, the higher the value of their shares (Stern, Stewart & Chew 1995: 37). The concentration of ownership and improvements in the pay-for-performance systems was probably one of the main reasons why researchers find large improvements in the operating activities of companies that were subject to an LBO.

The directors of a typical LBO company did not represent the shareholders, they **were** the shareholders. They became the owners and therefore it was second nature to them to unlock the true value and potential of the company.

But, as the 1980s came to an end, it emerged that some of the deals concluded during the latter part of the decade were flawed. Jensen (1991: 25) was not only the first to see the value adding potential of LBOs, but he was also the first to identify the source of the problems that arose in the later transactions. It appears that the problem originated from the fact that there were no great parallels between the goals and incentives of the dealmakers who promoted the transactions and the lenders and other investors who provided the necessary funds. This led to a concentration of overpriced and poorly structured deals which were entered into without the right incentives or objectives. In addition, it was these very transactions where the famous "junk bonds" made their appearance. As a result, management and other interested parties, notably the dealmakers, put in less equity (and presumably less risk, effort and heart).

LBOs thus underwent a sharp decline in popularity and use during the 1990s. According to Stern, Stewart and Chew (1995:39) there were, moreover, a number of inherent limitations in the LBO that, at best, reserve for them a specialized role in corporate finance. First, there is their reliance on high leverage. This limits their use to industries (or companies) where one finds tangible assets, modest capital requirements and highly stable cash flows. The second limitation of LBOs stems from one of their biggest benefits: equity ownership. Concentration of ownership

also means a concentration of risk-bearing. Listed companies are efficient in spreading ownership and hence risk among the different investors. The costs associated with the rewards required by the owners of this risk at some point outweigh the benefits of concentrated ownership.

4.8.3 The best method

The accomplishments of the LBO movement hold some important lessons for the structure and governance of public companies. Top management must design a performance measurement and reward system that stimulates the feel and payoff of ownership. This is the principal aim and accomplishment of an EVA financial management system.

An EVA-based system "rewrites" the traditional accounting income statement and balance sheet. Operating profit is converted to economic profit, total capital is measured and, most importantly, the **total** cost of capital is made explicit **and accounted for** in the calculation of shareholder wealth.

EVA is an internal measurement that management can implement throughout the company. It allows key management decisions to be clearly modelled, monitored, communicated and rewarded, according to how much value they add to shareholder investment. Whatever the action or decision (capital budgeting, valuing an acquisition, assessing performance, or determining bonuses), the objective of increasing EVA over time offers a clear financial mission for management: one that truly supports the goal of the firm by focusing soundly on an increase in shareholder wealth.

When an EVA system is properly implemented and utilized, it is a closed-loop system of decision-making, accountability and incentives - one that holds the entire organization, not just the CEO, responsible for the successes and failures of their actions.

It is all these attributes of the EVA system that arguably makes it the best performance measure of corporate performance. Furthermore, its composition and calculation abilities allows an analysis of the various variables or pillars on which it is built. The identification, categorizing and analysing of these variables form the subjects of Chapter 5, before the study moves to its primary objective of this study, namely the quantification of those variables that determine shareholder value.

CHAPTER 5

VARIABLES WHICH DETERMINE SHAREHOLDER VALUE

5.1 INTRODUCTION

This study aims to arrive at recommendations and conclusions on the subject of shareholder value. These recommendations and conclusions will be set out in the last chapter called "Value-Based Management". An important prerequisite for the practice of value-based management is a deep understanding of the performance variables that actually drive or determine the value of a business for its shareholders. In order to accomplish this understanding, one must first identify those variables that determine shareholder value (the subject of this chapter). Thereafter, one can shift one's attention to those variables that can be quantified.

There are a number of reasons why an understanding of the key drivers of value is important. Firstly, an organization and its managers cannot change value itself. The manager have to alter those **variables** that they can influence, such as customer satisfaction, cost, capital expenditures, and so on. Of course, there are a number of variables which management have no or very little control over. These "uncontrolled" variables are discussed in more detail in Section 5.3. Secondly, it is through these drivers of value that managers learn to understand not only the rest of the organization, but also the building blocks and cement needed to achieve growth in shareholder value by making use of a synergy effect across all departments and at all levels in the company. Dialogue about what needs to be accomplished can include all involved.

A value driver is any variable that affects the value of a company. As mentioned above, some variables can be quantified, others cannot. Some variables are under the control or influence of management (internal) whilst other external variables are beyond management control.

To be useful, value drivers need to be organized (quantified) in such a way that one can identify which variables have the greatest impact on value and can assign responsibility for their performance to individuals who must then help the organization to meet its targets for the shareholders.

Variables determining a company's value can be expressed using different levels of detail. Copeland, Koller and Murrin (1994:107) categorise value drivers in three levels. Generic value drivers are set out in terms of the typical return on the invested capital tree (ROIC tree), comprising operating margins and invested capital. These calculations can be done for all companies, but they lack specificity and are consequently less useful at grassroots level. The next level of value drivers is business-unit level drivers, which includes variables such as customer mix, sales force productivity or cost allocations. The last level is the operating level at grass roots level where variables such as percentage of capacity utilized (of a plant or a machine), cost per delivery and debtors or creditors terms and timing are directly controlled and altered by the decisions of frontline managers or clerical personnel.

This chapter and its calculations concentrate on the so-called generic variables, for which one can obtain information relatively easily from the financial statements. Examining variables at grass roots level includes collecting a great deal of operating information from the company itself; an activity that is not only very time-consuming but falls beyond the scope of this study. All of these aspects are, however, addressed and explained in more detail with examples in Chapter 8 entitled Value-based management where recommendations are made on these and other issues.

As mentioned above, some variables which determine shareholder value are not under the control of management (external), while others most definitely are (one could also refer to the latter as internal variables). In the discussion below, a clear distinction between these two categories is drawn.

When a quantification of value drivers is attempted in the empirical section of this study, Economic Value Added (EVA) is used as a yardstick for increases in shareholder value. It is therefore necessary to separately identify those quantifiable variables that determine shareholder value as measured by a company's EVA.

At this stage, it should be remembered that the value drivers or variables have actually already been mentioned and illustrated in the previous chapter, when calculations of the various economic models were made. Chapter 5 merely highlights and classifies these variables and presents them in a way which stresses their influence or effect on the value created.

In addition, these variables, whether previously mentioned or not, are analysed or broken down as far as possible to a point where they can be quantified. Special attention is paid to the cost of capital, a figure that has so far in the study been used as a single absolute amount without analysing its components.

The conclusion to this chapter includes a summary of the variables, comments on the link between this chapter and the previous chapters, as well as the way this chapter will be used in the chapters to follow.

5.2 INTERNAL VARIABLES

5.2.1 Introduction

Internal variables are those variables that can be controlled, changed, managed or even manipulated by management of a company. In this chapter, value drivers are included in this category in so far as they can be quantified on the basis of an analysis of the (sometimes adjusted) income statement and balance sheet of the organisation.

In Chapter 3 and Chapter 4 of this study, a number of writers' models or ways to calculate shareholder value were addressed. Whilst there is sometimes only a

slight variation between the models and their underlying principles, they aim to achieve exactly the same goal.

In Section 5.2.2, there is another look at the different approaches. Next those variables that are common in quantifying shareholder value are identified.

5.2.2 The variables

Fruhan (1979:66) states that the way to increase the value of any asset (capital) investment is to influence either the cash flow derived from it or the appropriate discount rate used.

The cash flow from an investment can be increased either by consistently increasing the prices of the products sold, or by achieving a cost saving from a lower cost structure than that of competitors, or lastly by reducing capital used in the generation of the cash flow.

The discount rate used to determine the present value of the cash flow stream is the weighted average cost of capital (WACC). A company's WACC depends on a number of factors, namely:

- a) the cost of debt financing;
- b) the cost of equity to the company;
- c) the effective tax rate of the company; and
- d) the specific composition of the company's capital structure.

The calculation of SASOL's WACC in Chapter 4 is a good example of the calculation of WACC:

**FIGURE 5.1 : WEIGHTED AVERAGE COST OF CAPITAL
(WACC)**

	3 YEAR AVERAGE DEBT TO CAPITAL RATIO	AFTER TAX RETURN	WEIGHTED AVERAGE COST OF CAPITAL (WACC) %
Equity	85.72	19.76	16.9
Debt	14.28	8.12	1.2
	100.00		18.1

The cost of equity consists of a number of underlying variables which determine its value. Some of these variables are identified separately in order to quantify them for use in calculations.

There are a number of factors that are beyond the control of management but exercise an influence on the cost of capital, for example, a company's **nominal** tax rate as determined by the fiscus, the prevailing interest rate levels in the country, as well as certain elements of the cost of equity. These factors as applicable to a company can, to a certain extent, be influenced (lowered) by management in favour of the company and its shareholders. In addition, management do have some control over the debt ratio of a firm, a determinant of WACC. From Figure 5.1 above, it should be clear that changes in the components of the WACC will cause a change in the WACC itself. We have to conclude then that most of the factors which determine a company's WACC can be quantified, and can also be controlled by management.

Fruhan (1979:94) states that the profitability (which does not necessarily mean shareholder wealth creation) of any firm can be broken down into three components, namely the **capital intensity** of the firm's operations, its **profit margins** and its use of **leverage**.

The drawback of Fruhan's slightly modified version of the well-known Du Pont formula is that the end result is a company's return on equity (ROE), which has already been discussed in this study as having many disadvantages and which possibly differs from shareholder wealth. What is important, however, is that both the income statement and the balance sheet are combined for the calculations. Methods employed by other writers eliminate the shortcomings of this approach.

The Economic Profit Model of Copeland, Koller and Murrin (1994:149) measures the value created in a company as follows:

$$\text{Economic Profit} = \text{Invested capital} \times (\text{ROIC} - \text{WACC})$$

Economic profit thus translates the value drivers (invested capital, ROIC and WACC) into a single amount. The components of these variables must be examined more closely to show whether other quantifiable "sub-variables" can be identified.

The rate of return on invested capital (ROIC) is the single most important value driver, and therefore the key components thereof should be analysed. A very useful way to organize an analysis of the rate of return is to develop what Copeland, Koller and Murrin (1994:171) calls a "return-on-invested-capital tree". The tree begins by dividing ROIC into its key components:

$$\text{ROIC} = \frac{\text{NOPAT (Net operating profit after tax)}}{\text{Invested capital}}$$

Since NOPAT can be expressed as EBIT (Earnings before interest and tax) $\times (1 - T)$, ROIC can be expressed as a pretax ROIC as follows:

$$\text{ROIC} = \frac{\text{EBIT}}{\text{Invested capital}} \times (1 - T)$$

If one relates EBIT and invested capital to sales, one gets the equation:

$$\frac{\text{EBIT}}{\text{Invested capital}} = \frac{\text{EBIT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Invested capital}}$$

Pretax ROIC is thus segregated into two components:

- a) operating margin (EBIT/Sales), expressing the efficiency of converting sales into profit; and
- b) capital turnover (Sales/Invested capital), measuring how efficiently the company employs its invested capital.

Each of these components can be broken down further to a point where the more detailed expense or capital items are compared to sales. In order to do these calculations, one has to have information that is not necessarily contained in the published financial statements of a company (the source of information upon which calculations in this study are based), and therefore some of these above variables are excluded as relevant quantifiable variables. This problem is specifically relevant for the first part of the equation (**economic profit**) where the income statement is analysed, and some companies report very little information between **sales** and **operating income**.

However, if the calculation of **invested capital** is analysed, one sees that most of these components of invested capital are contained in the balance sheet. Without going into too much detail, one can say that invested capital can be calculated by adding up the following:

- a) nett working capital;
- b) nett fixed assets; and
- c) goodwill.

The same result should be obtained if the following is added up:

- a) equity;
- b) deferred income taxes; and
- c) all interest bearing debt.

From the above it should be clear that the data on the efficient use of the **total** of invested capital in relation to sales can be broken down to include detail such as the efficiency of working capital, fixed assets, equity and debt as contributing factors to shareholder wealth. Some of these (more detailed) variables, together with the fact that the component measures of the return on invested capital are industry and company specific, are dealt with in subsequent chapters of this study.

One can thus identify, in addition to the components of WACC, the following quantifiable variables which determine shareholder value:

ROIC

NOPAT/Invested capital

EBIT/Invested capital

EBIT/Sales

Sales/Invested capital

Nett working capital/Sales

Nett fixed assets/Sales

Equity/Sales

Debt/Sales

Rappaport (1986:74) developed a formula to measure the value created by a given strategy. Shareholder value creation in his formula is determined by a number of factors, namely:

- a) sales growth;

- b) the profit margin on sales less the minimum required rate to maintain shareholder value, which includes the fixed as well as the working capital investment rates;
- c) the time span of the growth;
- d) the income tax rate; and
- e) WACC.

These factors can be combined in a formula which is recapped from Chapter 3:

Change in shareholder value	=	(Present value of incremental cash flow before new investment)	-	(Present value of investment in fixed and working capital)
	=	$\frac{(\text{Incr sales}) * (\text{Operating profit margin on incremental sales}) * (1-T)}{\text{Cost of capital}}$		
	-	$\frac{(\text{Incr sales}) * (\text{Incremental fixed plus working capital rate})}{(1 + \text{Cost of capital})}$		

More formally the following formula to calculate the present value of an increase in shareholder value in **19x1** can be used:

$$\Delta E_t = \frac{(p_t - p_{t \min})(1 - T) \Delta S_t}{k(1 + k)^{t-1}}$$

Operating profit margin (p_t) is the ratio of pre-interest, pretax operating profit to sales (ΔS). All cost of sales and depreciation are deducted to arrive at operating profit. An **incremental fixed capital investment** (part of p_{\min}) is defined as capital expenditures less depreciation. It is necessary to calculate and forecast this investment as a percentage of incremental sales.

The **incremental working capital investment** (part of p_{tmin}) represents the net investment in debtors, stock and creditors required to support sales growth. This investment can also be expressed as a percentage of incremental sales.

The **cash income tax rate** (T) represents taxes on operating profit paid during the financial year or that are a liability at the end of the financial year. Readers are referred to the calculation of the effective tax rate of SASOL in Chapter 4. Note that the taxes paid on dividends are included as part of the effective cash tax rate.

The calculation and composition of WACC (k) was dealt with above in Figure 5.1.

From the above method of calculating shareholder value by Rappaport, in addition to the components of WACC, one can identify the following quantifiable variables:

- a) sales growth rate;
- b) operating profit margin (Operating profit/Sales);
- c) effective income tax rate;
- d) working capital investment (Net working capital/Sales);
- e) fixed capital investment (Net fixed assets/Sales); and
- f) the time span of the calculation period.

5.2.3 Concluding remarks

The aim of Section 5.2 was to identify quantifiable variables that determine shareholder value as represented by the models of Fruhan, Copeland, Koller and Murrin, and Rappaport.

A notable omission was the discussion of those variables that determine a company's EVA. As mentioned above, the EVA model forms the basis of calculations upon which the results from this study are based, and therefore a separate section in this chapter is devoted to EVA.

What are the quantifiable value drivers determining EVA that are under the control of management?

In the first place, it is clear that the **weighted average cost of capital**, together with its components, as well as the **effective cash tax rate** of the company are central in the wealth creating process. In addition to these two variables, one needs to calculate the **returns** earned on the capital supplied by the shareholders, that is the total **invested capital**.

More formally, the variables are the following:

ROIC

NOPAT/Invested capital

EBIT/Invested capital

EBIT/Sales

Sales/Invested capital

Nett working capital/Sales

Nett fixed assets/Sales

Equity/Sales

Debt/Sales

WACC

The cost of debt financing

The cost of equity to the company

The specific composition of a company's capital structure, its Debt/Equity ratio

The effective **cash tax rate** of the company

In order to calculate these ratios, one of course, also needs, the underlying amounts that make up the ratios. The values of **invested capital**, **EBIT**, **sales**, **fixed assets** and components to calculate **the cost of equity** for a company are needed. It is, however, at this stage unnecessary to classify these amounts as value drivers

per se, as their values are already contained in the relevant variables themselves.

Before we discuss the value drivers (variables) of the Economic Value Added of a company, let us discuss those variables that are external to a company - over which management have very little or no control, even if some variables are quantifiable.

5.3 EXTERNAL VARIABLES

A country's **macro-economic** and **political** outlook affects both the time horizons of investments and the returns thereon of all the companies that are operating in that country to a greater or lesser extent. There are also a number of **micro-economic** factors which can influence the variables which determine shareholder value. Some of these variables could be unique to a specific company or industry.

The variables that are contained or classified under these headings are seldom under the control of management and are external to the company. The fact of the matter, however, is that these variables do influence shareholder wealth in the organization (some have a direct influence on the quantifiable internal value drivers) and should therefore be included in this study.

The **macro-economic** variables that may influence a company's performance includes the following:

- a) the exchange rate;
- b) the inflation rate;
- c) the interest rate levels in the country;
- d) various factors that the Reserve Bank may take into consideration when it is setting interest rate policy, such as the growth in money supply and levels of saving and investment in the country;
- e) the level of unemployment;

- f) the economic growth rate as measured in terms of the Gross National Product;
- g) regulations governing free trade and exchange controls; and
- h) export incentives.

The **fiscal** variables as determined and set by government that may influence a company's performance include the following:

- a) the company and other tax rates;
- b) levels of disposable income of individuals and companies; and
- c) investment incentives.

If one turns to the **micro-economic** variables that influence the wealth a company creates, Rappaport (1986:81) presents an interesting framework that was, in turn, developed by Porter. The core of this framework is an analysis of five competitive forces that drive industry structure and thereby the rates of return that firms in an industry can expect to earn. These rates of return influence the variables that create wealth and therefore shareholder wealth creation.

These elements of industry structure that influence the **micro-economic** variables that influence shareholder value are the following (Rappaport 1986:81):

- a) Entry Barriers
 - * Economies of scale
 - * Brand identity
 - * Switching costs
 - * Capital requirements
 - * Access to distribution channels
 - * Absolute cost advantages (learning curve)
 - * Government policy
 - * Expected retaliation

- b) Threat of substitute products
 - * Relative price performance of substitutes
 - * Buyer propensity to buy substitute

- c) Determinants of buyer power
 - * Buyer concentration and volume
 - * Buyer information
 - * Substitute products
 - * Product differences
 - * Brand identity

- d) Determinants of supplier power
 - * Differentiation of inputs
 - * Switching cost of suppliers and firms in the industry
 - * Presence of substitute inputs
 - * Supplier concentration
 - * Importance of volume to supplier
 - * Cost structure in the industry
 - * Forward or backward integration possibilities in the industry

- e) Competitors
 - * Industry growth
 - * Fixed costs in relation to value added
 - * Achievement of capacity
 - * Product differences
 - * Brand identity
 - * Concentration
 - * Diversity of competitors
 - * Exit barriers

The above factors reveals the fact that competitors determine only a part of the micro-economic competitive setting. Customers, suppliers, potential entrants and

substitute products also affect competitive structure and thereby industry and individual company rates of return (Rappaport 1986:82).

The relative importance of these factors differs from industry to industry and from company to company. Their importance also changes over time.

The macro-economic, micro-economic and fiscal variables that have been discussed above are the building blocks for the internal quantifiable value drivers of shareholder value. They are, however, very difficult to quantify and are not controlled by the management of a company.

