# THE EFFECT OF FIRM CHARACTERISTICS AND ECONOMIC FACTORS ON THE CAPITAL STRUCTURE OF SOUTH AFRICAN LISTED INDUSTRIAL FIRMS

**by**

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# DECLARATION

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# ABSTRACT

The objective of almost all firms should be to maximise the wealth of shareholders. To achieve this goal, firms should use an optimal combination of debt and equity, which will consequently result in the lowest weighted average cost of capital. Firms therefore need to determine their target capital structure. This will require firms to be aware of the various factors that can influence their decision-making regarding capital structure.

The effects of firm characteristics and economic factors on capital structures have been researched in many countries. Various South African studies have been conducted on this topic; however, limited research was found where both the firm characteristics and economic factors were included in the same study. The majority of South African studies furthermore either focused on a specific industry on the Johannesburg Securities Exchange Limited (JSE) or their focus was predominantly on the theory of capital structure applied by South African firms. Most of the studies were also conducted for the period prior to the demise of apartheid in 1994.

Six firm characteristics (profitability, asset structure, liquidity, business risk, growth and size) and three economic factors (interest rate, inflation and economic growth) were identified for this study. The primary objective was to determine the effect of firm characteristics and economic factors on the capital structure of South African listed industrial firms.

External databases were used to obtain the data needed for statistical analysis. McGregor BFA (2008) was used to obtain the data required to calculate the measures for the firm characteristics. This database contains annual standardised financial statements for listed and delisted South African firms. INET-Bridge (2005), Statistica South Africa (2006) and the South African Reserve Bank (SARB) website were used to obtain data for the economic factors.

The study was conducted for a period of 14 years, from 1995 to 2008. Focusing only on those firms that are listed at the end of the selected period would have exposed the study to a survivorship bias. The census for this study, therefore, included all firms listed on the industrial sector of the JSE, as well as those firms that delisted

during the selected period. Firms had to provide financial data for at least five years in order to be included in this study. This requirement was incorporated since the data set contains cross-sectional and time-series dimensions. The final census included a total of 280 firms (170 listed firms and 110 delisted firms), providing 2 684 complete observations for the firm characteristics and 14 complete observations for the economic factors.

The results from this study indicated that the growth of firms and the interest rate may be the most important firm characteristic and economic factor, respectively, to consider in financing decisions. The study furthermore indicated that differences exist between the results obtained for book value leverage and those obtained for market value leverage. An important observation is that the results are stronger when the performance of the variables in the preceding year is included. Not only are the $R^2$ values higher, but the independent variables also reported to be more significant when one-year lag variables are included. This may indicate that capital structure takes time to adjust. Differences between listed firms and delisted firms are also evident from the results. Lastly, it appears that the firms included in the study overall, lean more towards the pecking order theory than towards the trade-off theory.

Based on these results, it appears that firm characteristics and economic factors do have an effect on capital structures of listed industrial firms in South Africa. Firms should, therefore, take these factors into consideration when making their optimal capital structure decisions.

# OPSOMMING

Dit behoort die doelwit van byna alle firmas te wees om die welvaart van aandeelhouers maksimaal te verhoog. Om hierdie doelwit te bereik, moet firmas ’n optimale kombinasie van geleende kapitaal en ekwiteit gebruik, wat gevolglik sal lei tot die laagste geweegde gemiddelde koste van kapitaal. Firmas moet dus hulle beoogde kapitaalstruktuur bepaal. Dit sal van firmas vereis word om bewus te wees van die verskillende faktore wat ’n invloed op hul kapitaalstruktuur-besluite kan hê.

Die uitwerking van 'n firma se eienskappe en ekonomiese faktore op kapitaalstruktuur is al in baie lande nagevors. Verskeie Suid-Afrikaanse studies is in dié verband gedoen, maar daar is beperkte navorsing waar beide firma eienskappe en ekonomiese faktore in dieselfde studie ingesluit is. Die meerderheid Suid-Afrikaanse studies het gefokus op ’n spesifieke nywerheid op die Johannesburg Sekuriteite-beurs Beperk (JSE) of die hooffokus was op die teorie van kapitaalstruktuur soos deur Suid-Afrikaanse firmas toegepas. Die meeste van die studies is ook gedoen vir die tydperk voor die afskaffing van apartheid in 1994.

Ses eienskappe van firmas (winsgewendheid, batestruktuur, likiditeit, sakerisiko, groei en grootte) en drie ekonomiese faktore (rentekoers, inflasie en ekonomiese groei) is vir die studie geïdentifiseer. Die primêre doelwit was om die uitwerking van firmas se eienskappe en ekonomiese faktore op kapitaalstrukture van genoteerde nywerheidsfirmas in Suid-Afrika te bepaal.

Eksterne databasisse is gebruik om die data wat vir statistiese ontleding nodig was, te bekom. McGregor BFA (2008) is gebruik om die nodige data vir die berekening van die maatstawwe vir die firma se eienskappe te bekom. Hierdie databasis bevat jaarlikse, gestandaardiseerde finansiële state vir genoteerde en gedenoteerde Suid-Afrikaanse firmas. INET-Bridge (2005), Statistica South Africa (2006) en die Suid-Afrikaanse Reserwebank (SARB) se webtuiste is gebruik om die data vir die ekonomiese faktore te bekom.

Die studie is uitgevoer vir ’n tydperk van 14 jaar, van 1995 tot 2008. Deur slegs op daardie firmas wat aan die einde van die navorsingstydperk genoteer was, te fokus sou die studie aan ’n oorlewingsydigheid blootstel. Die sensus vir die studie het, dus,

genoteerde firmas op die nywerheidsektor van die JSE asook daardie firmas wat gedurende die geselekteerde tydperk gedenoteer is, ingesluit. Firmas moes finansiële data vir ten minste vyf jaar verskaf om by die studie ingesluit te word. Hierdie vereiste is gestel aangesien die datastel beide deursnee- en tydreeks-dimensies bevat het. Die finale sensus het ’n totaal van 280 firmas (170 genoteerde firmas en 110 gedenoteerde firmas) ingesluit, waaruit 2 684 volledige waarnemings vir die firma se eienskappe en 14 volledige waarnemings vir die ekonomiese faktore gemaak kon word.

Die resultate van hierdie studie dui moontlik daarop dat die groei van firmas en die rentekoers, onderskeidelik die belangrikste eienskap van 'n firma en ekonomiese faktor is om te oorweeg by finansieringsbesluite. Die studie dui verder daarop dat die resultate, onderskeidelik verkry vir boekwaarde-hefboomwerking en markwaarde-hefboomwerking, verskil. ’n Belangrike opmerking is dat die resultate sterker is wanneer die prestasie van die veranderlikes in die voorafgaande jaar ingesluit word. Nie alleen is die $R^2$-waardes hoër nie, maar die onafhanklike veranderlikes blyk ook om meer beduidend te wees wanneer een-jaar-vertraagde veranderlikes ingesluit word. Verskille tussen genoteerde firmas en gedenoteerde firmas is ook duidelik uit die resultate van die studie. Laastens wil dit blyk dat die firmas in die studie oor die algemeen meer leun na die pikorde-teorie ("pecking order theory") as na die kompromis-teorie ("trade-off theory").

Op grond van hierdie resultate wil dit voorkom asof 'n firma se eienskappe en die ekonomiese faktore wel 'n uitwerking het op die kapitaalstrukture van genoteerde nywerheidsfirmas in Suid-Afrika. Firmas moet dus hierdie faktore in ag neem wanneer hulle besluite neem rakende hul besluite oor optimale kapitaalstruktuur.

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# TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

# Chapter 1

# INTRODUCTION TO THE STUDY

## 1.1 INTRODUCTION

One of the most debated topics in corporate finance is capital structure. The focal point of this debate revolves around the existence of an optimal capital structure. This question has challenged and fascinated academics and practitioners ever since Modigliani and Miller's article on capital structures in 1958.

The overriding goal for almost all firms is to maximise shareholders' value as well as the value of the business as a whole. To achieve this, firms need to determine their target capital structure by taking their internal and external environment into consideration. Based on previous studies and empirical research, six firm characteristics (size, growth, asset structure, liquidity, profitability and business risk) and three economic factors (interest rate, inflation, economic growth) were identified for this study.

The effects of these firm characteristics and economic factors on capital structures have been researched in various countries. Various South African studies have been conducted on the topic of capital structures; however, limited research was found where both the firm characteristics and economic factors were included in the same study. The majority of the South African studies furthermore either focused on a specific industry on the Johannesburg Securities Exchange Limited (JSE) or their focus was predominantly on the theory of capital structure applied by South African firms. Most of the studies were also conducted for the period prior to the demise of apartheid in 1994 (Louw, 1983; Harry, 1990; Jordaan & Smit, 1993). In this study, all South African firms listed in the industrial sector of the JSE during the period 1995 to 2008 were considered. Primary research was conducted to determine the effect of these identified firm characteristics and economic factors on the capital structures of those firms listed in the industrial sector of the JSE.

This chapter starts with a background sketch to the study. A discussion of the formulation of the research problem and the objectives of the study is provided. This is followed by a discussion of the research methodology of the study and an orientation towards the study concludes this chapter.

The results from this study should benefit firms in South Africa when they attempt to determine their optimal capital structures. By combining the results from this study with their own characteristics, it can guide them in determining their target capital structure. Ultimately, this could contribute to the maximisation of shareholders' value and the value of the firm as a whole.

## 1.2 BACKGROUND TO THE STUDY

Modigliani and Miller's article on the irrelevance of capital structure in 1958 was the beginning of a debate on this subject that continues after 50 years of research. Modigliani and Miller declared that in a world of frictionless capital markets, there would be no optimal financial structure (Schwartz & Aronson, 1967). This theory was based on restrictive assumptions such as perfect capital markets, homogenous expectations, no taxes and no transaction costs. New dimensions have been added to this debate since some of the assumptions they made were unrealistic. Modigliani and Miller adjusted their own model in 1963 by including company tax. In 1977, Miller (1977:261) wrote an article which also incorporated personal tax.

A reconciliation of theoretical and empirical investigation in this area has resulted in two major theories of optimal capital structure: the trade-off theory and the pecking order theory (Myers, 1984). In the application of the trade-off theory, firms who use debt as a source of financing should weight the benefits of using debt against the various costs associated with debt (for example, costs of financial distress and agency costs). The pecking order theory states that firms will consider all methods of financing available and use the least expensive source first (Myers, 1984:581–582). The order of financing will consequently be as follows: retained earnings, debt and finally the issuing of new equity. According to Myers (2001:81), each theory works out under its own assumptions, which implies that there is no universal theory of debt-equity choice.

For firms to create value, they have to make investments that will generate positive net present value cash flows. These cash flows are generated from the use of the firm's assets. These assets in turn, are financed by sources of financing. In general, the three main ways of financing is to issue new shares, to use retained earnings or to borrow money through debt instruments. These different sources of financing make up the capital structures of firms.

Debt is a cheaper form of financing than the issuing of new shares, but a firm cannot make use of debt only. During periods of high interest rates, debt can cause the earnings on an investment to be wiped out by the high interest payments and this could thus be a very risky financing option. On the other hand, issuing shares only in an attempt to raise funds can also be risky because a firm must use cash to fund new investments, while shares cannot always generate cash at the time the firm needs to pay for the new investment (Huang & Vu Thi, 2003:21).

This knowledge makes it clear that firms need to combine these different sources of financing. Theoretical research to date has shown that firms can influence their value by varying their ratio between debt and equity (Titman & Wessels, 1988; Harris & Raviv, 1991; Bolton & Scharfstein, 1996). It appears that the decisions regarding capital structure could impact on the success and future prosperity of the firm. But how do firms choose the amounts of debt and equity in their capital structures? This relates to the question already raised regarding an optimal capital structure.

Capital structures differ from country to country and from industry to industry; the debt-equity choice even varies between companies within the same industry. According to Thompson and Wright (1995), the variations in capital structure from country to country might be due to variations in the determinants of capital structure that operate at the firm level, rather than real differences between countries (Hall, Hutchinson & Michaelas, 2004:712). This is supported by Myers's (1984) argument that differences in capital structures between industries might be due to firm-specific attributes rather than industry differences.

This implies that each firm should concentrate on their own unique characteristics when making capital structure decisions. Research done by Titman and Wessels (1988) for U.S. data, and by Rajan and Zingales (1995) for an international study,

documented that leverage is related to firm-specific characteristics such as profitability, investment opportunities, tangibility of assets or volatility (Drobetz, Pensa & Wanzenried, 2007:2). Therefore, their debt-equity combination must be aligned with their objectives. Each firm has to determine a target capital structure according to their characteristics and the environment they operate in.

One main objective that all firms should have in common is the maximisation of shareholders' value and the value of the business as a whole. The decisions financial managers make will impact on the overall performance of the firm and it will determine how the firm is perceived by investors and its shareholders. According to Ehrhardt and Brigham (2003:442), the value of a business based on the going concern expectation is the present value of all the expected future cash flows to be generated by the assets, discounted at the company's weighted average cost of capital (WACC) (De Wet, 2006:2). The target capital structure is therefore the ideal combination of debt and equity under current market conditions that result in the lowest possible WACC, which will ultimately maximise the value of the business as a whole.

WACC has a direct impact on the value of a business. The inputs that determine the WACC are very dynamic and are affected by an ever-changing environment. This implies that a specific optimal capital structure cannot exist for a long period of time. In order to keep up with this ever-changing environment, firms need to focus on factors external to the firm that can have an impact on the combination of debt and equity they decide on. Significant variability in economic indicators can be found in the South African economy over the past two decades.

When making capital structure decisions, it may appear that managers' main concerns are to decide between debt and equity, but this is far from being the case. As previously mentioned, external factors must also be taken into consideration. According to the literature, it is evident that internal and external factors should be considered when dealing with capital structure decisions. Due to limited South African research, this study focused specifically on the effect of firm characteristics and economic factors on the capital structure of firms listed in the industrial sector of the JSE.

## 1.3 RESEARCH PROBLEM

From the above it is clear that the optimal combination of debt and equity capital plays a crucial role in achieving the overriding goal of financial management. In order to achieve this, it is necessary for firms to determine their target capital structure. This requires firms to be aware of the various factors that can influence their capital structure decision-making.

According to Baral (2004), the capital structure of a firm is determined by various internal (firm characteristics) and external (economic) factors. Based on previous studies and empirical investigations, six firm characteristics (profitability, asset structure, liquidity, business risk, growth and firm size) and three economic factors (interest rate, inflation and economic growth) were selected for this study (Harris & Raviv, 1991; Hutchinson & Hunter, 1995; Wald, 1999; Baral, 2004; Hall *et al.*, 2004; Drobetz *et al.*, 2007; Eriotis, Vasiliou & Ventoura-Neokosmidi, 2007).

Various studies on this topic have already been conducted in different countries. Similar studies have also been conducted in South Africa. The majority of those studies were, however, conducted before 1994. Furthermore, the predominant focus of those studies was to determine which theory of capital structure is applied by South African firms.

The reason for this study was therefore to determine the effect of firm characteristics and economic factors on the capital structures of listed industrial firms in South Africa.

### 1.3.1 Objectives of the study

The primary objective of this study was to determine the effect of firm characteristics and economic factors on the capital structure of South African listed industrial firms.

Furthermore, the following secondary objectives were formulated:

- analyse whether the firm characteristics can explain variance in capital structure;

- analyse whether the economic factors can explain variance in capital structure;
- determine if different results are obtained for book value leverage and for market value leverage;
- determine if different results are obtained for firms that remained listed on the JSE and firms that delisted from the JSE during the selected study period of 14 years; and
- conclude if the findings of the firms included in the study correspond more with the trade-off theory or the pecking order theory.

### 1.3.2 Statement of hypotheses

A hypothesis is a conjectural statement of the relationship between two or more variables that can be tested with empirical data (McDaniel & Gates, 1998:30). The null hypothesis ($H_0$) is used to test statistical significance. The null hypothesis states that no difference exists between the population parameter and the sample statistics being compared to it (Cooper & Schindler, 2006:494). The main objective of this study was to determine the effect of firm characteristics and economic factors on the capital structure of South African listed industrial firms and, therefore, the following hypotheses have been formulated:

$H_0$: Capital structure is not affected by firm characteristics and economic factors.

$H_A$: Capital structure is affected by firm characteristics and economic factors.

## 1.4 RESEARCH METHODS

### 1.4.1 Secondary research

Secondary research refers to information that has been collected for some other purpose and is readily available (Gerber-Nel, 2004:11). According to McDaniel and Gates (2000), one of the main advantages of secondary research is that it may provide necessary background information to a particular research study and build creativity for the research report.

In order to solve research problems, researchers use secondary data. If the problem is not solved, primary research needs to be conducted. Secondary data sources can be obtained from internal records or external sources. External sources can either be published data, syndicate sources or external databases (of which the internet forms an integral part) (Cant, Gerber-Nel, Nel & Kotzé, 2005:69). External data sources were used for the purpose of this study. Firstly, a vast number of academic publications were included in a thorough analysis of the existing literature for this particular study. These publications were used to provide an extensive theoretical background to the study. External databases were used to obtain the data needed for statistical analysis. McGregor BFA (Pty) Ltd (2008) was used to obtain the data required for the firm characteristics and INET-Bridge (2005), Statistics South Africa (2006) and the website of the South African Reserve Bank (SARB) (2007) were used to obtain data relating to the economic factors.

### 1.4.2 Primary research

Primary sources of information are those that have originated directly as a result of a particular problem under investigation (McDaniel & Gates, 2001:25). In primary research, the analyst is responsible for the design of the research, the collection of the data, and the analysis and summary of the information (Stewart & Kamins, 1993:3). Even though secondary data were used in the study, the data (in its original form) obtained through secondary research were not sufficient to provide an answer to the research question. It therefore required that primary research be conducted to collect specific information to answer the research question.

The primary research process addressed the following steps: determining the research frame, data collection and data processing.

#### *1.4.2.1 Defining the research frame*

As already mentioned, the primary objective of this study was to determine the effect of firm characteristics and economic factors on the capital structure of South African listed industrial firms. The target population for this particular study was, therefore, all firms listed in the industrial sector of the JSE. All the firms that provided the

necessary information were included, hence the use of a census instead of a sample.

The study was conducted from 1995 to 2008. The focus was on post-1994, because the South African economy has undergone significant changes since the demise of apartheid in 1994 (Bhorat & Oosthuizen, 2005:1). The removal of trade and financial sanctions along with a successful political transition contributed significantly to a turnaround in the performance of the South African economy since 1994 (Du Plessis & Smit, 2006:15).

At the end of the selected period, all South African firms were considered, but since a majority of those firms' financial data are not publicly available, the focus of this study was on all firms listed on the JSE. Firms included in the mining and financial sector were, however, excluded since their financial characteristics and their use of leverage are considerably different from firms in other sectors. Furthermore, firms that operate in these two sectors incorporate different types of business activities and their financial statements are very different to those of firms in other sectors. This makes comparisons between firms more difficult. The industrial sector is, however, representative of the vast majority of firms operating in the South African business environment. The census is therefore restricted to the industrial sector of the JSE

Focusing only on those firms that are listed at the end of the selected period would expose the study to a survivorship bias. In order to reduce survivorship bias, it was important to include those firms that delisted during the period investigated in this study. Both listed and delisted firms during the selected period were, therefore, included in the study. Due to the inclusion of both listed and delisted firms in the study, it was decided to divide the full data set (containing all firms) into two sub-sets of firms (listed firms and delisted firms). This was done to determine whether differences may exist between listed and delisted firms. This was also identified as one of the secondary objectives of the study.

Finally, firms had to provide financial data for a period of at least five years in order to be included in the study. This requirement was incorporated in the study since the data set contains cross-sectional and time-series dimensions. A data set that

contains both of these two dimensions is classified as panel data. Since the data set contained observations on different firms over a series of time periods, a period of at least five years was required to obtain sufficient observations for this study. This also reduces instability amongst firms in the industrial sector, thus providing more reliable results.

To conclude, the census for this study included all firms listed in the industrial sector of the JSE, as well as those firms that delisted during the selected period. By incorporating the above-mentioned requirements, the final census included a total of 280 firms. The census comprised of 170 listed firms and 110 delisted firms. This study was conducted for a period of 14 years, namely 1995 to 2008.

## 1.5 DATA COLLECTION

In this stage of the research process, the actual collection of data takes place. Quantitative research was conducted to achieve the primary and secondary objectives of the study. According to Coldwell and Herbst (2004:15), this approach describes, infers and resolves problems by using numbers. The quantitative approach was applied to this study, since financial ratios and economic indicators (numbers) were used to answer the research question.

Financial ratios were used as measurement instruments to define capital structure (the dependent variable), and the firm characteristics. Several instances may occur where data are missing from a firm's financial data. This could be the result of unpublished information such as when a firm does not disclose its annual turnover. Another obstacle was where the denominators of certain ratios equalled zero, since it does not signify a true zero. For example, if a firm does not disclose its cost of sales figure, the calculation of the turnover time of inventory would equal zero since the denominator (cost of sales) is not available. To overcome this obstacle, these years and or ratios were deleted from the data set. As was mentioned earlier, a firm had to provide complete financial data for at least five of the selected 14 years to be included in the study. This requirement resulted in the exclusion of 163 firms, leaving the final census with a total of 280 firms with 2 684 observations.

The income statement, balance sheet and sundry data items were obtained from the financial statements of all the firms included in the census. An external database, McGregor BFA (2008), was used to gain access to these financial statements in a standardised format. The year-end share prices of all the firms included in the sample were also obtained from the McGregor BFA (2008) database.

Economic indicators were used as measure instruments for the three economic factors (interest rate, inflation rate and economic growth) included in the study. These economic indicators were obtained from INET-Bridge (2005), Statistics South Africa (2006) and the website of the South African Reserve Bank (SARB) (2007).

## 1.6 IDENTIFYING THE VARIABLES AND THE MEASUREMENTS USED TO QUANTIFY THEM

The following table provides a summary of the dependent and independent variables, as well as the measurements used to quantify these variables.

**Table 1.1: Dependent variable and independent variables**

| IDENTIFIED | MEASURED |
|---|---|
| Dependent variable | |
| Capital structure | Debt-equity ratio ($DE_{BV}$ & $DE_{MV}$) |
| Independent variables | |
| A) Firm characteristics | |
| Profitability | Return on assets (ROA) |
| Asset structure | Fixed assets-to-total assets (FA/TA) |
| Liquidity | Current ratio (CR) |
| Business risk | Adjusted return on assets (adjusted ROA) |
| Growth | Market-to-book ratio (M/B) |
| Size | Natural logarithm of sales (ln [sales]) |
| B) Economic factors | |
| Interest rate | Prime interest rate (PR) |
| Inflation | Change in the consumer price index (CPI%) |
| Economic growth | Change in the gross domestic product (GDP%) |

* The abbreviations in the above table will be used throughout the study when referring to the measurement instruments of the variables.

## 1.6.1 Dependent variable

### *1.6.1.1 Capital structure*

The dependent variable for this study was capital structure and it was defined as the debt-equity ratio. Both book value and market value leverage were used as dependent variable, since researchers cannot reach consensus on which measure of leverage is the best to use to quantify capital structure. Another secondary objective was thus identified to determine whether different results will be obtained for book value and market value leverage.

The measures used in this study to calculate the dependent variable are therefore calculated as follow:

$$\mathbf{DE_{BV}} = \frac{\text{book value of total debt}}{\text{preference share capital} + \text{book value of ordinary equity} + \text{minority interest}}$$

$$\mathbf{DE_{MV}} = \frac{\text{book value of total debt}}{\text{preference share capital} + \text{market value of ordinary equity} + \text{minority interest}}$$

where:

Total debt = long-term and short-term interest-bearing debt

Book value of ordinary equity = distributable reserves plus non-distributable reserves + ordinary share capital

Market value of ordinary equity = market capitalisation (market price X number of issued ordinary shares)

## 1.6.2 Independent variables

The independent variables for this study were divided between six internal (firm characteristics) and three external (economic) factors.

### *1.6.2.1 Profitability*

Profitability refers to the ability of a firm to generate earnings compared to its assets. This variable was measured by the ratio of return on assets and it is quantified as:

$$\mathbf{ROA} = \frac{\text{EBIT}}{\text{total assets}}$$

where:

EBIT = earnings before interest and tax (including extraordinary items)

Total assets = non-current assets + current assets

#### *1.6.2.2 Asset structure*

The asset structure of a firm refers to the composition of a firm's assets. This is defined as the ratio of the fixed assets divided by the total assets of the firm. The measure used to calculate asset structure is:

$$\textbf{FA/TA} = \frac{\text{fixed assets}}{\text{total assets}}$$

where:

Fixed assets = property, plant and equipment less depreciation

#### *1.6.2.3 Liquidity*

Liquidity refers to the ability of a firm to fulfil its short-term obligations, hence the ease with which a firm's current assets can be converted into cash. In this study, the current ratio was used to calculate liquidity and it is given by:

$$\textbf{CR} = \frac{\text{current assets}}{\text{current liabilities}}$$

where:

Current assets = total stock + debtors + short-term loans + cash and bank + other current assets

Current liabilities = short-term borrowings + creditors + bank overdraft + provision for taxation + provision for dividends

#### *1.6.2.4 Business risk*

According to Ward (1993), business risk refers to the effects of uncertainties in the environment on the earning ability of a firm. An adjusted return on assets (excluding extraordinary items) was used to calculate the business risk of firms, since return on assets is affected by uncertainties in the business environment. The calculation is therefore given by:

$$\textbf{Adjusted ROA} = \frac{\text{operating profit} + \text{investment income}}{\text{total assets}}$$

#### *1.6.2.5 Growth*

The market-to-book ratio used by Rajan and Zingales (1995), Booth, Aivazian, Demirgüc-Kunt and Maksimovic (2001) and Cheng and Shiu (2007), was applied in this study. The measure for growth is given by:

**M/B ratio** = $\frac{\text{market value of equity}}{\text{book value of equity}}$

where:

Market value of equity = preference share capital + market capitalisation of ordinary shares + minority interest

Book value of equity = ordinary share capital + preference share capital + distributable reserves + non-distributable reserves + minority interest

#### *1.6.2.6 Size*

The most commonly used measurements for firm size are based on annual sales and total asset values. According to Frank and Goyal (2004:17), the logarithm of sales has a more powerful effect on leverage than the logarithm of assets. Based on Frank and Goyal's (2004) argument, the measure used in this study to quantify size is:

**ln (sales)** = natural logarithm of sales revenue

#### *1.6.2.7 Interest rate*

In this study, the prime interest rate was used to measure interest rates in South Africa, since this rate represents the price that firms included in the study would most probably have to pay on borrowed funds. The interest rate is therefore given by:

**PR** = prime interest rate of South Africa

#### *1.6.2.8 Inflation*

The changes in the CPI inflation rate of South Africa were used for this study, since the CPI is generally used by the South African Reserve Bank as a measure for the inflation rate in South Africa. It is:

**CPI%** = the change in the consumer price index

#### *1.6.2.9 Economic growth*

Changes in the GDP growth rate of the South African economy were used as a measure for economic growth. The economic growth rate is most conveniently measured by GDP and most prior empirical studies used this economic indicator as a measure for economic growth. This economic variable is:

**GDP%** = the change in the gross domestic product growth rate

## 1.7 DATA PROCESSING

During data processing, the data is firstly prepared and then analysed (Cant, Gerber-Nel, Nel & Kotzé, 2003:54). Data preparation is the process of converting the raw data to a reduced form that is appropriate for analysis and interpretation (Coldwell & Herbst, 2004:96). The data obtained from the external database (McGregor BFA, 2008), were in raw form and needed to be converted into a usable format, which was done through Microsoft Excel (2003). Once the data had been prepared and the accuracy verified, it was entered into a computer using Statistica Version 9 (2009) and SAS® software (2008) for further analysis.