The above list is by no means complete and a detailed discussion of the individual factors falls beyond the scope of the chapter. For the purposes of this study, it is only important to recognize that these factors influence shareholder returns because they influence prices, quantities sold, investment and the riskiness of firms in an industry. The exact influence of these factors and the way the relationships behave, are addressed in Chapters 7 and 8, where recommendations on these aspects are made.

It is, however, now necessary to address the main topic of this chapter: the identification of those quantifiable variables that influence shareholder value and that are used in the empirical analysis of this study.

5.4 EVA VARIABLES

5.4.1 Introduction

Quantifiable variables that are internal to the company have been identified in a number of models in Section 5.2. Any of these models with their key variables could be used for the calculations in the empirical analysis of this study. However, the results or outcome of the calculations differ depending on which model is used.

Due to the advantages which the EVA model has over other models (as discussed in Chapter 4) as well as the fact that a reliable database of the EVA of listed industrial companies in the Johannesburg Stock Exchange exists, it helps to identify those variables that are the building blocks of a company's EVA.

5.4.2 Variables determining EVA

Chapter 4 indicated that the formula used to calculate a company's EVA is the following:

$$\text{EVA} = (\text{rate of return} - \text{cost of capital}) \times \text{capital}$$

$$\text{EVA} = (r - c) \times \text{capital}$$

In essence, thus, there are only three "main variables" that determine EVA. In order to analyse variables "r" (the rate of return) and "capital" further, one has to look at the calculation thereof from both an operating and financing perspective.

From an **financing** viewpoint:

$$r = \frac{\text{NOPAT}}{\text{capital}}$$

where

NOPAT

- = Income attributable to ordinary shareholders
- + Increase in equity equivalents

ADJUSTED NET INCOME

- + Preferred dividend
- + Minority interest provision
- + Interest payments after tax savings

Capital

- = Common equity
- + Equity equivalents

ADJUSTED COMMON EQUITY

- + Preferred share capital
- + Minority interest
- + Debt

From an operating perspective:

$$r = \frac{\text{NOPAT}}{\text{capital}}$$

where

NOPAT

- = Sales
- Operating expenses
- Taxes

Capital

- = Net working capital
- + Net fixed assets

From both these two alternatives, one can see that the various amounts needed to calculate the value drivers can be obtained from a company's financial statements.

The amounts or variables used in both approaches are used in the calculations of the empirical analysis in Chapter 7.

The rate of return (r) can be broken down into three components which reflects the operating profit margin, the turnover of capital and the effective cash tax rate on operating income:

$$r = \frac{\text{NOPAT}}{\text{capital}}$$

$$r = \text{operating profit margin} \times \text{capital turnover} \times (1 - T)$$

$$r = \frac{\text{NOPBT}}{\text{sales}} \times \frac{\text{sales}}{\text{capital}} \times (1 - T)$$

Capital turnover can be analysed as a function of the efficiency of working capital management and of net fixed assets (Stewart 1991:107):

$$r = \frac{\text{NOPBT}}{\text{sales}} \times \frac{1}{\frac{\text{net working cap}}{\text{sales}} + \frac{\text{net fixed assets}}{\text{sales}}} \times (1 - T)$$

Although it is the overall rate of return that matters, breaking up the rate of return into the various components can indicate just which component is the biggest contributor to the rate of return, especially in comparison to prior levels and relative to the rate of return of competitors.

The various components of "c", the weighted average cost of capital (WACC) have already been discussed in Section 5.2, and they need not to be added at this stage.

Stewart (1991:299) identifies six variables that account for the intrinsic value of any company. The following four can be controlled by management:

- a) net operating profit after tax (NOPAT);
- b) the tax benefit associated with the use of debt, tD ;
- c) the amount of new capital invested; and
- d) the after-tax rate of return (r) on new capital investments.

Factors which would be very difficult for management to influence are WACC and T , the time period over which investors expect management to have attractive investment opportunities.

In this study it is, however, assumed that WACC can, to some extent, be influenced by management and it is included among the quantifiable variables. A small change in a company's WACC will have a large effect on shareholder wealth due to WACC's important function in the calculation formulae.

5.4.3 Concluding remarks

In Chapters 3 and 4, a discussion of the models which determine shareholder value indicated that a number of the models are based on economic principles (as opposed to accounting-based models). For a number of reasons EVA was selected as the preferred method, and therefore a number of relatively simple calculations were supported by a detailed real life example to demonstrate the mechanics of EVA.

In this chapter, once again, the focus falls on the variables that determine a company's EVA, as these are the value drivers that are used in this study to represent shareholder wealth creation.

The following quantifiable variables were identified:

$$\text{EVA} = (r - c) \times \text{capital}$$

- a) $r = \frac{\text{NOPAT}}{\text{Capital}}$
 $\frac{\text{NOPBT}}{\text{Sales}}$
 $\frac{\text{Sales}}{\text{Capital}}$
 $\frac{\text{Net working capital}}{\text{Sales}}$
 $\frac{\text{Net fixed assets}}{\text{Sales}}$
- b) $c = \text{WACC}$
The cost of debt financing
The cost of equity to the company
The specific composition of a company's capital structure, its Debt/Equity ratio
- c) The effective cash tax rate of the company
- d) The amount of capital invested

In addition to these variables a number of other variables are introduced to complete the list. A number of additional variables that can be calculated using the financial statements, but not so directly derived from the basic EVA model are added.

The final list of variables that can determine shareholder value in terms of EVA and that are used in the empirical analysis in Chapter 7 is the following:

- a) **Return on capital employed (ROCE = NOPAT/CE)**
- b) **Net operating profit before tax/Capital employed**
- c) **Net operating profit before tax/Sales**
- d) **Net operating profit after tax/Sales (Margin)**
- e) **Gross profit/Sales**
- f) **Sales growth**
- g) **Retained profit/Capital employed**
- h) **Sales/Capital employed**

- i) **Sales/Net working capital**
- j) **Sales/Average total fixed assets**
- k) **Weighted average cost of capital (WACC)**
- l) **Debt ratio : (Total long-term loan capital
+ short-term borrowings + bank overdraft)/
Capital employed**
- m) **Total owners' interest/Capital employed**
- n) **Total long-term loan capital/Capital employed**
- o) **(Short term-borrowings + bank overdraft)/
Capital employed**
- p) **Investment rate : Change in Capital employed/
Net operating profit after tax**
- q) **Company cash tax rate**
- r) **Operating leverage**
- s) **Financial leverage**

The empirical analysis, therefore, attempts to quantify the above variables as value drivers of the shareholder wealth created by the actions of a company's managers and all other personnel.

5.5 CONCLUSION

Variables that determine shareholder value can either be internal or external to an organisation. Internal variables can be controlled by management while external variables cannot be controlled by management. In addition, some variables are quantifiable whilst others are not.

The variables common to all the models described in this chapter show that the following factors work together to create value:

- a) the return on invested capital (this must exceed the weighted average cost of capital);

- b) the amount of capital invested (this is the shareholder's investment on which the excess return must be earned); and
- c) various external factors, some of which are quantifiable and some of which are not, some of which are under the control of management whilst others are determined by the government.

Various combinations of these factors work together to create value. They are fundamentally forward-looking and are based on future cash flows, which use both income statement and balance sheet information.

Value drivers can be traced down to grass roots level (e.g. number of trips per transaction) and they are not static - they must be periodically reviewed.

The variables which create shareholder value as identified above remain valid over time, they are relevant for most companies and the information needed to calculate them can be obtained from a company's published financial statements.

Chapter 5 marks the end of the literature study and the "literature objectives" have been achieved. In the next chapter, we turn to the empirical research in order to arrive at the primary objective of this study, namely the quantification of the variables that determine shareholder value.

CHAPTER 6

RESEARCH METHODOLOGY

6.1 INTRODUCTION

So far, the theoretical principles under discussion in this study have been dealt with. As a forerunner to the empirical analysis, it is also necessary to develop a blueprint for the collection, measurement and analysis of the data.

In the first place, the data collection method is discussed to indicate which data base was used. The methodology used to determine the final sample are then set out. A list of the companies which were included in the final sample is presented, together with an illustration of the data utilised for a company. Once again, the various variables that are used in the analysis are briefly discussed.

Once the sample has been set out, it is appropriate to describe the statistical techniques used in order to evaluate the data, whereafter the results can be described.

Finally, the hypotheses to be tested must be clearly defined, so that they can be tested against the results from the statistical analysis.

6.2 DATA COLLECTION METHOD

The data base of the Bureau of Financial Analysis (BFA) at the University of Pretoria was used to obtain information about the various companies used in the sample.

In order for an analysis to be performed on the sample of companies selected, those **companies** that meet specified criteria first had to be identified.

Economic value added, as the first criterion can best be calculated by using financial information from industrial companies. The financial statements of mining,

financial and investment companies do not provide the type of financial information required. They pose a number of problems, which means that an EVA calculation can only be done after considerable adjustments (and sometimes problematic and sweeping assumptions) have been made. For the purpose of this study, it was therefore decided to use industrial companies only. When the sample was compiled and the statistical analysis was done (during the last half of 1997) there were 342 industrial companies listed on the Johannesburg Stock Exchange.

The second criterion was the number of years for which EVA could be calculated for each company. It was decided that a period of ten years would provide sufficient information. In order to calculate the EVA of a company for ten years, one needs financial information on the company for eleven years, because beginning capital ("ending" capital of the previous year) is used in the calculation. This criterion eliminated 173 companies from the original sample of 342, so that 169 were left.

The last criterion required the elimination of thinly traded shares. This criterion was applied because one of the variables that is calculated by the EVA-program at the BFA is the beta of a company's share, which in turn is used to calculate the cost of equity of that company. The 169 companies remaining in the sample were ranked in descending order of average number of shares traded per year for 11 years. It was decided to set the cut-off point at an average of 500 000 shares traded per year for 11 years. This eliminated another 34 companies, so that a final sample of 135 companies was left. A list of these companies is included as Appendix A at the end of this study.

The next phase in the data collection procedure was to compute the various variables as input into the statistical programmes. The following variables were calculated:

- (a) Market value added (MVA)
- (b) Standardized MVA
- (c) Economic value added (EVA)
- (d) Standardized EVA
- (e) Return on assets (ROA)
- (f) Return on equity (ROE)
- (g) Return on capital employed (ROCE)
- (h) Earnings per share (EPS)
- (i) Dividend per share (DPS)
- (j) Total debt ratio
- (k) Total asset turnover
- (l) Current ratio
- (m) Net operating profit before tax/Capital employed
- (n) Net operating profit before tax/Sales
- (o) Net operating profit after tax/Sales (Margin)
- (p) Gross profit/Sales
- (q) Sales growth
- (r) Retained profit/Capital employed
- (s) Sales/Capital employed
- (t) Sales/Net working capital
- (u) Sales/Average total fixed assets
- (v) Weighted average cost of capital (WACC)
- (w) Total owners' interest/Capital employed
- (x) Total long-term loan capital/Capital employed
- (y) $(\text{Short term-borrowings} + \text{bank overdraft}) / \text{Capital employed}$
- (z) $\text{Investment rate} : \frac{\text{Change in Capital employed}}{\text{Net operating profit after tax}}$
- (aa) Company cash tax rate
- (ab) Operating leverage
- (ac) Financial leverage
- (ad) Discounted EVA

It is important to bear in mind that the above variables were calculated for each of the 10 years as well as for the total 10 year period under review, both with and without inflation adjustments to the relevant data.

6.3 STATISTICAL TECHNIQUES

After the sample of companies had been selected and the relevant variables as described in Section 6.2 above had been calculated, the study moved on to the statistical analyses of this data.

The various variables were classified under the following headings:

(a) **Variables that can correlate with MVA**

<i>Dependent variable</i>	MVA Standardized MVA
<i>Independent variables</i>	Economic value added (EVA) Standardized EVA Return on assets (ROA) Return on equity (ROE) Return on capital employed (ROCE) Earnings per share (EPS) Dividend per share (DPS) Total debt ratio Total asset turnover Current ratio Net operating profit before tax/Capital employed Net operating profit before tax/Sales Net operating profit after tax/Sales (Margin) Gross profit/Sales Sales growth

Retained profit/Capital employed
Sales/Capital employed
Sales/Net working capital
Sales/Average total fixed assets
Weighted average cost of capital (WACC)
Debt ratio : (Total long-term loan capital
+ short-term borrowings + bank overdraft)/
Capital employed
Total owners' interest/Capital employed
Total long-term loan capital/Capital employed
(Short term-borrowings + bank overdraft)/
Capital employed
Investment rate : Change in Capital employed/
Net operating profit after tax
Company cash tax rate
Operating leverage
Financial leverage
Discounted EVA

(b) **Variables that can determine EVA**

- (i) Return on capital employed (ROCE = NOPAT/CE)
- (ii) Net operating profit before tax/Capital employed
- (iii) Net operating profit before tax/Sales
- (iv) Net operating profit after tax/Sales (Margin)
- (v) Gross profit/Sales
- (vi) Sales growth
- (vii) Retained profit/Capital employed
- (viii) Sales/Capital employed
- (ix) Sales/Net working capital
- (x) Sales/Average total fixed assets
- (xi) Weighted average cost of capital (WACC)

- (xii) Debt ratio : (Total long-term loan capital
+ short-term borrowings + bank overdraft)/
Capital employed
- (xiii) Total owners' interest/Capital employed
- (xiv) Total long-term loan capital/Capital employed
- (xv) (Short term-borrowings + bank overdraft)/
Capital employed
- (xvi) Investment rate : Change in Capital employed/
Net operating profit after tax
- (xvii) Company cash tax rate
- (xviii) Operating leverage
- (xix) Financial leverage

The following statistical calculations were done on the above data:

- (a) A correlation was sought between the independent variables and:
 - (i) MVA;
 - (ii) Standardized MVA.

- (b) A stepwise regression analysis was done of the 19 independent variables that can determine EVA and:
 - (i) EVA;
 - (ii) Standardized EVA.

- (c) All these statistical calculations were done under the following conditions:
 - (i) for each of the ten years;
 - (ii) for the total of the ten year period;
 - (iii) without inflation adjustments to the data; and
 - (iv) with inflation adjustments to the data.

It should be clear at this stage that the results obtained from these calculations were in line with the primary objectives of this study, namely the quantification of variables that determine the shareholder wealth, as represented by EVA, of a company.

6.4 HYPOTHESES

In research, a hypothesis serves several important functions. The most important of these is that it guides the direction of the study. It also limits what shall be studied and what not, identifies facts that are relevant and those that are not and, finally, a hypothesis provides a framework for organizing the conclusions that result from the research.

In this study, the following hypotheses are tested:

- (a) (i) H_0 There is a low level of correlation between MVA unadjusted for inflation and EVA unadjusted for inflation.
 H_1 There is a high level of correlation between MVA unadjusted for inflation and EVA unadjusted for inflation.
- (ii) H_0 There is a high level of correlation between MVA adjusted for inflation and EVA adjusted for inflation.
 H_1 There is a low level of correlation between MVA adjusted for inflation and EVA adjusted for inflation.
- (iii) H_0 There is a low level of correlation between standardized MVA unadjusted for inflation and standardized EVA unadjusted for inflation.
 H_1 There is a high level of correlation between standardized MVA unadjusted for inflation and standardized EVA unadjusted for inflation.

- (iv) H_0 There is a high level of correlation between standardized MVA adjusted for inflation and standardized EVA adjusted for inflation.
- H_1 There is a low level of correlation between standardized MVA adjusted for inflation and standardized EVA adjusted for inflation.
- (v) H_0 There is a low level of correlation between MVA unadjusted for inflation and discounted EVA unadjusted for inflation.
- H_1 There is a high level of correlation between MVA unadjusted for inflation and discounted EVA unadjusted for inflation.
- (vi) H_0 There is a high level of correlation between MVA adjusted for inflation and discounted EVA adjusted for inflation.
- H_1 There is a low level of correlation between MVA adjusted for inflation and discounted EVA adjusted for inflation.
- (vii) H_0 There is a low level of correlation between standardized MVA unadjusted for inflation and discounted standardized EVA unadjusted for inflation.
- H_1 There is a high level of correlation between standardized MVA unadjusted for inflation and discounted standardized EVA unadjusted for inflation.
- (viii) H_0 There is a high level of correlation between standardized MVA adjusted for inflation and discounted standardized EVA adjusted for inflation.
- H_1 There is a low level of correlation between standardized MVA adjusted for inflation and discounted standardized EVA adjusted for inflation.

From the above 8 hypotheses it can be seen that it is hypothesised that it is especially the inflation adjustments to fixed assets and profit as well as the standardization process that gives rise to the high correlation between EVA and MVA.

It is therefore hypothesised that without these adjustments the correlation between EVA and MVA should be low.

It is further hypothesised that it is especially the discounting of EVA that gives rise to a high correlation between EVA and MVA.

The second set of hypotheses address the stepwise regression analyses.

(b) H_0 Of the variables under the control of management that could influence EVA, it is especially the income statement variables that drive or explain EVA and not as much the balance sheet variables.

H_1 Of the variables under the control of management that could influence EVA, it is especially the balance sheet variables that drive or explain EVA and not as much the income statement variables.

From the above 2 hypotheses it can be seen that it is hypothesised that it is especially the income statement variables (profit margins) that determine a company's EVA, and therefore shareholder value creation.

6.5 CONCLUSION

The research methodology is one of the most important elements of any empirical research project. In this section, a description of the data and techniques used in order to attain the envisaged empirical results and therefore to achieve the

objective of this study, has been related briefly to the literature overview included in the earlier parts of this study. The all important discussion of the results of the empirical analyses follows in Chapter 7.

CHAPTER 7

EMPIRICAL RESEARCH RESULTS

7.1 INTRODUCTION

One of the main objectives of this study is to quantify certain variables that determine shareholder value. This was done in the study by means of a **stepwise regression analysis**. However, before these results are discussed, the **correlation** between MVA and the variables specified in the previous chapter is dealt with.

The **correlation analyses** consisted of **four** different runs. Firstly, "ordinary" MVA was correlated with the various variables without any inflation adjustments to the data. The second run made provision for inflation adjustments to all the amounts. The next two runs sought a correlation between standardized MVA and the variables under review, the third run with and the fourth run without inflation adjustments to the data. The results of these four different correlations are discussed below. The discussion concludes with a comparison between the results of the individual four runs.

The stepwise regression procedure added one independent variable at a time to the model, one step at a time. The computer programme entered variables in single steps from best to worst, in other words, the independent variable that explained the greatest amount of variance in the dependent variable was calculated (as explained by r^2) first. The next variable to be calculated explained the greatest amount of variation in conjunction with the first, and so on.

Four different **stepwise regression procedures** were performed. In the first run, EVA was used as the dependent variable with the 19 independent variables specified in Chapter 6. No inflation adjustments were made to the data. The second run was similar to the first, except that all relevant data items were adjusted to take inflation into account. The next two regressions used standardized EVA as dependant variable with the same independent variables, the

third run with and the fourth run without inflation adjustments to the data. A discussion of the results of these four different regressions is set out below. The discussion concludes with a comparison between the results of the individual four runs.

7.2 CORRELATION ANALYSES

7.2.1 Background

As an introduction to this discussion, the reader is reminded that MVA is determined by taking the market value of the company (share price at year-end multiplied by the number of shares issued, plus the book value of all debt) and subtracting the book value of all equity and debt from this calculated market value. Variables that correlate positively (or negatively) with MVA most probably influence (or do not influence) the variables that make up MVA.

A quick glance at the four tables reveals that quite a number of correlation coefficients significant at the 1% level were achieved, although the correlation coefficients themselves were relatively low. The highest positive correlation coefficient were in the region of 0.35 to 0.40, the highest negative correlation coefficients were between -0.25 and -0.40, whilst the majority of variables had a small positive or small negative correlation with MVA or standardised MVA. Possible explanations for this are attempted in the discussion that follows.

7.2.2 MVA without inflation adjustments to data

A summary of the results of this correlation analysis is contained in **Table 7.1** (overleaf).

The correlation of MVA with EVA was negative. The correlation coefficient for the total 10 year period was -0.23 whilst the highest correlation was -0.64 during the "infamous" 1987 period, when share prices underwent a considerable downward

166(a)

**TABLE 7.1 CORRELATION OF MVA WITH THE FOLLOWING VARIABLES
 (WITHOUT INFLATION ADJUSTMENTS AND WITHOUT STANDARDIZATION TO DATA)**

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
EVA	-0.22626 *	-0.08160	-0.30643 *	-0.28422 *	-0.16429	-0.13915	-0.17565	-0.25153	*-0.17983	0.00761	-0.64331 *
SIGNIF	0.0001	0.3504	0.0003	0.0009	0.0598	0.1115	0.0439	0.0053	0.0391	0.9310	0.0001
ROA	0.04564	0.20593	0.19066	0.14108	0.28350 *	0.27395 *	0.14581	0.05665	0.02427	0.00187	-0.06939
SIGNIF	0.0946	0.0170	0.0273	0.1039	0.0009	0.0014	0.0940	0.5172	0.7816	0.9829	0.4274
ROE	0.00946	0.10132	0.07091	0.03249	0.01752	0.17378	0.05303	0.03817	0.05389	0.01344	0.04376
SIGNIF	0.7324	0.2477	0.4209	0.7136	0.8438	0.0489	0.5475	0.6651	0.5409	0.8779	0.6169
ROCE	0.00496	0.08626	0.04772	0.04687	0.09207	0.07375	0.08529	0.00881	0.02070	0.00268	-0.06929
SIGNIF	0.8574	0.3273	0.5883	0.5936	0.2975	0.4007	0.3309	0.9201	0.8137	0.9756	0.4299
EPS	0.09741 *	0.23489 *	0.23276 *	0.38523 *	0.30244 *	0.31159 *	0.11329	0.05519	0.24156 *	0.12677	0.00869
SIGNIF	0.0004	0.0063	0.0068	0.0001	0.0004	0.0003	0.1942	0.5280	0.0051	0.1459	0.9209
DPS	0.11168 *	0.18755	0.25117 *	0.37343 *	0.33422 *	0.30363 *	0.16219	0.05748	0.26256 *	0.17282	0.00098
SIGNIF	0.0001	0.0300	0.0034	0.0001	0.0001	0.0004	0.0622	0.5111	0.0023	0.0467	0.9911
TOT DEBT RAT	0.03668	0.01351	0.01366	0.09968	0.15386	0.04506	0.09696	0.23913 *	0.22365 *	0.17392	0.12841
SIGNIF	0.1807	0.8769	0.8755	0.2518	0.0770	0.6065	0.2669	0.0056	0.0097	0.0453	0.1407
IOT ASSET T/O	0.06390	0.06841	0.06796	0.15269	0.00589	0.01543	0.02050	0.03325	0.02907	0.00910	0.00489
SIGNIF	0.0297	0.4540	0.4589	0.0945	0.9489	0.8700	0.8294	0.7290	0.7609	0.9244	0.9594

166(b)

TABLE 7.1 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
CURRENT RATIO	-0.02009	-0.04381	-0.05650	-0.13647	-0.12009	-0.13573	-0.16462	-0.12095	-0.04058	-0.08855	0.13038
SIGNIF	0.4639	0.6152	0.5167	0.1159	0.1686	0.1193	0.0583	0.1655	0.6428	0.3108	0.1362
NOPBT/CE	0.00312	0.18237	0.12028	0.05211	0.10945	0.05411	0.06507	-0.03662	0.03866	-0.00168	0.08944
SIGNIF	0.9129	0.0435	0.1833	0.5670	0.2243	0.5522	0.4728	0.6876	0.6686	0.9850	0.3334
NOPBT/SALES	0.11817 *	0.22264	0.24638 *	0.31809 *	0.25713 *	0.26960 *	0.14348	0.03521	0.01593	-0.04865	0.03726
SIGNIF	0.0001	0.0158	0.0072	0.0004	0.0048	0.0046	0.1330	0.7188	0.8694	0.6171	0.7086
NOPAT/SALES = MARGIN	0.11430 *	0.16696	0.10903	0.33760 *	0.29166 *	0.38807 *	0.16131	0.03042	0.01157	0.05671	0.00174
SIGNIF	0.0001	0.0672	0.2339	0.0002	0.0012	0.0001	0.0864	0.7513	0.9036	0.5562	0.9855
EBIT/SALES	0.09048 *	0.18809	0.20720	0.22729	0.34187 *	0.32999 *	0.15716	-0.00593	0.03128	0.02965	0.04605
SIGNIF	0.0021	0.0380	0.0226	0.0122	0.0001	0.0003	0.0964	0.9507	0.7434	0.7574	0.6313
SALES GROWTH	-0.02062	0.00408	0.03230	0.01622	0.04426	0.12033	0.05617	0.00714	0.02216	0.00422	0.06924
SIGNIF	0.4833	0.9645	0.7251	0.8598	0.6297	0.2002	0.5545	0.9407	0.8166	0.9650	0.4702
RET. PROFIT/CE	0.02932	0.05959	0.08240	0.05643	0.13022	0.22725 *	0.07196	0.01994	0.02888	0.030369	0.03628
SIGNIF	0.2847	0.4940	0.3439	0.5172	0.1352	0.0085	0.4104	0.8198	0.7415	0.7258	0.6785
SALES/CE	0.06483	0.06579	0.08515	0.12586	0.03621	-0.05145	-0.05157	0.08542	0.05355	0.01273	0.01287
SIGNIF	0.0274	0.4716	0.3531	0.1690	0.6933	0.5850	0.5875	0.3727	0.5749	0.8945	0.8933

166(c)

TABLE 7.1 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
SALES/NWC	0.01111	0.03530	0.04437	0.12720	0.10542	0.07971	0.11364	-0.02318	-0.03108	-0.01737	-0.06834
SIGNIF	0.7200	0.7143	0.6500	0.1834	0.2753	0.4235	0.2555	0.8162	0.7577	0.8645	0.5015
SALES/F. ASSETS	-0.01401	0.03963	-0.13415	-0.13591	-0.02955	-0.10466	-0.11213	-0.02817	-0.07857	-0.02959	-0.03917
SIGNIF	0.6340	0.6647	0.1424	0.1372	0.7477	0.2656	0.2370	0.7692	0.4124	0.7578	0.6831
WACC	0.04280	0.09742	0.13848	0.08358	0.04896	0.09007	0.04125	-0.05283	-0.07968	0.11991	0.13802
SIGNIF	0.1197	0.2646	0.1119	0.3388	0.5772	0.3044	0.6386	0.5474	0.3638	0.1708	0.1145
TOT OWN INT/CE	-0.02410	-0.03261	-0.00853	-0.08259	-0.12043	-0.04310	-0.08847	-0.21799	-0.22108	-0.17410	-0.13875
SIGNIF	0.3794	0.7084	0.9221	0.3428	0.1674	0.6223	0.3112	0.0117	0.0105	0.0450	0.1112
TOT LT LOAN/CE	0.01263	0.00574	0.02358	0.01656	0.04092	0.02388	0.07648	0.10680	0.12223	0.11805	0.10924
SIGNIF	0.6450	0.9475	0.7869	0.8494	0.6400	0.7850	0.3816	0.2211	0.1610	0.1760	0.2107
ST LOAN/CE	-0.03073	-0.01895	-0.05992	0.06753	0.01376	-0.05439	-0.01921	0.04722	0.07754	0.06527	-0.11432
SIGNIF	0.2657	0.8299	0.4966	0.4434	0.8760	0.5388	0.8276	0.5922	0.3769	0.4554	0.1901
INVEST RATE											
CE/NOPAT	0.00906	0.01388	0.00599	0.00613	0.00920	0.02562	-0.04075	0.03185	0.00508	0.01892	0.02640
SIGNIF	0.2657	0.8764	0.9463	0.9448	0.9182	0.7724	0.6492	0.7180	0.9546	0.8315	0.7701
TAX RATE	0.01970	0.15765	0.21343	0.16591	0.18724	0.04361	0.07988	0.02603	0.04757	0.00166	0.00548
SIGNIF	0.4889	0.0816	0.0173	0.0667	0.0365	0.6320	0.3778	0.7750	0.5983	0.9852	0.9428

166(d)

TABLE 7.1 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
OPR LEV	-0.04631	-0.07220	-0.01405	-0.04253	-0.09027	-0.09270	-0.12794	-0.13992	0.00723	-0.01735	0.10589
SIGNIF	0.1227	0.4392	0.8789	0.6489	0.3373	0.3400	0.1978	0.1526	0.9403	0.8579	0.2777
FIN LEV	0.02969	0.07042	0.08398	0.04811	0.08285	0.07202	0.06803	0.02841	0.02315	0.08777	0.07923
SIGNIF	0.2839	0.4296	0.3384	0.5838	0.3487	0.4155	0.4454	0.7493	0.7922	0.3151	0.3684
DISCOUNTED EVA						-0.25714*	-0.22193*	-0.22988*	-0.19220	0.00153	0.53417*
SIGNIF						0.0027	0.0100	0.0075	0.0261	0.9860	0.0001

* Indicates significance at the 0,01 (1%) level.

adjustment. Both these correlations were significant at the 1% level. A possible explanation for the negative correlation might be the fact that MVA already to a large extent, discounts or provides for inflation in the share price, reflecting nominal values. EVA was, at that stage, not adjusted for inflation. A second possible reason might be the fact that, as share prices increase (to increase MVA), equity and therefore the weighted average cost of capital become more expensive and this fact reduces a company's EVA. The same arguments can be advanced to explain the even larger negative correlation coefficients between MVA and discounted EVA, which were significant in four of the six possible appearances.

Both return on assets (ROA) and return on equity (ROE) had a very low positive correlation coefficient with MVA. In some years, however, there was a relatively large positive correlation with only two significant correlations (both 0.28) with ROA during 1993 and 1992. According to the results of this study it seemed that these ratios have very little bearing on a company's market value. This confirms what was discussed in the literature study.

The contrary applies when one observed the relatively high positive correlation coefficient between MVA and earnings per share and dividend per share. Although the correlation coefficients for the total 10 year period were generally low (0.10 and 0.11 respectively), they were significant. In some years they varied between 0.25 and 0.37 and even 0.38 and in these cases they were also significant at the 1% level. Earnings and dividends did matter, according to these empirical results, contrary to the beliefs of some proponents of economic-based methods of determining shareholder value. It must, however, be stated that the theory admitted that these measures were not the best measures of shareholder value, but that their influence on the market value of a company cannot be ignored. It seemed that the dividend discount model is still very much in use: earnings and dividends do have a positive influence on a company's market value.

According to the results of this study, the total debt ratio, total asset turnover as well as the current ratio bear little relation to a company's market value. The debt

ratio in the study had a significant positive correlation of between 0.22 and 0.24 during 1989 and 1990.

Three different profitability ratios that were correlated with MVA were net operating profit before tax, net operating profit after tax and earnings before interest and tax, all expressed as a percentage of sales. These ratios all had positive correlation coefficients with MVA, especially during the period from 1992 to 1996, when the values varied between 0.18 and 0.39. This finding was in line with the positive correlation between MVA, return on assets, earnings per share and dividends per share during the same period. The profitability ratios were positively correlated with earnings attributable to ordinary shareholders as well as with dividends, hence the similar result. The shareholders seemed to be sensitive to this chain reaction, hence the positive correlation with the market value. All correlation coefficients over 0.25 during the individual years were significant at the 1% level. The correlation coefficient of 0.11 of the total 10 year period of all three these ratios was significant at the 1% level.

According to the results of this study, neither net operating profit nor retained profit expressed as a percentage of capital employed showed any significant correlation with the market value of a company.

Three balance sheet efficiency ratios were also correlated with MVA. Capital employed, net working capital as well as fixed assets were expressed as a percentage of sales. All these ratios provided small positive or small negative and no significant correlation coefficients with MVA.

Ratios that also provided a small positive correlation with MVA were the weighted average cost of capital (WACC) and the company cash tax rate. Both these ratios correlated positively with MVA from 1988 to 1995. Theory predicted that both of these ratios should have had a very small effect on the market value of a company. The correlation for the total 10 year period, however, was 0.04 and 0.02 respectively, which was very low indeed, as well as not significant.

Total owners' interest, total long-term loan capital and total short-term loan capital expressed as a percentage of capital employed had small positive or small negative correlation coefficients with MVA, indicating that the financing structure of a company bears little or no relation to its market value.

The fact that the operating and financial leverage respectively had, for the total 10 year period, a small negative (-0.05) and a small positive (0.03) correlation coefficient with MVA seemed to contradict some of the findings and possible explanations advanced above. One must bear in mind, however, that these two ratios differed from the other profitability ratios as discussed above, hence their indifference to MVA.

7.2.3 MVA with inflation adjustments to data

A summary of the results of this correlation analysis is contained in **Table 7.2** (overleaf).

The correlation of MVA with EVA was positive. The correlation coefficient for the total 10 year period was 0.16, and significant at the 1% level. The highest correlation coefficient was 0.44 (1991) and also significant, whilst the only negative correlation was found during 1987 (-0.42). Only during 1994 and 1995 was there not a significant correlation appearance. MVA already, to a large extent, discounts or provides for inflation in the share price, which reflects nominal values. EVA at this stage was also adjusted for inflation, hence the positive correlation.

The same arguments as in the above paragraph can be advanced in explanation of the even bigger positive correlation coefficients between MVA and discounted EVA. All the correlations obtained were significant. Barring 1987, in four of the five years (1992 to 1987) the correlation coefficients were between 0.36 and 0.43. This finding supported the theory which claims that MVA is equal to the discounted value of all future EVA.

**TABLE 7.2 CORRELATION OF MVA WITH THE FOLLOWING VARIABLES
 (WITH INFLATION ADJUSTMENTS AND WITHOUT STANDARDIZATION TO DATA)**

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
EVA	0.15585 *	0.29654 *	0.21684	0.11192	0.37525 *	0.38004 *	0.44281 *	0.34668 *	0.25106 *	0.38119 *	-0.41553 *
SIGNIF	0.0001	0.0005	0.0122	0.1997	0.0001	0.0001	0.0001	0.0001	0.0037	0.0001	0.0001
ROA	0.10647 *	0.20075	0.19921	0.17570	0.32929 *	0.32461 *	0.18572	0.16521	0.11407	0.10455	-0.00260
SIGNIF	0.0001	0.0200	0.0210	0.0423	0.0001	0.0001	0.0323	0.0574	0.1911	0.2310	0.9763
ROE	0.06005	0.12609	0.01346	0.12993	0.13796	0.22940 *	0.12934	0.04612	0.10068	0.08025	-0.01518
SIGNIF	0.0294	0.1497	0.8782	0.1391	0.1175	0.0087	0.1409	0.5995	0.2507	0.3585	0.8624
ROCE	0.01711	0.09644	0.08409	0.05515	0.09626	0.06998	0.09350	0.02603	0.02462	0.04860	-0.09960
SIGNIF	0.5352	0.2732	0.3396	0.5300	0.2760	0.4253	0.2863	0.7670	0.7793	0.5800	0.2559
EPS	0.09763 *	0.19956	0.13890	0.35998 *	0.24840 *	0.28528 *	0.08499	0.08820	0.23193 *	0.12011	0.01500
SIGNIF	0.0004	0.0208	0.1093	0.0001	0.0039	0.0009	0.3307	0.3127	0.0072	0.1685	0.8639
DPS	0.16888 *	0.17871	0.25586 *	0.29222 *	0.31297 *	0.31235 *	0.21772	0.21289	0.28573 *	0.24013 *	0.07840
SIGNIF	0.0001	0.388	0.0028	0.0006	0.0002	0.0003	0.0118	0.0139	0.0009	0.0054	0.3697
TOT DEBT RAT	0.05530	0.00413	-0.00666	0.10762	0.15861	0.06255	0.12528	0.26054 *	0.26073 *	0.18616	0.10907
SIGNIF	0.0435	0.9622	0.9391	0.2158	0.0682	0.4745	0.1508	0.0025	0.0024	0.0319	0.2114
TOT ASSET T.O	0.05064	0.02341	0.00042	0.07561	0.13149	0.14289	0.15678	0.14756	0.14447	0.16084	0.18765
SIGNIF	0.0850	0.7980	0.9964	0.4098	0.1506	0.1276	0.0972	0.1222	0.1286	0.0917	0.0486

169(b)

TABLE 7.2 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
CURRENT RATIO	-0.01291	-0.03904	-0.05504	-0.12459	-0.09689	-0.13791	-0.14058	-0.09315	-0.01839	-0.04544	0.13745
SIGNIF	0.6377	0.6543	0.5276	0.1515	0.2672	0.1134	0.1065	0.2862	0.8336	0.6035	0.1160
NOPBT/CE	0.03429	0.18806	0.14919	0.07574	0.14544	0.08190	0.09695	0.03843	0.02457	0.06860	-0.07401
SIGNIF	0.2285	0.0372	0.0982	0.4051	0.1056	0.3678	0.2841	0.6730	0.7856	0.4435	0.4258
NOPBT/SALES	-0.01040	0.17599	0.14780	0.22360	0.05223	0.04620	-0.09740	-0.16124	-0.15661	-0.14692	-0.19511
SIGNIF	0.7283	0.0577	0.1102	0.0149	0.5727	0.6334	0.3092	0.0971	0.1039	0.1292	0.0494
NOPAT/SALES = MARGIN	-0.03412	0.13638	0.06092	0.21835	-0.01451	0.09637	-0.13659	0.20419	-0.17750	0.21122	-0.25924*
SIGNIF	0.2450	0.1358	0.5068	0.0166	0.8744	0.2950	0.1473	0.0309	0.0612	0.0261	0.0058
EBIT/SALES	0.09183*	0.16841	0.17073	0.21899	0.30957*	0.28829*	0.11444	0.02523	0.02591	0.01342	0.04852
SIGNIF	0.0018	0.0637	0.0612	0.0158	0.0005	0.0018	0.2275	0.7926	0.7863	0.8888	0.6130
SALES GROWTH	-0.01222	-0.00926	-0.03828	-0.00727	0.01892	0.12015	0.03979	0.02798	0.00822	0.01955	0.00993
SIGNIF	0.6777	0.9194	0.6768	0.9369	0.8368	0.2009	0.6756	0.7706	0.9314	0.8386	0.9176
RET PROFIT/CE	0.05824	0.05347	0.10163	0.09068	0.18245	0.27158*	0.06216	0.05321	0.04905	0.04462	0.02927
SIGNIF	0.0335	0.5395	0.2426	0.2974	0.0356	0.0016	0.4772	0.5430	0.5750	0.6100	0.7380
SALES/CE	0.02455	0.02681	0.03050	-0.07202	0.06683	0.05870	0.05046	0.07459	0.08827	0.11306	0.14770
SIGNIF	0.4039	0.7694	0.7398	0.4324	0.4664	0.5332	0.5956	0.4365	0.3547	0.2374	0.1219