The purpose of data analysis is to generate meaning from the raw data collected (Coldwell & Herbst, 2004:92). Two data analysis options are available: descriptive and inferential statistics. Both of these options were used in this study.

### 1.7.1 Descriptive statistics

Numerical descriptive statistics was used in this study to summarise and present the data. According to Keller (2005:90), these values should provide a better understanding of the nature of the data and it is very important for the development

of statistical inference. The following descriptive statistics measures were included in the study:

- **Mean:** The mean is the measure of central tendency and it reflects all the values in a data set (Coldwell & Herbst, 2004:102).

- **Median:** According to Coldwell and Herbst (2004:103), the median is the middle observation of a data set and is considered more appropriate than the mean when a data set contains extreme outliers.

- **Variance:** This measure, and its related measure, the standard deviation, are used to measure variability. According to Keller (2005:102), this statistic measure is useful when comparing two or more data sets.

- **Standard deviation:** This measure determines how far away from the mean the data values typically are (Cooper & Schindler, 1998:467).

- **Minimum and maximum values:** These two values represent the range of a particular data set. According to Cooper and Schindler (1998:467), the range may indicate the homogeneity (small standard deviation) or heterogeneity (large standard deviation) of the distribution.

- **Kurtosis:** This is a measure of shape and it measures the peakedness (or flatness) of a distribution relative to a normal distribution (Cooper & Schindler, 1998:468).

- **Skewness:** This also represents a measure of shape and it measures the extent to which a distribution deviates from symmetry (Cooper & Schindler, 1998:468).

### 1.7.2 Inferential statistics

According to McDaniel and Gates (2001:413), the basic principle of statistical inference is that it is possible for numbers to be different in a mathematical sense but not significantly different in a statistical sense. Statistical differences are defined by a selected level of significance. Three levels of significance were considered in this study: 1%, 5% and 10%.

- **Correlation analysis**

The main purpose of conducting a correlation analysis is to measure the strength of association between two variables (Keller, 2005:602). Various methods of correlation analysis exist and the method to be used in a study depends on the nature of data of that particular study at hand.

The Pearson Product Moment correlation method is a parametric type of statistical test and it is applied to populations with a normal distribution (Keller, 2005:602). The Spearman Rank Order correlation method is a non-parametric type of test and is applied to a data set of which the population is not normally distributed or when considering severely skewed data.

The results from the descriptive statistics should reveal the nature of the data, whether the data are parametric or non-parametric. It will, therefore, indicate which correlation method should be used in the study.

- **Regression analysis**

If a researcher is interested in more than the nature of a relationship between variables, a regression analysis may also be conducted to further describe the nature of the relationship. According to Hair, Bush and Ortinau (2006:177), the objective of this type of analysis is to predict a single dependent variable (y) from the knowledge of one or more independent variables ($X_1$ to $X_k$). Regression analysis can take the form of either a simple regression analysis or a multiple regression analysis. The following regression analyses were conducted in this study:

  - **Simple regression:** According to Hair *et al*. (2006:177), this is a regression model with a single independent variable and it describes the relationship between one dependent and only one independent variable.

  - **Multiple regression:** This is a multivariate statistical technique that is used when a study has two or more independent variables. Since this study includes nine independent variables, a multiple regression analysis was also conducted.

The data set for this study contained panel data for which the application of regression analysis is much more complex. Panel data means that a data set contains observations on a variety of units observed over a series of time periods for different firms (Keller, 2005:650). The data set for this study did contain a variety of units (nine independent variables) that were observed over a period of 14 years for 280 different firms. This was an important observation since it indicated which procedure to use for the regression analysis. For panel data, the time-series-cross-section regression procedure (TSCSREG) in SAS® was used to conduct the simple and the multiple regression analyses.

## 1.8 ORIENTATION OF THE STUDY

The orientation of the study was as follows:

**Chapter 1 INTRODUCTION TO THE STUDY**

This chapter provides a background sketch to the study, formulates the research problem and objectives, and discusses the research method of the study.

**Chapter 2 CAPITAL STRUCTURE THEORIES**

This chapter provides an in-depth discussion on the various sources of financing available to management, together with the costs associated with each source. This is followed by an extensive overview of the different theories of capital structure that have evolved since Modigliani and Miller (1958) stated that capital structure is irrelevant to firm value.

**Chapter 3 FIRM CHARACTERISTICS AND ECONOMIC FACTORS**

This chapter provides an in-depth discussion on variations that exists in capital structures and the effect that certain internal and external factors may have on capital structure decisions. With the support of prior theoretical and empirical research, six internal factors (firm characteristics) and three external factors (economic factors) were identified to better explain the financing decisions of firms. Each of these factors was discussed in detail with regard to the effect it might have on capital structures.

### Chapter 4 RESEARCH METHODOLOGY

This chapter focuses on the research methodology of the study. Business research is discussed and this is followed by an elaborate discussion on the research process applied for the analysis in the study. The latter part of this chapter focuses on reliability and validity to ensure the trustworthiness of the research results.

### Chapter 5 RESEARCH RESULTS

The empirical results obtained from the statistical tests conducted, as explained in Chapter 4, are presented in Chapter 5. These results refer to the effect of six firm characteristics and three economic factors on the capital structure of firms listed in the industrial sector of the JSE. The results from both descriptive and inferential statistics are discussed.

### Chapter 6 SUMMARY, FINDINGS AND MANAGERIAL IMPLICATIONS

This chapter starts with a broad summary of the study's results. Based on the research results in Chapter 5, the findings are interpreted and managerial implications of these findings are provided. The chapter concludes with possible areas for future research.

# Chapter 2

# CAPITAL STRUCTURE THEORIES

## 2.1 INTRODUCTION

The overriding goal of most companies is to create value for shareholders and maximise the overall value of the firm (Brigham & Daves, 2004:5). Various financial researchers have concluded that the value of a firm is a product of its free cash flows and weighted average cost of capital (WACC). The argument is that the value of a firm is the present value of its expected future cash flows, discounted at its weighted average cost of capital (Brigham & Daves, 2004:487). In order to maximise the value of a firm as a whole, management need to make investments in assets in order to generate cash flow. To make investments in assets, they have to acquire funds, either by using equity or by making use of debt instruments. If management is able to choose an optimal financing combination of debt and equity, referred to as the optimal capital structure, it can minimise its WACC and maximise its share price. The end result will be the maximisation of shareholders' wealth and subsequently the value of the firm.

This chapter will start with an in-depth discussion on the various sources of financing available to management, together with the costs associated with each source. This will be followed by an extensive overview of the different theories of capital structure that have evolved since Modigliani and Miller (1958) stated that capital structure is irrelevant to firm value.

## 2.2 SOURCES OF FINANCING, COST OF CAPITAL AND THE ESTIMATION OF WACC

For firms to create value, they have to make investments that will generate positive net present value cash flows. These cash flows are generated from the use of the firm's assets. These assets in turn, are financed by sources of financing, which make up the capital structure of the firm. This is illustrated in Figure 2.1:

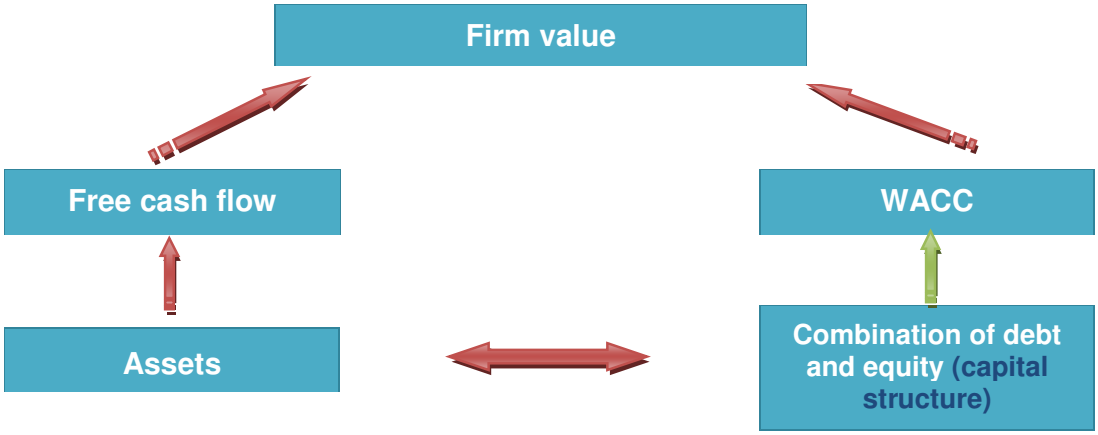


**Figure 2.1: A graphical depiction of how to maximise the overall value of a firm.**

The capital structure of a firm consists of various sources, which are presented in the equity and liability side of the balance sheet. A firm has three main sources of financing, also called capital components (Brigham & Daves, 2004:296), at their disposal to fund new investment opportunities. It includes the use of retained earnings (internal equity), issuing new shares (external equity) or borrowing money through debt instruments (debt capital). These sources of financing constitute the capital structure of a firm and also reflect the ownership structure of the firm (Huang & Vu Thi, 2003:20). Internal and external equity represent ownership by the shareholders, while debt capital represents contributions by debt holders.

The financing decisions made by management are vital for the financial well-being of the firm. Unwise decisions can ultimately result in bankruptcy. According to Jefferson (2001) absolutely nothing is more important to a new business than raising capital. The way that money is raised can, however, have an enormous impact on the success of a business. This argument may be applicable to all businesses and not only to new businesses.

How a firm chooses the combination of debt and equity in their capital structure depends on various factors such as the characteristics of the firm, the economy and the perceptions and objectives of the managers. Financial literature provides different views on how management makes their capital structure decisions.

Researchers such as Miller and Modigliani (1966), Kraus and Litzenburger (1973), Jensen and Meckling (1976), Kim (1978) and DeAngelo and Masulis (1980), to mention only a few, all support the view that management's first priority is to evaluate the various costs and benefits associated with the use of both debt and equity. Management will base their decision with regard to the combination of debt and equity on these various costs and benefits. According to these researchers, management will be able to set up an optimal capital structure, which can maximise the value of the firm.

This, however, is only one side of the debate on capital structures. Researchers such as Myers and Majluf (1984), Rajan and Zingales (1995) and Leland and Pyle (1977) argue that management will consider all methods of financing available and use the least expensive source first (Myers, 1984:581–582). According to Titman and Wessels (1988), highly profitable firms are usually less leveraged than their less profitable counterparts because they often use their earnings to pay down debt. In addition, Masulis and Kowar (1986) and Asquith and Mullins (1986) found that firms tend to issue equity following an increase in stock prices. This implies that firms that perform well subsequently reduce their leverage (Hovakimian, Opler & Titman, 2001:1).

Although theoretical and empirical research provide mixed evidence with regard to the existence of an optimal capital structure, financial theory still provides some help in understanding how the financing mix could affect the firm's value (Eriotis *et al.*, 2007:321).

As mentioned earlier, debt and equity are the two main sources of financing. Before management can make any decision with regard to the proportion of debt and equity they want to use in their capital structure, it is important that they are aware of all the different elements of both sources and of the advantages and disadvantages offered by both debt and equity. In addition, certain costs (costs of use) are associated with the use of both debt and equity. The cost of capital is therefore an important consideration in the firm's decision-making process. Furthermore, the cost of capital used to analyse financing decisions, should be a weighted average of the various capital components' costs (Brigham & Daves, 2004:296). In the following sections,

the two main sources of financing, the cost of the capital components and the estimation of a firm's WACC will be discussed in detail.

### 2.2.1 Debt

Debt financing means that firms borrow money in order to obtain the capital they require for capital expenditure. It represents any agreement between a lender and a borrower: notes, certificates, bonds, debentures, mortgages and leases. The main characteristic of debt financing is that the amount borrowed, plus interest, must be paid back to the providers of debt over a given period of time. The interest rate that must be paid on the borrowed money, together with a repayment schedule will be set out in the contract between the lender and the borrower. If the borrower does not fulfil their obligations set out in the contract, it can negatively impact on their credit rating, make it more difficult to obtain funds in the future and it can also lead to financial failure. Even if a firm suffers financially and is not able to make the scheduled payments, they still have an obligation towards the debt providers. Therefore, any form of debt must be recorded in the balance sheet of a firm, because if bankruptcy occurs, the debt provider must be paid back with the remaining assets of the firm.

Debt can either be short-term or long-term. Short-term debt represents funds needed to finance the daily operations of the firm, such as trade receivables, short-term loans and inventory financing. These types of funds' repayment schedules take place in less than one year. Long-term financing is usually acquired when firms purchase assets such as buildings, equipment or machinery. The scheduled repayments for these funds extend over periods longer than one year.

Debt financing provides various advantages and disadvantages to the firm, namely:

**Advantages**

- The institution that lends the money to the firm does not gain an ownership interest in the business; the firm retains ownership and control.

- The lenders of debt do not share in the profits of a firm. A firm's only obligation is to make payments in a timely manner. Once the borrowed money is paid back, there are no more obligations toward the lenders.

- Debt funding is quick to obtain, thus acquisitions or major projects tended to be funded by debt, if possible (Allen, 1991:113).

- Debt financing offers a tax advantage, because the interest payments on the loan are deductible for tax purposes.

**Disadvantages**

- A firm is obliged to make timely payments on the debt as set out in the contract. If the firm does not fulfil this obligation, it can negatively influence the credit rating of the firm and make future borrowing more difficult.

- Sometimes financial institutions seek security for their funds, which means a firm can lose business or personal assets if they default on their payments.

- A firm is always exposed to the risk of bankruptcy when they make use of debt financing.

Debt financing provides various advantages to a firm, but when considering the possible disadvantages, it is evident that a firm cannot make use of only debt in their capital structure. Management need to incorporate other financing sources to lower their risk, especially in terms of bankruptcy. If a firm uses only debt in their capital structure, outside investors will most probably reject that company as a possible investment due to the large risk it carries. Providers of debt could also be less willing to lend funds to the firm because the risk of default is too high.

### 2.2.2 Equity

Equity enables the firm to obtain funds without incurring debt. This means that the funds obtained through equity do not have to be repaid at a particular time. The investors who purchase shares in the firm hope to reclaim their investment out of future profits. The shareholders have the privilege to share in the profits of the firm in the form of dividends or future capital gains. However, if the firm suffers a loss, the

shareholders have limited liability, which means that the only loss they face is the amount that they had invested in the firm.

There are two kinds of equity: internal equity and external equity (Myers, 1984:581). Internal equity refers to the retained earnings of a firm which forms part of the firm's distributable reserves. When distributable profit is determined in the income statement, the firm has to decide what proportion of that profit will be paid out as dividends to the ordinary shareholders. The remaining amount represents the retained earnings and this amount will be carried over to the firm's distributable reserves in the balance sheet. The retained earnings therefore represent the amount that is reinvested back into the firm.

External equity refers to outside capital which is obtained through the issuing of new shares. It generally consists of ordinary share capital and preference share capital. A firm has to raise external equity when its internal equity (retained earnings) is not sufficient for the required investment opportunity. When a firm raises too much capital though equity issues, it could be interpreted as a signal to the market that it does not have sufficient reserves or cash flows, and this could result in the undervaluation of the firm's shares. When investments are financed with external equity, the share prices of firms sometimes fall. Therefore, it is better to build up reserves so that a higher proportion of capital needs can be supplied from internal sources (Narayanan, 1988:48). According to Leland and Pyle (1977), the proportion of equity used by the firm acts as a signal of the quality of the firm.

Equity financing provides various advantages and disadvantages to a firm, viz.:

**Advantages**

- A firm does not have to pay the money back that they obtain through an equity issue. Therefore, the firm reduces the risk of bankruptcy.
- A firm and its shareholders have a common interest with regard to success, growth and profitability.
- Dividend payments are not compulsory; therefore, if the firm has cash flow problems, they do not have to pay dividends to the shareholders.

- Investors, depending on who they are, can offer valuable business assistance by bringing valuable skills, contacts and experience to the firm.

**Disadvantages**

- The shareholders become part-owners of a firm and thus gain a say in business decisions. This can cause ownership interest to become diluted, which means that management faces a loss of control over the firm.

- The process to obtain equity is demanding, time consuming and costly. If a firm needs funds quickly, equity financing is not the best option. This can cause the firm to lose out on a good investment opportunity.

- A firm has to provide regular information to the shareholders to monitor the performance of the firm.

Equity could appear to be a very good financing option, especially because a firm has no obligation to repay the funds to the shareholders (while they do have to repay financing to debt providers). However, when considering the disadvantages of equity, it is evident that the use of only equity in the capital structure will also not be a very wise decision by management.

### 2.2.3 Combination of debt and equity

When considering the characteristics of and the various advantages and disadvantages associated with debt and equity, it is clear that firms should consider a combination of these different sources of financing. As already mentioned, using only debt in the capital structure can be very risky (especially due to the risk of bankruptcy, because the more debt a firm uses, the higher the bankruptcy risk). During periods of high interest rates, it can cause the earnings on an investment to be wiped out by high interest payments (Huang & Vu Thi, 2003:21). Issuing only shares in an attempt to raise funds can also be a very risky option. The main reason is because a firm must use cash to fund new investments, while shares may not generate cash at the time the firm needs to pay for the new investment (Huang & Vu Thi, 2003:21).

Theoretical research to date has indicated that firms can influence its value by varying its ratio of debt and equity (Titman & Wessels, 1988; Harris & Raviv, 1991; Bolton & Scharfstein, 1996). The main argument is that firms need to find an optimal combination of debt and equity that will ultimately increase the overall value of the firm. Therefore, it appears that the decisions regarding capital structure could impact on the success and future prosperity of the firm.

### 2.2.4 Cost of capital components

Another consideration when deciding on a capital structure is the cost of the capital components. It was already mentioned that the main sources of financing are internal equity (retained earnings), external equity (ordinary shares and preference shares) and debt. The one common feature in all these capital components is that the investors who provide funds expect to receive a return on their investment (Brigham & Daves, 2004:296). Each of these capital components have a cost associated with it, which can be regarded as the costs of using it.

The retained earnings of a firm are that portion of its distributable profit that is not paid out to shareholders in the form of dividends; it is the amount that is reinvested in the firm. This will incur an opportunity cost for the shareholders since those retained earnings could have been paid out as dividends. If they had been paid dividends, the shareholders could have reinvested that money in other investments. Consequently, according to Brigham and Daves (2004), a firm should earn at least as much on its reinvested earnings as its shareholders themselves could earn on alternative investments of equivalent risk.

The cost of debt refers to the rate of return debt holders require on the funds they provide to the firm. Firms will normally use a combination of debt sources such as bonds, debentures and loans. At the beginning of the planning period management would most probably not know the exact types and amounts of debt that will be used. They will, however, more or less have an idea what forms of debt are typical for the firm. Therefore, an approximate cost of debt is known, since the promised rate of return is always one of the terms of a debt contract (Armitage, 2005:316). The cost of debt is the interest rate on new debt and not the interest rate on existing debt, thus the marginal cost of debt is required. Also, the cost is computed as an after-tax cost

since the debt payments are tax deductible expenses (Brigham & Daves, 2004:298). This makes it comparable to the cost of equity, which is also an after-tax cost. The cost of both short-term and long-term debt is therefore the rate at which the present value of the interest payment obligations (after tax) and the capital redemption/amortisation are set equal to the initial amount borrowed.

The cost of equity represents the opportunity cost of investing in a firm's shares, meaning that a firm should offer a reasonable rate of return to their shareholders for bearing risk. The cost of equity should, therefore, attract the attention, and maintain the interest of outside investors. In the case of preference shares, a firm has to pay preference dividends to the preference shareholders before ordinary dividends can be declared. These dividends are usually expressed as a fixed percentage of the preference share capital; however it is not mandatory that preference dividends are paid. Preference dividends are not tax deductible, unlike the interest on debt, which means a firm has to bear the full cost. Therefore, the cost of preference shares should reflect the preferred dividend and the absence of tax deductibility (Brigham & Daves, 2004).

The cost of ordinary/common shares are more difficult to estimate because ordinary share capital carries no explicit cost (Huang & Vu Thi, 2003:21). As was the case with debt, the shareholders of a firm also require a certain rate of return on their investment. Seeing that most investors are risk averse, they expect a return in excess of the risk-free rate, called the risk premium, as a reward for bearing risk. In order to provide this rate of return, the firm must earn more on their new equity than the required rate of investors, because there are commissions and fees, called flotation costs, when a firm issues new equity (Brigham & Daves, 2004:300). The cost of equity reflects the riskiness of an investment in a firm's shares.

The estimation of the cost of equity has been the subject of extensive debate by various researchers such as Bruner, Eades, Harris and Higgens (1998) and Welch (2004). The cost of equity is typically estimated using the CAPM (capital asset pricing model), APT (arbitrage pricing theory) or variants of the dividend growth model (Cooper & Davydenko, 2001).

### 2.2.5 Weighted average cost of capital

It was already mentioned that a firm will employ different types of capital in its capital structure, due to differences in risk, and that each of these capital components has its own required rates of return. In financial management, a weighted average of the various costs is used to analyse a firm's cost of capital (Brigham & Daves, 2004:296). This is called the weighted average cost of capital (WACC). In order to determine WACC, a firm will make use of its cost of equity, cost of debt, the tax rate and values (weights) of debt and equity in the capital structure (Cohen, 2002).

The following equation is used to determine WACC:

$$WACC = w_d k_d(1-T) + w_p k_p + w_c k_s$$

where:

- $w_d$, $w_p$ and $w_c$ are the weights used for debt, preferred equity and common equity (retained earnings and common stock), respectively;
- $k_d(1-T)$ is the after-tax cost of debt;
- $k_p$ is the cost of preferred equity; and
- $k_s$ is the cost of common equity.

(Brigham & Houston, 2004:371)

The above equation to determine the WACC is also illustrated in Figure 2.2. It provides a graphical depiction of the various components and costs applicable to determine the weighted average cost of capital of a firm.

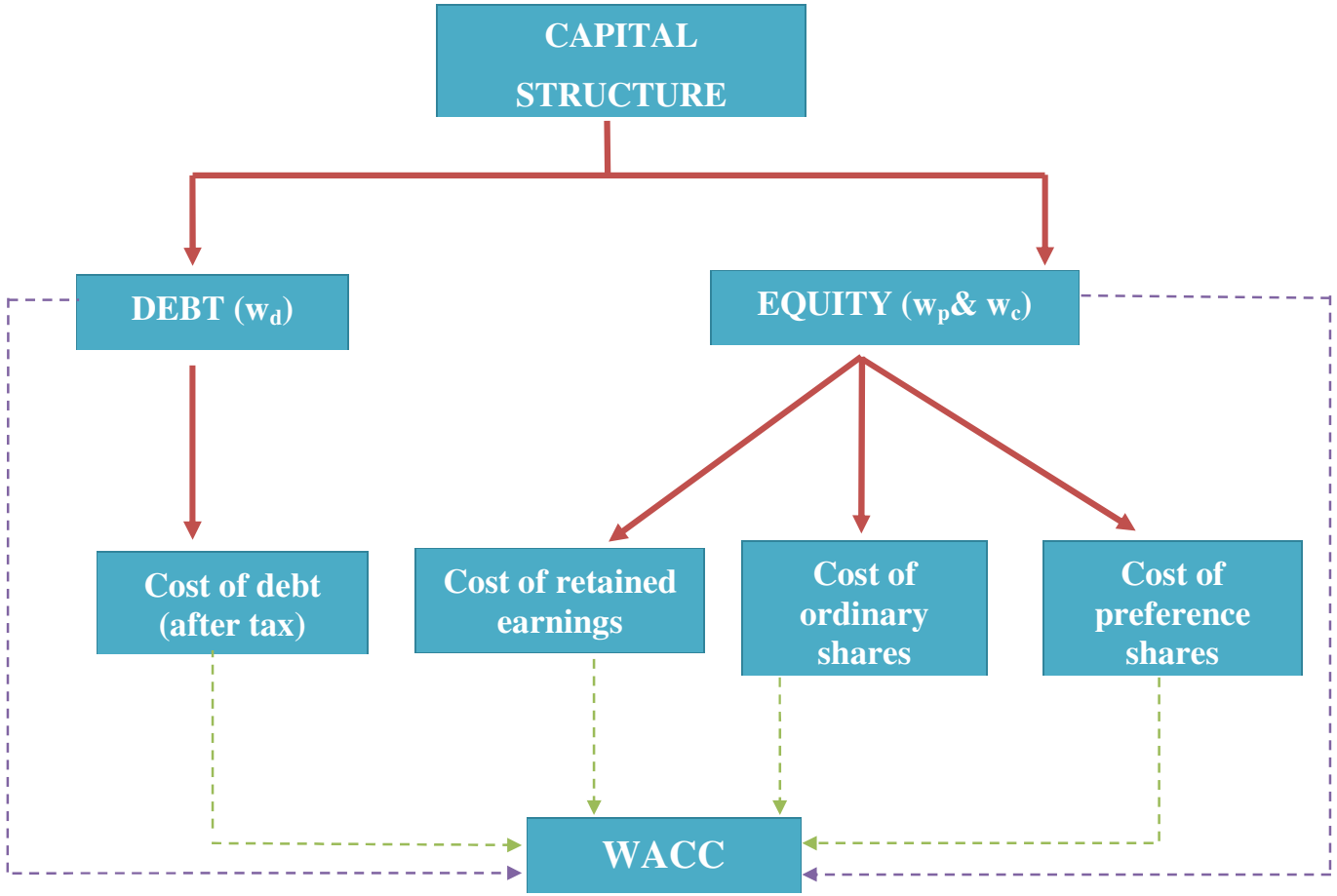


**Figure 2.2: A graphical illustration of determining the WACC**

The value of a firm is the present value of its expected future cash flows, discounted at its weighted average cost of capital. Thus, the value of a firm is a function of its free cash flows and its cost of capital (Brigham & Daves, 2004:487). This is supported by Ehrhardt and Brigham (2003:442) who state that the value of a business based on the going concern expectation is the present value of all the expected future cash flows to be generated by the assets, discounted at the company's WACC. This implies that the value of a firm can change by affecting either its free cash flows or cost of capital.

Various factors have an influence on WACC. Some of these factors are beyond the control of a firm, such as interest rates and tax rates. However, the firm can directly impact on its cost of capital through its capital structure policy, its dividend policy and its investment policy (Brigham & Houston, 2004:373–375). The effect on a firm's cost of capital due to its financing decisions will be illustrated in Table 2.1.

**Table 2.1: The effect of different debt/asset ratios on share price and on WACC**

| D/A ratio | D/E ratio | $k_d$ | EPS= DPS | Estimated beta | $k_s$ | Estimated price | P/E ratio | WACC |
|---|---|---|---|---|---|---|---|---|
| 0% | 0.00% | 4.8% | $2.40 | 1.50 | 12.0% | $20.00 | 8.33 | 12.00% |
| 10 | 11.11 | 4.8 | 2.56 | 1.60 | 12.4 | 20.65 | 8.06 | 11.64 |
| 20 | 25.00 | 5.0 | 2.75 | 1.73 | 12.9 | 21.33 | 7.75 | 11.32 |
| 30 | 42.86 | 5.4 | 2.97 | 1.89 | 13.5 | 21.90 | 7.38 | 11.10 |
| **40** | **66.67** | **6.0** | **3.20** | **2.10** | **14.4** | **22.22** | **6.94** | **11.04** |
| 50 | 100.00 | 7.2 | 3.36 | 2.40 | 15.6 | 21.54 | 6.41 | 11.40 |
| 60 | 150.00 | 9.0 | 3.30 | 2.85 | 17.4 | 18.97 | 5.75 | 12.36 |

*D/A ratio = Debt/asset ratio
*D/E ratio = Debt/equity ratio
*P/E ratio = Price earnings ratio
*EPS = Earnings per share
*DPS = Dividend per share

Source: Adapted from Brigham and Houston (2004:493)

The table above illustrates the effect of changes in the weights of debt and equity on the WACC of a firm. As the debt ratio increases, the cost of debt and the cost of equity rise. At a debt level of 0%, the WACC equals 12%. As the debt level increases, the WACC decreases accordingly until the capital structure reaches a debt level of 40%. When the firm uses 40% debt in its capital structure, the WACC of the firm reaches a minimum of 11.04%, after which it starts to rise again. An increase in debt levels to 40% therefore minimises WACC.

This, however, is not the only change indicated in the table. It is also important to notice that at a level of 40%, the estimated share price of the firm reaches its maximum, after which it starts to decrease again. This means that an optimal capital structure occurs at a combination of 40% debt and 60% equity, since at this ratio the WACC is minimised, and consequently the value of the firm is maximised. These changes in the WACC and the share prices are also illustrated in Figures 2.3 and 2.4.

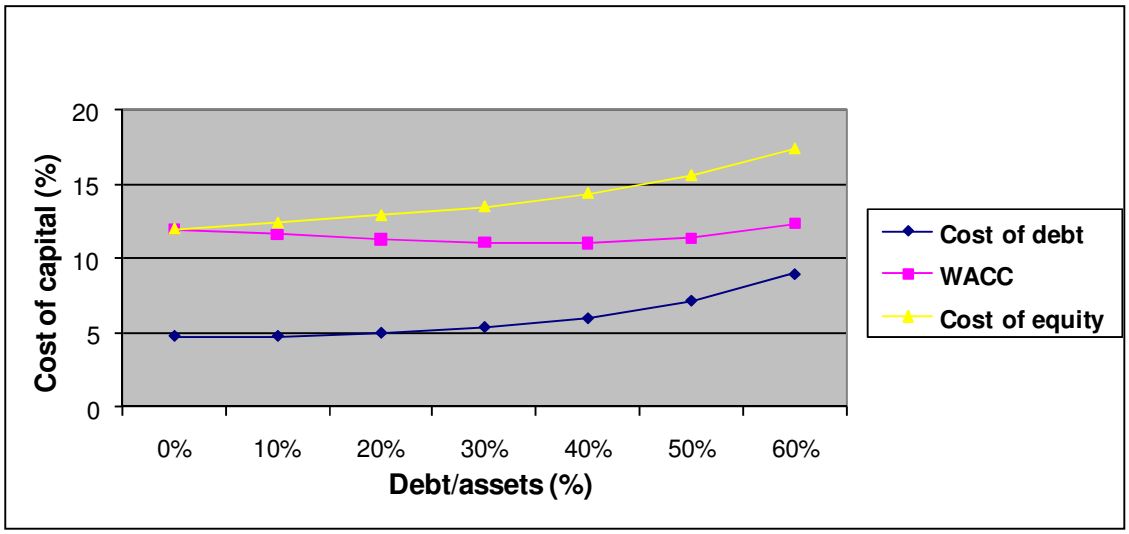


**Figure 2.3: The effect of capital structure on the WACC.**

Source: Adapted from Brigham and Houston (2004:493).

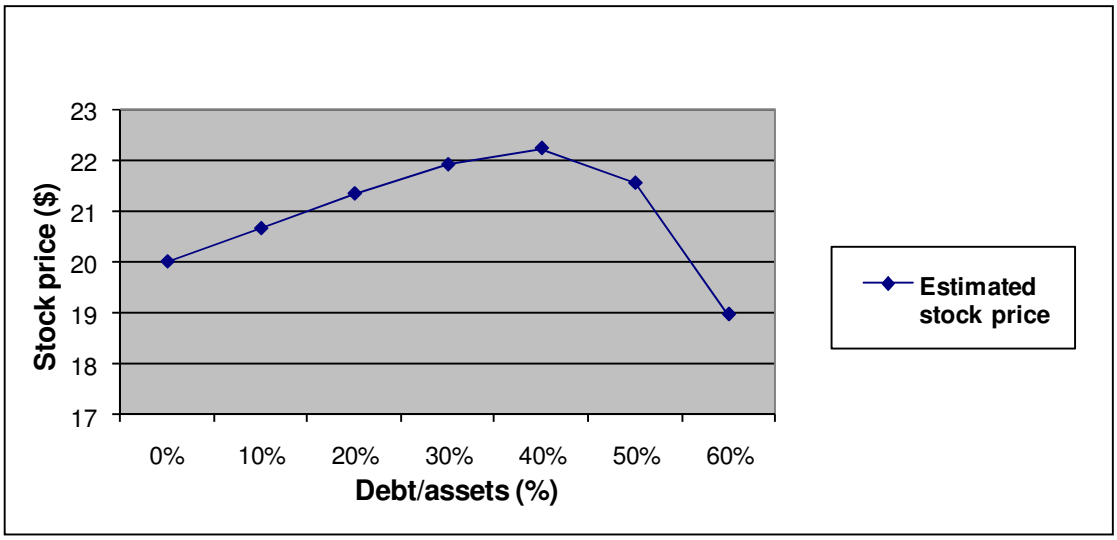


**Figure 2.4: The effect of capital structure on estimate share prices.**

Source: Adapted from Brigham and Houston (2004:493).

This scenario is supported by various theoretical and empirical studies in an attempt to determine whether an optimal capital structure does exist. Hsieh (1993:14), Ehrhardt and Brigham (2003:442) and De Wet (2006), all express the view that a firm should choose a combination of debt and equity which will lead to the lowest WACC and, consequently, to the maximum value for the firm as a whole. This combination is referred to as the optimal or target capital structure of a firm.

### 2.2.6 Conclusion on sources and costs of financing

In the discussion on the various sources of capital, it was stated that firms have three main sources of financing available: internal equity, external equity and debt. It is important that firms are aware of the various advantages and disadvantages of these sources, because any incorrect funding decision can be detrimental to a firm. Another important aspect to consider is the costs that each of these capital components carry, since these costs are all included in the equation to determine the weighted average cost of capital (WACC) of a firm. The WACC is used in valuation, capital budgeting, goal-setting, performance measurement and regulation. Its value is one of the most important issues in corporate finance (Cooper & Davydenko, 2001). The objective of most firms is to maximise their value. This objective can be

achieved by choosing the correct combination of debt and equity. The correct combination can minimise its WACC, and subsequently, maximise the firm's value.

## 2.3 CAPITAL STRUCTURE THEORIES

Each firm's management team attempts to maximise the overall value of the firm by employing an optimal capital structure for that particular firm. This has resulted in the development of different capital structure theories to explain firms' financing decisions and the variation in capital structures of firms over time or across regions (Shah & Hijazi, 2004:605).

The irrelevance capital structure theory by Modigliani and Miller (1958) was the beginning of a debate on the subject of an optimal capital structure. In their article, "The cost of capital, corporation finance and the theory of investment", they demonstrated that the market value of a firm is independent to its capital structure (Modigliani & Miller, 1958). In the irrelevance capital structure theory they concluded that the use of debt in a firm's permanent capital structure will not increase its value. However, this theory was based on restrictive assumptions such as perfect capital markets, homogenous expectations, no taxes and no transaction costs.

Therefore, Modigliani and Miller declared that in a world of frictionless capital markets, there would be no optimal financial structure (Schwartz & Aronson, 1967). These assumptions are not only very restrictive, but they would also not hold in the real world. New dimensions have been added to this debate since some of the assumptions they made were unrealistic. It is very important to acknowledge that Modigliani and Miller's theory is not disregarded because of these assumptions. Their article set the foundation for extensive further research on this debate around optimal capital structure. The fact that some of the assumptions they made can be violated, indicates that an optimal capital structure could exist to maximise the overall value of the firm. Furthermore, it led researchers to examine determinants of optimal capital structure and how those factors might affect capital structure.

Modigliani and Miller's (1958) article was the starting point from which several theories on capital structure developed. Much of the further research focused on the relaxation of some of the restrictive assumptions made by Modigliani and Miller.

Researchers include variables such as taxes, bankruptcy costs, industrial characteristics, ownership structure and agency costs (Harris & Raviv, 1991). Modigliani and Miller adjusted their own model in 1963 by including company tax. In their article "Corporate income taxes and the cost of capital: A correction", they concluded that firms can increase their net cash flow by financing with debt rather than equity (Modigliani & Miller, 1963). Interest is a tax-deductible expense, which means that if a firm does make use of debt financing in their capital structure, they will receive a tax benefit in the form of lower taxes paid. Therefore, they propose that in order for firms to maximise their value, they need to incorporate as much debt capital in their capital structure as possible.

The taxation aspect of capital structure is only one form of relaxation of Modigliani and Miller's restrictive assumptions. It indicated to researchers that capital structure decisions may affect firm value once these restrictive assumptions are removed (Correia & Cramer, 2008:34). This has ultimately led to the development of a number of capital structure theories. Excellent surveys on capital structure theories are provided by Myers (1984) and Harris and Raviv (1991). The reconciliation of theoretical and empirical studies in this area has resulted in two major theories of optimal capital structure: the trade-off theory and the pecking order theory (Myers, 1984). An in-depth discussion on each of these two dominant capital structure theories will follow in the next two sections.

## 2.4 TRADE-OFF THEORY

The trade-off theory states that there is an optimal capital structure that maximises the value of a firm. Therefore, management will set a target leverage ratio and then gradually move towards that. Previous studies have demonstrated that firms select target leverage ratios based on a trade-off between the benefits and costs of increased leverage (Modigliani & Miller, 1963; Jensen & Meckling, 1976; Stulz, 1990; Hart & Moore, 1995; Ross, 1977). This target leverage ratio is influenced by three factors: tax, financial distress costs and agency costs. Managers will therefore choose the combination of debt and equity that achieves a balance between the benefits of debt (tax advantage) and the various costs associated with debt (financial distress costs and agency costs) (De Wet, 2006:4). These three factors will be

discussed in more detail to demonstrate how they could affect the target leverage ratio.

### 2.4.1 Tax

As mentioned earlier, Modigliani and Miller (1958) showed that the value of a company is not affected by its capital structure, which indicates that no optimal capital structure exists. However, their study was conducted under certain strict assumptions (perfect capital markets, homogenous expectations, no taxes and no transaction costs). This implies that there is no gain from opportunistically switching between debt and equity, because the costs of the different forms of capital do not vary independently (Baker & Wurgler, 2002:28–29). Modigliani and Miller's (1958) initial theory of no taxes and no financial distress costs is illustrated in Figure 2.5.

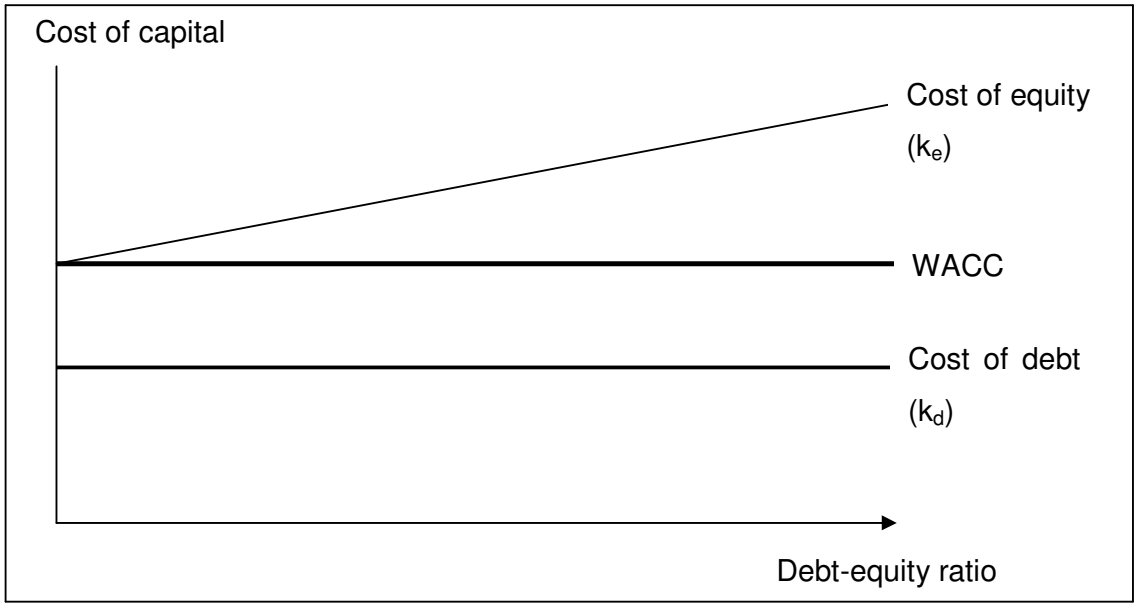


**Figure 2.5: WACC for different levels of financial gearing, with no taxes and no financial distress costs.**

Source: Adapted from Hawawini and Viallet and CIMA (in De Wet 2006:5)

The graph in Figure 2.5 shows that increases in the debt/equity ratio are accompanied with increases in the cost of equity. However, the WACC remains constant for all levels of financial gearing. An increase in the debt/equity ratio results in an increase in the WACC due to the increase in the cost of equity. This increase is, however, set off perfectly by the decrease in the WACC, since a greater weight

has been given to the cheaper cost of debt (De Wet, 2006:5). Considering the strict assumptions of Modigliani and Miller (1958), there is no gain to a firm to switch between debt and equity. The capital structure, therefore, has no effect on the WACC and, consequently, the overall value of a firm.

Modigliani and Miller (1963) adjusted their own model by including company tax and further research by Miller (1977) also included personal tax in the model. The most important advantage of using debt as a source of financing is the fact that the interest payments on debt are tax-deductible which creates a "tax shield" for firms. This tax shield allows a firm to pay lower taxes when using debt capital than they would when using only their own capital (Eriotis *et al.,* 2007:322). This means that by including a large portion of debt in the capital structure, it will lower the real after-tax cost of capital, which will subsequently raise the value of the firm. The graph in Figure 2.6 illustrates the effect on the WACC (and the overall value of the firm) when tax is taken into consideration.

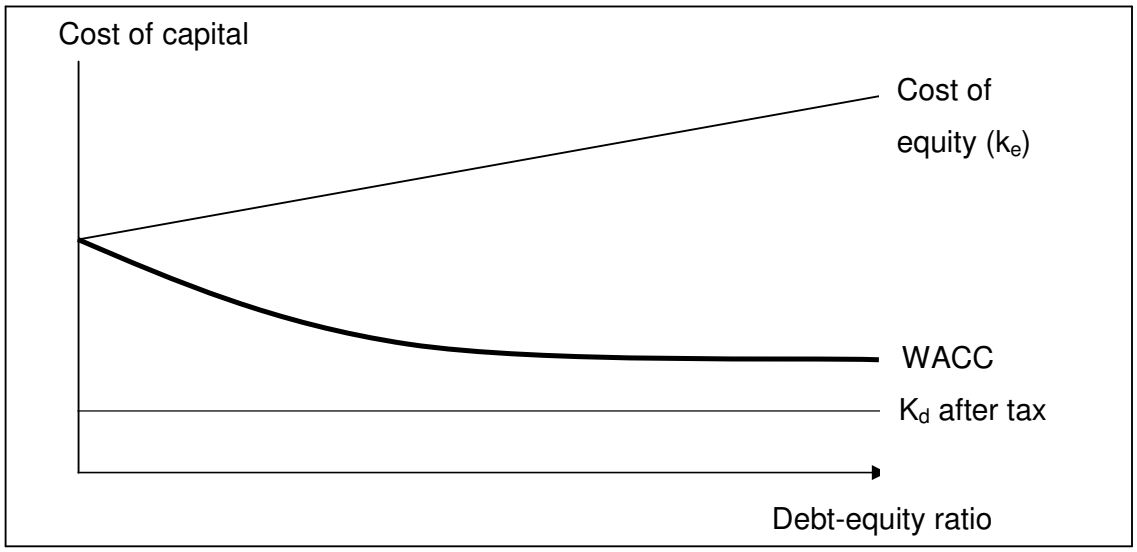


**Figure 2.6: WACC for different levels of financial gearing, with taxes and no financial distress costs.**

Source: Adapted from Hawawini and Viallet and CIMA (in De Wet 2002:6)

Figure 2.6 shows that an increase in the debt/equity ratio results in an increase in the cost of equity and a decrease in the WACC. The decrease in the WACC is due to the inclusion of tax, since it reduces the after-tax cost of debt. The lower after-tax cost of debt, therefore, causes the WACC to decrease with higher levels of debt in the

capital structure. In the absence of financial distress costs, one might conclude that the use of only debt in the capital structure is optimal.

This more recent approach of incorporating company and personal tax into Modigliani and Miller's model indicated that an optimal capital structure, which could maximise the value of the firm, could possibly exist. However, it also raised the important implication that firms should finance their projects completely with debt in order to maximise the total value of the firm (Chen & Strange, 2005:14). This is impractical and contradicts reality, since firms cannot make use of debt only in their capital structure.

Thus far the focus has been placed on the advantages of using debt, which refers to lower taxes paid by firms due to the fact that the interest payments on the debt are tax-deductible. Various costs are also associated with the use of debt, which need to be taken into consideration when incorporating a large percentage of debt into the capital structure. These costs associated with debt are financial distress costs and agency costs.

### 2.4.2 Financial distress costs

The more debt a firm uses in its capital structure, the larger the legal interest obligation becomes. During periods of high interest rates, it can cause the earnings on an investment to be wiped out by high interest payments. This puts more and more pressure on firms to survive because there is an increased probability that a firm may not be able to successfully meet all its debt obligations (Eriotis *et al.*, 2007:322). If a firm cannot fulfil all its legal interest obligations, this can ultimately lead to bankruptcy. Financial distress costs consist of two parts, namely direct and significant indirect financial distress costs. The direct financial distress costs are the costs of bankruptcy and this usually includes legal and administrative fees. Indirect costs are defined as expenses or economic losses that result from bankruptcy but are not cash expenses of the process itself (Titman, 1984). Therefore, when a firm includes too much debt in its financing mix, the financial distress costs will significantly increase. The impact of these increased financial distressed costs will increase the risk of bankruptcy, which will cause a decrease in the overall value of a firm (De Wet, 2006:6). This is illustrated in Figure 2.7.

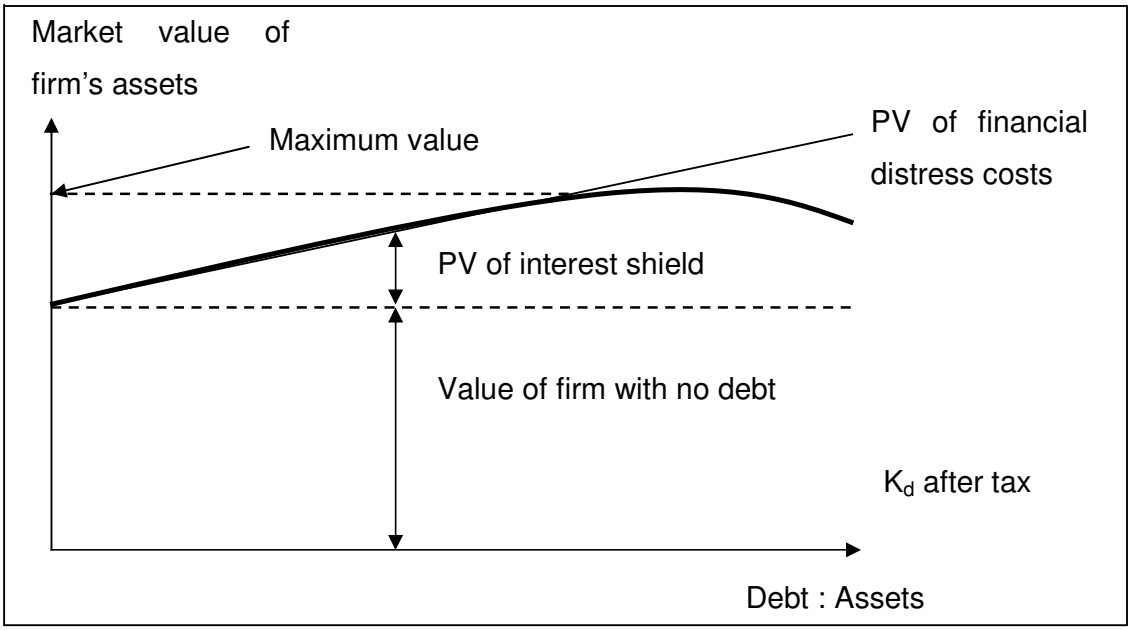


**Figure 2.7: Value of a firm relative to financial gearing, with taxes and financial distress costs.**

Source: Adapted from Hawawini and Viallet and Moyer *et al*. (in De Wet 2006:7)

Figure 2.7 shows that a firm can increase its value by using higher levels of debt in the capital structure, but only up to the point where the benefits of debt are offset by the disadvantages of financial distress.

### 2.4.3 Agency costs

As mentioned earlier, the use of debt in the capital structure can also lead to agency costs which arise due to a conflict of interest. According to Jensen and Meckling (1976), conflicts of interest can arise either between shareholders and bondholders (agency costs of debt) or between shareholders and managers (agency costs of equity) (Vasiliou, Eriotis & Daskalakis, 2003).

- **Conflict between shareholders and management**

Agency costs of equity may arise when the incentives of the shareholders and management do not coincide. According to Myers (2001:95), "… perfect alignment is implausible in theory and impossible in practice …". Shareholders will expect of management to run the firm and take advantage of opportunities that will increase shareholders' value. On the other hand, management may wish to over-expand the

size of the firm in order to maximise their own personal wealth at the expense of the shareholders (Jensen & Meckling, 1976). Managers may at times act in their own interest to obtain job security or higher salaries, and these individual incentives may deviate from the maximisation of the value of the firm. To prevent this, firms need to employ various mechanisms of monitoring and control, such as supervision by independent directors (Vasiliou *et al.*, 2003). These monitoring and control mechanisms result in agency costs, which can be extremely expensive. Therefore, the shareholders will seek solutions that will monitor and control the actions of the managers, and that will not extract large amounts of the value of the firm.