169(c)

TABLE 7.2 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
SALES/NWC	0.02945	0.05572	0.06355	0.15617	0.15715	0.11797	0.10072	0.03025	-0.00139	0.01335	0.00058
SIGNIF	0.3419	0.5631	0.5155	0.1017	0.1027	0.2353	0.3138	0.7616	0.9890	0.8957	0.9955
SALES/F.ASSET	-0.00559	-0.02024	-0.06703	-0.05408	0.10444	0.03091	0.01896	0.00116	0.07647	0.09535	0.10456
SIGNIF	0.8493	0.8249	0.4651	0.5558	0.2542	0.7430	0.8420	0.9904	0.4250	0.3195	0.2748
WACC	-0.00812	0.08431	0.12917	0.05020	-0.02426	0.02585	-0.04483	-0.15950	-0.17816	-0.18747	0.09829
SIGNIF	0.7680	0.3346	0.1384	0.5661	0.7825	0.7686	0.6097	0.0677	0.0410	0.0314	0.2622
TOT OWN INT/CE	0.08554 *	0.00373	0.03449	-0.01768	0.04226	0.09621	0.04324	-0.01985	0.05061	0.03984	0.24624 *
SIGNIF	0.0018	0.9659	0.6924	0.8393	0.6291	0.2706	0.6212	0.8206	0.5629	0.6489	0.0043
TOT LT LOAN/CE	0.02606	-0.00690	0.00932	0.02149	0.04653	0.02556	0.10489	0.14800	0.14017	0.13469	0.09588
SIGNIF	0.3418	0.9369	0.9149	0.8053	0.5949	0.7703	0.2296	0.0891	0.1076	0.1222	0.2723
ST LOAN/CE	0.01038	0.00475	0.04007	0.11516	0.05531	0.01984	0.03611	0.10783	0.15148	0.11059	0.08750
SIGNIF	0.7048	0.9566	0.6457	0.1852	0.5271	0.8207	0.6799	0.2167	0.0818	0.2051	0.3166
INVEST RATE											
Δ CE/NOPAT	0.01248	0.01533	0.01767	0.01725	0.01972	0.06600	-0.02559	0.01084	0.01109	0.06172	0.02435
SIGNIF	0.6561	0.0847	0.8425	0.8468	0.8265	0.4556	0.7778	0.9026	0.9007	0.4872	0.7884
TAX RATE	0.04270	0.23081	0.24561 *	0.21558	0.26618 *	0.17978	0.04119	0.10550	0.09336	0.13195	0.01860
SIGNIF	0.1337	0.0102	0.0060	0.0166	0.0027	0.0466	0.6497	0.2455	0.3004	0.1392	0.8416

169(d)

TABLE 7.2 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
OPR LEV	-0.05187	-0.15331	-0.02351	0.03191	-0.12089	-0.06087	-0.12517	-0.22352	0.07459	0.06016	-0.03973
SIGNIF	0.0883	0.1004	0.7996	0.7373	0.2022	0.5334	0.2123	0.0239	0.4451	0.5421	0.6977
FIN LEV	0.04759	0.06360	0.06653	0.16342	0.14796	0.08786	0.14295	0.03864	0.03094	0.04182	-0.01512
SIGNIF	0.0904	0.4775	0.4556	0.0632	0.1068	0.3338	0.1118	0.6662	0.7257	0.6379	0.8660
DISCOUNTED EVA						0.26004*	0.40074*	0.36167*	0.39080*	0.42593*	0.34978*
SIGNIF						0.0024	0.0001	0.0001	0.0001	0.0001	0.0001

* Indicates significance at the 0,01 (1%) level

Both return on assets (ROA) and return on equity (ROE) were positively correlated with MVA. However, ROA had a higher positive correlation coefficient with MVA, with values ranging from 0.11 to 0.33. However, only the correlation coefficients for the total 10 year period (0.11), 1993 (0.33) and 1992 (0.32) were significant. The inflation adjustments to ROA might have had a bigger influence on the calculated correlation coefficients than those to ROE. It seemed that once these ratios were adjusted for inflation, they correlated more positively with MVA.

The same pattern was found in the relatively high positive correlation coefficients between MVA and earnings per share (EPS) and dividend per share (DPS). Although the correlation coefficients for the total 10 year period were low (0.10 and 0.17 respectively), they were significant at the 1% level. In most of the years, they oscillated between 0.25 and 0.33 and was significant. The positive correlation of DPS to MVA was higher than that of EPS and it seems that there was a cycle of rising and declining positive correlations - probably because of changes in the business cycle. As discussed above, earnings and dividends did matter, according to these empirical results. The shareholders attach a considerable weight to earnings and the resultant cash benefits.

According to the results of this study, the total debt ratio, total asset turnover and the current ratio had little or no relation to a company's market value, although the total debt ratio had a significant positive correlation coefficient of 0.26 for both 1989 and 1990.

Three different profitability ratios that were correlated with MVA were net operating profit before tax, net operating profit after tax and earnings before interest and tax, all expressed as a percentage of sales. Most of these ratios all had very small correlation coefficients with MVA with no significant appearances. EBIT divided by sales, however, had the highest correlation coefficient for the total 10 year period (0.09 and significant). It seemed that once these ratios were adjusted (downwards) for inflation, their correlation coefficients with MVA also dropped significantly.

According to the results of this study, neither net operating profit nor retained profit expressed as a percentage of capital employed had any significant correlation with the market value of a company.

Three balance sheet efficiency ratios were also correlated with MVA. Capital employed, net working capital and fixed assets were expressed as a percentage of sales. All of these ratios displayed relatively small positive or small negative correlations with MVA.

Ratios that provided a small negative and a small positive correlation coefficients with MVA respectively were the weighted average cost of capital (WACC) and the company cash tax rate. Both these ratios showed an increasing correlation with MVA from 1988 to 1995. It was especially the tax rate that achieved a correlation coefficient of above 0.20 during the last four years under review with two significant correlations (0.25 in 1995 and 0.27 during 1993). Theory predicted that both of these should have had a negative effect on the market value of a company. The correlation coefficients for the total 10 year period, however, were not significant and were -0.01 for WACC and 0.04 for the tax rate.

As found above, total owners' interest, total long-term loan capital and total short-term loan capital expressed as a percentage of capital employed had low positive or low negative correlation coefficients with MVA, indicating that the financing structure of a company had little or no effect on its market value, even when adjusted for inflation.

The fact that the operating and financial leverage respectively had, for the total 10 year period low negative (-0.05) and low positive (0.05) correlation coefficients with MVA was consistent with the previous analysis where no inflation adjustments to data were made.

7.2.4 Standardized MVA without inflation adjustments to data

A summary of the results of this correlation analysis is contained in **Table 7.3** (overleaf).

The correlation of standardized MVA with standardized EVA was very low. The correlation coefficient for the total 10 year period was 0.04, while the highest was 0.16 during 1987. Neither correlation coefficient was significant at the 1% level. One is once again dealing with the fact that MVA already, to a large extent, discounts or provides for inflation in the share price, which reflects nominal values. Standardized EVA was, at this stage, not adjusted for inflation. The same arguments can be advanced in explanation of the even lower positive correlation between standardized MVA and discounted standardized EVA (0.01 for the total 10 year period, and also not significant).

Return on assets and return on equity had a very low positive and a very low negative correlation with standardized MVA respectively. It is interesting to note that the negative correlation of ROA became slightly higher during the last three years under review (1994 to 1996). As found in the previous correlation analysis, it seemed that these ratios bore very little relation to a company's market value, which confirmed theory on this matter as discussed in the literature study. No significant correlation coefficients were found.

Quite the contrary to the relatively low correlations as described in the above paragraph was found when one observed the relatively high negative correlation between standardized MVA and earnings per share and dividend per share. Although the correlation coefficients for the total 10 year period for both these ratios were low (-0.15 and -0.14 respectively, but significant at the 1% level), in both cases they became increasingly negative towards the end of the period under review (1996). In the case of EPS, the negative correlation coefficient increased from -0.28 (1993) to -0.44 (1996), with DPS slightly lower at a constant correlation coefficient of -0.28 from 1992 to 1996. During these periods all the

172(a)

**TABLE 7.3 CORRELATION OF STANDARDIZED MVA WITH THE FOLLOWING VARIABLES
 (WITHOUT INFLATION ADJUSTMENTS AND WITH STANDARDIZATION TO DATA)**

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
STDAARD EVA	0.04180	-0.02465	-0.00005	-0.00571	0.01230	0.03699	0.02173	0.02981	0.06906	0.06326	0.16275
SIGNIF	0.1290	0.7790	0.9995	0.9482	0.8886	0.6737	0.8047	0.7344	0.4314	0.4712	0.0623
ROA	0.01175	0.11797	-0.08069	-0.03201	-0.02319	-0.03533	-0.09195	0.05732	0.05959	0.07996	0.04139
SIGNIF	0.6685	0.1763	0.3558	0.7146	0.7910	0.6864	0.2925	0.5122	0.4957	0.3602	0.6362
ROE	-0.01510	0.00344	-0.03034	0.08045	-0.05089	-0.10304	0.05917	-0.04776	0.08111	0.00961	0.07291
SIGNIF	0.5855	0.9689	0.7318	0.3648	0.5668	0.2452	0.5020	0.5880	0.3571	0.9126	0.4043
ROCE	0.08952*	0.04065	0.08301	0.08228	0.09482	0.07620	0.07225	0.08857	0.10285	0.12425	0.10177
SIGNIF	0.0012	0.6461	0.3477	0.3502	0.2832	0.3852	0.4103	0.3125	0.2406	0.1558	0.2456
EPS	-0.14920*	0.43678*	-0.46038*	0.37196*	-0.27851*	-0.17468	0.20107	-0.06226	0.10093	0.09139	-0.06001
SIGNIF	0.0001	0.0001	0.0001	0.0001	0.0012	0.0443	0.0203	0.4765	0.2477	0.2955	0.4926
DPS	-0.14097*	0.28318*	0.35557*	0.29794*	0.26066*	0.28051*	-0.15636	0.06960	0.12630	0.06991	-0.05551
SIGNIF	0.0001	0.0010	0.0001	0.0005	0.0024	0.0011	0.0723	0.4260	0.1474	0.4240	0.5257
TOT DEBT RAT	0.03873	0.05161	-0.04480	-0.05112	0.08878	0.06470	0.05038	0.11816	0.12494	0.08933	0.06219
SIGNIF	0.1581	0.5552	0.5927	0.5590	0.3095	0.4594	0.5647	0.1756	0.1519	0.3066	0.4770
TOT ASSET T/O	0.24895*	0.25518*	0.26764*	0.30038*	0.25072*	0.20455	0.21271	0.26460*	0.25650*	0.24981*	0.25312*
SIGNIF	0.0001	0.0047	0.0081	0.0009	0.0055	0.0283	0.0237	0.0050	0.0063	0.0082	0.0074

172(b)

TABLE 7.3 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
CURRENT RATIO	0.01651	0.03024	-0.05929	0.04036	0.02170	-0.00925	0.02238	0.06558	0.03963	0.02489	-0.05112
SIGNIF	0.5477	0.7297	0.4978	0.6447	0.8042	0.9158	0.7982	0.4533	0.6506	0.7761	0.5605
NOPBT/CE	0.10240 *	0.02242	0.06704	0.10597	0.07392	0.09838	0.10845	0.11176	0.10413	0.17589	0.10880
SIGNIF	0.0003	0.8064	0.4613	0.2454	0.4127	0.2790	0.2305	0.2184	0.2478	0.0479	0.2389
NOPBT/SALES	-0.17194 *	0.22128	-0.35521 *	0.29469 *	-0.27027 *	-0.17678	-0.20053	-0.20500	0.13468	-0.08638	-0.18155
SIGNIF	0.0001	0.0170	0.0001	0.0013	0.0030	0.0659	0.0348	0.0342	0.1626	0.3741	0.0665
NOPAT/SALES = MARGIN	-0.14580 *	-0.15636	0.17847	-0.27760 *	0.25595 *	-0.27993 *	-0.18007	0.17251	0.09754	0.08767	0.14664
SIGNIF	0.0001	0.0881	0.0512	0.0022	0.0046	0.0020	0.0552	0.0702	0.3062	0.3624	0.1246
EBIT/SALES	-0.11273 *	0.19072	-0.26519 *	-0.21577	-0.24651 *	-0.18249	-0.18277	0.03129	0.16769	-0.11233	0.13022
SIGNIF	0.0001	0.0361	0.0034	0.0179	0.0064	0.0509	0.0527	0.7444	0.0772	0.2405	0.1731
SALES GROWTH	0.02541	0.05293	0.01259	0.00986	0.15328	-0.04579	-0.00045	0.05920	0.05890	0.05916	0.01874
SIGNIF	0.3883	0.5642	0.8914	0.9149	0.0932	0.6270	0.9962	0.5371	0.5373	0.5374	0.8452
RET. PROFIT/CE	-0.03152	0.06264	0.00493	-0.02475	-0.06192	-0.08860	0.08300	0.05523	0.02059	0.00324	0.00094
SIGNIF	0.2506	0.4738	0.9551	0.7774	0.4789	0.3105	0.3422	0.5278	0.8140	0.9705	0.9915
SALES/CE	0.20276 *	0.22316	0.23924 *	0.24029 *	0.20789	0.20609	0.18627	0.23565	0.21878	0.21853	0.22415
SIGNIF	0.0001	0.0139	0.0085	0.0082	0.0221	0.0271	0.0482	0.0128	0.0205	0.0212	0.0180

172(c)

TABLE 7.3 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
SALES/NWC	0.04895	0.12214	0.08176	0.05878	0.12121	0.07543	-0.04789	0.08709	0.05537	0.05505	0.01888
SIGNIF	0.1145	0.2058	0.4047	0.5419	0.2093	0.4489	0.6327	0.3817	0.5824	0.5883	0.8528
SALES/F ASSET	0.02480	0.09633	0.25178 *	0.25057 *	0.28343 *	0.28359 *	0.24647 *	0.05654	0.25384 *	0.25129 *	0.24886 *
SIGNIF	0.3999	0.2932	0.0055	0.0058	0.0016	0.0021	0.0085	0.5556	0.0072	0.0078	0.0084
WACC	0.158828 *	0.16743	-0.16915	-0.15295	-0.19523	-0.20257	-0.18563	-0.23838 *	-0.25328 *	-0.24558 *	0.22487 *
SIGNIF	0.0001	0.0550	0.0525	0.0800	0.0249	0.0198	0.0331	0.0059	0.0034	0.0045	0.0095
TOT OWN INT/CE	-0.07414 *	-0.01730	-0.03031	-0.01407	-0.07803	-0.10115	-0.09524	-0.13325	0.13925	0.13017	0.09630
SIGNIF	0.0068	0.8433	0.7291	0.8723	0.3720	0.2467	0.2755	0.1262	0.1099	0.1353	0.2702
TOT LT LOAN/CE	-0.01318	0.07138	0.04824	-0.00195	0.00794	0.01438	0.00262	0.07052	0.01100	0.03942	0.01099
SIGNIF	0.6310	0.4142	0.5813	0.9823	0.9278	0.8695	0.9761	0.4199	0.9000	0.6524	0.9001
ST LOAN/CE	0.09884 *	0.11646	0.10586	0.01755	0.07982	0.09907	0.08893	0.08068	0.15057	0.15269	0.16452
SIGNIF	0.0003	0.1870	0.2306	0.8429	0.3648	0.2621	0.3124	0.3596	0.0848	0.0793	0.0584
INVEST RATE											
Δ CE/NOPAT	0.01199	0.06112	0.03435	0.03867	0.03619	-0.03550	0.01871	-0.04368	0.10535	0.04217	0.05267
SIGNIF	0.6681	0.4949	0.7003	0.6635	0.6863	0.6884	0.8346	0.6204	0.2366	0.6352	0.5596
TAX RATE	0.02832	0.01939	0.08406	0.02175	0.05509	0.09780	0.04641	0.06851	0.00502	0.06077	0.03381
SIGNIF	0.3203	0.8321	0.3553	0.8121	0.5417	0.2819	0.6086	0.4515	0.9557	0.4973	0.7151

172(d)

TABLE 7.3 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
OPR LEV	0.02083	0.02003	0.07365	-0.19008	0.01603	0.06846	0.04741	-0.07004	0.08913	0.10698	0.02472
SIGNIF	0.4883	0.8310	0.4260	0.0410	0.8650	0.4814	0.6344	0.4756	0.3544	0.2682	0.8005
FIN LEV	0.01866	0.05424	0.04291	0.08733	0.00512	-0.03712	-0.02398	0.03696	0.04186	0.07638	0.11268
SIGNIF	0.5010	0.5447	0.6265	0.3213	0.9539	0.6750	0.7882	0.6775	0.6337	0.3822	0.2000
DISCOUNT STD EVA						0.00730	0.00046	-0.00608	-0.03427	0.03360	-0.02400
SIGNIF						0.9333	0.9958	0.9444	0.6942	0.6999	0.7832

* Indicates significance at the 0,01 (1%) level

correlation coefficients were significant at the 1% level. Earnings and dividends did not matter according to these empirical results, which confirmed arguments advanced in the theory on this matter.

According to the results of this study, the total debt ratio as well as the current ratio bore little or no relation to the company's market value. However, the total asset turnover displayed a consistent positive correlation coefficient of approximately 0.25 over the entire 10 year period, which were also significant at the 1% level. This followed from the theory, as total asset turnover from a fundamental analysis point of view had a very definite bearing on share prices, and therefore MVA.

Three different profitability ratios that were correlated with standardized MVA were net operating profit before tax, net operating profit after tax and earnings before interest and tax, all expressed as a percentage of sales. These ratios all displayed negative correlation coefficients with standardized MVA, especially during the period from 1993 to 1996, where the values varied between -0.18 and -0.27. These correlation coefficients were significant at the 1% level. This finding was contrary to the positive correlation coefficients obtained with "ordinary" MVA.

Neither net operating profit nor retained profit expressed as a percentage of capital employed were correlated with the market value of a company.

Three balance sheet efficiency ratios were also correlated with standardized MVA. Capital employed, net working capital and fixed assets were expressed as a percentage of sales. Of these, fixed asset turnover provided the highest correlation, with a nearly consistent positive and significant correlation coefficient of 0.25. This finding also supported the positive correlation of total asset turnover with standardized MVA.

The weighted average cost of capital (WACC) provided a relatively low negative correlation coefficient (-0.16 for the total 10 year period), but significant at the 1%

level. The company cash tax rate displayed a low positive correlation coefficient of 0.03 for the total 10 year period with no significant appearances during the entire period under review. According to the results of this study, both these ratios had very little influence on standardized MVA.

Total owners' interest, total long-term loan capital and total short-term loan capital expressed as a percentage of capital employed displayed low positive or low negative correlations with standardized MVA, supporting previous findings that the financing structure of a company had little or no effect on its market value.

The fact that both the operating and financial leverage had a low positive correlation coefficient of 0.02 with standardized MVA for the total 10 year period seemed to support the fact that these ratios had a relative small bearing on standardized MVA. None of these correlation coefficients were significant at the 1% level.

7.2.5 Standardized MVA with inflation adjustments to data

A summary of the results of this correlation analysis is contained in **Table 7.4** (overleaf).

The correlation of standardized MVA with standardized EVA was, like the previous correlation analysis (where no inflation adjustments were made), very low. The correlation coefficient for the total 10 year period was 0.04, and the highest correlation coefficient was 0.20 during 1987. No significant correlations were obtained. Although the highest correlation coefficient was marginally higher with this run, where inflation adjustments had been made, according to the results of this study, there was no high correlation between standardized MVA and standardized EVA when adjusted for inflation. There was also an even lower correlation between standardized MVA and discounted standardized EVA (a correlation coefficient of 0.03 for the total 10 year period, with no significant appearances).

174(a)

**TABLE 7.4 CORRELATION OF STANDARDIZED MVA WITH THE FOLLOWING VARIABLES
 (WITH INFLATION ADJUSTMENTS AND WITH STANDARDIZATION TO DATA)**

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
STDARD EVA	0.03951	-0.01155	0.01927	0.02523	0.03081	0.05078	0.04857	0.05582	0.09446	0.11134	0.19615
SIGNIF	0.1516	0.8954	0.8264	0.7740	0.7258	0.5646	0.5817	0.5250	0.2813	0.2037	0.0242
ROA	0.07552 *	-0.05837	-0.00316	0.04605	0.07012	0.06982	0.03447	0.16893	0.17436	0.15233	0.11431
SIGNIF	0.0059	0.5046	0.9712	0.5986	0.4226	0.4245	0.6937	0.0519	0.0447	0.0800	0.1901
ROE	0.02864	0.02252	0.05435	0.08929	-0.02071	-0.04076	0.00904	-0.00693	0.14954	0.11081	0.10200
SIGNIF	0.2998	0.7985	0.5375	0.3124	0.8151	0.6452	0.9184	0.9371	0.0870	0.2042	0.2427
ROCE	0.11020 *	0.06095	0.09899	0.10179	0.12014	0.09272	0.10415	0.12785	0.13758	0.16233	0.13805
SIGNIF	0.0001	0.4909	0.2625	0.2473	0.1734	0.2903	0.2346	0.1440	0.1157	0.0629	0.1144
EPS	0.08838 *	0.38236 *	-0.42826 *	0.29985 *	-0.11381	-0.06076	-0.07067	0.02194	0.02871	-0.04629	0.00014
SIGNIF	0.0013	0.0001	0.0001	0.0005	0.1921	0.4872	0.4189	0.8021	0.7429	0.5968	0.9987
DPS	0.09947 *	0.00604	0.09519	0.18240	0.19173	0.15523	0.22104	0.21990	0.10578	0.10118	0.10574
SIGNIF	0.0003	0.9450	0.2757	0.0356	0.0270	0.0744	0.0106	0.0110	0.2256	0.2465	0.2258
TOT DEBT RAT	0.05665	0.02761	0.01705	0.00997	0.08089	0.08041	0.07686	0.12439	0.14078	0.10760	0.08749
SIGNIF	0.0388	0.7524	0.8455	0.9093	0.3547	0.3575	0.3792	0.1537	0.1060	0.2176	0.3166
TOT ASSET T.O	0.26834 *	0.26384 *	0.27613 *	0.30404 *	0.25809 *	0.23713	0.25202 *	0.30200 *	0.30145 *	0.29099 *	0.28754 *
SIGNIF	0.0001	0.0035	0.0023	0.0007	0.0043	0.01070	0.0071	0.0013	0.0012	0.0019	0.0022

174(b)

TABLE 7.4 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
CURRENT RATIO	0.01965	0.03183	-0.03432	0.04624	0.02342	-0.01488	0.01001	0.04579	0.03811	0.04138	0.00568
SIGNIF	0.4740	0.7161	0.6950	0.5972	0.7890	0.8650	0.9089	0.6007	0.6632	0.6363	0.9485
NOBPT/CE	0.11262 *	0.04516	0.09732	0.12972	0.10345	0.10213	0.08770	0.13954	0.15423	0.17481	0.12634
SIGNIF	0.0001	0.6214	0.2843	0.1544	0.2509	0.2610	0.3328	0.1237	0.0859	0.0493	0.1728
NOBPT/SALES	-0.23215 *	-0.24640 *	-0.36991 *	0.30606 *	-0.30640 *	-0.28549 *	-0.30278 *	-0.28570 *	-0.21501	-0.17544	0.28494 *
SIGNIF	0.0001	0.0077	0.0001	0.0008	0.0007	0.0026	0.0012	0.0029	0.0248	0.0694	0.0037
NOPAT/SALES = MARGIN	-0.25895 *	-0.21580	0.26702 *	0.33670 *	-0.37033 *	-0.40065 *	-0.36115 *	-0.31542 *	-0.23659	-0.23845	0.31433 *
SIGNIF	0.0001	0.0179	0.0032	0.0002	0.0001	0.0001	0.0001	0.0007	0.0120	0.0117	0.0007
EBIT/SALES	-0.06681	0.15781	0.20803	0.14485	0.12621	-0.07968	-0.08617	0.02591	0.08995	0.03237	0.03205
SIGNIF	0.0232	0.0839	0.0226	0.1145	0.1678	0.3973	0.3642	0.7872	0.3456	0.7359	0.7384
SALES GROWTH	0.02461	-0.04421	0.00593	-0.03188	0.10924	-0.01919	0.00532	0.05874	0.05472	0.05489	0.02702
SIGNIF	0.4035	0.6302	0.9487	0.7296	0.2330	0.8387	0.9554	0.5403	0.5666	0.5672	0.7783
RET PROFIT/CE	-0.01385	-0.05083	0.03085	0.00478	-0.01038	-0.02043	-0.04602	0.00095	0.09455	0.02973	0.03013
SIGNIF	0.6139	0.5612	0.7244	0.9565	0.9056	0.8154	0.5989	0.9914	0.2790	0.7341	0.7306
SALES/CE	0.22040 *	0.22276	0.24430 *	0.24988 *	0.21653	0.22268	0.18878	0.26795 *	0.26397 *	0.24740 *	0.25073
SIGNIF	0.0001	0.0141	0.0072	0.0059	0.0171	0.0168	0.0452	0.0045	0.0049	0.0088	0.0079

174(c)

TABLE 7.4 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
SALES/NWC	0.04937	0.11290	0.07075	0.06293	0.12174	0.07826	-0.01797	0.08563	0.05203	0.05754	0.05396
SIGNIF	0.1114	0.2425	0.4711	0.5137	0.2073	0.4320	0.8577	0.3898	0.6054	0.5716	0.5958
SALES/F.ASSET	0.02139	0.09405	0.25387*	0.24969*	0.26289*	0.25744*	0.20033	0.04926	0.25576*	0.24156	0.22532
SIGNIF	0.4678	0.3048	0.0051	0.0060	0.0036	0.0055	0.0334	0.6077	0.0067	0.0106	0.0174
WACC	-0.16695*	-0.16941	-0.17432	-0.16498	-0.18484	-0.19200	-0.18297	-0.23874*	-0.25368*	-0.24337*	-0.22095
SIGNIF	0.0001	0.0521	0.0456	0.0587	0.0339	0.0274	0.0357	0.0058	0.0033	0.0049	0.0109
TOT OWN INT/CE	0.07737*	0.10776	0.09024	0.10718	0.08858	0.08415	0.07410	0.11339	0.13786	0.09697	0.14128
SIGNIF	0.0048	0.2170	0.3016	0.2195	0.3106	0.3355	0.3966	0.1938	0.1135	0.2668	0.1048
TOT LT LOAN/CE	0.01312	-0.04481	-0.01790	0.02325	0.01867	0.03848	0.04539	0.09151	0.05243	0.05760	0.03350
SIGNIF	0.6326	0.6085	0.8379	0.7905	0.8311	0.6601	0.6039	0.2948	0.5489	0.5102	0.7018
ST LOAN/CE	0.09812*	0.10310	0.09108	0.03015	0.08694	0.10204	0.08710	0.09729	0.15771	0.15170	0.16007
SIGNIF	0.0003	0.2376	0.2971	0.7305	0.3197	0.2425	0.3188	0.2652	0.0698	0.0813	0.0657
INVEST RATE											
CE/NOPAT	0.01538	0.00696	0.03460	0.03872	0.03689	0.00885	0.03105	0.05006	0.03544	0.07469	0.05203
SIGNIF	0.5837	0.9386	0.6982	0.6656	0.6817	0.9204	0.7321	0.5716	0.6901	0.4002	0.5660
TAX RATE	0.00810	0.01402	0.03829	0.00731	0.00135	0.10345	0.02612	0.07588	0.06489	0.06042	0.02067
SIGNIF	0.7765	0.8782	0.6742	0.9363	0.9881	0.2548	0.7733	0.4042	0.4722	0.4998	0.8242

TABLE 7.4 CONTINUED

174(d)

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
OPR LEV	0.01544	0.09747	0.04521	0.07742	0.07656	0.06571	0.00423	-0.14371	0.15175	0.08528	0.01060
SIGNIF	0.6125	0.3001	0.6269	0.4172	0.4203	0.5013	0.9665	0.1496	0.1187	0.3871	0.9175
FIN LEV	0.01195	-0.03303	-0.02330	0.21581	0.06315	-0.01383	0.08221	0.02654	-0.03375	0.01544	0.12342
SIGNIF	0.6713	0.7218	0.7948	0.0140	0.4932	0.8794	0.3620	0.7671	0.7020	0.8621	0.1668
DISCOUNT STD EVA						0.02882	0.02987	0.03262	0.02892	0.03526	0.04572
SIGNIF						0.7419	0.7338	0.7104	0.7404	0.6881	0.6027

* Indicates significance at the 0.01 (1%) level

Return on assets and return on equity both had very low positive correlations with standardized MVA, with only one significant correlation coefficient. It is interesting to note that the positive correlation of ROA turned negative during the last two years under review (1995 to 1996). As found in the previous correlation analysis, it seemed that these ratios bore very little relation to a company's market value, which confirmed the theory as discussed in the literature study.

The opposite to these low correlations was found in the relatively high negative correlation coefficients between standardized MVA and earnings per share. The low correlation with dividend per share was positive. Although the correlation coefficients for the total 10 year period were low (-0.09 for EPS and 0.10 for DPS, but significant), in both cases they became increasingly more negative towards the end of the period under review (1996). In the case of EPS it increased from -0.05 (1988) to -0.38 (1996) with the correlation coefficients from 1994 to 1996 significant at the 1% level. The correlation coefficient of DPS became lower and ended at 0.01 during 1996. Earnings and dividends did not matter, according to these empirical results, a finding which was supported by arguments advanced in the theory.

Both the total debt ratio and the current ratio bore little or no relation to a company's market value. However, the total asset turnover had a consistently positive correlation coefficient of approximately 0.30 (higher than without inflation adjustments) over the entire 10 year period with all correlation coefficients significant at the 1% level. The positive correlation coefficients obtained from this variable supported the fact that, from a fundamental analysis point of view, total asset turnover had a definite influence on the market value of a company.

Three different profitability ratios correlated with standardized MVA were net operating profit before tax (NOPBT), net operating profit after tax (NOPAT) and earnings before interest and tax, all expressed as a percentage of sales. These ratios all displayed negative correlations with standardized MVA, especially during the period from 1992 to 1996, when the correlation coefficients varied between

-0.14 and -0.27, with quite a number larger than -0.30. The correlation coefficients of NOPBT divided by sales and NOPAT divided by sales were significant from 1992 to 1996. Once again, this finding was the opposite of the positive correlations with "ordinary" MVA.

Neither net operating profit (NOPBT) nor retained profit expressed as a percentage of capital employed had any correlation with the market value of a company. Only one correlation coefficient was significant, namely the correlation coefficient for the total 10 year period for NOPBT divided by capital employed (0.11).

Three balance sheet efficiency ratios were also correlated with standardized MVA. Capital employed, net working capital as well as fixed assets were expressed as a percentage of sales. Of these, fixed asset turnover did not provide as high a positive correlation with inflation adjustments as previously without inflation adjustments. A higher positive correlation coefficient was found with sales divided by capital employed, which turned out to be consistently above 0.22 and significant at the 1% level. A possible explanation for this phenomenon might be the fact that capital employed was used in the standardization of MVA, and hence the positive correlation coefficients, especially with inflation adjustments.

The weighted average cost of capital (WACC) displayed a relatively low negative correlation coefficient (-0.17 for the total 10 year period, but significant at the 1% level), whilst the company cash tax rate showed a low positive correlation coefficient of 0.01 for the total 10 year period with no significant appearances. According to the results of this study, both these ratios had a relative small influence on standardized MVA.

Total owners' interest, total long-term loan capital and total short-term loan capital expressed as a percentage of capital employed had low positive correlation coefficients with standardized MVA, indicating that the financing structure of a company had little or no effect on its market value, as found in the previous analyses.

Both the operating and financial leverage respectively had a low positive correlation coefficient with standardized MVA (0.02 and 0.01 for the total 10 year period and not significant at the 1% level). Therefore, according to the results of this study, these ratios had a relative small effect on standardized MVA.

7.2.6 Concluding remarks

One of the most important determinants of a company's MVA is the share price. It has been said that the single most important determinant of share prices is investor mood - whether positive or negative. If a great number of investors descent on the market, all theoretical principles, complex and logical calculations, even reason, are thrown overboard. Share prices are then driven by emotions. Although it is difficult to quantify exactly how large a part of share prices is determined by these illogical (and sometimes unnecessary) investor actions, one must acknowledge that they do play a significant role in setting share prices.

Another possible reason for the relatively low correlation coefficients might lie in the composition of the sample used for the empirical analyses. The EVA values used in the study were from a sample of companies where both positive and negative EVA values were found. If a company is destroying value (a negative EVA value), one may expect the share price (as represented by MVA) to react in a different way from when a company produces positive EVA values. It is against this background that one must evaluate, compare and summarize the results of the correlation analyses, especially the fact that the highest correlation coefficients obtained were in the region of 0.4.

The highest consistent positive correlation coefficient obtained (in the order of 0.4) was between MVA and EVA **with** inflation adjustments to the data. The very same pattern was obtained with discounted EVA. In **Table 7.5** (overleaf) the correlation coefficients between MVA and the various variables for the total 10 year period are presented. If one observes the ranking of the correlation coefficients of unstandardized or **normal** EVA with MVA, it is clear that when inflation adjustments

177(a)

**TABLE 7.5 CORRELATION OF MVA WITH THE FOLLOWING VARIABLES
 FOR THE TOTAL 10 YEAR PERIOD UNDER REVIEW**

	Unstandardised without inflation adjustment		Unstandardised with inflation adjustment		Standardised without inflation adjustment		Standardised with inflation adjustment	
EVA	-0.22626 *	(26)	0.15585 *	(2)	0.04180	(7)	0.03951	(12)
ROA	0.04564	(6)	0.10647 *	(3)	0.01175	(16)	0.07552 *	(8)
ROE	0.00946	(14)	0.06005	(7)	-0.01510	(18)	0.02864	(13)
ROCE	0.00496	(16)	0.01711	(17)	0.08952 *	(5)	0.11020 *	(4)
EPS	0.09741 *	(4)	0.09763 *	(4)	-0.14920 *	(25)	-0.08838 *	(24)
DPS	0.11168 *	(3)	0.16888 *	(1)	-0.14097 *	(23)	0.09947 *	(5)
TOT DEBT RAT	0.03668	(8)	0.05530	(9)	0.03873	(8)	0.05665	(9)
TOT ASSET T/O	0.06390	(24)	0.05064	(10)	0.24895 *	(1)	0.26834 *	(1)
CURRENT RATIO	0.02009	(19)	-0.01291	(24)	0.01651	(14)	0.01965	(16)
NOPBT/CE	0.00312	(17)	0.03429	(13)	0.10240 *	(3)	0.11262 *	(3)
NOPBT/SALES	0.11817 *	(1)	0.01040	(22)	-0.17194 *	(27)	0.23215 *	(26)
NOPAT/SALES - MARGIN	0.11430 *	(2)	0.03412	(25)	0.14580 *	(24)	0.25895 *	(27)
EBIT/SALES	0.09048 *	(5)	0.09183 *	(5)	-0.11273 *	(22)	0.06681	(23)

TABLE 7.5 CONTINUED

	Unstandardised without inflation adjustment		Unstandardised with inflation adjustment		Standardised without inflation adjustment		Standardised with inflation adjustment:	
SALES GROWTH	-0.02062	(20)	0.01222	(23)	0.02541	(10)	0.02461	(14)
RET. PROFIT/CE	0.02932	(10)	0.05824	(8)	-0.03152	(20)	-0.01385	(22)
SALES/CE	-0.06483	(25)	0.02455	(16)	0.20276 *	(2)	0.22040 *	(2)
SALES/NWC	0.01111	(13)	0.02945	(14)	0.04895	(6)	0.04937	(10)
SALES/F. ASSETS	-0.01401	(18)	-0.00559	(20)	0.02480	(11)	0.02139	(15)
WACC	0.04280	(7)	-0.00812	(21)	-0.158828 *	(26)	-0.16695 *	(25)
TOT OWN INT/CE	-0.02410	(21)	0.08554 *	(6)	-0.07414 *	(21)	0.07737 *	(7)
TOT LT LOAN/CE	0.01263	(12)	0.02606	(15)	-0.01318	(17)	0.01312	(19)
ST LOAN/CE	-0.03073	(22)	0.01038	(19)	0.09884 *	(4)	0.09812 *	(6)
INVEST RATE								
CE/NOPAT	0.00906	(15)	0.01248	(18)	0.01199	(15)	0.01538	(18)
TAX RATE	0.01970	(11)	0.04270	(12)	0.02832	(9)	0.00810	(21)
OPR LEV	-0.04631	(23)	0.05187	(26)	0.02083	(12)	0.01544	(17)
FIN LEV	0.02969	(9)	0.04759	(11)	0.01866	(13)	0.01195	(20)
DISCOUNTED EVA	0.53417 *	(27)	0.34974 *	(27)	0.02400	(19)	0.04572	(11)

* Indicates significance at the 0,01 (1%) level and number in bracket indicates ranking.

to the data were made, EVA's ranking improved from second last (26th) (without inflation adjustments) to second best (2nd) (with inflation adjustment to data). Possible reasons for this were advanced in the discussion above, but this finding supported the theory on this matter. The correlation coefficient ranking of **standardized** EVA with MVA without and with inflation adjustments to data did not differ much. In fact, the ranking decreased from 7th to 12th when inflation adjustments to the data were introduced. The ranking of **discounted** EVA with MVA was, in all four cases, at the lower end of the spectrum in comparison to the other variables, with a slight improvement when **standardization** was introduced. It was arguably the standardization process of MVA and EVA that caused this improvement in ranking in comparison to the unstandardized data.