According to Grossman and Hart (1982) and Jensen (1986), debt can be used as a tool to reduce agency costs. The use of debt limits the scope of managerial discretion because debt is associated with compulsory interest payments which will result in cash outflows. When financial distress was discussed earlier, it was said that higher debt increases the probability of bankruptcy. This will result in increased risks for managers as well, because they can lose their jobs or their reputation may be damaged. Consequently, managers will be less likely to undertake unprofitable investments that they otherwise would have done to maximise their own interest.

When firms increase the level of debt in the capital structure, their legal obligation to pay interest payments will also increase. In turn, the possible remaining cash flows will be reduced. This implies that managers will rather use their remaining cash flows to pay their debt obligations than use these cash flows for personal wealth. Firms will therefore choose the amount of debt that will minimise their total agency costs. The optimal capital structure will thus be derived from the balance between the costs of debt and the benefits of debt (Eriotis *et al.*, 2007:322).

- **Conflict between shareholders and bondholders**

The conflict of interest between the shareholders and the bondholders of a firm is also very important because this results in agency costs of debt. Agency costs of debt come into play when there is a risk of default. If there is a possibility of default, shareholders can gain at the expense of the bondholders. Once a firm obtains capital from a bank or through issuing bonds, a firm can increase its risk by borrowing more capital or by taking on projects that may be very risky. Myers (1977)

refers to this as the "asset substitution problem". The asset substitution problem arises when a firm exchanges its low-risk assets for high-risk investments. This places more risk on the debt holders without being compensated for the additional risk. High-risk investments can yield higher returns for the firm but the added profit may only benefit the shareholders given that bondholders only require a fixed return.

If everything works out well, the shareholders will reap the benefits of these high-risk investments, but if something goes wrong, the debt holders will bear most of the consequences because of limited liability (Chen & Strange, 2005:16). To protect themselves, debt holders will set restrictive covenants which will allow them to monitor and control the firm's risk (Eriotis *et al.*, 2007:323). If, however, the firm does not accept these restrictive covenants, the debt holders can demand higher returns on the capital they provide. Firms are subjected to certain direct and indirect costs due to these actions taken by debt holders. These costs refer to the agency costs of debt. Jensen and Meckling (1976:117) therefore argued that an optimal capital structure can be obtained at a level where the benefits of debt for the shareholders balance with the costs associated with debt by the debt holders.

## 2.5 PECKING ORDER THEORY

The pecking order theory differs from the trade-off theory in that there is no well-defined debt-equity ratio (Myers, 1984). According to Smart, Megginson and Gagman (2004:419), the pecking order theory assumes there is no target capital structure. Instead of putting a target debt-equity ratio into place, firms adapt their financing policy to minimise associated costs (La Rocca, Cariola & La Rocca, 2007). The results from various studies concluded that firms prefer internal financing to external financing. This means that the order in which financing is obtained is firstly the use of retained earnings, then debt, then convertible debt and preference shares, while the issuing of new equity will be the last resort to obtain financing. Therefore, if external financing is required, firms will issue the safest security first (Myers, 1984:581).

The pecking order theory was first introduced by Donaldson (1961:67), and he observed the following: "Management strongly favoured internal generation as a

source of new funds even to the exclusion of external funds except for occasional unavoidable 'bulges' in the need for funds."

Myers (1984) argued that he could not find any theoretical foundation for these results that correspond with the modern theory of finance. Myers' (1984) main argument was that the capital structure theories up to the 1980s did not explain actual financing behaviour. According to him, firms cannot be advised on optimal capital structure if actual financing decisions cannot be explained thoroughly. He elaborated on the pecking order theory, which was originally developed by Donaldson in 1961 in an attempt to explain the financing behaviour of management. Today, the pecking order theory is most prominently associated with Stewart Myers (Myers, 1984; Myers & Majluf, 1984).

In an attempt to explain the pecking order theory, several theoretical and empirical studies state that this theory is based on the information asymmetries between well-informed managers and less-informed investors. Based on this information asymmetry, firms will use a specific order when it comes to financing. In the presence of information asymmetry, Ross (1977), Myers and Majluf (1984) and John (1987) have shown that firms may prefer debt to equity financing. An extended discussion on the concept of information asymmetries and its effect on capital structure will now follow.

### 2.5.1 Information asymmetries

Theoretical models incorporating asymmetric information and empirical results can be found in Leland and Pyle (1977) and Rajan and Zingales (1995). As mentioned before, these models state that the pecking order theory is based on the information asymmetries between the firm's well-informed managers and less-informed outside investors. This implies that managers have superior information with regard to future investment opportunities for the firm than outside investors.

Managers have an insider's view of their firm and know what it can and cannot accomplish. Not only do managers have more facts than outside investors, but more importantly, they know what these facts mean for the firm. This distinction between professional management and investors creates asymmetric information (Myers &

Majluf, 1984). This causes managers to act in a different manner than might be expected by outside investors. Therefore, the firm's choice of capital serves as a signal to outside investors of the information held by insiders (Wiwattanankantang, 1999:372).

Investors are interested in firms' financing choices, because share prices may change when the choices are announced (Myers, 1984). Therefore the actions taken by management send signals to outside investors, which will ultimately affect the price they are willing to pay for new equity issues.

The announcement of new debt generally sends a positive signal to investors, in the sense that the firm has confidence in their ability to fulfil all their debt obligations in the future. It could also be interpreted as a signal that the firm has more investment opportunities and growth prospects than it can finance with its internal funds. Therefore, a firm will only use debt as a source of financing if it is confident of its ability to repay its obligations. No undervaluation is involved when the firm uses internal funds and riskless debt to finance projects (Harris & Raviv, 1991:306).

However, the announcement of a new equity issue is generally treated as a negative signal, because investors interpret this as a signal that the shares of the firm are overvalued. Generally, this is due to the fact that investors are less informed than the managers about the value of a firm's assets and this causes the mispricing of equity by the market. When a new project requires equity financing, the effect of under-pricing may be so serious that the new investors capture more of the net present value of the new project, which can result in a net loss to the firm's existing shareholders. This problem can be avoided if the firm can finance the investment opportunity by using a security that is not as undervalued by the market (Harris & Raviv, 1991:306).

As a consequence, new shares will only be issued at a lower price than that imposed by the real market value of the firm. This sends out a negative signal to outside investors in the sense that current shareholders possess overvalued shares. According to Myers and Majluf (1984), an announcement of a new equity offering may inform the market that management believes assets in place and future investment opportunities are overvalued. Because of this negative signalling effect,

firms would avoid new issues of equity to finance investment opportunities (De Wet, 2006).

The model by Myers and Majluf (1984) shows that a firm is more likely to issue new equity when it is overvalued than when it is undervalued (Bauer, 2004). It also declares that equity will be issued only when debt capacity is running out and financial distress threatens (Bauer, 2004:28). This helps to explain why the most profitable firms borrow less. The reason for this is that profitable firms have a lot of financial slack, which is defined as a firm's highly liquid assets (cash and marketable securities) plus any unused debt capacity (Moyer, McGuigan & Kretlow, 2001). When firms have sufficient financial slack, they will be able to finance most of their capital investment opportunities with internal funds, and therefore will not require external funds. Investors realise this and thus interpret the announcement of new equity as negative news about the firm's prospects.

This negative signal that is conveyed through the announcement of new equity issues could ultimately result in a decline in the share price. Studies by Korwar (1982), Dann and Mikkelson (1984) and Asquith and Mullins (1986) show significant negative average price impacts when a new equity issue was announced. Several other studies also confirmed this decline in the share price after the announcement of new equity issues (Asquith & Mullins, 1986; Mikkelson & Partch, 1986; Schipper & Smith, 1986). According to Myers (1984), the most obvious explanation for these declines in share prices are information asymmetry. Dierkens (1991) also showed that the price drop at announcement is greater when information asymmetry is large (Bauer, 2004).

This information asymmetry between managers and outside investors causes managers to raise finance in a certain order, which is referred to as the pecking order. Firms prefer internal to external financing, which means that the order in which financing is normally obtained is first the use of retained earnings, then debt, then convertible debt and preference shares and the last resort to obtain financing will be the issuing of new equity (De Wet, 2006:8).

It is evident from the various studies discussed that corporate financing choices are driven by the costs of adverse selection that arises as a result of information

asymmetry between managers and outside investors. Retained earnings have no adverse selection problem, which means that retained earnings are the best source of financing. Equity is subject to more serious adverse selection problems than debt, which means that debt is a better source of financing that equity (Frank & Goyal, 2003). This implies that profitable firms will retain earnings and become less leveraged, while unprofitable firms will borrow and become more leveraged (Hovakimian, Hovakimian & Tehranian, 2003:523).

According to Titman and Wessels (1988), highly profitable firms are usually less levered than their less profitable counterparts, because they often use their earnings to pay down debt. In addition, Masulis and Kowar (1986) and Asquith and Mullins (1986) found that firms tend to issue equity following an increase in stock prices. This implies that firms that perform well subsequently reduce their leverage (Hovakimian *et al.*, 2001:1). These findings are all consistent with Donaldson's (1966) pecking order theory of how firms make their financing decisions. It therefore provides evidence that in the presence of information asymmetry, firms prefer debt financing to equity financing. Thus, the pecking order theory attempts to explain how managers react to particular aspects of the environment rather than making broader trade-offs like the trade-off theory (Frank & Goyal, 2003:2).

## 2.6 TRADE-OFF THEORY VS PECKING ORDER THEORY

Subsequent to the debate on capital structures that started with Modigliani and Miller's (1958) article, strong evidence has been found in favour of both the trade-off theory and the pecking order theory. The trade-off theory has the most support, although the pecking order theory has undergone a strong revival (De Wet, 2006). Each theory provides a different explanation for the financing behaviour of firms. The financial literature conveys that the trade-off model is useful for explaining corporate debt levels, while the pecking order model is superior for explaining capital structure changes. A comparison between these two capital structure theories is provided in Table 2.2.

**Table 2.2: A comparison between the trade-off and pecking order theories**

| TRADE-OFF THEORY | PECKING ORDER THEORY |
|---|---|
| Conforms with value maximising construct | Considers managerial motivations |
| Assumes a relatively static capital structure | Allows for a dynamic capital structure |
| Considers the influences of taxes, transaction costs, and financial distress | Considers the influence of financial slack and availability of positive net present value (NPV) projects |
| Ignores the impact of capital market signals | Acknowledges capital market signals |
| Ignores concerns regarding proprietary data | Acknowledges proprietary data concerns |
| Cannot explain many real-world practices | Explains many real-world practices |

Source: Adapted from Huang and Vu Thi (2003:19).

From Table 2.2 it is evident that there are significant differences between these two theories. Firstly, the pecking order theory provides explanations for the financing behaviour of managers and it explains the share market reactions to changes in leverage. The trade-off theory, however, cannot explain these managerial and market reactions. On the other hand, the trade-off theory explains the effects of various factors such as tax, financial distress costs and agency costs on the capital structure, which the pecking order theory does not explain. Furthermore, the trade-off theory provides a formula for determining an optimal capital structure, which could result in value maximisation for the firm.

Modigliani and Miller (1963), Miller and Modigliani (1966), Kraus and Litzenberger (1973), Kim (1978) and Jensen and Meckling (1976) are just a few examples of studies that provide strong support for the static trade-off theory. All of these studies conclude that firms will maintain a target debt-equity ratio that will maximise the value of the firm.

However, several studies found a significant negative relationship between profitability and leverage, which supports the pecking order theory. Examples of such studies are Myers (1984), Kester (1986), Friend and Lang (1988), Rajan and Zingales (1995), Wald (1999) and Baskin (1989).

It is evident from the findings of the above studies that the literature on the efficiency of the trade-off theory versus the pecking order theory has delivered mixed evidence. Because of this mixed evidence, several studies have been conducted to test the trade-off theory versus the pecking order theory to determine which theory is the best predictor for firms' financing behaviours. Examples of such studies are Shyam-Sunder and Myers (1999), Fama and French (2002) and Frank and Goyal (2003).

In their article "Testing static trade-off against pecking order models of capital structure", Shyam-Sunder and Myers (1999) found evidence that supports both the pecking order and the trade-off theory, but the results convey more confidence in the pecking order theory. Shyam-Sunder and Myers (1999:242) concluded the following:

(1) The pecking order is an excellent first-order descriptor of corporate financing behaviour.

(2) The simple target adjustment model, when tested independently, also seems to perform well.

(3) When the two models are tested jointly, the coefficients and significance of the pecking order models change hardly at all; the performance of the target-adjustment models degrades, though coefficients still appear statistically significant.

As a result, they found that a simple pecking order model explains much more of the time-series variance in actual debt ratios than a target adjustment model based on the static trade-off theory (Shyam-Sunder & Myers, 1999:221).

Fama and French (2002) found evidence in favour of and against both theories. They conducted a study to examine the predictions about how long-term leverage and the dividend payout ratio vary across firms with profitability and investment opportunities as the main driving variables (Fama & French, 2002:2). The results of

their study also delivered mixed evidence. Many of the issues showed that there is no conflict between the trade-off and pecking order theory. For example, the results indicated that more profitable firms have higher dividend payouts, which confirms predictions shared by both models. However, there were some issues where the results were in favour of the trade-off model and against the pecking order model, and vice versa. These mixed results are well illustrated in their conclusion (Fama & French, 2002:30):

> "In sum, we identify one scar on the trade-off model (the negative relation between leverage and profitability), one deep wound on the pecking order (the large equity issues of small low-leverage growth firms), and one area of conflict (the mean reversion of leverage) on which the data speak softly. The many shared predictions are confirmed, attributing causation is elusive: we cannot tell whether the results are due to trade-off forces, pecking order forces, or indeed other factors overlooked by both."

Frank and Goyal (2000) also tested the pecking order theory against the trade-off theory by using a broad cross-section of U.S. firms over the period 1980–1998. Their results were inconsistent with the pecking order theory. This is illustrated by the following conclusion (Frank & Goyal, 2000:25):

> "In all of the specifications that we have tried, all of the quantitative predictions of the pecking order theory were empirically rejected. Consistent with static trade-off theory, clear evidence of mean reversion is found in the data. Mean reversion is found both unconditionally, and conditional on a range of conventional financial factors."

The overall conclusion from the above studies is that these two competing theories should not be evaluated in isolation; they should be viewed as complementary. According to the pecking order theory, for instance, the most dominant factor in capital structure decisions is adverse selection costs (Myers & Majluf, 1984). Studies done by Fama and French (2002), Frank and Goyal (2003) and Barclay and Smith (2005), however, suggest that adverse selection costs are only one of many factors that firms consider, even when operating under the trade-off theory (Byoun, 2008:3070). This implies that firms may have target debt levels to obtain and still prefer internal funds to external funds (Leary & Roberts, 2005; Strebulaev, 2007).

According to Myers (2001), there is no universal theory of the debt-equity choice; however, there are several conditional theories to capital structure, which represents a different explanation of the financing decisions. Each theory emphasises certain costs and benefits, and therefore works out under its own assumptions.

Fama and French (2005:580–581) came to the following conclusion:

> "Thus it is probably time to stop running empirical horse races between them as stand-alone stories for capital structure. Perhaps it is best to regard the two models as stable mates with each having elements of truth that help explain some aspects of financing decisions."

Barclay and Smith (2005:16) also concluded:

> "Although the pecking order theory is incapable of explaining the full array of financial policy choices, this does not mean that information costs are unimportant in corporate financing choices and, along with other costs and benefits, must be part of a unified theory of corporate financial policy."

## 2.7 CONCLUSION

In this chapter, an in-depth discussion was provided with regard to the sources of financing available to management to fund new investment opportunities. It was stated that firms have three main sources at their disposal, namely internal equity, external equity and debt financing. The combination in which these sources are used is very important to the financial success and survival of a firm. Financial literature provides two substantiated explanations of firms' financing behaviours, which were explained via the two main capital structure theories.

The trade-off theory claims that an optimal capital structure does exist. This implies that management can choose an optimal combination of debt and equity that will ultimately maximise the value of the firm. In an attempt to make this financing decision, management will trade off the benefits of using debt with the costs associated with debt.

The pecking order theory states that management will consider all the financing sources available and then use the least expensive source first, implying that an optimal capital structure does not exist. Firms use a specific order in the financing

decision. First they will use their retained earnings. If that is not sufficient, they will make use of debt instruments because debt is a cheaper form of financing than equity. Therefore, firms leave the issuing of new equity as a last resort.

The ongoing debate in financial literature on which of the two dominant theories of capital structure best explains the financial behaviour of firms, has resulted in various international studies to determine which theory holds in a specific country. Correia and Cramer (2008) found in a recent survey that only 21% of South African companies do not apply some form of a target debt-equity ratio. They also found that 65% of companies always or almost always use the target debt-equity ratio, in terms of determining the WACC. Their results support the argument that the corporate sector in South Africa is highly under-geared and that the target debt-equity ratios appear to be low in relation to what is predicted by the trade-off theory. Therefore, a secondary objective of this study is to examine whether the results for South African firms correspond more with the trade-off theory or the pecking order theory.

An understanding of the important sources of financing and the dominant capital structure theories, which could help explain the financing behaviour of firms, are only the starting place of an attempt to answer the research question of this study. Knowing which capital structure theory a firm uses, is not sufficient to explain how management make their final financing decisions. Further research on this subject of optimal capital structures demonstrates that capital structures differ between countries, industries and even between firms within the same industries. This revelation has taken financial research further in identifying certain specific firm characteristics and economic factors which may better explain these variations in capital structures between firms. In the next chapter, variations in capital structures will be discussed, after which six firm characteristics and three economic factors will be identified in an attempt to provide an explanation of the financing decisions of firms.

# Chapter 3

# FIRM CHARACTERISTICS AND ECONOMIC FACTORS

## 3.1 INTRODUCTION

The conclusion from the previous chapter was that firms have to find an optimal combination of debt and equity financing in order to maximise shareholders' value and the value of the firm as a whole. Furthermore, an in-depth discussion of the two dominant capital structure theories (the trade-off theory and the pecking order theory) was provided. It was evident from prior research that the financing choices of management will depend on the capital structure theory followed by the firm. The literature also revealed that it may be best to view these two theories as complementary. The question now remains: How do firms choose their combination of debt and equity?

This chapter will provide an in-depth discussion on variations in capital structures in different countries, in different industries and also in different firms within the same industry. These variations result in the conclusion that there must be certain internal and external factors more closely related to each firm that must be considered when financing decisions are made. With the support of previous theoretical and empirical research, six internal factors (firm characteristics) and three external factors (economic factors) will be identified to better explain the financing decisions of firms. Each of these factors will be discussed in more detail with regard to the effect they might have on capital structures. This information might shed some light on the continuous debate of the existence of an optimal capital structure and it might provide an answer to the question on how firms choose their combination of debt and equity.

## 3.2 CAPITAL STRUCTURES ACROSS COUNTRIES

Ever since Modigliani and Miller's (1958) article, theoretical and empirical studies have been conducted in an attempt to prove that an optimal capital structure does exist and that it has an impact on firm value. Various capital structure theories have evolved to explain the financial behaviour of managers and the conclusion thus far was that these different theories should not be viewed in isolation, but rather as complementary to each other.

Previous capital structure research has been conducted for different economies with different institutional backgrounds (Chen & Strange, 2005). The focus, however, has predominantly been on data from developed countries (Rajan & Zingales, 1995; Booth *et al.,* 2001; Bevan & Danbolt, 2002; Hall *et al*., 2004). The results from these studies are similar in the sense that leverage differs across countries. More recent empirical studies on capital structure include data from both developed and developing countries to determine whether determinants of capital structures in developing countries were similar to those in developed countries. Rajan and Zingales (1995), Booth *et al*. (2001) and Fan, Titman and Twite (2008) observed that cross-sectional determinants of leverage are more or less consistent across countries. These studies, however, also found that significant cross-country differences do exist, which implies that factors specific to each country must play a vital role in financing decisions.

Various empirical studies support the above-mentioned finding that leverage is directly related to several country specific factors (Demirgüç-Kunt & Maksimovic, 1999; Booth *et al*., 2001; Bancel & Mittoo, 2004; De Jong, Kabir & Nguyen, 2008). Demirgüç-Kunt and Maksimovic (1999) also compared capital structures of firms from developed countries and developing countries and found that a large portion of variation in the debt-equity choice can be explained by institutional differences between developed and developing countries. Furthermore, it was found that in both developed and developing countries the leverage of firms is influenced differently by institutional factors (De Jong *et al*., 2008). This finding is supported by Smart *et al.* (2004:415) who conducted an international survey on the financial leverage of firms. Seven developed countries and seven developing countries, including South Africa,

were included in this survey, and they found that capital structures vary across countries. The results can be found in Table 3.1.

**Table 3.1: Capital structures in different countries**

| Country | Total debt to total assets (book values, %) | Long-term debt to total capital (book values, %) | Long-term debt to total capital (market values, %) |
|---|---|---|---|
| **Developed countries (G7)** | | | |
| United Kingdom | 54% | 28% | 35% |
| Canada | 56% | 39% | 35% |
| United States | 58% | 37% | 28% |
| Japan | 69% | 53% | 29% |
| Italy | 70% | 47% | 46% |
| France | 71% | 48% | 41% |
| Germany | 78% | 38% | 23% |
| **Developing countries** | | | |
| Malaysia | 42% | 13% | 7% |
| Jordan | 47% | 12% | 19% |
| Turkey | 59% | 24% | 11% |
| Pakistan | 66% | 26% | 19% |
| India | 67% | 34% | 35% |
| South Korea | 73% | 49% | 64% |
| South Africa | 79% | 62% | 35% |

Source: Adapted from Smart *et al.* (in De Wet, 2006)

It is evident from the results in Table 3.1 that leverage differs from country to country. Furthermore, it is clear that leverage for countries within the developed country group is different from that of countries within the developing country group. The majority of the three ratios are higher for countries within the developed country group compared to the countries within the developing country group. The table furthermore shows that South African firms have a higher degree of leverage compared to the other developing countries included in the survey.

## 3.3 CAPITAL STRUCTURES AMONGST INDUSTRIES AND FIRMS WITHIN THE SAME INDUSTRY

In the previous section, it was mentioned that capital structures differ from country to country. Another important question to ask when financing options are considered is whether managers take industry norms into consideration. Various economists

(Caves & Pugle, 1985; Spence, 1985) have analysed the effect of industries on capital structures. There is a general assumption that leverage will vary systematically across industries (Balakrishnan & Fox, 1993:3). This argument is based on theoretical support that firms within the same industry tend to cycle together because they face the same environment and economic conditions (Remmers, Stonehill, Wright & Beekhuisen, 1974). Schwartz and Aronson (1967), Gupta (1969), Scott (1976) and Bradley, Jarrell and Kim (1984) are all in agreement that the industry does have an effect on capital structure choices.

According to Harris and Raviv (1991), it is generally accepted that leverage ratios of firms in a given industry will be similar, while the leverage ratios vary across industries (Hatfield, Cheng & Davidson 1994). Harris and Raviv (1991) furthermore combined the findings of four studies (Bowen, Daley & Huber, 1982; Bradley *et al.*, 1984; Long & Malitz, 1985; Kester, 1986) and found that specific industries have a common leverage ratio which remains relatively stable over time (Hatfield *et al.,* 1994). Smart *et al.* (2004) support the arguments of Schwartz and Aronson (1967) and Scott (1976) that capital structures tend to display definite industry patterns (De Wet, 2006). The afore-mentioned studies confirm that industry type influences capital structures worldwide.

Although the majority of empirical studies argue that leverage varies by industry, Remmers *et al.* (1974) argue that they found no evidence of industry effects. Empirical research has also indicated that capital structures of firms within the same industry could differ. Brigham and Ehrhardt (2004) did an analysis of U.S. industries and reported that variations in capital structure exist among industries and among individual firms within those industries (Mahmud, Herani, Rajar & Farooqi, 2009). This finding is illustrated in Table 3.2.

**Table 3.2: Capital structures in different industries**

| Sector | United States companies' long-term debt to total capital (book values, %) | South African companies' long-term debt to total capital (book values, %) |
|---|---|---|
| Technology | 19% | 20% |
| Energy | 30% | 31% |
| Healthcare | 32% | 33% |
| Transportation | 40% | 45% |
| Basic materials | 46% | 48% |
| Capital goods | 46% | 56% |
| Conglomerates | 54% | 32% |
| Services | 63% | 35% |

Source: Adapted from Ehrhardt & Brigham (in De Wet, 2006)

Table 3.2 shows the average capital structures in different industries in the United States and in South Africa. The leverage for some industries is quite similar, and for others, significantly different. According to Ehrhardt and Brigham (2003), the leverage of American firms in the same industry is considerably different (De Wet, 2006:3). This implies that leverage for firms in a given industry is not similar, even though they are exposed to similar economic risks.

Various empirical studies report that leverage does not vary systematically across industries; however, they do argue that industry effects play a role in capital structure decisions. Although industry effects do exists, it represents only a small piece of the big picture. The results mentioned prove that the industry alone cannot explain variations in the capital structure choices of firms within the same industry. This is a clear indication that financing choices are related to factors specific to each individual firm. This supports Myer's (1984) argument that differences in capital structures between industries may be due to attributes specific to the firm, rather the industry differences.

In recent theoretical and empirical research it is evident that there has been a switch in emphasis from inter-industry effects to firm-specific effects (Hutchinson & Hunter, 1995). The majority of empirical investigations support the view that firm-specific factors dominate industry-specific factors with regard to capital structure decisions (Balakrishnan & Fox, 1993; Chung, 1993). Thus, in order to get to the core of capital structure decisions, it is vital to execute a further analysis of the firm itself.

## 3.4 FIRM CHARACTERISTICS

Thus far, evidence has been provided that capital structures differ between countries, industries and firms within a given industry. This supports Myer's (1984) argument that differences in capital structures between industries may be due to attributes specific to the firm. The focus of capital structure studies to date has been to identify determinants that can explain the financing behaviour and choices of firms. As a result of these theoretical and empirical studies, several determinants have emerged to better explain capital structures. According to Harris and Raviv (1991), the consensus is that firms' levels of leverage increase with fixed assets, non-debt tax shields, investment opportunities and firm size. Similarly, levels of leverage decrease due to volatility, advertising expenditure, the probability of bankruptcy, profitability and the uniqueness of the product (Rajan & Zingales, 1995).