Slightly lower positive correlations were found between MVA and ROA, ROE, EPS and DPS. These correlation coefficients were higher when data **with** inflation adjustments were utilized. It seemed that, in some ways contrary to the theory, these "well known" ratios were set in the mind of investors and that they were used in determining share prices, or market value. On the basis of this study, this cannot be disputed. Without a doubt, these ratios did have an influence on share prices and the market value of a company in the study. It is, however, doubtful whether these ratios are the best indication, expression or inputs in the calculation of shareholder value.

Positive correlations between MVA and the three profitability ratios were also obtained, although inflation adjustments to the data caused a decrease in the correlation coefficients. The positive influence of these profitability ratios on EPS and DPS supported the positive correlation coefficients obtained between MVA and EPS and DPS respectively.

Variables which expressed asset efficiency and the financing structure of the company displayed very little or no correlation with market value. The same results were obtained with the rest of the variables, especially WACC and the company tax rate.

The correlations sought between **standardized MVA** and the other variables, especially standardized EVA, provided disappointing results. Very low (positive and negative) correlation coefficients were obtained. With hindsight, it seems that the standardization of both MVA and EVA had its own niche application: comparison between (vastly) different individual companies over a number of years rather than a correlation based on a sample of companies, as was done in this research. Such comparisons fall beyond the scope of this study, but they do provide an interesting topic for further research.

7.3 STEPWISE REGRESSION ANALYSES

7.3.1 Background

A stepwise regression procedure using various independent variables with EVA as dependent variable were used in these analyses. **All** variables that were included in the **results** as presented in Tables 7.6 to 7.10 were significant at the 15% (0.1500) level.

As in the case of the correlation analyses above, the reader is reminded of the various variables that were used in the calculation of EVA. The fact that only variables or ratios that could be obtained from a company's published financial statements, as well as the problem with external variables that could not be quantified, limited the analyses in a way.

As explained in Section 7.1 above, the stepwise regression procedure determined the variable that explained EVA the best and repeated the process with the next variable until the 15% significance level was reached, after which no more regression coefficients for the variables were calculated. It was therefore necessary to observe just how many times a variable featured in the eleven different procedures (10 individual years plus the total for the 10 year period under review). Thereafter the actual regression coefficients of the individual variables could be analyzed as well as their ranking in relation to each other.

A quick glance over the five tables containing the results (Table 7.6 to Table 7.10) reveals that, on average, relatively low total regression coefficients were obtained. Although, in a small number of instances, a total regression coefficient of 1 or close to 1 was obtained, the average seemed to oscillate between 0.48 and 0.53. Possible explanations for this have been advanced above, but also emerge in the discussion that follows.

7.3.2 EVA without inflation adjustments to data

A summary of the results of this regression analysis is contained in **Table 7.6** (overleaf).

Out of a possible eleven appearances of each of the independent variables used in the regression, the weighted average cost of capital (WACC) featured ten times, sales divided by capital employed nine times, return on capital employed (ROCE) eight times, the investment rate six times and retained profit divided by capital employed five times. A number of other variables recurred two or three times, whilst the debt to equity ratio, total owners' interest divided by capital employed and the financial leverage occurred only once. Sales divided by net working capital and short-term borrowings divided by capital employed did not feature in this analysis at all. In total, 66 appearances were recorded.

From this analysis, it seems that WACC and ROCE must be seen as prominent drivers of EVA. In the eight times (out of the eleven possible times) that ROCE featured, six times it explained between 9% and 22% of the variance in EVA with an explanation of 9% for the total 10 year period under consideration. WACC, on the other hand, featured ten times, but explained only between 2% and 10%, with an explanation of 2.1% for the total 10 year period.

Of the seven profitability ratios, sales divided by capital employed occurred nine times and varied from 2% to a maximum of nearly 13% with an explanation of 1% for the total 10 year period under review. Retained profit divided by capital

180(a)

**TABLE 7.6 REGRESSION COEFFICIENTS (r^2) OF THE FOLLOWING VARIABLES WITH EVA
 (WITHOUT INFLATION ADJUSTMENTS TO DATA)**

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
ROCE	0.089(1)	0.089(2)	0.044(3)	0.024(5)			0.122(1)	0.174(1)	0.222(1)		0.105(1)
NOPBT/CE		0.113(1)			0.039(5)					0.109(1)	
NOPBT/SALES	0.028(2)		0.052(2)							0.024(5)	
NOPAT/SALES				0.023(6)					0.096(2)		
EBIT/SALES		0.031(4)	0.027(5)								
SALES GROWTH		0.023(6)	0.016(6)		0.036(6)						
RET PROTIT/CE	0.005(5)		0.040(4)		0.043(3)				0.059(4)	0.020(6)	
SALES/CE	0.010(4)	0.033(3)	0.128(1)	0.056(3)	0.100(1)	0.019(4)		0.023(4)		0.057(3)	0.057(3)
SALES/NWC											
SALES/AVE TOT FIXED ASSETS	0.004(7)					0.080(1)	0.040(2)			0.017(8)	
WACC	0.021(3)	0.026(5)		0.014(7)	0.053(2)	0.063(2)	0.031(3)	0.047(2)	0.073(3)	0.104(2)	0.072(2)

180(b)

TABLE 7.6 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
DEBT TO EQUITY RATIO				0.029(4)							
TOT OWNERS INTEREST/CE										0.018(7)	
TOT LONG TERM CAP/CE	0.004(8)									0.026(4)	0.029(5)
TOT ST BORR + BANK OD/CE											
INVT RATE: CHA IN CE/NOPAT	0.004(8)		0.027(5)	0.189(1)	0.022(7)			0.039(3)			0.036(4)
CO TAX RATE	0.004(6)				0.042(4)						0.020(6)
OPRERAT LEV				0.169(2)		0.026(3)					
FIN LEVE			0.015(7)								
TOTAL r ²	0.169	0.315	0.349	0.504	0.335	0.188	0.193	0.283	0.450	0.375	0.319

Number in bracket indicates ranking

employed occurred five times whilst the others occurred only two or three times. Net operating profit before tax divided by capital employed weighed in on two of its three appearances with 11%, whilst net operating profit after tax divided by sales (the margin) occurred meaningfully only once at 9,6%. As can be seen from Table 7.6, the contribution of the other profitability ratios was approximately 2% when they occurred.

It is clear that the various profitability ratios (income statement ratios) played a relatively important role in explaining EVA and must therefore be seen as important drivers of EVA.

As the "return variables" in all cases consisted of a profit margin, an asset turnover ratio and a leverage factor, it was observed from the results that it was especially the profit margin that was important as an EVA value driver, and not the asset turnover ratio or the leverage factor. This statement can be made based on the low regression coefficients (r^2) found in this study for the asset turnover ratios and the leverage factors.

The investment rate (change in capital employed divided by NOPAT) can be another important indicator of a company's EVA. This variable occurred six times in the eleven procedures. Although the regression coefficient for the total 10 year period was very small at 0.4%, it appeared in the other periods to be quite constant at 3% with one large contribution of 19%.

The balance sheet ratios or variables that were entertained in this regression procedure performed quite badly, as can be observed from Table 7.6. Sales divided by net working capital did not feature once, while sales divided by fixed assets occurred only four times, once meaningfully at 8%. Total owners' interest, long-term loan capital and short-term loan capital were all respectively expressed as a portion of total capital employed. Out of a possible 33 occurrences of the three variables, they appeared only four times, with no appearance by short-term loan capital. The other appearances were relatively low. An explanation for this might

be that although capital employed as an amount is central in the EVA calculation, profitability ratios and WACC weighed more.

What was also surprising in this analysis is that the company cash tax rate appears only three times. In one of the cases, it explained 4% and in the other case 2% of EVA. One must, therefore, recognize that the cash tax rate, according to this study, could not be viewed as an important driver of EVA and hence of shareholder value.

The operating and financial leverage occurred only three times in total, with the operating leverage once doing so meaningfully at 17%.

This regression analysis must also be discussed in terms of the cumulative regression coefficients as recorded per year to give some indication of the total explanation of variance in EVA for that year.

If one observes the total of the regression coefficients at the 15% significance level, there were five years when the total for that particular year was between 30% and 40%, one year between 40% and 50% and one year above 50%. The 66 occurrences that were recorded implies that on average six of the total nineteen variables appeared in any particular year. The years where only three or four variables occurred also recorded the lowest cumulative regression coefficients. For further analysis purposes, the year above 50% (1994) can be disregarded due to the fact that the operating leverage made its only meaningful contribution of 17% during that year.

Although the cumulative regression coefficient for the total 10 year period for the **total** data base was only 17%, it is worthwhile to look at the nine variables that this total of 17% consisted of, due to the fact that these variables represented the most popular occurrences. ROCE explained 9%, other profitability ratios 4.4% (with net operating profit before tax divided by sales 3%), WACC 2% and the balance was made up of relatively small contributions of three other variables.

The cumulative regression coefficient of **1989** was 45%. ROCE represented 22%, NOPAT divided by sales 9.6%, retained profit divided by capital employed 6% and WACC 7.3%.

If one observed a year like **1993**, the fact that no regression coefficient for the all-important ROCE was found immediately draws one's attention. However, some other profitability ratios were there to support the total explanation (r^2) of 33.5%. Four different profitability ratios provided a total of 21.8% explanation of the variance in EVA, with sales divided by capital employed providing a 10% explanation. WACC contributed 5.3%, the investment rate 2.2% and the company tax rate 4.2%.

One can analyze another couple of years, but at this stage an important pattern already started to emerge. This was discussed already in this section: profitability ratios weighed in heavily, WACC contributed relatively significantly and the balance sheet ratios do not appear to do well at all. These preliminary findings were in line with the theoretical calculations and "make-up" of EVA as set out in the literature.

The regression analysis must also be discussed in terms of the ranking between the various independent variables to the dependent variable, EVA. From Table 7.6 it was observed that ROCE was ranked first and NOPBT divided by sales second in the total for the 10 year period under review. ROCE also ranked first during 1987 to 1991. The weighted average cost of capital ranked second or third during most of its appearances, with a ranking of third during the total of the 10 year period under review. The balance sheet ratios obtained the lowest rankings, both during the individual years as well as for the total 10 year period.

The analyses and discussion of the regression procedures was enriched if one introduced the important factor of inflation, which is discussed in the next section.

7.3.3 EVA with inflation adjustments to data

A summary of the results of this regression analysis is contained in **Table 7.7** (overleaf).

Out of a possible eleven appearances of each of the independent variables used in the regression, return on capital employed (ROCE) featured eleven times, the margin (NOPAT divided by sales) nine times, earnings before interest and tax (EBIT) divided by sales seven times, the investment rate, WACC and the company tax rate five times each, whilst net operating profit before interest and tax occurred six times. Sales growth and short-term borrowings divided by capital employed occurred once only. Total owners' interest and long-term loan capital, both divided by capital employed, did not feature in this analysis at all. The rest of the variables occurred two, three or four times.

In total, 69 appearances were recorded, only slightly more than the 66 of the previous regression analysis without inflation adjustments.

As explained in the previous section and in the literature on this matter, ROCE and the margin (NOPAT divided by sales) are amongst other variables very prominent in the determination of EVA. In the eleven times that it featured, ROCE explained in ten cases between 9% and 21% of the variance in EVA with an explanation of 14% for the total 10 year period under review. This appearance was much more consistent, as well as with a higher regression coefficient (r^2), than the previous analysis where no inflation adjustments to the data were made. The margin featured nine times with a regression coefficient of between 7% and 26% and an explanation of 6.8% for the total 10 year period under review.

Of the six remaining profitability ratios in this analysis, net operating profit before tax divided by capital employed occurred six times with a highest factor of 8% and the rest in the region of 3% or 4%. More or less the same pattern was found with EBIT divided by sales, where a highest regression coefficient of 11% was followed

184(a)

**TABLE 7.7 REGRESSION COEFFICIENTS (r^2) OF THE FOLLOWING VARIABLES WITH EVA
 (WITH INFLATION ADJUSTMENTS TO DATA)**

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
ROCE	0.139(1)	0.211(1)	0.178(1)	0.094(3)	0.152(1)	0.134(1)	0.039(4)	0.174(1)	0.213(2)	0.090(2)	0.177(2)
NOPBT/CE	0.007(6)			0.014(7)		0.044(5)	0.078(3)			0.034(7)	0.033(7)
NOPBT/SALES			0.096(2)	0.016(6)			0.022(7)				
NOPAT/SALES	0.068(2)			0.134(2)	0.072(2)	0.060(4)	0.140(1)	0.116(2)	0.258(1)	0.174(1)	0.183(1)
EBIT/SALES	0.003(9)	0.017(6)				0.078(2)	0.112(2)	0.039(3)		0.058(4)	0.044(3)
SALES GROWTH		0.028(4)									
RET PROFIT/CE	0.005(7)						0.025(6)			0.068(3)	0.035(6)
SALES/CE	0.003(9)	0.019(5)		0.013(8)					0.029(3)		
SALES/NWC										0.016(8)	0.039(4)
SALES/AVE TOT FIXED ASSETS	0.004(8)						0.026(5)				
WACC	0.021(4)		0.016(3)	0.028(5)	0.030(3)			0.027(4)			

184(b)

TABLE 7.7 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
DEBT TO EQUITY RATIO						0.033(7)			0.017(4)		
TOT OWNERS INTEREST/CE											
TOT LONG TERM CAP/CE											
TOT ST BORR + BANK OD/CE		0.040(3)									
INVES RATE: CHA IN CE/NOPAT	0.015(5)			0.196(1)		0.036(6)				0.042(6)	0.036(5)
CO TAX RATE	0.055(3)			0.045(4)		0.063(3)				0.044(5)	0.018(8)
OPPRERAT LEV	0.004(8)	0.052(2)									
FIN LEVE											
TOTAL r ⁷	0.324	0.367	0.290	0.540	0.254	0.448	0.442	0.356	0.517	0.526	0.565

Number in bracket indicates ranking

by 8% and 6% with the rest lower. As can be seen from Table 7.7, the contribution of the other profitability ratios was, approximately 2% when they occurred, except in one or two cases where 10% and 7% were obtained.

Both the investment rate (change in capital employed divided by NOPAT) and the weighted average cost of capital were important indicators of a company's EVA. These variables both occurred five times each in the eleven procedures. Although the explanation during the total 10 year period was 1.5% and 2.1% respectively, the individual appearance appeared to be quite constant at 3%. The investment rate made one big contribution of 20% in 1994. The same rate of occurrences as well as size of regression coefficient (r^2) was found in the previous regression analysis where no inflation adjustments were made to the data.

As was the case in the previous analysis, the balance sheet ratios or variables that were entertained in this regression procedure performed quite badly, as can be observed from Table 7.7. Both sales divided by net working capital and sales divided by fixed assets occurred only twice, with no real meaningful regression coefficients. Total owners' interest and long-term loan capital were respectively expressed as a portion of total capital employed. Out of a possible 22 occurrences from these two variables, they appeared not once. The debt to equity ratio appeared twice and short-term loan capital divided by capital employed occurred once only. The regression coefficients obtained were lower than in the previous analysis where no inflation adjustments to the data were made.

What was interesting in this analysis compared to the previous analysis (without inflation adjustments to data) was the fact that the company cash tax rate appeared five times, up from the previous three times. It explained 5.5% of the variance of EVA during the total 10 year period under consideration, also well up from the previous analysis's regression coefficients without inflation adjustments.

The operating leverage occurred only twice, whilst the financial leverage did not occur at all.

As was done in the previous regression analysis, this regression analysis must also be discussed in terms of the cumulative regression coefficients as recorded per year to give an indication of the total explanation of variance in EVA for an individual year and for the total 10 year period, but now with inflation adjustment to the data.

If one observes the cumulative regression coefficients (r^2), there were only two years when the total regression coefficient was below 30%. In three years it was between 30% and 40%, in two years between 40% and 50%, and in four cases above 50%. The regression coefficients obtained in this analysis were much higher than when the data had no inflation adjustments made to them. The 69 occurrences recorded were only slightly higher than in the previous analysis (66), and also implied that on average six of the total nineteen variables appeared in a year. The two years where only three variables occurred also recorded the lowest cumulative regression coefficients.

The cumulative regression coefficient of the **total** data base for the total 10 years under consideration was more than 32%, which was nearly double the regression coefficient of the previous regression analysis without inflation adjustments to the data. The number of variables that occurred during the total 10 year period under review increased by two to eleven. It is worthwhile to observe these eleven variables, due to the fact that these variables represented the most popular occurrences. ROCE explained 14%, other profitability ratios nearly 9% (with net operating profit before tax divided by sales 7%), WACC 2%, the company tax rate 5.5% whilst the balance were made up of relatively small contributions of three variables.

The cumulative regression coefficients of **1989** were nearly 52%. ROCE represented 22%, NOPAT divided by sales (the margin) 26%, sales divided by capital employed 3% and the debt equity ratio nearly 2%. If one compares this with the regression analysis where no inflation adjustments were made to the data, it is in essence the margin that increased from the previous regression coefficient

of 10% to the current explanation of 26%. The inflation adjustment to the data caused this variable to increase in importance, not only in this year, but for the total 10 year period under review as well.

If one observes a year such as **1992**, one observed that four various profitability ratios explained 31.6% of the variance in EVA, the investment rate 3.6%, the company tax rate 6.3% and the debt to equity ratio 3.3%.

More or less the same pattern was found when one analysed another couple of years.

The pattern identified in the previous regression analysis in Section 7.3.2 was confirmed: profitability ratios weighed in heavily, the company tax rate and WACC contributed relatively significantly and the balance sheet ratios did not appear to do well at all.

What further enhances this finding is the fact that the regression coefficients (r^2) **with** inflation adjustments to the data were significantly higher than those without inflation adjustments. This phenomenon will be discussed in more detail in the conclusion to this subsection.

The regression analysis must also be discussed in terms of the ranking between the various independent variables to the dependent variable, EVA. From Table 7.7 it may be observed that ROCE was ranked first and NOPBT divided by sales second in the total for the 10 year period under review. These two variables also achieved the highest number of first and second rankings during the individual years. This was exactly the finding of the previous analysis where no inflation adjustments to the data were made. The company tax rate was ranked third and WACC fourth during the total 10 year period under review. According to the results of this regression analysis, it was the balance sheet ratios that obtained the lowest rankings, both during the individual years and the total 10 year period.

The analyses and discussion can now be extended by analysing another form of EVA, namely standardized EVA.

7.3.4 Standardized EVA without inflation adjustments to data

A summary of the results of this regression analysis is contained in **Table 7.8** (overleaf).

Out of a possible eleven appearances of each of the independent variables used in the regression of the variables, return on capital employed (ROCE) featured in all of the eleven possible appearances, the weighted average cost of capital (WACC) featured nine times, total owners interest divided by capital employed seven times, sales divided by capital employed five times, the operating leverage also five times and the financial leverage six times. A number of other variables recurred once or twice, whilst the debt to equity ratio recurred four times. Three of the profitability ratios, including the margin, did not feature in this analysis at all. A total of 64 appearances were recorded, which was, for all practical purposes, similar to the 66 of the regression analysis of "normal" EVA.

For analysis purposes, 1987, and to a lesser extent 1988, could be disregarded due to the fact that 1987 was the base year of standardization. The total regression coefficient (r^2) of 1 during that year also supported this argument.