The predominant firm characteristics from prior research that are included in this South African study are profitability, asset structure, liquidity, business risk, growth and size. These firm characteristics are identified as important factors in both developed countries and developing countries. These firm characteristics are illustrated in Figure 3.1 and will be discussed and explained in more detail.


**Figure 3.1: A graphical depiction of the six firm characteristics included in the study**

### 3.4.1 Profitability

Profitability indicates how efficiently management utilise its total assets in order to generate earnings. Shareholders are concerned with the profitability of a firm because this can predict the future earnings of that firm (Chen & Hammes, 2004). Outside investors will, therefore, include profitability in their analysis of the firm when making investment decisions.

Traditional financial literature states that profitable firms can employ more debt because they are exposed to lower risks of bankruptcy and financial distress. Baral (2004:4) supports this by stating that more profitable firms have more capacity to borrow and providers of debt will be more willing to provide funds because the probability of default is lower than for less profitable firms. With profitable firms also subject to higher tax payments, there is a greater incentive to employ more debt to exploit debt interest tax shields (Hutchinson & Hunter, 1995:67).

The theoretical and empirical results of the relationship between profitability and capital structure are controversial. The results from previous studies correspond with both the trade-off theory and the pecking order theory. Most studies found a negative relationship between profitability and leverage, which supports the pecking order theory where firms prefer internal financing to external financing (Jensen & Meckling, 1976; Myers, 1977; Kester, 1986; Titman & Wessels, 1988; Friend & Lang, 1988; Rajan & Zingales, 1995; Booth *et al.*, 2001; Fama & French, 2002; Drobetz *et al.*, 2007; Baral, 2004). This negative relationship is observed for both developed as well as developing countries (Chen & Strange, 2005).

Donaldson (1961) and Myers (1984) argue that firms prefer internal financing to external financing to fund investments and, therefore, raise capital in a specific order. If the internal funds are not sufficient, firms prefer debt financing to equity financing. This theory therefore suggests that firms with a higher profitability will use their internal funds (retained earnings) and rely less on debt financing. Firms that generate high retained earnings, generally tend to avoid gearing (Vasiliou, Eriotis & Daskalakis, 2005:13). This implies a negative relationship between profitability and capital structure. Myers (1984) argues that this might be due to the higher costs from

issuing equity. The past profitability of a firm and the amount of retained earnings should be an important determinant of its capital structure (Titman & Wessels, 1988).

Some empirical studies, however, found a positive relationship between profitability and leverage, which supports the trade-off theory (Frank & Goyal, 2004). Firms with high profitability imply higher debt capacity and consequently less risk for debt providers (Baral, 2004:4). Debt providers will, therefore, be more willing to provide funds to more profitable firms, because these firms have the ability to fulfil their debt obligations. Furthermore, profitable firms will use debt to take advantage of the tax shields. The most important advantage of debt is the fact that the interest payments on debt are tax-deductible, which creates a tax shield. This tax shield allows firms to pay lower taxes than they should when they use debt capital instead of their own equity capital (Eriotis *et al*., 2007:322). This implies that profitable firms have higher leverage, because they can take advantage of tax shields.

Another possible reason why profitable firms use more debt in their capital structure is to minimise agency costs. According to Grossman and Hart (1982) and Jensen (1986), debt can be used as a tool to reduce agency costs. The use of more debt limits the actions taken by management, since debt is associated with compulsory interest payments. In terms of free cash flow, it would therefore be advisable for profitable firms to use more debt as a tool to discipline managers (Bauer, 2004). Thus, due to higher debt capacity, lower agency costs and the advantage of tax shields, it is expected that firms with a higher profitability will have a higher degree of leverage, which results in a positive relationship between profitability and leverage. This result supports the trade-off theory of capital structure.

According to the above findings, support exists for both the trade-off theory and the pecking order theory of capital structure. The arguments provided by both theories are valid. The question now remains whether the relationship between profitability and leverage is a product of the capital structure theory followed in South Africa.

### 3.4.2 Asset structure

Most capital structure theories argue that a contributing factor of capital structure is the types of assets owned by a firm. This is because the cost of financial distress depends on the types of assets in the asset structure.

The asset structure of a firm consists of tangible and intangible assets. Tangible assets are those assets that have a physical form and there are two subclasses: current assets (inventory, cash, trade receivables) and non-current assets (machinery, plant, equipment, buildings). Intangible assets are not physical in nature, but they are very valuable to the firm and can be critical to its future success or failure. These types of assets consist of patents, brand recognition, goodwill and copyrights. According to Rajan and Zingales (1995), these types of assets reflect the unique characteristics of a firm.

From a theoretical perspective, tangible assets, more specifically non-current assets, can be used as collateral for debt, which means that the more tangible assets a firm has, the lower the risk for the debt provider. The liquidation value of the firm's assets will also be higher with tangible assets, which will decrease the probability of mispricing in the event of bankruptcy and make lenders more willing to supply loans (Huang & Vu Thi, 2003). Booth *et al.* (2001:101) also state that a large amount of tangible assets increases a firm's ability to issue secured debt. According to Titman and Wessels (1988) and Rajan and Zingales (1995), tangible assets are associated with higher leverage because they provide better collateral for loans. The fact that non-current assets can serve as collateral, is the main argument to support the notion that the asset structure of a firm can affect its capital structure. This argument is supported by Scott (1976), Myers and Majluf (1984), Titman and Wessels (1988), Rajan and Zingales (1995), Booth *et al.* (2001) and Vasiliou *et al*. (2005).

Scott (1976) argues that the total value of a firm can be increased with the issuance of secured debt. He states that the agency costs of secured debt are lower than the costs for unsecured debt; therefore, firms will issue as much secured debt as possible (Scott, 1976). This argument is supported by Jensen and Meckling (1976) who state that the agency costs of debt increases when firms cannot collateralise their debt.

According to Myers and Majluf (1984), there are costs associated with the issuing of securities, of which management has better information than outside investors. They argue that firms with assets that can be used as collateral may issue more debt to avoid these agency costs (Titman & Wessels, 1988:3). According to the pecking order theory, firms with more intangible assets face more serious information asymmetry problems, which will result in more agency costs for the firm (Chen & Strange, 2005:27). Debt financing helps mitigate these problems, because the use of debt is a stronger positive signal than the issuing of equity (Myers & Majluf, 1984).

Grossman and Hart (1982) also suggest that higher debt levels lessen the tendency of management to act in their own interest due to the increased risk of bankruptcy. The borrower is restricted to use the funds for a specified project, if the debt can be collateralised (Titman & Wessels, 1988:3). Due to the fact that management is restricted in what they do with the funds, it can decrease the conflict between debt holders and equity holders, which will subsequently decrease the agency costs of the firm. A further argument is that the business risk of a firm will ultimately be reduced, thus resulting in lower financial distress costs for the firm (Asgharin, 1997). Generally, when a firm has collateral for debt, they can borrow at lower interest rates. According to Williamson (1988), firms can borrow at a lower interest rate if their debt is secured by assets with stable, long-term value. This implies that firms with less non-current assets generally have higher costs of borrowing due to the lack of collateralised assets. It is therefore expected that firms with a large amount of non-current assets will borrow more due to the fact that they can get debt at lower rates.

The majority of previous studies found a positive relationship between the tangibility of assets and leverage (Friend & Lang, 1988; Titman & Wessels, 1988; Rajan & Zingales, 1995; Wald, 1999; Frank & Goyal, 2004; Vasiliou *et al.*, 2005; Drobetz *et al.*, 2007). Rajan and Zingales (1997) conducted a study on European countries and found that there is a positive relationship between leverage and the tangibility of assets for all countries included in their study. These results are consistent with studies of U.S. companies (Rajan & Zingales, 1995) and Swedish companies (Asgharin, 1997).This positive relationship supports the prediction of the trade-off

theory that debt capacity increases with the proposition of tangible assets on the balance sheet (Drobetz *et al.,* 2007).

Contradicting results were also found with regard to the relationship between the tangibility of assets and leverage. Bevan and Danbolt (2002) and Booth *et al.* (2001) found that the tangibility of assets is negatively related to leverage. Another interesting result is provided by Chittenden, Hall and Hutchinson (1996) and Stosh and Mauer (1996). They found that there is a strong, positive relationship between asset structure and long-term debt. However, they also found that there is a negative relationship between short-term debt and asset structure, which suggests that small firms need to make use of short-term financing, because they do not have enough non-current assets to use for collateral.

The financial literature concludes that it could be to the advantage of a firm to employ as much tangible assets, specifically non-current assets, in its asset structure as possible. The reason for this conclusion is that tangible assets can serve as collateral for debt. If the firm has sufficient collateralised assets, it will lower the risk for the debt providers, thus enabling the firm to obtain debt capital at lower interest rates. It also reduces the conflict between debt holders and equity holders because management is restricted to use the funds for specific projects. This will result in lower agency costs for the firm. The firm will also experience lower financial distress costs, due to the fact that collateralised assets reduce the business risk of the firm.

### 3.4.3 Liquidity

The impact of the liquidity of a firm's assets on optimal leverage has been a source of debate for many years (Sibilkov, 2009). Throughout this study, liquidity is defined as the ability of a firm to fulfil its short-term obligations; hence, the ease with which a firm's assets can be converted into cash. A firm with sufficient liquidity has sufficient current assets available to cover its current liabilities. If a firm, therefore, has sufficient liquidity it may decrease its chances of bankruptcy, because there will be enough cash reserves to cover its debt. Liquidity is also an important determinant of the costs of financial distress (Shleifer & Vishny, 1992:1364). If a firm's liquidity is insufficient over the long-term it may eventually lead to solvency problems and

subsequently threaten the survival of a firm. This will increase the financial distress costs of a firm. Liquidity is an important factor in the capital structure debate, because if a firm faces a threat of bankruptcy, they will be better able to use more debt, given that they own sufficient liquid assets (Rao, Mohamed Al-Yahyaee & Syed, 2007). With the threat of bankruptcy, the firm can more easily convert its liquid assets into the funds required (Baumol & Malkiel, 1967:562). The traditional view is that liquidity increases debt capacity, because higher liquidity may increase firm value in liquidation (Shleifer & Vishny, 1992). However, Weiss and Wruck (1998) argue that liquidity could reduce a firm's ability to issue debt securities (Morrelec, 2000).

Another rationale for the existence of a relationship between liquidity and capital structure is provided by the agency theory. The conflict between management and shareholders may influence the financing choices of a firm. The argument is that management is extremely risk averse and therefore builds excess liquidity. According to Zietlow, Hankin and Seidner (2007:24), managerial risk aversion exceeds shareholders' risk aversion, because the shareholders are well diversified. This may lead to conflict between management and shareholders, because shareholders may argue that the excess cash can be put to better use to maximise their wealth. This conflict will eventually result in higher agency costs for the firm.

Liquidity management is extremely important for every firm. Empirical research has stated that liquidity measures are important for assessing and/or pricing credit, determining bond ratings, forecasting bankruptcy, etcetera (Zietlow *et al.*, 2007:240). It is to the advantage of a firm to invest in liquid current assets, because that generates sufficient cash flows in order to be able to cover its current liabilities. Management, however, must maintain an optimal balance between current assets and current liabilities. If the liquidity is too high (current assets is much higher than current liabilities), it may signal to investors that the firm has a lot of funds tied up in non-productive assets such as excess cash, marketable securities or inventory. As already mentioned, this might pose a problem to the shareholders since those funds can be put to better use to maximise their wealth. On the other hand, if liquidity is too low, it could indicate that the firm does not have the ability to cover its current

liabilities. If the firm's liquidity continues to remain too low, it will eventually lead to solvency problems.

This balance between current assets and current liabilities is influenced by the financing decisions of management. The more debt a firm uses, the more current liabilities will be implied and the fewer current assets will remain after dealing with the liabilities. However, if a firm employs more current assets, it can generate more internal cash inflows that can be used to finance its investment opportunities (Eriotis *et al.*, 2007:325).

The predominant finding from various empirical studies is that liquidity is negatively related to leverage, thus firms with high liquidity tend to borrow less. Aggrawal and Nagarajan (1990), Eriotis *et al.* (2007) and Rao *et al.* (2007) are examples of such studies that report a negative relationship between liquidity and leverage. According to Rao *et al.* (2007), this finding could be due to the fact that firms are concerned with financial risk. Firms with a high level of liquidity maintain a high amount of current assets, which means that they also generate high cash inflows. They use these inflows to finance their investment opportunities instead of using debt capital. This supports the pecking order theory (Eriotis *et al.*, 2007:325).

### 3.4.4 Business risk

There is consensus in financial literature that business risk is among the primary determinants of a firm's capital structure. Theoretical and empirical research, however, cannot reach consensus on whether leverage is an increasing or decreasing function of business risk. Empirical evidence can be found in favour of both. A few empirical studies show that no relationship between the two variables exists and some studies show the relationship is U-shaped. Booth *et al.* (2001) argue that the relationship between business risk and leverage is different for different countries and says that this might reflect the institutional structures within which the firms operate (Chen & Strange, 2005). Wald (1999), Deesomsak, Paudyal and Pescetto (2004) and De Jong *et al.* (2008) support Booth *et al.'s* (2001) theory, regarding different coefficients for different countries.

From a business perspective, risk is often associated with a potentially negative impact on the firm's value, and most financial textbooks and empirical research predict an inverse relationship between business risk and the amount of leverage which a firm can use. An inverse relationship implies that an increase in business risk, results in a decrease in the amount of leverage that can be used by a firm. The basis for this prediction is that the use of debt in the capital structure increases the probability of financial distress. By using more debt, the cash flows of the firm become less stable because of the firm's larger debt obligations. According to Ward (1993), business risk refers to the effects of uncertainties in the environment on the earning ability of a firm. In other words, the more variable the cash flows of a firm, the higher its business risk will become, and this increases the chances of bankruptcy. This will result in higher bankruptcy costs for the firm, which will bear a greater weight in the firm's financing decisions. It is often argued that firms with higher business risk have less capacity to sustain high financial risk (Kim & Sorensen, 1986). Firms will consequently use less debt in their capital structure to reduce the risk of business failure. According to the bankruptcy theory, a negative relationship between business risk and leverage is therefore predicted (Baral, 2004). Other empirical studies that support this negative relationship are Mackie-Mason (1990), Ryen, Vasconcellos and Kish (1997), Graham and Harvey (2001), Singh, Wallace and Suchard (2003) and Deesomsak *et al.* (2004).

Myers (1984), however, argues that firms with a high business risk may have lower agency costs of debt and will therefore borrow more (Kim & Sorensen, 1986:136). This proposes a positive relationship between business risk and leverage. According to Grossman and Hart (1982) and Jensen (1986), debt can be used as a tool to ensure that management gives preference to shareholders' wealth maximisation, which will reduce the conflict between managers and shareholders, hence reducing agency costs. Situations of financial distress do not only pose a risk to the firm, but also to the managers in terms of job security. Managers will, therefore, operate the firm as efficiently as possible to be able to meet their debt obligations, hence working more towards shareholders' wealth maximisation than maximising their own wealth.

Based on a study by Hsia (1981), it is expected that business risk and leverage will be positively related. He combines the option pricing model, the capital asset pricing

model and the theory of Modigliani and Miller (1958) and shows that, as the variance of the value of a firm's assets increases, the systematic risk of equity decreases (Huang & Song, 2006). An international study conducted by Wald (1999), shows that in several countries, firms with a larger variance in earnings, appear to use more debt, which is contradictory to the traditional view that firms with larger variances in earnings should use less debt. Toy, Stonehill, Remmers, Wright and Beekhuisen (1974) also found that higher earning risks are associated with higher debt ratios for several countries. Other empirical studies that support a positive relationship between business risk and leverage are Kim and Sorensen (1986), Gaud, Jani, Hoesli and Bender (2003) and Chen and Strange (2005).

Empirical studies by various researchers, such as Wiwattanakantang (1999) and Deesomsak *et al.* (2004), report that there is no relationship between business risk and leverage, since the coefficients between the two variables is insignificant. Ferri and Jones (1979) used variations in income, measured in several ways, and concluded that it shows no association with a firm's leverage. Flath and Knoeber (1980) also concluded that variation in capital structure is not related to proportionate variation in failure costs and income. Based on these findings, business risk is not considered a primary determinant of a firm's capital structure.

Other studies present a different view in terms of this relationship by stating that the relationship between business risk and leverage is roughly U-shaped. This opinion was stated as early as 1976 by Scott, and was further supported by Castanias (1983), Bradley *et al.* (1984) and Kale, Noe and Ramirez (1991). Kale *et al.* (1991) show that within the DeAngelo and Masulis (1980) framework, the relationship between a firm's business risk and capital structure is U-shaped, decreasing for low levels of business risk and increasing for high levels of business risk (Kale *et al.*, 1991:1707).

This relationship presented by Kale *et al.* (1991) completely goes against the other empirical findings of a positive, negative or no relationship between the two variables. However, it does again emphasise the fact that empirical research to date cannot find consensus with regard to the relationship between business risk and leverage. It is therefore important and relevant to determine whether a relationship does exists for the firms included in this study. Furthermore, if a relationship does

exist, it is important to determine if the results support a positive, negative or U-shaped relationship.

### 3.4.5 Growth

Growth firms are usually still relatively young and therefore have limited internal funds available to finance investment opportunities. Generally, when a firm experiences high growth in its sales, it often needs to acquire more non-current assets, which means that higher growth firms have a greater need for future funds (Pandey, 2001). Since growth firms are still relatively young and have limited internal funds, they are highly dependent on external financing to be able to acquire the assets required to grow. This is not necessarily a negative thing for a growing firm, because it still has the prospect of future growth. Drobetz *et al.* (2007) argue that even if these firms have to use external funds to finance investment opportunities, the value of the firm may remain unchanged because of the positive effects of future growth opportunities. This holds even under asymmetric information. However, a non-growth firm can only change its capital structure by swapping debt against equity, or vice versa. In the presence of asymmetric information, this swapping may result in negative signalling effects, which have a negative impact on the value of the firm (Drobetz *et al.,* 2007).

The theoretical and empirical results on the relation between growth and capital structure are controversial. This controversy is explained by the different theories of capital structure. According to the trade-off theory, agency costs are likely to be higher for growing firms, because these firms have more flexibility with regard to their choice of investments (Shah & Hijazi, 2004:611). Galai and Masulis (1976), Jensen and Meckling (1976) and Myers (1984) argue that, when a firm's leverage is high, management have an incentive to engage in asset substitution, which will transfer wealth from the shareholders to the bondholders. This will result in higher agency costs for the firm. Booth *et al.* (2001) support this by stating that improvements in a firm's growth opportunities will lead to higher agency costs of debt. The bondholders will impose higher costs on debt for growing firms because they fear that such firms may opt for risky projects in the future.

The trade-off theory, thus, predicts that firms with high growth opportunities would prefer to keep leverage low because they have stronger incentives to avoid underinvestment and asset substitution that arise due to agency conflicts between shareholders and bondholders (Drobetz & Fix, 2003:15). This proposes a negative relationship between growth and capital structure.

The free cash flow theory of Jensen (1986) strengthens the above prediction that growth is negatively related to leverage (Bauer, 2004). According to the free cash flow theory, firms with limited growth opportunities should use more debt, because this will prevent managers from using the money for investments that are not beneficial to the firm. Empirical studies by Kim and Sorensen (1986), Titman and Wessels (1988), Rajan and Zingales (1995), Wiwattanakantang (1999), Bevan and Danbolt (2002), Frank and Goyal (2004) and Eriotis *et al.* (2007) support this finding that firms with a high growth potential employ less debt and more equity.

Booth *et al.* (2001) and Baral (2004) report a positive relationship between growth and leverage, which supports the pecking order theory. According to the pecking order theory, growing firms will have higher leverage because if their internal funds are not sufficient they will use debt to finance investment opportunities. This is very important for growing firms because as was already mentioned, these firms are generally still relatively young and have limited internal funds to finance their investment opportunities. Growing firms are, therefore, extremely dependent on external financing. Myers and Majluf (1984) argue that the high growth firms should issue debt, because debt is a more convincing financing instrument than outside equity financing. This proposes a positive relationship between growth and leverage. Thus, according to the pecking order theory, the proportion of debt in the capital structure of a growing firm will be larger than that of a stagnant firm (Baral, 2004).

It is evident from various theoretical and empirical studies that the relationship between growth and capital structure is controversial and that the results correspond with the type of capital structure theory that is followed.

### 3.4.6 Size

The size of a firm is closely related to the amount of risk associated with it and bankruptcy costs (Vasiliou *et al.*, 2005:8). Larger firms tend to have less risk than smaller firms, because they are more diversified and therefore have more stable cash flows. Consequently, the larger firms will have a lower probability of bankruptcy and therefore also have lower financial distress costs (Titman & Wessels, 1988). This implies that larger firms are prone to use more debt to finance their investment opportunities. Li and Li (1996) empirically observed that diversified firms carry more debt than non-diversified firms. Authors such as Kaplan and Weisbach (1992), and Singh, Wallace and Suchard (2003) support this argument by stating that diversified firms can maximise their value by carrying greater leverage.

Generally, larger, well-known firms have easier access to the capital market and the stock market than their smaller counterparts (Chen & Hammes, 2004). This is because the risk of default by a larger firm is much lower than for a smaller firm. Larger firms also have a better reputation in the debt market because they would generally receive higher credit ratings (Pinches & Mingo, 1973). Due to more security, financial institutions would be more willing to provide funds to larger firms and these funds are usually obtained at lower interest rates than by smaller firms.

According to Whited (1992), small firms cannot access long-term debt markets since their growth opportunities usually exceed their amount of assets that can serve as collateral. Smaller firms have a higher risk of bankruptcy and will, therefore, borrow less. Martin and Scott (1974) and Cragg and Baxter (1970) argue that smaller firms tend to either use short-term funds by means of bank loans, or issue stock. This will ultimately result in higher costs of capital for the smaller firms.

Information asymmetry also plays an important role with regard to the size of a firm. Myers and Majluf (1984) argue that, due to information asymmetry, firms would prefer debt since the issuing of equity sends a negative signal to outside investors that the firm's equity is undervalued in the market. According to Rajan and Zingales (1995), there is less asymmetric information in larger firms. Larger firms generally provide more information than smaller firms, which means that the public are more aware of what is going on in larger firms. This reduces the information asymmetry,

which implies that the chances of a new equity issue being undervalued is reduced and therefore encourages larger firms to use equity financing. Rajan and Zingales (1995:1451) also conclude that size may be a proxy for the information outside investors have, which should increase their preference for equity relative to debt (Bauer, 2004).

Empirical results on the relationship between the size of a firm and its capital structure are also controversial. In terms of information asymmetry explained above, a negative relationship can be expected. Since larger firms have less information asymmetry, their equity becomes more attractive to outside investors and will, therefore, have more capital available to them. This negative relationship is supported by Titman and Wessels (1988) and Chaplinksy and Niehaus (1993).

However, in terms of the bankruptcy theory, it is expected that the size of a firm and its capital structure will be positively related. Due to the fact that larger firms are more diversified, they have a lower risk of bankruptcy, which lowers their financial distress costs and they have easier access to capital markets. Larger firms will, thus, use more debt in their capital structure to take advantage of the lower financial distress costs and the lower interest rates provided by financial institutions. Friend and Lang (1988), Rajan and Zingales (1995), Barclay and Smith (2005), Wald (1999), Wiwattanakantang (1999), and Frank and Goyal (2004) are examples of studies that found a positive relationship between size and leverage.

## 3.5 ECONOMIC FACTORS

In Chapter 2, the concept of the weighted average cost of capital (WACC) was briefly discussed. It was stated that the WACC has a direct impact on the value of a business and that the inputs determining the WACC are very dynamic and are affected by an ever-changing environment. Therefore, in order to stay in touch with such an environment, it is vital for firms to focus on factors outside the firm itself as well. Previous research showed that leverage is not only affected by firm-specific factors, but it is also directly related to several factors specific to a country (Demirgüç-Kunt & Maksimovic, 1999; Booth *et al.*, 2001; Bancel & Mittoo, 2004; De Jong *et al.*, 2008).

Rajan and Zingales (1995), Booth *et al*. (2001) and Fan, Titman and Twite (2008) observed that cross-sectional determinants of leverage are more or less consistent across countries. However, significant cross-country differences do exist, which implies that factors specific to each country must play a vital role in financing decisions. Booth *et al.* (2001) reported that the variables used in their study were affected by factors such as the inflation rate, gross domestic product and growth rate.

De Jong *et al.* (2008) observed that certain economic factors significantly explain the variation in capital structures across countries. They found that in countries with a healthy economy, firms tend to use more debt. For example, according to Fan, Titman and Twite (2008), the strength of a country's legal system and public governance affects capital structure. They observed that weaker laws and more government corruption induce higher debt ratios and shorter maturity.

The position of the economy plays a vital role in the business cycle, since it is an important determinant of default risk and therefore of financing decisions (Drobetz *et al.,* 2007). According to Korajczyk and Levy (2003), economic conditions are also important when firms have to make issue choices. Firms will usually time both their debt and equity issues for when economic conditions are favourable and when economic prospects are good. These conditions are indicated with the aid of various business cycle variables such as interest rates, term spread or credit spread (Korajczyk & Levy, 2003).

The South African economy has undergone significant changes since the demise of apartheid in 1994 (Bhorat & Oosthuizen, 2005:1). The removal of trade and financial sanctions along with a successful political transition contributed significantly to a turnaround in the performance of the South African economy since 1994 (Du Plessis & Smit, 2006:15). An improvement in growth performance in South Africa can be seen in the decade since 1994, particularly if compared to the previous ten years.

Since the demission of apartheid in 1994, South Africa seems to be enjoying a combination of stable output growth and low inflation (Du Plessis & Boshoff, 2007). Blanchard and Simon (2001) and Stock and Watson (2003) refer to this combination as "the great moderation". The "great moderation" of South Africa has been

characterised by lower and stable inflation rates as well as interest rates, positive and sturdy GDP growth and fiscal deficits and debt (Du Plessis & Boshoff, 2007:5). Based on this statement, inflation, the interest rate and economic growth are selected as economic factors to determine whether these factors specific to South Africa will have an effect on the capital structures of firms. These economic factors are illustrated in Figure 3.2.

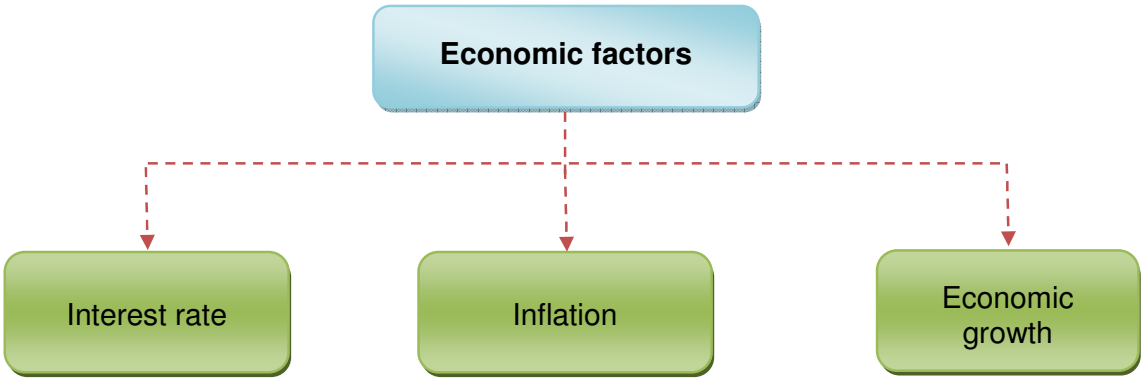


**Figure 3.2: A graphical depiction of the economic factors included in the study**

### 3.5.1 Interest rates

According to Modigliani and Miller's (1958) article on the irrelevance of capital structure, changes in the interest rates should not affect management financing decisions, since the value of a firm is independent of its capital structure. However, several theories have developed since then to argue against their theory.

The trade-off theory argues that firms will choose their capital structure based on a trade-off between the benefits (tax shields) and the costs (financial distress and bankruptcy) of increased leverage. If interest rates in the economy rise, the cost of debt (a component of the WACC) increases, because firms will have to pay bondholders a higher interest rate to obtain debt capital. An increase in the cost of capital will increase the risk of bankruptcy. On the other hand, a decline in interest rates will reduce the cost of capital for all firms, which will encourage additional investment (Brigham & Houston, 1998:370). The trade-off theory, therefore, suggests that there is a negative relationship between interest rates and leverage.

Henderson, Jegadeesh and Weisbach (2006) state two possible reasons why firms would issue more debt when interest rates are low. During periods of low interest rates, firms are likely to have more positive net present value projects, hence increasing the capital demand by firms to finance these projects. The lower interest rates increase the borrowing capacity of a firm, because they need less real cash flow to fulfil their debt obligations. Secondly, firms tend to substitute debt for equity when interest rates are low because debt is then a much cheaper source of finance than equity (Henderson *et al*., 2006:89).

Another theory that suggests a negative relationship between these two variables is the market timing theory. According to this theory, managers look at the debt markets and equity markets and use whichever market is currently more favourable (Frank & Goyal, 2003). Management tend to issue equity when the value of their shares is overvalued and will repurchase their shares when the market value is low compared to historic market values (Hovakimian *et al*., 2001). Managers are able to make these equity financing decisions since they have superior information that outside investors do not have. Henderson *et al.* (2006) reported that firms tend to issue more equity when the stock market is overvalued and firms time their debt issues prior to future increases in interest rates (Henderson *et al.,* 2006:66). If management can successfully anticipate the future interest rates, they may be able to reap the benefits of a decrease in interest rates, or at least be prepared for an increase in the interest rates.

Various empirical studies on individual firms in the United States found that, when interest rates are low, firms tend to issue more debt than equity (Bosworth, Smith & Brill*,* 1971; White, 1974; Taggart, 1977). Consistent with these studies, Henderson *et al. (*2006) found negative relationships between both short-term and long-term debt and the particular interest rate. This strongly supports the results from a survey by Graham and Harvey (2001), in which chief financial officers claim they attempt to issue debt during periods of low interest rates.

Although most empirical studies support a negative relationship between interest rates and capital structure, there are studies that convey the opposite results. Frank and Goyal (2001) argue that, when interest rates increase, the value of the existing equity and bonds will decrease. Furthermore, the decrease in the value of equity

tends to be more than the decrease in the value of debt, which leaves the firm with a higher degree of leverage (Frank & Goyal, 2001). Based on their argument, a positive relationship between interest rates and leverage is predicted, meaning that an increase in interest rates will lead to an increase in leverage.

It is thus clear that interest rates do influence the financing decisions of firms, though there is no consistence in the results as to whether the effect is positive or negative. Therefore it is essential for the management of a firm to be aware of, and attempt to predict future changes in the interest rates since it will have an effect on their financing decisions.

Figure 3.3 illustrates the prime interest rate (a measure for interest rates) in South Africa for the period 1982–2008. The prime interest rate experienced many fluctuations from 1982 to 2008.

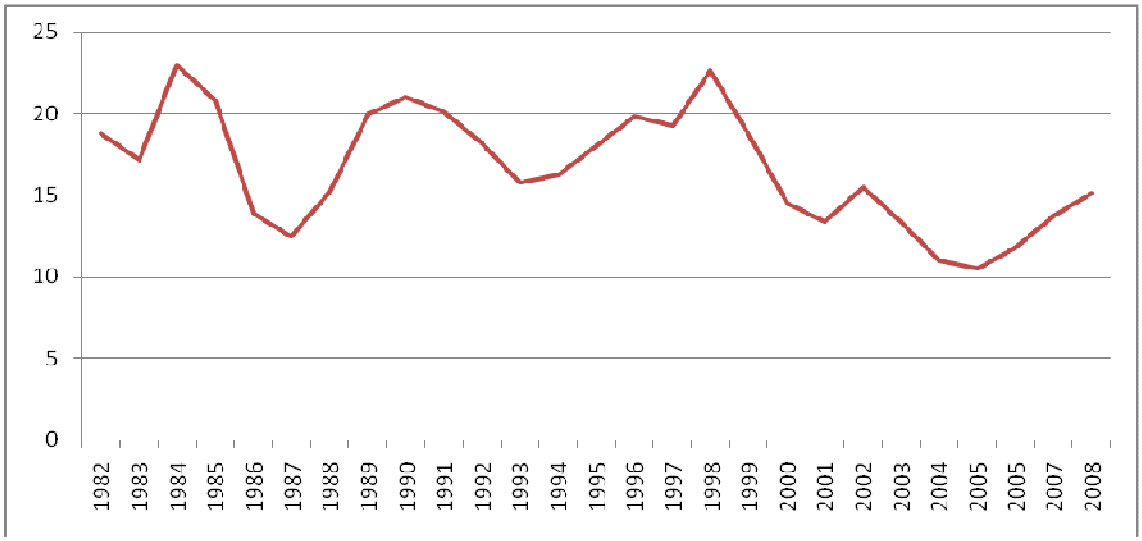


**Figure 3.3: The average prime interest rate in South Africa for the period 1982–2008.**

Data source: South Africa Reserve Bank (SARB) (2007) website.

From 1982 to 1994, the prime interest rate remained above 15% for most of the time and it exceeded the 20% level a few times. After the demise of apartheid in 1994, the prime interest rate remained relatively high, and in 1998 it reached a high of almost 23%. From thereon, however, the prime interest rate has dropped to considerably lower levels compared to the 1980s. From the graph, it is clear that the prime interest

rate in South Africa has been very volatile for the past two decades. Since 1994, the prime interest rates have reached a high of 23% and a low of 10.5%. Thus, if the empirical results from this South African study convey that a relationship does exist between interest rates and capital structure, these fluctuations will definitely provide a clear indication whether the interest rate has a positive or negative effect on capital structures.

### 3.5.2 Inflation

It is essential that management understand the vital role of the expected inflation rate and the effect thereof on the financial performance and the asset and capital structure of a firm, since it can be a decisive factor in the investment, dividend and financing decisions of a firm. Inflation affects the financial markets and the return rates that investors receive on capital, hence affecting the financial decisions of firms.

The subject of inflation cannot be discussed without mentioning the Fisher hypothesis by Irwing Fisher (1930). The Fisher effect implies that there exists a positive relationship between nominal interest rates and the expected inflation rate. Fisher (1930) suggested that the nominal interest rate reflects movements in the expected rate of inflation. The nominal interest rate, therefore, represents the real interest rate plus the expected inflation rate over the economic lifetime of a financial asset (Al-Khazali, 2004). The hypothesis, furthermore, states that nominal interest rates move one-for-one with expected inflation, and the real interest rate remains unchanged. An elaboration on the Fisher hypothesis by Darby (1975) and Feldstein (1976) convey that an increase in inflation should result in a more than proportional increase in the nominal interest rate. This finding is based on the fact that investors make their investment decisions on the after-tax expected consequences of their actions (Gandolfi, 1982).

In the event of an unexpected change in the inflation rate, the real interest rate is affected. During inflationary periods, the value of debt decreases in real terms and the firm requires less real cash flow to fulfil their debt obligations (Lambrechts, 1992:567). Thus, an increase in inflation will reduce the cost of debt and increase the borrowing capacity of the firm, meaning that the firm can obtain more debt capital.

Studies by Jaffe (1978), Modigliani and Cohn (1979), and Modigliani (1982) support the finding that firms will employ more debt in their capital structure during an inflationary period, since the real cost of debt decreases.

Lambrechts (1992:568) provides further important influences of inflation on the financing decision of a firm:

1. Firms find it more difficult to obtain long-term loans at a fixed interest rate due to the negative influence of inflation on the real earnings of the providers of debt capital.
2. When inflation, and consequently the interest rates, are high and a decrease in these rates is expected, there is not enough motivation for the firm to borrow over the short-term.
3. It becomes more difficult for firms to make a prognosis of the expected inflation rate due to quick changes in the inflation rate.

The figure below provides a graphical depiction of the South African consumer price index (one measure for inflation) for the period 1982 to 2008. A clear distinction in the CPI inflation rate can be seen in the period before 1994 and the period thereafter.

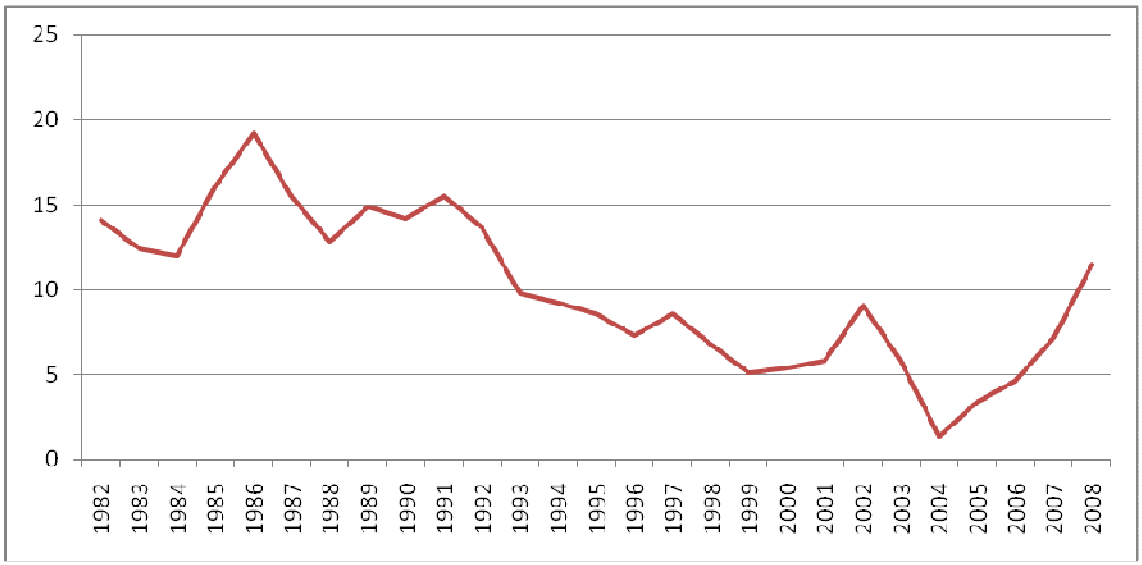


**Figure 3.4: The average consumer price index (CPI) inflation rate in South Africa for the period 1982–2008.**

Data source: Statistics South Africa (2006)

Before 1994, consumer inflation varied between 20% and 10%. From 1994 to 2008, the average annual consumer inflation has not exceeded 10%. This illustrates that since the end of apartheid, inflation has been brought under control to low and predictable levels (Nowak, 2005). Based on the data provided by Statistics South Africa (2006), South Africa has experienced an inflationary period ever since the demise of apartheid, which could have had an impact on the financial decisions of firms. It is expected that a decrease in inflation will increase the cost of debt and therefore firms will employ less debt in their capital structure. The assumptions made above imply that a positive relationship exists between a firm's leverage and the inflation rate, and increases in inflation will result in an increase in leverage. This corresponds with Modigliani's (1982) statement that inflation should push the value of leverage upward.

### 3.5.3 Economic growth

Economic growth takes place when an economy performs better compared to the previous year. That means that a country experiences an increase in the production of products and/or services, thus output increases. Economic growth impacts on everyone within that economy. Increase in businesses, low unemployment rates and wage increases are only some features associated with a healthy economy. The condition of the economy also impacts on the stock market. A decline in economic growth implies less profit for firms, which leads to a decline in the stock prices of firms.

It is expected that economic growth could affect a firm's capital structure, seeing that economic growth definitely has an impact on the operations of a firm. Most firms benefit when the economy is growing, since an increase in economic growth implies that firms are generally producing more. During periods of increasing economic growth, the demand for products and/or services tend to increase, which requires firms to produce more. Firms, therefore, experience an increase in their sales and possible opportunities to expand the business present themselves. To be able to expand the business to provide for the increase in demand, firms will require additional capital to finance these projects. Again, the financing decision comes into play, where firms have to decide to obtain funds through debt or equity issues or a combination of debt and equity.

The opposite holds for a decrease in the economic growth of a country. With a decline in economic growth, firms expect demand to fall. This will result in less income for the firm and, depending on their capital structure, it may result in financial distress. If a firm has high leverage, it may struggle to fulfil all its debt obligations when a decline in cash inflow is experienced. In such economic situations firms may opt for financial restructuring by exchanging debt for equity, making the firm less leveraged. If financing is required for projects, managers are also more likely to prefer equity to debt.

The question still remains whether firms prefer debt or equity as a source of financing during changes in the economic growth of a country. Hussain, Malik and Hayat (2009) did find that economic growth (measured by gross national product growth) is significantly related to capital structure and also that higher economic growth tends to increase the use of long-term debt. Although financial literature and empirical studies with regard to the relationship between economic growth and capital structure are limited, economic growth is still included as a variable in this study. Based on the above arguments, it is expected that economic growth could have an effect on a firm's capital structure decisions.

Figures 3.5 and 3.6 provide a graphical depiction of the gross domestic product (GDP) growth rate in South Africa for the period 1982 to 2008.

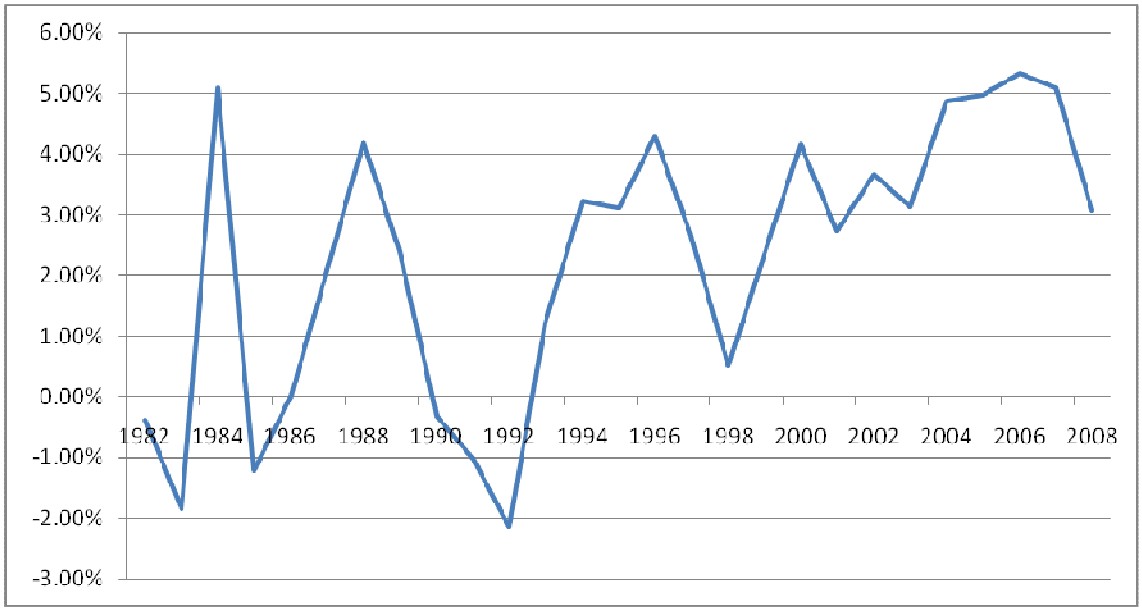


**Figure 3.5: The average GDP growth rate in South Africa for the period 1982–2008.**

Data source: I-Net Bridge (2005)

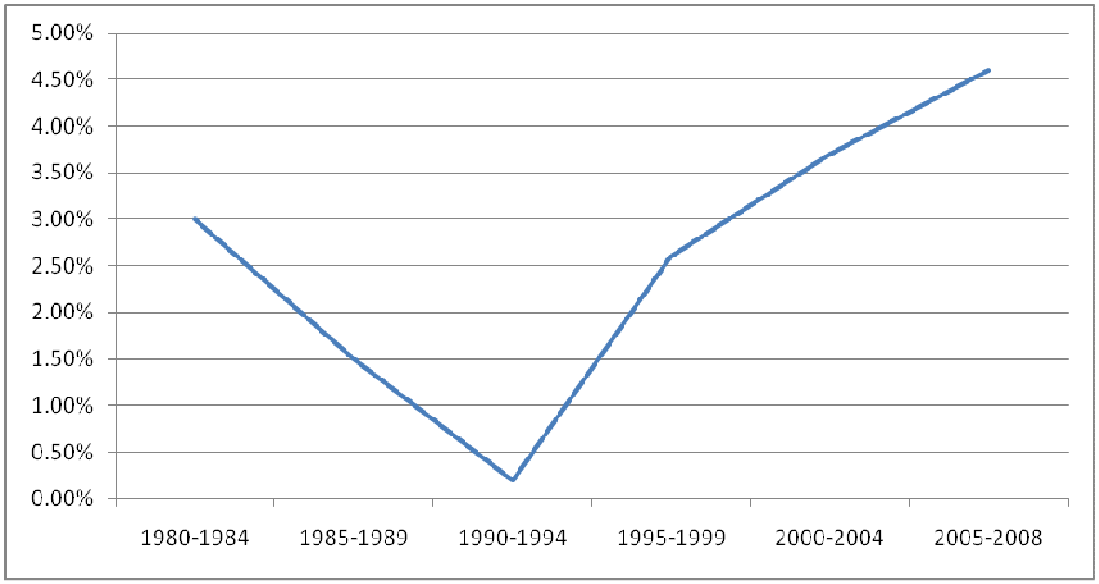


**Figure 3.6: Five-year averages for growth in GDP for South Africa.**

Data source: I-Net Bridge (2005)

Figure 3.6 provides a much smoother line than Figure 3.5 and it helps to identify two definite trends in the GDP growth rate. The first trend is the decline in the GDP growth rate since 1981, and the second trend is the revival in growth since 1995.

Since South Africa had undergone significant changes in 1994 with the demise of apartheid, the economy has enjoyed a positive and steady growth in GDP. The average growth rate for the period 1995–2004 was 3.1%, compared to a 0.8% average growth rate registered in the period from 1985–1994 (Du Plessis & Smit, 2006:3). This proves that the South African economy has enjoyed a substantial improvement in terms of economic growth. Considering the positive and steady growth in South Africa, it is expected that a positive relationship could exist between economic growth and capital structure. This assumption is based on the expectation that demand increases with an increase in economic growth. In a healthy economy, the demand for products and services increases, hence the sales of firms are likely to increase. If managers are equipped to manage these increases in sales well, the firm can expect an increase in profits, leaving the firm with more free cash flow. This will enable them to obtain more debt capital since they will be able to fulfil debt obligations. This argument supports the trade-off theory, which states that more profitable firms have more capacity to borrow. Profitable firms are subject to higher tax payments, and there is thus a greater incentive to employ more debt to exploit debt interest tax shields (Hutchinson & Hunter, 1995:67).

### 3.5.4 Summary of the three economic factors

Figure 3.7 illustrates the course of the three identified economic factors for the period 1982 to 2008.

- interest rate – measured by the prime interest rate of South Africa
- inflation – measured by the consumer price index (CPI) of South Africa
- economic growth – measured by the gross domestic product (GDP) growth rate of South Africa

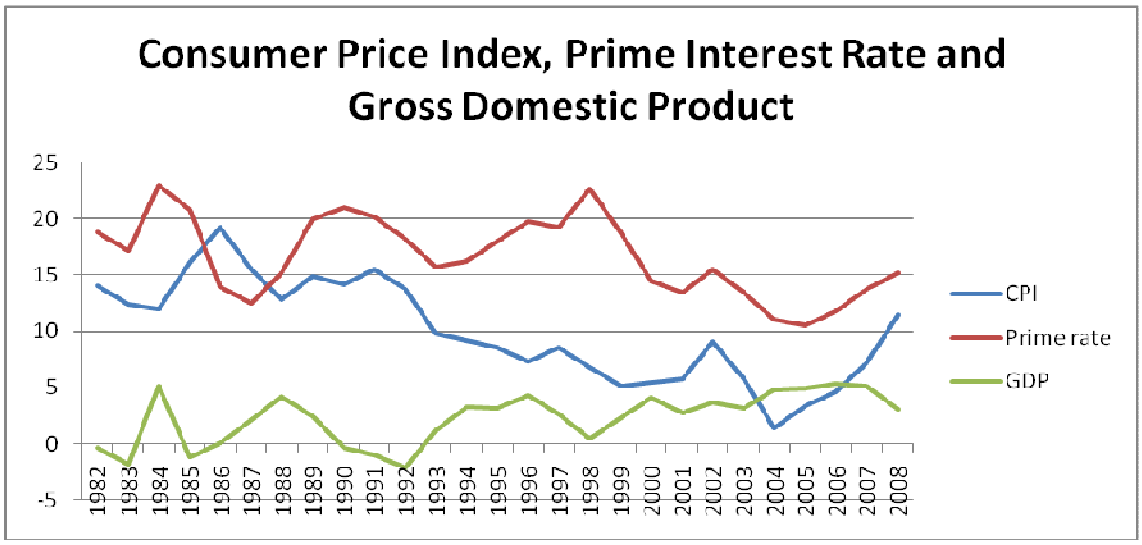


**Figure 3.7: The three economic factors combined for the period 1982–2008.**

Data source: Statistics South Africa (2006) and I-Net Bridge (2005)

The three graphs together give a good illustration of the South African economy for the past two decades. It is evident that South Africa has experienced substantial improvements in terms of all three economic indicators since the end of apartheid in 1994, which is referred to as the era of great moderation in South Africa. This is consistent with Aron and Muellbauer's (2005) statement that the period from 1994–2008 has been characterised by lower and stable inflation rates and interest rates and positive and steady GDP growth (Du Plessis & Boshoff, 2007:5).

## 3.6 CONCLUSION

The information provided in this chapter is important and relevant because every firm, independent of size, needs to choose a combination of debt and equity. Furthermore, it was stated that there are various factors that can affect the financing decisions of managers viz.: internal factors (firm characteristics) and external factors (economic factors).

The general assumption is that most firms use some sort of a target debt-equity ratio in an attempt to support their financing decision. Correia and Cramer (2008) conducted a study on South African listed firms and found that 21% of South African firms do not follow any form of a target debt-equity ratio. Compared to firms in the

United States (10%), a significantly larger proportion of South African firms use a strict debt-equity ratio (29%) (Correia & Cramer, 2008). From Correia and Cramer's findings, it is evident that the majority of South African firms do use target leverage ratios. These findings are illustrated in Figure 3.8.

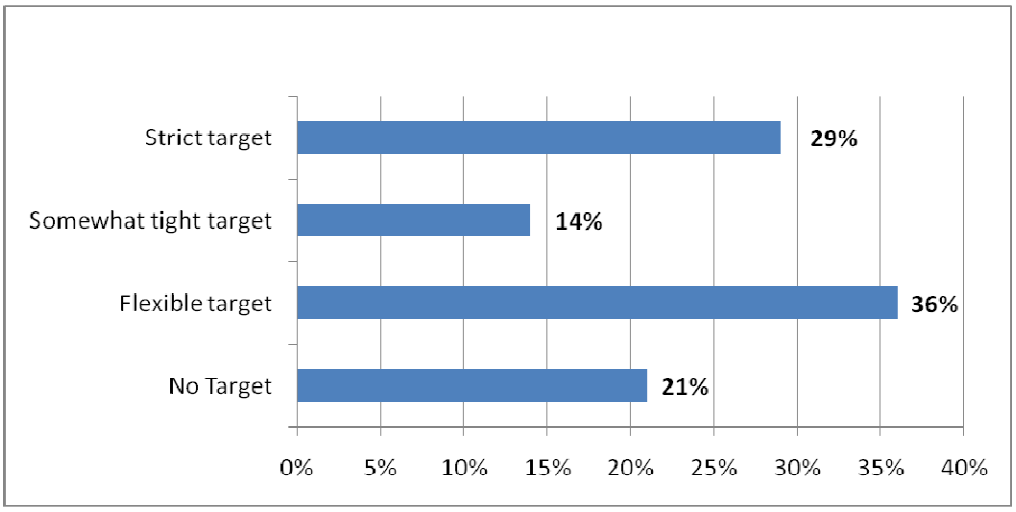


**Figure 3.8: The use of a target debt-equity ratio by South African listed firms.**

Source: Adapted from Correia and Cramer (2008:46)

Correia and Cramer (2008) also pointed out that the corporate sector in South Africa is highly under-geared as can be seen in Figure 3.9.