In the eleven times that it featured, ROCE explained, in 10 cases, between 13% and 25% of the variance in EVA with an explanation of 14.2% during the total 10 year period under review. WACC, on the other hand, featured nine times, but with a regression coefficient of between 2% and 5%, with an explanation of 1.5% during the total 10 year period under review. In the case of ROCE, a better explanation of **standardized** EVA than that of **ordinary** EVA was provided, but in the case of WACC, less.

188(a)

**TABLE 7.8 REGRESSION COEFFICIENTS (r^2) OF THE FOLLOWING VARIABLES WITH STANDARDIZED EVA
 (WITHOUT INFLATION ADJUSTMENTS TO DATA)**

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
ROCE	0.142(1)	0.130(1)	0.194(1)	0.248(1)	0.180(1)	0.145(1)	0.130(2)	0.131(2)	0.189(1)	0.157(2)	0.875(1)
NOPBT/CE	0.004(7)			0.032(6)	0.030(4)	0.032(3)					
NOPBT/SALES											
NOPAT/SALES											
EBIT/SALES											
SALES GROWTH	0.009(4)			0.062(2)				0.171(1)		0.818(1)	
RET PROTIT/CE					0.027(5)		0.056(3)			0.001(6)	
SALES/CE	0.002(9)			0.041(3)	0.022(6)		0.034(5)			0.002(5)	
SALES/NWC											
SALES/AVE TOT FIXED ASSETS										0.004(4)	
WACC	0.015(3)		0.054(4)	0.027(7)	0.044(3)	0.045(2)	0.032(6)		0.026(6)	0.012(3)	0.125(2)

188(b)

TABLE 7.8 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
DEBT TO EQUITY RATIO	0.003(8)						0.160(1)	0.055(3)	0.042(4)		
TOT OWNERS INTEREST/CE	0.030(2)		0.056(3)	0.024(8)	0.058(2)	0.045(2)	0.043(4)		0.031(5)		
TOT LONG TERM CAP/CE	0.003(8)										
TOT ST BORR + BANK OD/CE	0.007(5)			0.034(5)							
INVES RATE: CHA IN CE/NOPAT		0.052(2)									
CO TAX RATE	0.005(6)										
OPPRERAT LEV		0.018(3)	0.060(2)			0.024(4)			0.044(3)	0.001(6)	
FIN LEVE	0.002(9)		0.024(5)	0.039(4)	0.019(7)			0.019(4)	0.067(2)		
TOTAL	0.222	0.200	0.388	0.507	0.380	0.291	0.455	0.376	0.399	0.995	1.000

Number in bracket indicates ranking

Of the seven profitability ratios, sales divided by capital employed occurred five times with a very low regression coefficient of 0.2% for the total 10 year period under consideration. Sales growth occurred four times, once relatively high at 17%. Retained profit divided by capital employed occurred three times. Three profitability ratios, namely net operating profit before tax, net operating profit after tax and earnings before interest and tax, all divided by sales, did not appear at all. As argued before, various profitability ratios played a relative important role in explaining EVA. According to the results of this study, the same cannot be said of standardized EVA. The fact was that only ROCE occurred meaningfully, with very few other profitability ratios in support.

The investment rate (change in capital employed divided by NOPAT) can be another important indicator of a company's EVA. As may be expected from the findings of the previous paragraph, this variable occurred only once and according to the results of this study appeared not to play a significant role in explaining standardized EVA.

The balance sheet ratios or variables entertained in this regression procedure performed quite badly with the exception of one, namely total owners' interest divided by capital employed, as can be observed from Table 7.8. This variable occurred seven times and its regression coefficient ranged in value from 3% to 5%. The fact that this variable appeared regularly during this analysis of standardized EVA (more than in the case of normal EVA) can be explained by the fact that capital employed plays a bigger role in the determination and calculation of standardized EVA than in "normal" EVA, mainly due to the standardization process.

Sales divided by net working capital did not feature once, whilst sales divided by fixed assets occurred only once. The debt to equity ratio appeared four times, once meaningfully at a regression coefficient of 16%.

The other occurrences of the balance sheet ratios were very low. As was found in the case of normal EVA, an explanation for this might be that although capital

employed as amount was central in the EVA calculation, ROCE and WACC weighed more.

What was also surprising in this analysis was that the company cash tax rate appeared only once and did not appear to play a role at all. According to the results of this study it played a relatively small part in the explanation of EVA as well as of standardized EVA, compared with other variables.

The operating and financial leverage occurred much more frequently than in the previous regression analyses, namely five and six times respectively. The explanation that they provided in the variance of standardized EVA varied mostly between 2% and 4% with two regression coefficients of 6%. The reason for their appearance was quite difficult to establish. It might lie in the fact that these variables are also, in essence, profitability ratios and, whilst such a bad performance was found from the other profitability ratios, it was these that kicked in to support ROCE in the total explanation of standardized EVA.

This regression analysis must also be discussed in terms of the cumulative regression coefficients recorded per year to indicate the total explanation of standardized EVA for a particular year.

As mentioned above, both 1987 and 1988 can be disregarded in the analysis. If one observed the total of the regression coefficients (r^2) of the remaining nine periods, there were six years when the cumulative regression coefficient was above 30% and three years when it was between 20% and 30%. On average, there were six variables per individual year and eleven variables in the total 10 year period under consideration.

Although the cumulative regression coefficient for the **total** data base for the total 10 year period under consideration was only 22%, it is worthwhile to have a look at the eleven variables that it consisted of, due to the fact that these variables represented the most popular occurrences. ROCE explained 14%, other

profitability ratios 1.5%, WACC 1.5% and the balance made up of relatively small contributions by the remaining variables.

The cumulative regression coefficient of **1993** was 38%. ROCE represented 25%, NOPBT divided by capital employed 3%, sales growth 6%, sales divided by capital employed 4%, WACC 3%, total owners' interest divided by capital employed 6% and the financial leverage 2%. There seemed in this year to be some balance between the profitability and the balance sheet variables.

One can analyse another couple of years, but, at this stage, a pattern different to that of the analysis of normal EVA has already started to emerge: profitability variables counted less and the balance sheet variables did better. It seemed that a better balance between these two types of ratios was found with standardized EVA. Once again, a prudent and solid explanation for this seemed difficult to find at this stage.

The regression analysis must also be discussed in terms of the ranking between the various independent variables to the dependent variable, standardized EVA. From Table 7.8 it may be observed that ROCE was ranked first during nearly all the individual years, as well as in the total 10 year period under consideration. NOPBT divided by sales was, contrary to previous findings where it ranked second, not ranked at all due to the fact that it did not record any appearances. Total owners' interest divided by capital employed was ranked second and WACC third during the total 10 year period under consideration. According to the results of this regression analysis, it was a mixture of the balance sheet ratios and the income statement ratios that obtained the rest of the rankings, during the individual years as well as for the total 10 year period.

The analyses and discussion can be enriched if one introduced the important factor of inflation, which is discussed in the next section.

7.3.5 Standardized EVA with inflation adjustments to data

A summary of the results of this regression analysis is contained in **Table 7.9** (overleaf).

Out of a possible eleven appearances of each of the independent variables used in the regression, return on capital employed (ROCE) featured in all of the eleven possible cases, the weighted average cost of capital (WACC) featured eight times, both net operating profit before tax divided by capital employed and sales growth five times with total owners' interest divided by capital employed occurring four times.

The rest of the variables recurred once or twice, whilst two of the profitability ratios, as well as the investment rate did not feature in this analysis at all. In total, 51 appearances were recorded, which was the lowest number in all four regression analyses.

As was argued in the previous analysis of standardized EVA without inflation adjustments to the data, for analyses purposes, 1987, and to a lesser extent 1988, could be disregarded due to the fact that 1987 was the base year of standardization. The total regression coefficient (r^2) of 1 during 1987 once again supported this argument.

In the eleven times that it featured, ROCE explained in ten cases between 10% and 38% of the variance in EVA with an regression coefficient of 12.1% during the total 10 year period under review. WACC, on the other hand, featured eight times, but with a regression coefficient of between 2% and 5% with an explanation of 2.5% during the total 10 year period under review. Both these variables explained more or less the same variance as was found in the previous analysis where no inflation adjustments to the data were made. In the case of ROCE, a better explanation than that of ordinary EVA was provided, but in the case of WACC less.

192(a)

**TABLE 7.9 REGRESSION COEFFICIENTS (r^2) OF THE FOLLOWING VARIABLES WITH STANDARDIZED EVA
 (WITH INFLATION ADJUSTMENTS TO DATA)**

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
ROCE	0.121(1)	0.384(1)	0.209(1)	0.133(1)	0.092(1)	0.126(1)	0.106(1)	0.128(1)	0.130(1)	0.227(2)	0.887(1)
NOPBT/CE	0.017(3)		0.040(3)	0.058(2)	0.060(2)	0.106(2)					
NOPBT/SALES											
NOPAT/SALES							0.023(5)				
EBIT/SALES											
SALES GROWTH	0.004(5)		0.016(6)				0.023(5)	0.045(3)		0.734(1)	
RET PROFIT/CE							0.059(2)			0.005(4)	
SALES/CE										0.004(5)	
SALES/NWC		0.011(6)			0.023(4)						
SALES/AVE TOT FIXED ASSETS			0.017(5)							0.003(6)	
WACC	0.025(2)	0.056(2)	0.053(2)	0.020(4)	0.022(5)		0.056(3)			0.021(3)	0.113(2)

192(b)

TABLE 7.9 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
DEBT TO EQUITY RATIO							0.022(6)				
TOT OWNERS INTEREST/CE	0.017(3)		0.025(4)	0.024(3)			0.030(4)				
TOT LONG TERM CAP/CE		0.021(4)						0.048(2)	0.046(2)		
TOT ST BORR + BANK OD/CE											
INVT RATE: CHA IN CE/NOPAT											
CO TAX RATE	0.006(4)										
OPPRERAT LEV		0.017(5)	0.025(4)								
FIN LEVE	0.002(6)	0.025(3)			0.024(3)						
TOTAL r ²	0.192	0.514	0.385	0.235	0.221	0.232	0.319	0.221	0.176	0.994	1.000

Number in bracket indicates ranking

Of the seven profitability ratios, net operating profit before tax divided by capital employed occurred the most (five times) with a regression coefficient that varied between 11% and 2% and an explanation of 1.7% during the total 10 year period under review. Sales growth occurred four times with low regression coefficients. The other ratios appeared once, twice or not at all with low explanation factors if they did appear.

As in the analysis of standardized EVA without inflation adjustments, according to this study, the profitability ratios in this case did not appear to play an important role in explaining standardized EVA. The fact that only ROCE occurred meaningfully, with very few other profitability ratios in support, can be attributed once again to the exclusive or specialised nature of standardized EVA in comparison to ordinary EVA.

The investment rate (change in capital employed divided by NOPAT) can be amongst other variables another important indicator of a company's EVA. In line with the findings of the previous paragraph, this variable never occurred and appeared not to play a significant role.

The balance sheet ratios or variables tested in this regression procedure performed quite badly, with the exception of the same variable in the analysis without inflation adjustments, namely total owners' interest divided by capital employed, as can be observed from Table 7.9. This variable occurs four times and ranged in value around 2% with an explanation of 1.7% for the total 10 year period under review. Both the number of appearances and the regression coefficient itself was less than in the case of standardized EVA without inflation adjustments. Both sales divided by net working capital and sales divided by fixed assets occurred twice. The total long-term capital divided by capital employed ratio appeared three times.

The other occurrences of the balance sheet variables were very low. As was found in the case of the previous regression analyses, according to the results of this study, an explanation for this might be that, although according to literature, capital

employed as amount is central in the EVA calculation, ROCE and WACC weighed more.

What was also surprising in this analysis was that the company cash tax rate appeared only once and according to the results of this study did not appear to play any role at all in explaining standardized EVA with inflation adjustments to data.

The operating and financial leverage occurred less than in the analysis of standardized EVA without inflation adjustments. The explanation that they provided in the variance of standardized EVA varied mostly around 2%. Once again, the reason for their appearance was quite difficult to establish. It might be the fact that these variables are also, in essence, profitability ratios and, whilst such a bad performance was found from the other profitability ratios, it was these that support ROCE in the total explanation of standardized EVA. In addition to this, the inflation adjustments to them implied a smaller role in the regression analysis.

As in the previous cases, this regression analysis must also be discussed in terms of the cumulative regression coefficients recorded per individual year to give an indication of the total explanation of standardized EVA for a particular year.

As mentioned above, both 1987 and 1988 were disregarded in the analysis. If one observes the total of the regression coefficients of the remaining nine periods, there were three years when the total regression coefficient was above 30% and six years when it was between 20% and 30%. On average, there were fewer than six variables per individual year.

Although the cumulative regression coefficient of the total data base for the total 10 year period under consideration was only 19%, it is worthwhile to have a look at the seven variables that it consisted of, due to the fact that these variables represented the most popular occurrences. ROCE explained 12%, other profitability ratios 2%, WACC 2,5% and the balance was made up of relatively small contributions of the remaining variables. All in all, a slightly smaller

explanation factor was obtained than in the case of the previous analyses without inflation adjustments to data.

The cumulative regression coefficient of **1995** was 38.5%. ROCE represented 21%, net operating profit before tax divided by capital employed 4%, sales growth and sales divided by fixed assets 2% each, WACC 5%, total owners' interest divided by capital employed 3% and the operating leverage 2%. There seemed, in this case, to be some balance between the profitability (income statement) and the balance sheet ratios.

One can analyse another couple of years, but at this stage, the patterns that were identified after discussion of the previous regression analyses have already been confirmed: it seems that a better balance between the profitability ratios and the balance sheet ratios was struck in the case of standardized EVA than with ordinary (unstandardized) EVA. Once again, a prudent and solid explanation for this seems difficult to find at this stage.

The regression analysis must also be discussed in terms of the ranking between the various independent variables to the dependent variable, standardized EVA. From Table 7.9 it was observed that ROCE was ranked first during nearly all the individual years, as well as in the total 10 year period under consideration. WACC was ranked second and NOPBT/Sales third during the total 10 year period under consideration.

7.3.6 Concluding remarks

Four different stepwise regression analyses were performed. Their individual results have been discussed, and, to a lesser extent, compared and contrasted to each other. A comparison of the results supports, clarifies or dismisses patterns, trends or conclusions that can be drawn from these in collaboration with the theoretical principles as discussed in this study.

If one observed the regression analyses of EVA as dependent variable with various other independent variables, the importance of the operating profitability variables and margins from the income statement was confirmed. ROCE seemed to be the single most important variable. This finding is not only supported by constantly high regression coefficients (r^2), but also by the fact that ROCE had the highest occurrence in the eleven periods compared with the other variables.

When inflation adjustments to the data were introduced, it was especially ROCE, and to a lesser extent the other profitability ratios, whose appearances increased even more. ROCE, together with two or three additional other profitability ratios explained a substantial part of the variance (as explained by r^2) in a company's EVA. This viewpoint is strongly supported by the literature study on EVA and even by other (economic) models of measuring shareholder value as discussed in Chapter 3 and Chapter 4 of this study.

The balance sheet variables did not provide as big an explanation of EVA as the profitability variables. When inflation adjustments to the data were introduced, their occurrences and relevance appeared to fade even more. The specific compositions of capital employed also did not feature in the regression analyses.

The investment rate (change in capital employed divided by net operating profit after tax) as well as sales divided by capital employed featured a minimum of five times each in the regression analyses.

Although capital employed played an important role in the theoretical and practical quantification of EVA, the results of this study show that capital employed cannot be constituted an important driver of EVA.

There are two other variables that are worth mentioning, namely the weighted average cost of capital (WACC) and the company cash tax rate. Although the appearance of WACC decreased when inflation adjustments were introduced, those of the tax rate increased, but disappointingly enough to only five times. Fact of the

matter is, however, that these two variables provided a constant, although relatively low, explanation of EVA. The theory places especially WACC in the centre of the EVA calculation. Both the company tax rate and WACC can make meaningful contributions in explaining EVA and neither can be ignored in the recommendations that will be made in the next chapter.

As mentioned previously, standardized EVA has a niche application, namely comparing different companies with each other over a period of time. Its use in this regression analyses was to find additional support for the findings and conclusions of "ordinary" EVA. Standardized EVA therefore, had a limited use for the purposes of this study.

Most of the findings, patterns and conclusions on variables, ratios and their grouping as discussed above, also applied to the regression analyses of standardized EVA. The company tax rate was the exception with only one occurrence in each of the two regression analyses.

In **Table 7.10** (overleaf) the regression coefficients of EVA as dependent variable and the other independent variables for the total 10 year period is presented. If one observes the ranking of the regression coefficients, it is clear that ROCE was the winner: in four out of four times it appeared with the highest ranking. There was no variable that ranks second consistently, but WACC ranked third in three out of the four times. The balance sheet ratios rank consistently at the lower end of the spectrum.

In the next chapter, ways in which management can apply value-based management is discussed. Variables that are included in the discussion are advanced as meaningful value drivers and are supported by the findings of all four regression analyses.

197(a)

**TABLE 7.10 REGRESSION COEFFICIENTS (r^2) OF THE FOLLOWING VARIABLES WITH EVA AND STANDARDIZED EVA
(FOR THE TOTAL 10 YEAR PERIOD UNDER REVIEW)**

	Unstandardized without inflation adjustments		Unstandardized with inflation adjustments		Standardized without inflation adjustments		Standardized with inflation adjustments	
ROCE	0.089	(1)	0.139	(1)	0.142	(1)	0.121	(1)
NOPBT/CE			0.007	(6)	0.004	(7)	0.017	(3)
NOPBT/SALES	0.028	(2)						
NOPAT/SALES			0.068	(2)				
EBIT/SALES			0.003	(9)				
SALES GROWTH					0.009	(4)	0.004	(5)
RET PROFIT/CE	0.005	(5)	0.005	(7)				
SALES/CE	0.010	(4)	0.003	(9)	0.002	(9)		
SALES/NWC								
SALES/AVE TOT FIXED ASSETS	0.004	(7)	0.004	(8)				
WACC	0.021	(3)	0.021	(4)	0.015	(3)	0.025	(2)

197(b)

TABLE 7.10 CONTINUED

	Unstandardized without inflation adjustments	Unstandardized with inflation adjustments	Standardized without inflation adjustments	Standardized with inflation adjustments
DEBT TO EQUITY RATIO			0.003 (8)	
TOT OWNERS INTEREST/CE			0.030 (2)	0.017 (3)
TOT LONG TERM CAP/ICE	0.004 (8)		0.003 (8)	
TOT ST BORR + BANK OD/CE			0.007 (5)	
INVT RATE: CHA IN CE/NOPAT	0.004 (8)	0.015 (5)		
CO TAX RATE	0.004 (6)	0.055 (3)	0.005 (6)	0.006 (4)
OPRERAT LEV		0.004 (8)		
FIN LEVE			0.002 (9)	0.002 (6)
TOTAL	0.169	0.324	0.222	0.192

Number in bracket indicates ranking

7.4 CONCLUSION

In a study of this nature, the specific subject is discussed and analysed firstly by means of the relevant literature available. The literature or theoretical principles must be supported by an empirical investigation. It is now appropriate not only to finally compare the theory with the empirical findings, but also to pave the way for one of the most important parts in the whole process: recommendations concerning the implementation of the findings of the empirical results.