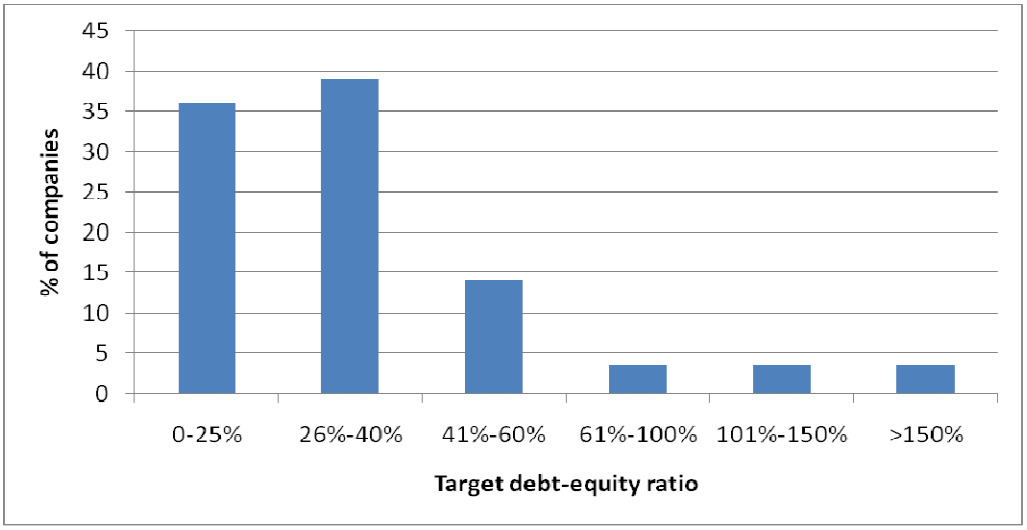


**Figure 3.9: The use of a target debt-equity ratio in South Africa.**

Source: Adapted from Correia and Cramer (2008:47)

Correia and Cramer (2008:47) reported the following as possible reasons for South African firms currently being under-geared:

- high profitability levels in the domestic economy, but limited growth prospects for expanding;
- unwillingness or inability to expand into offshore markets;
- high real interest rates that may have affected management's perspectives on the advisability of the use of debt; and
- increasing activity by private equity funds to acquire listed companies and to restructure balance sheets by taking on significant amounts of debt in order to finance these acquisitions.

From Correia and Cramer's (2008) study it is evident that firms in South Africa do use some form of a target leverage ratio. The important, unanswered question still remains how firms decide on their target leverage ratios. They must consider several factors, whether they be internal, external or a combination of factors, to make their decision. The current study, therefore, focused on six firm characteristics (profitability, asset structure, liquidity, business risk, growth and size) and three economic factors (inflation, interest rate and economic growth) to determine whether the capital structures of firms in South Africa correlate with these variables. The factors were selected as a result of previous theoretical and empirical research, in which these factors were most dominant.

By analysing the various factors, the results may shed some light on the capital structure debate and may provide some answers as to how South African firms make their financing decisions with regard to debt and equity.

# Chapter 4

# RESEARCH METHODOLOGY

## 4.1 INTRODUCTION

In the previous chapter it was mentioned that capital structures differ between countries, industries as well as firms within the same industry. Financial literature report that these differences may be explained by various factors that could have an influence on the capital structures of firms. Based on previous empirical studies, six firm characteristics and three economic factors were identified for this particular study. Chapter 3 focused specifically on these nine independent variables and the possible influences they could have on capital structures.

The primary objective of this study was to determine the effect of firm characteristics and economic factors on the capital structure of South African listed industrial firms. The secondary objectives included the following, to:

- analyse whether the firm characteristics can explain variance in capital structure;
- analyse whether the economic factors can explain variance in capital structure;
- determine if different results are obtained for book value leverage and for market value leverage;
- determine if different results are obtained for firms that remained listed on the JSE and firms that delisted from the JSE during the selected study period of 14 years; and
- conclude if the findings of the firms included in the study correspond more with the trade-off theory or the pecking order theory.

The previous chapters dealt with the sources of financing and capital structure theories, as well as the selected firm characteristics (profitability, asset structure, liquidity, business risk, growth, size) and economic factors (interest rate, inflation, economic growth). This chapter focuses on the research methodology of the study.

Business research will be discussed and this will be followed by an elaborate discussion on the research process that was followed in order to answer the research question. The research process will be structured in the form of nine steps, which will include various aspects such as developing a research frame, data collection and data processing. The latter part of this chapter will focus on reliability and validity to ensure the trustworthiness of the research results.

## 4.2 BUSINESS RESEARCH

Business research can provide the necessary information to management in order to guide managerial decisions. Cooper and Schindler (2006:4) define business research as: "... a process of planning, acquiring, analysing, and disseminating relevant data, information, and insights to decision makers in ways that mobilise the organisation to take appropriate actions that, in turn, maximise business performance".

According to Coldwell and Herbst (2004:5), business research plays two important roles in firms. Firstly, it provides management with data on the effectiveness of their current business strategies. Secondly, business research is a useful instrument to identify new business opportunities. The information obtained by conducting business research can therefore be used to define problems, to identify opportunities, to analyse causal factors and to clarify alternatives (Coldwell & Herbst, 2004:2). This information will support management in all stages of the decision-making process and will enable them to make sound and informed managerial decisions. It is important to mention that management needs information, and not raw data, to make managerial decisions. Data represent raw, unanalysed facts and it is only when the data have been analysed and processed that it becomes information (Gerber-Nel, 2004).

Data can be classified as either primary or secondary. Secondary data can be defined as data that have already been collected for other research purposes; however, it may help to resolve the research problem at hand. Secondary data are therefore data that already exist. Primary data on the other hand, do not exist prior to the research and it is specially collected by researchers to address a particular

research problem (Cant *et al.,* 2005:88). Steyn, Smit, Du Toit and Strasheim (1999:7) hold that there are two types of secondary and primary data, namely qualitative and quantitative data.

According to Cant *et al*. (2005:4), qualitative data refer to research data that are not subjected to quantification or quantitative methods, whereas quantitative data use mathematical analysis. The latter research approach describes, infers and resolves problems by using numbers (Coldwell & Herbst, 2004:15). The current study was a quantitative study, since numbers were used to resolve the research question.

As mentioned earlier, business research is very important since it can provide valuable information to management that may improve the decision-making process. It is, therefore, a principal instrument to facilitate effective management. In order to conduct business research, the researcher should follow a series of steps designed to achieve a specific objective (Coldwell & Herbst, 2004:6). The steps that need to be followed refer to the research process and they will be discussed in the following section.

## 4.3 THE RESEARCH PROCESS

For this chapter, the research process will consist of nine steps, which are illustrated in Figure 4.1.

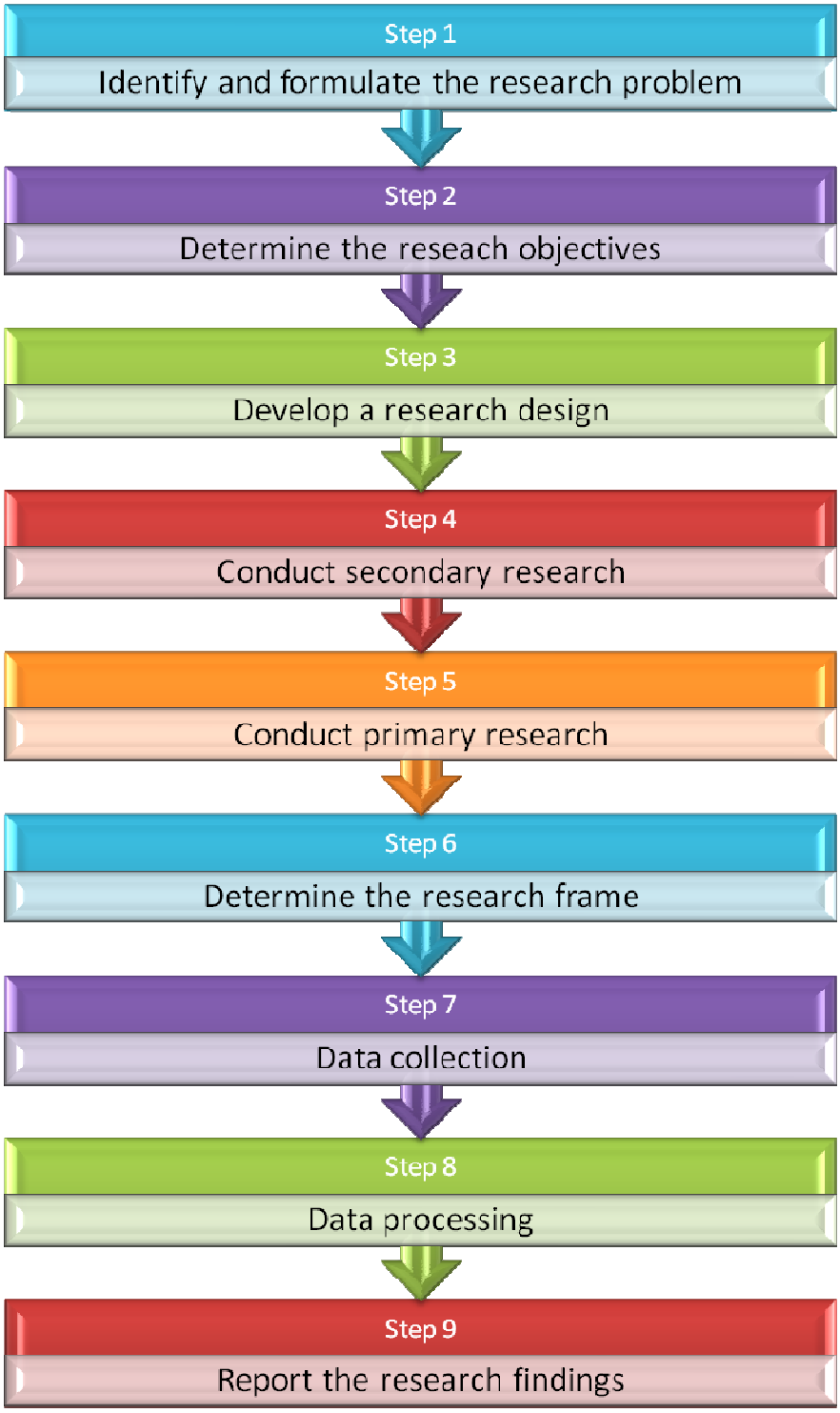


**Figure 4.1 The research process.**

Source: Adapted from Cant *et al.* (2003:39)

A detailed discussion on each of these steps will follow.

## 4.4 STEP 1: IDENTIFY AND FORMULATE THE RESEARCH PROBLEM

The research process begins with problems or opportunities faced by management, which prompt the need for a decision. Identifying a problem or opportunity is very important since it sets the research direction. If the diagnosis of the problem or opportunity is weak, the research may also lead to an insufficient solution (Cant *et al.,* 2005:40). Valuable resources, such as time and money, may then be wasted on an alternative that may not provide the correct information to rectify the actual problem or exploit the possible opportunity.

According to Gerber-Nel (2004:167), research should not only produce the kinds of answers needed, but it should also do so efficiently. It is therefore extremely important that the problem or opportunity faced by the firm (or business environment) is clearly defined and formulated in order to obtain relevant results through research.

Through exploration, researchers can develop concepts more clearly, establish priorities, develop operational definitions and improve the final research design (Coldwell & Herbst, 2004:10). According to Coldwell and Herbst (2004:36), the objectives of exploration are the development of hypotheses and not their actual testing. Exploratory research was conducted to identify and define the research question for this study.

## 4.5 STEP 2: FORMULATE THE RESEARCH OBJECTIVES

Once the purpose of the study has been established and the research question defined, certain primary and secondary objectives should be identified to support the purpose of the study and to guide the research process in the right direction (Cant *et al.*, 2005:42). These research objectives should disclose specific information that is required to answer the research question. To formulate the objectives, the general research question is divided into more specific questions (Cooper & Schindler, 1998:66). Data should, therefore, be gathered to address these more specific questions.

The purpose of this study, which constitutes the primary objective, was to determine the effect of firm characteristics and economic factors on the capital structure of South African listed industrial firms. The secondary objectives included the following, to:

- analyse whether the firm characteristics can explain variance in capital structure;
- analyse whether the economic factors can explain variance in capital structure;
- determine if different results are obtained for book value leverage and for market value leverage;
- determine if different results are obtained for firms that remained listed on the JSE and firms that delisted from the JSE during the selected study period of 14 years; and
- conclude if the findings of the firms included in the study correspond more with the trade-off theory or the pecking order theory.

The above research objectives were formulated to support the purpose of this study, which was identified and defined through exploratory research (see Section 4.4).

## 4.6 STEP 3: DEVELOP A RESEARCH DESIGN

At this stage of the research process, a problem or opportunity has been identified, a research question formulated and research objectives derived. The next step in the research process is to develop a research design, which is a preliminary plan for conducting research. Mouton (1996:107) defines a research design as a set of guidelines and instructions that should be followed in order to address the research problem. It therefore structures the research and shows how all the elements of research (samples, measures, treatments or programmes, and methods) work together to address and obtain answers to the research questions (Coldwell & Herbst, 2004:36).

The structure of the research design depends on the nature of the research that needs to be conducted. It is therefore important that the research objectives, determined in the previous step, be translated into specific data needs (Cant *et al.*,

2005:46). The specific information required from the research should be established and possible sources, from which the information will be obtained, should be considered. There are two information sources available to collect data, namely secondary sources and primary sources. Secondary information sources refer to data that already exist, while primary sources refer to data that have originated as a result of a particular problem under investigation (McDaniel & Gates, 2001:25). In order to solve research problems, researchers start with secondary research and if the problem is not solved, primary research needs to be conducted.

## 4.7 STEP 4: CONDUCT SECONDARY RESEARCH

As already mentioned, secondary research refers to data that already exist prior to the research problem at hand. Secondary research, thus, refers to the use of data that have been collected for another purpose. According to McDaniel and Gates (2001), one of the main advantages of secondary research is that it may provide the necessary background information to a particular research study and build creativity for the research report. Secondary sources, however, have their limitations. The most important limitation is probably the unavailability of data that will meet the specific research needs, since the information were collected by someone else for other purposes (Emory, 1976:176).

Secondary data sources can be obtained from internal or external sources. Internal data sources refer to data which are created within the organisation itself and it may include departmental reports, production summaries, financial and accounting reports and marketing and sales studies (Emory, 1976:176). External data sources, on the other hand, refer to data which are created, recorded or generated by entities other than the organisation who is conducting the research and these sources can either be published data, syndicate sources or external databases (of which the internet forms an integral part) (Cant *et al.*, 2005:71).

External data sources were used for the purposes of this study. An external database, McGregor BFA (2008), was used to obtain the data required for the firm characteristics and INET-Bridge (2005), Statistics South Africa (2006) as well as the

South African Reserve Bank (SARB) (2007) website was used to obtain data with regard to the economic factors.

The data obtained from the above-mentioned external data sources, however, are insufficient to answer the research question. Primary research, therefore, needs to be conducted to provide the exact required information, in the specific form it is needed to continue with the research project.

## 4.8 STEP 5: CONDUCT PRIMARY RESEARCH

As mentioned earlier, primary research needs to be conducted if the research problem is not solved through secondary research. Even though secondary data is used in this study, the data (in its original form) obtained through secondary research are not sufficient to provide an answer to the research question. The secondary data must therefore be converted into the specific forms needed for evaluation. Primary research must thus be conducted to collect the specific information needed to answer the research question.

In primary research, the analyst is responsible for the design of the research, the collection of the data, and the analysis and summary of the information (Stewart & Kamins, 1993:3). To begin the primary research process, it is important to consider who will be part of the investigation. This is referred to as the research frame of a study and a discussion on this will follow in the next section.

## 4.9 STEP 6: DETERMINE THE RESEARCH FRAME

Another important research question that arises when conducting primary research is the selection of subjects to study (Emory, 1976). The general idea is that the selection of subjects should be representative of all the elements from whom the information is needed (Cant *et al.*, 2003:51). These elements, on which the measurements are being taken, are known as the population or universe (Mouton, 1996). Cant *et al.* (2003:164) define the target population as the collection of elements or objects from which information is gathered to solve the research

question. It is therefore important to identify (for the particular study) the target population from whom information is needed.

Once the target population is identified, the sampling frame should be constructed. The sampling frame provides the basis for sampling and refers to all the elements from which the sample will be selected (Mouton, 1996:135). Depending on the research problem, a census or sample can be used to conduct the research (Cant *et al.*, 2003:51). A census entails the collection of data from or about all the elements in a particular population. A sample, however, refers to only a part of the target population. This implies that only some of the elements are selected from the identified population, in an attempt to find out something about that total population.

For this study, a census was used to obtain information about the target population. As already mentioned, the primary objective of this study was to determine the effect of firm characteristics and economic factors on the capital structure of South African listed industrial firms. The target population for this particular study was, therefore, all firms listed in the industrial sector of the JSE. A census was used instead of a sample because all the firms that complied with certain requirements were used for analysis. Thus, data were gathered from all the elements in the population. Since specific data were required from firms to be included in the study, it was vital to precisely define the census to be used. The census will be defined and discussed in the following section.

### 4.9.1 Define the census

As was mentioned above, the target population for this study was all listed industrial firms in South Africa. All the firms that provided the information that was needed for this study were included, hence, the use of a census. The main criteria for choosing the firms were the availability of financial data during the selected period of 14 years. The primary source of data was the external database, McGregor BFA (2008). This database comprises standardised financial statements for publicly traded firms from the JSE. This motivates the inclusion of only publicly traded firms in the study. At the end of the selected period, all firms listed on the JSE would have been considered. Firms included in the mining and financial sectors were, however, excluded since their financial characteristics and their use of leverage are different compared to

firms in other sectors. Furthermore, firms that operate in these two sectors incorporate different types of business activities and their financial statements are very different compared to other firms. This makes comparisons between firms more difficult. The industrial sector is, however, representative of the vast majority of firms operating in the South African business environment. The census is therefore restricted to the industrial sector of the JSE.

Focusing only on those firms which are listed at the end of the selected period would expose the study to a survivorship bias. Survivorship bias is the result of a firm that is delisted from the stock exchange. This might often be due to financial failures or the financial restructuring of firms. It is expected that the reported results would appear better/stronger when these delisted firms are excluded from the census. Carrying on with research which suffers survivorship bias could result in inconsistent and untrustworthy results. In order to reduce survivorship bias, it was important to include those firms that delisted during the period investigated in this study. Both listed and delisted firms during the selected period were, therefore, included in the study.

Finally, firms had to provide financial data for a period of at least five years in order to be included in the study. This requirement was incorporated in the study, since the data set contains cross-sectional and time-series dimensions. A data set which contains both of these dimensions is classified as panel data. This is an important observation since the data set contains observations on a variety of units observed over a series of time periods (Keller, 2005:650). A period of at least five years was, therefore, required to obtain sufficient observations for the study. This also reduces instability amongst firms in the industrial sector, thus, providing more reliable results.

To conclude, the census for this study included all firms listed in the industrial sector of the JSE, as well as those firms that delisted during the selected period. By incorporating the above-mentioned requirements, the final census included a total of 280 firms. The census comprised of 170 listed and 110 delisted firms. This study was conducted for a period of 14 years (1995 to 2008). The focus was on the period following 1994 as the South African economy had undergone significant changes since the demise of apartheid in 1994 (Bhorat & Oosthuizen, 2005:1).

## 4.10 STEP 7: DATA COLLECTION

In this stage of the research process, the actual collection of data takes place. The research methodology can finally be put into practice. As mentioned earlier, data can be classified as either primary or secondary. Furthermore, two types of secondary and primary data exist, namely qualitative and quantitative. For the purposes of this study, secondary data were used since the data existed prior to this study. Primary research was also necessary, since the data obtained from secondary research needed to be converted into a usable format. Quantitative research was, furthermore, used to achieve the primary and secondary objectives of the study. According to Coldwell and Herbst (2004:15), this approach describes, infers and resolves problems by using numbers. The quantitative approach was applied to this particular study, since financial ratios and economic indicators (numbers) were used to answer the research question.

Financial ratios were used as measurement instruments to define capital structure (the dependent variable), and the firm characteristics. Several instances may occur where data are missing from a firm's financial data. This could be the result of unpublished information (for instance when a firm does not disclose its annual turnover). Another obstacle was where the denominators of certain ratios equalled zero, since it does not signify a true zero. For example, if a firm does not disclose its cost of sales figure, the calculation of the turnover time of inventory would equal zero, since the denominator (cost of sales) is not available. To overcome this obstacle, these years and/or ratios were deleted from the data set. As mentioned earlier, a firm had to provide complete financial data for at least five of the selected 14 years to be included in the study. This requirement resulted in the exclusion of 163 firms, leaving the final census with a total of 280 firms, with 2 684 observations. The income statement, balance sheet and sundry data items were obtained from the financial statements of all the firms included in the study. An external database, McGregor BFA (2008), was used to gain access to these financial statements in a standardised format. The year-end share prices of all the firms included in the sample were also obtained from the McGregor BFA (2008) database.

Economic indicators were used as measurement instruments for the three economic factors (the interest rate, inflation rate and economic growth rate) included in the study. These economic indicators were obtained from INET-Bridge (2005), Statistics South Africa (2006) and the South African Reserve Bank (SARB) (2007) website.

Table 4.1 provides a summary of the dependent variable and the independent variables identified for the study as well as the calculation measure for each of the variables.

**Table 4.1: Dependent variable and independent variables**

| IDENTIFIED | MEASURED |
|---|---|
| **Dependent variable** | |
| Capital structure | Debt-equity ratio ($DE_{BV}$ & $DE_{MV}$) |
| **Independent variables** | |
| **A) Firm characteristics** | |
| Profitability | Return on assets (ROA) |
| Asset structure | Fixed assets-to-total assets (FA/TA) |
| Liquidity | Current ratio (CR) |
| Business risk | Adjusted return on assets (adjusted ROA) |
| Growth | Market-to-book ratio (M/B ratio) |
| Size | Natural logarithm of sales (ln [sales]) |
| **B) Economic factors** | |
| Interest rate | Prime interest rate (PR) |
| Inflation | Change in the consumer price index (CPI%) |
| Economic growth | Change in the gross domestic product (GDP%) |

*The abbreviations in the table will be used to describe the identified variables throughout the remainder of this study.

Table 4.1 provides the various variables for the study. It comprises of the dependent variable, namely capital structure, as well as the independent variables. The independent variables were divided between six firm characteristics and three economic factors. Table 4.1, furthermore, provides the different measures used to quantify each of the identified variables. As mentioned earlier, the dependent variable and the six firm characteristics were measured by means of financial ratios and the three economic factors were measured by using economic indicators. A discussion on each of these variables, as well as the calculation measures, will now follow.

## 4.10.1 Dependent variable

The dependent variable for this study was the capital structure. Different financial ratios can be used as measures for the leverage if the capital structure of a firm. Each of these measures could produce different results and could, thus, lead to different interpretations (Harris & Raviv, 1991). Studies by Rajan and Zingales (1995) and Booth *et al.* (2001) convey that the determinants of the capital structure are very sensitive to the choice of leverage.

There are various aspects to consider when deciding on a measure for the capital structure:

### *4.10.1.1 Financial ratio*

Based on financial literature, the leverage of a firm can be measured by using either the debt ratio (ratio of total debt to total assets), the debt-equity ratio (total debt divided by total equity) or by the interest coverage ratio (EBIT divided by interest payable) (Ross, Westerflied & Jaffe in Chen & Hammes, 2004). Based on an analysis of previous empirical studies, the latter measure, however, is not used as often as the first two measures.

In this study, the debt-equity ratio was used to quantify the dependent variable, namely the capital structure. The debt-equity ratio indicates what proportion of debt and equity a firm uses to finance its assets. The majority of previous empirical studies used the debt-equity ratio to measure leverage, hence the basis for using it in this study.

#### *4.10.1.2 Type of debt*

Another consideration when deciding which measure of leverage is appropriate, is the type of debt used. A distinction can be made between long-term debt, short-term debt and total debt. Bevan and Danbolt (2002:160) reported that the results of their analysis differed significantly depending on which form of debt is being considered.

For this study, total debt was used in the debt-equity ratio, thus including both interest-bearing short-term and long-term debt. Preference share capital can be included under debt capital or equity. In the standardised financial statements provided by McGregor BFA (2008), preference share capital forms part of the total owners' interest. For the purposes of this study, the preference share capital was included under equity.

#### *4.10.1.3 Book value versus market value of equity*

Finally, these measures of leverage can be based on book values or market values of equity. Both of these measures present their own strengths and weaknesses. Book value ratios and market value ratios are conceptually different. Book values consider the past since it is determined by what had already happened. Market values, on the other hand, are determined by looking into the future (Frank & Goyal, 2003:12). According to Thies and Klock (1992), book values better reflect the target leverage of management. Mackay and Phillips (2005) support the preceding argument by stating that financial managers concentrate more on book value when they decide on financial structure, since it is often argued that market valuations of equity is beyond the control of management. According to them, market value is a weak measure of leverage.