Theory predicted that there should be a high relationship between MVA and EVA. One can state that MVA is equal to the sum of all future discounted EVA. Although relatively low correlation coefficients were obtained (the reasons were discussed above), the highest correlation was found between MVA and discounted EVA **with** inflation adjustments to the data.

Other variables that also provided meaningful correlations were those that the theory predicted to be favourites of investors when share prices are set: return on equity (ROE), return on assets (ROA) and earnings per share (EPS). Although these variables are not the best measures of shareholder wealth, they, and a host of other (sometimes strange and not quantifiable) variables, are involved in determining a company's market value.

Once these important relationships between MVA and the specific variables as value drivers of EVA have been confirmed, it is time to analyse EVA as dependent variable within the framework of a stepwise regression analysis with a number of independent variables, and establish the value drivers it consists of.

There are a large number of variables that can determine a company's EVA. Unfortunately, this study was bound by the limitations of the information provided in the companies' annual financial statements. This limitation was imposed due to practical considerations. Some variables that could play a role in explaining a company's EVA should be found in the accountants' working papers used to

compile the financial statements. One is thinking here about ratios such as electricity use per period per machine, or administration costs per product or per division. This type of information does not appear in the published annual financial statements of a company. The results obtained from this study merely serve to point out to the management of a company the main variables or value drivers that have been identified to determine shareholder value. It is the task of management to analyse these main variables further and to apply it to specific operational activities.

As mentioned in Section 7.2.6 of this study, there can be another important reason for the relatively low correlation and regression coefficients obtained in this study. In a study which reveals some similarities to this study, Grant (1997:44) also undertook a regression analysis of EVA. However, his sample of companies consisted only of the top 50 wealth creators, as measured by their EVA. Another sample consisted of the 50 worst companies in terms of their EVA. In comparison, the sample used in this study did not discriminate against a company on the basis of its EVA (the selection criteria are dealt with in Chapter 6 of this study). If one uses a sample of companies with a dependent variable that is "homogenous" in the sense that it is positive, it is safe to assume that the results, in this case correlation and regression coefficients, will be higher than with a sample that contains a mixture of positive and negative EVA or MVA values.

It is against this background that the results of the stepwise regression procedures must be evaluated. Although the regression coefficients were not as high as one might expect, important relations and indications were observed. Profitability variables (income statement ratios), especially return on capital employed, played an important role in the explanation of a company's EVA. This relation increased when inflation adjustments to data were made. Although the balance sheet variables featured less, some of them provided meaningful contributions. A company's weighted average cost of capital (WACC) and its cash tax rate made relatively sizeable contributions in the determination of EVA. These findings were supported by the regression analyses of standardized EVA. The majority of these

findings could be substantiated from the theoretical principles as discussed in the earlier parts of this study.

The results of the empirical findings are used in the next chapter, where recommendations are formalized and applied to operational activities as well as to management decisions and actions in the quest for increasing and optimizing shareholder value.

CHAPTER 8

VALUE-BASED MANAGEMENT

8.1 INTRODUCTION

Chapters 2 to 5 of this study were devoted to a literature study of the issues under discussion, namely a comparison among the accounting-based and economic-based models of determining shareholder value, as well as identifying those variables that determine shareholder value. Chapter 6 spelt out the research methodology, whilst Chapter 7 dealt with the empirical results obtained from the statistical analyses.

It is now necessary to use the empirical results as a basis for recommendations which can be used by management to optimize decision-making.

Value-based management is an approach to management where the company's overall aspirations, analytical techniques, and management processes are all aligned to help the company to maximize its value by focusing management decision-making on the key drivers of value.

The results from the empirical study can now firstly be tested against the hypotheses set out in Chapter 6. Once this has been done, recommendations on how the variables determining shareholder value can be managed and applied to increase the value of a company for its shareholders can be made. Possible results from these actions by management also are discussed.

8.2 CONCLUSIONS FROM EMPIRICAL RESULTS

8.2.1 Hypotheses testing

The first set of hypotheses (as set out in Section 6.4 of this study) to be tested is that of the correlation between MVA and EVA.

The hypotheses containing **standardized** EVA or **standardized** MVA will not be tested, as it has been argued in Chapter 7 that these two variables are, due to their specific nature and niche application of comparing different companies with each other, not applicable to this study. This argument is supported by the results of this study.

If one turns to the other hypotheses, a low (negative) correlation was found between MVA and EVA without inflation adjustments to the data. Possible explanations based on the literature study were advanced. This hypothesis therefore tested positively.

The contrary was found with regard to the correlation between MVA and EVA **with** inflation adjustments to the data. Of all the independent variables tested, the second highest positive correlation was found to exist between MVA and EVA. This was supported by literature on the subject as discussed in this study. The fact that a positive correlation coefficient was obtained also means that this hypothesis tested positively.

The next hypotheses to be tested was that between MVA and **discounted** EVA. There was a low (negative) correlation between MVA and discounted EVA without inflation adjustments to data. This is in line with the low correlation coefficients obtained between MVA and ordinary EVA, and is also supported by literature on this subject. This hypothesis therefore also tested positively.

As was found in the correlation between MVA and ordinary EVA with inflation adjustments, a high correlation coefficient existed between MVA and discounted EVA when the data was adjusted for inflation. In fact, these correlation coefficients were the highest obtained in the analyses. This finding is also supported by the literature which states that MVA is equal to the discounted value of all future EVA. The hypothesis therefore tested positively.

The second set of hypotheses to be tested dealt with the variables that determine EVA, and comprised the stepwise regression analyses.

The variables that explained or contributed the most to EVA were, firstly, a number of profitability ratios (of which ROCE provided the highest explanation), and, secondly, the investment rate (change in capital employed divided by net operating profit after tax). The weighted average cost of capital (WACC) as well as the company tax rate also explained a significant portion of EVA. The balance sheet ratios or variables did not provide significant explanations of a company's EVA.

It can therefore be concluded that the hypothesis tested positive: it is especially the income statement variables that drive or explain EVA and not as much the balance sheet variables.

It must, however, be stressed again that any external analyst has to accept a number of limitations in attempting to do empirical analyses of this nature. The fact that only the published annual financial statements are available to allow one to calculate the necessary inputs for the statistical analyses, limits one, preventing one from analysing certain variables further. The management of a company can, as internal analysts, analyse further the main ratios or variables that they have been pointed to by the results of this study. By doing so, they can arrive at ratios that represent more specific operational activities, and which are not contained in the annual financial statements and therefore in this study.

8.2.2 Conclusions

Since the hypotheses as set out in Section 6.4 of this study have been tested, it is now appropriate to finally reflect on the results of the empirical analyses.

MVA is a method to quantify the value that has been added or subtracted from the total capital employed by a company's shareholders. It is an external performance measure which uses the share market as a basis. EVA is the internal performance

yardstick used to quantify the shareholder wealth that has been created or destroyed by the operating activities of the company and its management.

The literature study has indicated the close relationship between these two variables. Both MVA and EVA consist of a number of building blocks or variables which determine their value. A great deal of "number crunching" is necessary to calculate their values.

A correlation between these two variables can actually be expected to exist after all these theoretical explanations. The empirical analyses provided the proof. The correlation coefficient between MVA and discounted EVA was the highest of all the variables and was at its most positive when inflation adjustments to the data had been made. The second highest correlation coefficient was obtained between MVA and normal EVA. Slightly lower positive correlations were also obtained between MVA and more traditional corporate performance measures such as return on assets (ROA), return on equity (ROE), earnings per share (EPS) and dividends per share (DPS).

From the above, one can conclude that a relatively high relationship exists between a company's (discounted) EVA and MVA. Other traditional measures cannot be disregarded, however, although they are accounting-based measures subject to the accountants' treatment of their calculated values. The fact that they are positively correlated with MVA is proof of the fact that shareholders and thus the market do regard them as indicators of value created by a company from its operating activities.

Once it has been determined that EVA is arguably the best indicator of the market value that has been created or destroyed by management, it is logical to analyse EVA in terms of its variables or components.

If one turns to the stepwise regression analyses done with EVA as dependent variable with a number of independent variables, then the profitability ratios,

(income statement ratios), namely return on capital employed (ROCE), net operating profit after tax divided by sales (the margin) and earnings before interest and tax divided by sales provided the best explanation. The investment rate (change in capital employed divided by net operating profit after tax), WACC and the company tax rate also provided significant contributions. No meaningful results were obtained from various balance sheet ratios.

The results obtained from the empirical results either support the theory or possible explanations for them could be provided. Using these results and interpretations as a basis, the final step in this study can be attempted: recommendations to management on managing and creating shareholder wealth in the most efficient way.

8.3 RECOMMENDATIONS

8.3.1 Introduction

The recommendations derived from the empirical results of this study are presented in a "value-based management framework". There are a number of ways in which one can express or explain the concept of value-based management. It is important to recognize that there are some basic principles that can be found in any system of value-based management.

Weston and Copeland (1992: 709) provided the following four sequential steps as part of a value-based management system:

(a) Diagnostic scan:

- * this is done by top management;
- * it involves a "quick and dirty" analyses; and
- * it establishes key hypotheses.

(b) Restructuring:

- * value the company and each business unit;
- * establish strategic and operating improvements; and
- * understand financial engineering opportunities.

(c) Value-based planning:

- * build into the annual cycle;
- * establish dialogue between all levels of employees;
- * understand value drivers of total operating activities;
- * separate factors under management control from external factors; and
- * allocate capital based on value-creation potential.

(d) Value-based compensation:

- * tie compensation to value created.

The objective of value-based planning is not merely to value business units, but to help managers understand how their actions affect the value of the company, and to focus continually, through the value drivers, on value-creating opportunities.

In Section 8.3.2 aspects regarding the variables which determine value, as well as incentives to encourage managers to use these variables, are discussed.

8.3.2 Recommendations based on the study

The relevance of the variables that determine shareholder value were discussed in Chapter 7 as well as in the earlier parts of Chapter 8. The recommendations based on the results from this study entail a discussion of what management can do to improve the identified value drivers.

All decisions taken in a company that affect these variables eventually affect the wealth of shareholders. Moreover, management should specifically set out on a

mission to re-assess these value drivers in order to make them more value-enhancing. Thereafter, strategies and actions to continually manage the value drivers should be second nature to management.

The variables that undoubtedly have the biggest impact on shareholder value are the various income statement or profitability ratios. Return on capital employed (ROCE) is the most important, and a number of other profitability ratios also contribute to a significant degree. In order to improve profitability margins in a company, it is recommended that the following actions be undertaken:

- (a) Increase the gross profit margin by lowering the cost of sales through more efficient production, optimizing inputs and substituting inputs without affecting product quality.
- (b) Reduce operating expenses by calculating and monitoring (reducing) ratios of the various operating costs to output (sales). As is indicated later, these ratios are not only industry-specific, but depend on the specific operating activities of the company.
- (c) Achieve relevant economies of scale for each of the value activities.
- (d) Introduce mechanisms to improve the rate of learning, for example standardization, product design modifications and improved scheduling.
- (e) Find cost-reducing linkages with suppliers based on suppliers' product design, quality, packaging and order processing.
- (f) Find cost-reducing opportunities within the product distribution channels.
- (g) Eliminate overheads that do not add value to the product.

It must be stated that only variables that determine shareholder value as expressed at "company level" are dealt with here. This is especially applicable in the case of the profitability ratios. In order to be more effective, profitability ratios need to be broken right down to an "operating" or "grassroots level". At this level, cost inputs such as the optimal size of delivery truck, fuel consumption or machines and labour utilization can be utilized to improve profitability ratios.

However, the specific "grassroots" profitability ratios depend entirely on the type of operations that the specific company is engaged in. It falls beyond the scope of this study to go into detail in this regard. The study can simply point the manager in the direction of analysing and implementing those relevant ratios that contribute to the profitability ratio at company or shareholder level.

Another variable that makes a significant contribution towards shareholder value is the weighted average cost of capital (WACC). In order to increase shareholder wealth, WACC must be lowered and the following recommendations in this regard can be made:

- (a) Target an optimal capital structure.
- (b) Select least-cost debt and equity instruments.
- (c) Reduce business risk factors in a manner consistent with overall company strategy.

At this stage, a few comments on decreasing WACC are in order.

A number of the various factors that determine a company's WACC are not under the control of management, but are in the hands of the monetary and fiscal policy-makers of the country. These are factors such as the general interest rate level and the tax rate. Management can, however, through negotiation and by making use of all relevant incentives that might exist, achieve lower interest and tax rates

which in turn have a positive effect on a company's WACC.

Recall that traditional accounting calculations of a company's net profit after interest and tax do not take the total charge for the use of capital, namely WACC, into consideration, but only the interest payable on debt. The cost of equity is usually the biggest portion of a company's WACC. Although this sub-variable is more difficult to influence (decrease) through management's actions, the mere fact that management is aware that WACC's use is not only to evaluate capital investment projects, but that WACC has a sizable influence on company shareholder wealth creation, goes a long way towards achieving value-based management. It has been demonstrated that WACC can, to some, extent be influenced in order to have a positive influence on the wealth that management can create for shareholders.

The company tax rate is another variable that has an influence on a company's EVA, and therefore on shareholder value. According to the results of this study in Chapter 7 it was found that the company tax rate is of significant importance (as represented by r^2) in explaining EVA.

Although the company tax rate is set by the fiscal authorities (in essence the government), there are a number of ways in which a prudent company can minimize its tax burden. This can entail complicated tax schemes and structures that include offshore companies in tax havens. Most listed companies have professional tax managers that can concentrate on this issue. It falls beyond the scope of this study to discuss this matter in detail. What is recommended, however, is that a company's management or the responsible employees must see to it that all available tax incentives and deductions are used to the fullest possible extent.

Although the balance sheet ratios or variables provided by far the least explanation of a company's EVA, efficient management of both working and fixed capital investment can contribute towards more overall efficiency in operations and

enhanced shareholder value.

The following actions are recommended for working capital investment:

- (a) Minimize cash balances.
- (b) Manage accounts receivable to reduce the average number of days debt outstanding.
- (c) Minimize investment in inventory without impairing the required level of customer service. Increase inventory turnover.
- (d) Make maximum use of non-interest-bearing current liabilities such as creditors and taxes. Obtain best terms with suppliers in this regard.

The following actions are recommended for fixed capital investment :

- (a) Promote policies to increase utilization of fixed assets.
- (b) Obtain productivity-increasing assets by means of prudent project or investment evaluation techniques, such as net present value.
- (c) Sell unused or under-utilized fixed assets if possible.
- (d) Obtain assets at the lowest possible cost, for example, lease versus purchase.
- (e) Set levels of utilization or returns on assets employed.

Once again, the specific actions that a company can undertake to ensure better asset management depend on the industry the company is operating in, as well as on the company's specific operating activities.

8.4 CONCLUSION TO THE STUDY

In the literature part of this study, the main emphasis fell on drawing a distinction between the accounting-based and the economic-based models of determining shareholder value. It has been demonstrated that the economic-based models, and EVA in particular, have distinct advantages in determining value created (or destroyed) by the management of a company.

After the variables that can determine shareholder value as represented by the EVA of a company had been identified, the research methodology, including the statistical techniques as well as the boundaries of the sample used, was set out. The results of the empirical analyses were reported and compared with the theoretical principles. Recommendations on how the results that emerged can be used in practice were made.

Finally, some comments can be made on the variables which determine shareholder value (value drivers) and on possible pitfalls to avoid when using them in practice.

Although the key variables were identified by means of the statistical analyses above, the value drivers need to be broken down to grassroots level. These value drivers depend on each company's unique situation and identifying them can be a process that requires some trial and error. Operating margins can be split up according to product, geography or consumer segment. If a company is struggling to match the skills of its sales force against a given customer segment, better results might be obtained if such a ratio is measured on a geographic basis.

The key value drivers are not static. They must be reviewed periodically. In many cases, the company's reporting systems are not equipped to supply the necessary information, but a manager who has the necessary knowledge, abides by value maximization principles and above all, has the **incentive** to identify and manage those variables, can go a long way towards implementing the necessary information systems.

The value drivers can also not be considered in isolation. A price increase might have a large impact on value through an increased profit margin, but not if it results in a substantial loss of market share. A scenario analysis can be employed to understand the interfaces among value drivers. It falls beyond the scope of this study to pursue this matter further, however.

It must also be remembered that adopting a value-based mindset and finding the value drivers gets one only half way. Managers must establish processes that bring this value mindset to life in the daily activities and decision-making of the company. Value-based thinking must be embraced by line management as an improved way of making decisions. For value-based management to work, it must eventually involve all decision-makers throughout the company.

Four key management processes that collectively guide and govern value-based management in an organization, are the following:

- * strategy development;

- * target setting;

- * budgets; and

- * performance measurement with incentive systems as reward.

In most cases it is to the advantage of shareholders (with little agency cost involved) that management have an incentive scheme to induce them to adopt value-based management and actively manage those variables that determine shareholder value. Such an incentive scheme can be based on value created as measured by the EVA of a company over a period of time. Management can be remunerated (or penalised) on the basis of value created (or destroyed).

Practising value maximization is not easy, but EVA and its variables may be the answer.

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APPENDIX A

ALPHABETIC LIST OF COMPANIES IN SAMPLE

A-V-I	ADCOCK
AECI	AFCOL
AFROX	ALEXANDR
ALPHA	ALTRON
AMIC	AMREL
BARLOWS	BEARMAN
BERZACK	BIDVEST
BIVEC	BOUMAT
BTRDUN	CADSWEP
CASHBIL	CGS-FOOD
CGSMITH	CHARTER
CMI	CNAGALO
CONCOR	CONFRAM
CONSOL	CTP
CULLINAN	DA-GAMA
DALYS	DON
DORBYL	ED-LBATE
EDGARS	ELLERINE
ENGEN	FINTECH
FOODCRP	FORWARD
FOSHINI	FRALEX
FRAME	GOLDSTEIN
GRINAKE	GRINCOR
GROUP-5	HAGGIE
HARWILL	HIVELD
HLH	HUDACO

HUNTCOR	I-&-J
ICS	INMINS
ISCOR	JDGROUP
JOHNNIC	KAROS
KERSAF	KLIPTON
KOHLER	KWV-BEL
L-T-A	LASER
LEFIC	LENCO
LIONMATCH	LONRHO
M&R-HLD	MALBAK
MASHOLD	MCCARTHY
METCASH	METCOR
MOBILE	NAMPAK
NAMSEA	NEI-AFR
NEIHOLD	NICTUS
NUCLICKS	OCEANA
OCFISH	OMNIA
OMNICOR	OTIS
OZZ	PEP
PEPGRO	PEPKOR
PERSBEL	PICKNPAY
PIKWIK	PLATE-GL
POWTECH	PPC
PREM-GRP	PROFURN
PUTCO	RANDMIN
REMBR-BEH	REMGRO
REUNERT	ROMATEX
SA-BREWS	SAFREN
SAPPI	SASOL
SEARDEL	SENTRCHEM
SHOPRIT	SILTEK
SISA	STANTRN

STORECO	SUNCRUSH
T-&-N	T-M-L
TEGKOR	TIB
TIGR-OATS	TOLARAM
TONGAAT	TOYOTA
TRENCOR	UNI HOLD
USKO	VOLTEX
WALHOLD	WINBEL
WINHOLD	WOOLTRU