Modigliani and Miller (1958), however, argue that market value measures better reflect the ownership between equity and debt holders and that it represents the primary input into the WACC calculations. Welch (2004) furthermore argues that market value measures significantly explain stock returns and that the variation in stock returns accounts for most of the leverage variation (Drobetz *et al.*, 2007).

Considering the above arguments, both the book value and the market value of equity were used in this study to determine the difference in the results obtained for

the two measures. Since book value ratios look at the past and market value ratios are determined by looking into the future, a difference in results between these two measures was expected. In the market value measure, the book value of equity was replaced by the market value of equity.

To conclude, the debt-equity ratio was used to measure capital structure, both long-term and short-term interest-bearing debt was included in the calculations and finally, both book value measures and market value measures were calculated.

#### *4.10.1.4 Measuring instruments for capital structure*

When equity was measured in terms of the book value, the measure was termed book value leverage ($DE_{BV}$). When the market value of equity was used, it was termed market value leverage ($DE_{MV}$). For the remainder of this study, $DE_{BV}$ will be used as the abbreviation for the book value debt-equity ratio and $DE_{MV}$ for the market value debt-equity ratio.

The measures used in this study to calculate the dependent variable are therefore calculated as follow:

$$\mathbf{DE_{BV}} = \frac{\text{book value of total debt}}{\text{preference share capital} + \text{book value of ordinary equity} + \text{minority interest}}$$

$$\mathbf{DE_{MV}} = \frac{\text{book value of total debt}}{\text{preference share capital} + \text{market value of ordinary equity} + \text{minority interest}}$$

where:

Total debt = long-term and short-term interest-bearing debt;
Book value of ordinary equity = distributable reserves plus non-distributable reserves + ordinary share capital; and
Market value of ordinary equity = market capitalisation (market price x number of issued ordinary shares).

### 4.10.2 Independent variables

The independent variables for this study were divided between six firm characteristics (profitability, asset structure, liquidity, business risk, growth and size)

and three economic factors (interest rate, inflation and economic growth). Each of these nine independent variables will now be discussed in more detail with specific reference to the measures that will be applied to calculate these variables.

#### *4.10.2.1 Profitability*

Profitability refers to the ability of a firm to generate earnings compared to its assets. This is important to shareholders since it can predict the earning ability of a firm. The return on assets (ROA) is generally used to determine profitability. Rajan and Zingales (1995) calculated profitability by dividing the earnings before interest, tax and depreciation, by the book value of total assets. Buferna, Bangassa and Hodgkinson (2005) used a similar calculation; however, they used only the earnings before tax and divided that by the book value of total assets. The most commonly used formula to determine profitability, is dividing the earnings before interest and tax (EBIT) by the total assets of the firm (Bauer, 2004; Chen & Strange, 2005; Chen & Shiu, 2007).

For the purposes of this study, profitability is quantified by:

$$\textbf{ROA} = \frac{\text{EBIT}}{\text{total assets}}$$

where:

| | | |
|---|---|---|
| EBIT | = | earnings before interest and tax; and |
| Total assets | = | non-current assets + current assets. |

Based on the existing literature, a negative relationship between profitability and leverage (both book value and market value leverage) was expected, which corresponds with the pecking order theory.

#### *4.10.2.2 Asset structure*

The asset structure of a firm refers to the composition of a firm's assets. Asset structure distinguishes between tangible and intangible assets. The majority of previous empirical studies are consistent with regard to the calculation used to measure the asset structure of a firm. Asset structure is quantified by dividing the

fixed assets by the total assets of a firm. The fixed assets generally include property, plant and equipment. The measure used to calculate asset structure is therefore given by:

$$\textbf{FA/TA} = \frac{\text{fixed assets}}{\text{total assets}}$$

where:

Fixed assets = property, plant and equipment (PPE) less depreciation

Fixed assets are generally used as collateral when firms borrow funds. A larger proportion of fixed assets thus indicate lower risk for the lender. A positive relationship between asset structure and leverage was, therefore, expected.

#### *4.10.2.3 Liquidity*

Throughout this study, liquidity was defined as the ability of a firm to fulfil its short-term obligations; hence the ease with which a firm's current assets can be converted into cash. General liquidity ratios include the current ratio, acid test ratio and the cash ratio. The ratios most often used in empirical studies are the current ratio and the acid test ratio. The current ratio indicates a firm's ability to pay its current liabilities by using current assets that can be converted into cash. The acid test ratio also indicates a firm's ability to pay its current liabilities, but without relying on the sale of its inventories.

The current ratio is the most commonly used measure of short-term solvency, because it provides the best indicator of the extent to which the claims of short-term creditors are covered by assets that are expected to be converted to cash fairly quickly. Trade receivables (debtors), inventory (stock), cash, bank balances and short-term loans granted are all examples of current assets that can be easily converted into cash.

In this study, the current ratio was used to calculate liquidity and it is given by:

$$\textbf{CR} = \frac{\text{current assets}}{\text{current liabilities}}$$

where:

| | | |
|---|---|---|
| Current assets | = | total stock + debtors + short-term loans + cash and bank + other current assets; and |
| Current liabilities | = | short-term borrowings + creditors + bank overdraft + provision for taxation + provision for dividends. |

Liquid or current assets serve as internal sources of funds. According to the pecking order theory, these funds will first be used instead of debt. A negative relationship between liquidity and leverage was thus expected.

#### *4.10.2.4 Business risk*

According to Ward (1993), business risk refers to the effects of uncertainties in the environment on the earning ability of a firm. In other words, the more variable the cash flows of a firm, the higher its business risk will become and this increases the chances of bankruptcy. Previous empirical studies differ with regard to the calculation of business risk. Chen and Strange (2005) use the standard deviation of the return on equity. The return on equity, however, focuses more on the method of financing than on business operations. This calculation would, therefore, be more appropriate to calculate the financial risk of a firm. Baral (2004) uses the coefficient of variation in EBIT to calculate the business risk of a firm. A similar calculation is the standard deviation of the return on assets (Booth *et al*., 2001; Bauer, 2004). These two calculations are more appropriate to determine business risk, since EBIT and the return on assets are affected by uncertainties in the business environment. In this study, the latter calculation (return on assets) was used, since it was used by the majority of previous empirical research. Even though return on assets was also used as a measure of profitability, there was, however, a difference between the two measures. The return on assets ratio used for this particular variable excluded extraordinary items, such as profit on the sale of PPE. According to Ward (1993), business risk refers to the effects of uncertainties in the environment on the earning ability of a firm. Business risk is, therefore, more concerned with the operating activities of a firm. By including the extraordinary items in the calculation, there will be a greater focus on the financial risk of a firm. For the remainder of the study, this ratio will be referred to as the adjusted return on assets (adjusted ROA).

The calculation is therefore given by:

**Adjusted ROA** = $$\frac{\text{operating profit} + \text{investment income}}{\text{total assets}}$$

A negative relationship was expected, since higher business risk indicates higher volatility of earnings and consequently increases the probability of bankruptcy.

#### *4.10.2.5 Growth*

Growth firms are usually still relatively young and therefore have limited internal funds available to finance investment opportunities. However, growing firms do have the prospect of future growth. Different measures can be used to determine the growth potential of a firm. These measures may include the price-earnings ratio, research and development cost divided by total sales, or market value per share divided by book value per share (Ross, Westerfield & Jaffe in Chen & Hammes, 2004).

A wide variety of measures for growth have been used in previous studies. Chen and Strange (2005) use the average percentage growth rate of sales. Vasiliou *et al.* (2005) use a similar measure, which is the annual change in the earnings of a firm. The vast majority of studies, however, use some form of market-to-book ratio. The market-to-book ratio used by Chen and Hammes (2004) and Bauer (2004), is built on the Tobin q-value, which is the market value of a firm divided by the replacement value of its assets. The market-to-book ratio shows the value of a firm by comparing the book value of its equity to its market value. This ratio indicates the expected future growth prospects of a firm.

The market-to-book (M/B) ratio used by Rajan and Zingales (1995), Booth *et al.* (2001) and Chen and Shiu (2005) was applied in this study. The measure for growth is given by:

**M/B ratio** = $$\frac{\text{market value of equity}}{\text{book value of equity}}$$

where:

Market value of equity = preference share capital + market capitalisation of ordinary shares + minority interest; and

Book value of equity = ordinary share capital + preference share capital + distributable reserves + non-distributable reserves + minority interest.

In order to avoid underinvestment and asset substitution that arise due to agency conflicts, firms with high growth opportunities seek equity financing instead of debt financing. Growth was, thus, expected to be negatively related to leverage.

#### *4.10.2.6 Size*

There are many different ways in which firm size can be measured, but based on previous empirical investigations, the most commonly used measurements for firm size are based on annual sales and total asset values.

Studies by Anderson (2003), Buferna *et al.* (2005) and Chen and Strange (2005), all use the natural logarithm of total assets to measure the size of a firm. Baral (2004), Vasiliou *et al.* (2005), Bauer (2004) and Rajan and Zingales (1995), however, use the natural logarithm of sales revenue to measure size. Frank and Goyal (2004:17) argue that the logarithm of sales has a more powerful effect on leverage than the logarithm of assets. They found that for a given level of sales, having more assets means that the firm has less leverage.

Based on Frank and Goyal's (2004) argument, the measure used in this study to calculate size is given by:

**ln (sales)** = natural logarithm of sales revenue

According to Vasiliou *et al.* (2005:8), the natural logarithm of sales is used to measure the trend of this particular variable in the determination of capital structure rather than the contribution of the absolute size. This measure will smooth the differences that may arise between large differences in sizes amongst the firms included in this study. A positive relationship between size and leverage was

expected, since larger firms are less likely to face financial distress and therefore it decreases the risk of bankruptcy.

#### *4.10.2.7 Interest rate*

Various interest rates are available for the different financial markets of the economy. The repo rate and the prime interest rate are well-known interest rates in South Africa. The repo rate represents the rate at which the private (sector) banks borrow funds from the South African Reserve Bank. The prime rate, on the other hand, is the rate at which the private banks lend funds to the public. In this study, the prime rate was used to measure interest in South Africa, since this rate represents the price that the firms in the study would most probably have to pay on borrowed funds. The interest rate is therefore given by:

**PR** = prime interest rate of South Africa

The prime interest rates for the selected period were obtained from the South African Reserve Bank (SARB) (2007) website. An average annual prime interest rate for each year, included in the selected period of 14 years, was determined and these values were used in the study. It was expected that firms will borrow more when interest rates are low, because they need less real cash flow to fulfil their debt obligations.

#### *4.10.2.8 Inflation*

The three dominant measures used as indicators of inflation in South Africa are the consumer price index (CPI), the consumer price index excluding interest on mortgage bonds (CPIX) and the producer price index (PPI). The CPI represents the prices of a representative "basket" of goods and services and it is used as the official measure of inflation in South Africa. The CPIX inflation rate is similar to the CPI inflation rate. The mortgage interest rates are, however, excluded from the calculation. This measure is used by the South African Reserve Bank (SARB) to make decisions with regard to inflation targeting. Finally, the PPI inflation rate measures price changes from the perspective of sellers and not consumers. Generally, investors are more concerned with the CPI than the PPI.

The changes in the CPI inflation rate of South Africa were used for this study, since the CPI is generally used by the South African Reserve Bank as a measure of the inflation rate in South Africa. For the remainder of this study, this variable will be referred to as CPI%. It is given by:

**CPI%** = the change in the consumer price index

The CPI inflation rates for the selected period were obtained from Statistics South Africa (2006). A positive relationship was expected between CPI and leverage, since it was expected that a decrease in inflation will increase the real cost of debt and therefore firms will employ less debt.

#### *4.10.2.9 Economic growth*

The gross domestic product (GDP) is a good measure of the size and growth of a country's economy. GDP is the total value of goods and services produced within the borders of a country, plus goods and services exported, minus goods and services imported (SARB, 2007). The economic growth of any country is most conveniently measured by the GDP, and most previous empirical studies used this economic indicator as a measure of economic growth. The GDP growth rate of the South African economy was used as a measure for economic growth in South Africa for this study. For the remainder of the study, this measure will be referred to as GDP%. This economic variable is, thus, given by:

**GDP%** = the change in the gross domestic product (GDP) growth rate

The annual GDP growth rates of South Africa for the period 1995–2008 were obtained from INET-Bridge (2005). An increase in economic growth may result in an increase in demand (sales), which leaves firms with more free cash flow. This will increase the borrowing capacity of firms. A positive relationship was therefore expected between GDP% and leverage.

## 4.11 STEP 8: DATA PROCESSING

Once the data are obtained through primary research, attention is directed towards processing the data. During data processing, the data is firstly prepared and then analysed (Cant *et al*., 2003:54). Data preparation is the process of converting the raw data to a reduced form which is appropriate for analysis and interpretation (Coldwell & Herbst, 2004:96). The data obtained from the external database (McGregor BFA), were in raw form and needed to be converted into financial ratios for analysis purposes which were done through Microsoft Excel (2003). After the data were prepared and the accuracy of the data ensured, it was entered into a computer using statistical computer software, namely Statistica Version 9 (2009) and SAS® software (2008).

Once the data were entered into the computer, it had to be analysed. The purpose of data analysis was to generate meaning from the raw data that were collected (Coldwell & Herbst, 2004:92). There are two options available to researchers when analysing data: descriptive statistics and inferential statistics. These two options formed a fundamental part of the study and will therefore be discussed in detail under separate headings.

## 4.12 DESCRIPTIVE STATISTICS

According to Keller (2005:18), descriptive statistics involve arranging, summarising and presenting a large data set in such a way that it provides useful information to financial managers. In this study, numerical descriptive measures were used to summarise and present the data. These values should provide a better understanding of the nature of the data and it is very important for the development of statistical inference (Keller, 2005:90). The following descriptive statistics were included in this study:

### 4.12.1 Mean

The mean is a measure of central tendency and it reflects all the values in a data set (Coldwell & Herbst, 2004:102). It is calculated by adding the observations and dividing it by the number of observations (Keller, 2005:90).

$$\bar{x} = \frac{\sum x}{n}$$

where: $\sum x =$ the sum of all the values in the data set; and

$n$ = total number of values in the data set.

### 4.12.2 Median

This is also a measure of central tendency and it represents the most central item in a data set. It is calculated by placing all the observations in ascending or descending order. The median is the middle observation, in other words, half of the observations lie above the median and the other half below it (Coldwell & Herbst, 2004:103). This measure is considered a more appropriate measure of central tendency than the mean if a data set contains extreme outliers, since the mean is very sensitive to outliers.

### 4.12.3 Range (minimum and maximum values)

The range of a data set is the difference between the largest and the smallest values in the distribution (Cooper & Schindler, 1998:467). The range is calculated from only two observations, namely the minimum and the maximum values. This, however, is a very rough measure of spread because it conveys nothing about the other observations in the distribution. According to Cooper and Schindler (1998:467), the range may indicate the homogeneity (small standard deviations) or heterogeneity (large standard deviation) of the distribution. It is, therefore, a useful but limited measure of all the data in the distribution.

### 4.12.4 Variance

This measure, and its related measure, the standard deviation, are used to measure variability. It is, therefore, used to characterise the dispersion of a set of data points

around its mean value and it provides an indication of the difference between what is expected and the actual values. According to Keller (2005:102), this statistic is especially useful when comparing two or more data sets. The variance, which is often denoted by $\sigma^2$, is given by:

$$\sigma^2 = \frac{\sum(x-\bar{x})^2}{n-1}$$

where: $\sigma$ = standard deviation;

$x$ = each value in the data set;

$\bar{x}$ = mean of all the values in the data set; and

$n$ = total number of values in the data set.

### 4.12.5 Standard deviation

The standard deviation is regarded as the most useful indicator of spread or variability of the data (Coldwell & Herbst, 2004:104). This measure determines how far away from the mean the data values typically are (Cooper & Schindler, 1998:467). The standard deviation is the square root of the variance and it is given by:

$$\sigma = \sqrt{\frac{\sum\left(x-\bar{x}\right)^2}{n-1}}$$

where:

$\sigma$ = standard deviation;

$x$ = each value in the data set;

$\bar{x}$ = mean of all the values in the data set; and

$n$ = total number of values in the data set.

### 4.12.6 Kurtosis

Kurtosis is a measure of shape, and it measures the peakedness (or flatness) of a distribution relative to a normal distribution (Cooper & Schindler, 1998:468). If a distribution is more peaked than a normal distribution, it is referred to as leptokurtic. Platykurtic describes a distribution that has a lower, wider peak around the mean than a normal distribution. This measure is taken into consideration to determine whether the distribution deviates from the standard normal distribution (with an excess kurtosis of zero).

### 4.12.7 Skewness

This also represents a measure of shape and it measures the extent to which a distribution deviates from symmetry (Cooper & Schindler, 1998:467). A standard normal distribution has a skewness of zero, meaning that the data is not skewed from the mean. A distribution, however, can be either negatively skewed (skewed to the left) or positively skewed (skewed to the right). The skewness of a distribution is an important measure since it can enable managers to better estimate whether a given value in the data set will be more or less than the mean.

## 4.13 INFERENTIAL STATISTICS

The null hypothesis ($H_o$) is used to test statistical significance. The null hypothesis states that no difference exists between the population parameter and the sample statistics being compared to it (Cooper & Schindler, 2008:494). The main objective for this study was to determine the effect of firm characteristics and economic factors on the capital structure of South African listed industrial firms and, therefore, the following hypotheses were formulated:

$H_0$ : Capital structure is not affected by firm characteristics and economic factors.

$H_A$ : Capital structure is affected by firm characteristics and economic factors.

According to McDaniel and Gates (2001:413), the basic principle of statistical inference is that it is possible for numbers to be different in a mathematical sense,

but not significantly different in a statistical sense. Statistical differences are defined by a chosen level of significance. These levels of significance show how probable a result is due to chance. Most researchers use significance levels of 5% and 1% when performing statistical tests (Gerber-Nel, 2006:188). The chosen level of significance is largely determined by how much risk a researcher is willing to accept (Cooper & Schindler, 2008:501). The larger the chosen level of significance (α) the smaller the risk (β) for the researcher. For this particular study, three significance levels were considered, namely a 1%, 5% and 10% level of significance.

These significance levels should always be compared with the *p*-value of a test statistic. The test statistic as well as the *p*-value is reported by most statistical software programmes. According to Cant *et al.* (2005:223), the *p*-value is the probability of obtaining a test statistic value that is as large as or larger than the one actually obtained if the null hypothesis is true. The *p*-value represents the smallest level of significance for which the null hypothesis can be rejected. The lower the *p*-value, the stronger the evidence against the null hypothesis and vice versa.

The statistical tests used in this study were correlation and regression analysis. These are discussed in more detail in the next sections.

### 4.13.1 Correlation analysis

Correlation analysis is concerned with measuring the degree of association between variables (Emory, 1976). According to McDaniel and Gates (2001:448), this is the analysis of the degree to which changes in one variable are associated with changes in another. It can, therefore, be used to determine if a linear relationship exists between variables (Keller, 2005:602). Various methods of correlation analysis exist, and the method used depends on the type of data of the particular study at hand.

Parametric statistics rely on assumptions with regard to the distribution of the population and are applied to populations with a normal distribution. The Pearson Product Moment correlation method is a parametric type of statistical test and it is used to measure the strength of a relationship between two variables (Keller, 2005:602).

Non-parametric statistics are applied to a dataset of which the population is not normally distributed or when considering severely skewed data. In such a case, the Spearman Rank Order correlation method is used to determine whether a relationship exists. The observations are ranked and then the Pearson correlation coefficient of the ranks is calculated.

The descriptive statistics should reveal the nature of the data, in other words whether the data are parametric or non-parametric. It will, therefore, indicate whether the Pearson Product Moment correlation or the Spearman Rank Order correlation should be used in the analysis.

The correlation coefficients vary over a range of -1 to +1, and these values describes the strength of association between two variables. The sign of the correlation coefficient indicates whether a positive or negative linear relationship exists between two variables. A correlation with a plus sign indicates a positive relationship, a correlation with a minus sign indicates a negative relationship and a correlation of 0.00 indicates no relationship. The more closely the correlation coefficient is to either -1.00 or +1.00, the stronger the relationship. On the other hand, the more closely the correlation coefficient approaches 0.00, the weaker the relationship (Witte & Witte, 2004:149).

The main purpose of conducting a correlation analysis is to measure the strength of association between two variables (Keller 2005:602). If a researcher is only interested in determining whether a relationship exists between two variables, a correlation analysis should be sufficient. If, however, a researcher is not only interested in the existence of a relationship, but also in the nature of an existing relationship, further statistical tests should be conducted. In order to obtain statistical evidence that describes the nature of the relationship that exists between a dependent and an independent variable, a regression analysis can be conducted.

### 4.13.2 Regression analysis

Regression analysis may be used to further summarise and explain the nature of the relationships between the dependent variable and the independent variables. It enables a researcher to develop a mathematical relationship amongst variables in

order to predict the value of one variable based on another variable (Levine & Stephan, 2009:207). The dependent variable is denoted Y and the independent variables are denoted $X_1$, $X_2$,...,$X_k$ (k is the number of independent variables) (Keller, 2005:578).

According to Hair *et al*. (2006:177), the objective of this type of analysis is to predict a single dependent variable (Y) from the knowledge of one or more independent variables ($X_1$ to $X_k$). Regression analysis can be either simple or multiple. Simple regression is found where the problem involves only one independent variable. When the problem involves two or more independent variables, the statistical technique is called multiple regression (Hair *et al*., 2006).

#### *4.13.2.1 Simple regression analysis*

This type of regression model, also known as bivariate regression, is a regression model with a single independent variable (Hair *et al*., 2006). This statistical test is used to describe the relationship between one dependent variable and only one independent variable. The regression coefficient, therefore, explains the variation in the dependent variable in terms of the one independent variable. The equation for a simple regression model is given by:

$$\hat{Y} = b_0 + b_1 X$$

where:

$\hat{Y}$ = represents the dependent variable;

$b_0$ = represents the intercept;

$b_1$ = represents the regression coefficient; and

$X$ = represents the independent variable.

#### *4.13.2.2 Multiple regression analysis*

This type of regression analysis is an expansion of the simple regression model. It is a multivariate statistical technique that is used when a study has two or more independent variables. It examines the relationship between a single dependent

variable and several independent variables. Since this study includes nine independent variables, a multiple regression analysis will be conducted. The equation for a multiple regression model is given by:

$$\hat{Y} = b_0 + b_1X_1 + b_2X_2 + .... + b_kX_k$$

where:

| | |
|---|---|
| $\hat{Y}$ | = represents the dependent variable; |
| $b_0$ | = represents the intercept; |
| $b_1, b_2 .. b_k$ | = represents the regression coefficients; |
| $X_1, X_2 ... X_k$ | = represents the independent variables; and |
| $k$ | = represents the number of independent variables. |

#### *4.13.2.3 Time-series-cross-section regression analysis*

Before any regression type analysis is applied in research, it is vital to determine the type or the nature of a data set. It is important to determine certain issues such as whether the data set has skewness or whether it contains extreme outliers. Large samples are very sensitive to extreme outliers, often indicating that almost any relationship is statistically significant (Hair *et al.,* 2006:195). The descriptive statistics will report these various issues when used to describe the data set.

Another important aspect to take into consideration, is that the data set for this research study consists of both cross-sectional and time-series dimensions. This implies that the data set contains observations on a variety of units observed over a series of time periods for different firms (Keller, 2005:650). A data set such like this is referred to as panel data, for which the application of regression analysis is much more complex than for one-dimensional data sets. The data set for this particular study contained both of these dimensions, since a variety of units (nine independent variables) were observed over a period of 14 years for different firms, thus, representing panel data. This is an important observation since it determines which procedure should be used to conduct the regression analysis. For panel data, the

Time-Series-Cross-Section Regression procedure (TSCSREG) in SAS® (2008), was used to conduct simple and multiple regression analysis.

The following regression equation was used (Allen, 1999):

$$Y_{it} = \sum_{k=1}^{K} X_{itk}\beta_k + u_{it}$$

where:

$i$ = 1,…, $N$ ;

$t$ = 1,…, $T$ ;

$N$ = number of cross sections;

$T$ = length of the time series for each cross section;

$K$ = number of independent variables;

$y$ = dependent variable;

$x$ = independent variable;

$\beta$ = regression coefficient; and

$\mu$ = error term.

The TSCSREG procedure will be conducted through the software program SAS®. This procedure in SAS® estimates the regression parameters under several error structures, including the one- and two-way fixed and random effects model. A one-way model is referred to as a model with one-way effects if the specification depends only on the cross section to which an observation belongs. If the specification, however, depends on both the cross-section and the time-series to which an observation belongs, the model is referred to as a model with two-way effects. A further dimension is the difference between a fixed-effect and a random-effect model. If an analysis includes all possible levels of a factor, meaning that the effects are non-random, it is referred to as a fixed-effect model. A technique is called a random-effect model if the levels included in a study represent a random sample of all the levels that exist (Keller, 2005:509). SAS® offers several different error structure options for the TSCSREG procedures such as FIXONE, FIXTWO,

RANONE, RANTWO, FULLER, PARKS and DASILVA. For purposes of this study, a two-way random effects model (RANTWO) was used.

An important statistic provided by the regression analysis is the $R^2$ (coefficient of determination) measure, which measures the total variation (%) in the dependent variable explained by all the independent variables included in a study. The $R^2$ value obtained from the TSCSREG procedure will, therefore, indicate what percentage of the variation in capital structure (debt-equity ratio) is explained by the variation in firm characteristics and economic factors. The results from the TSCSREG procedure will further indicate which of the independent variables are significant at a 1% level.

## 4.14 RELIABILITY AND VALIDITY

The measurement tools used in a study should be an accurate indicator of what is being measured and it must be efficient to use. According to Cant *et al.* (2005), the keys to assessing the trustworthiness of any research study is reliability and validity. Therefore, to ensure the trustworthiness of the research results it is important that the measures used in the study are reliable and valid measures for the specific characteristics. Reliability and validity will now be discussed in more detail.

### 4.14.1 Reliability

Reliability refers to the extent to which a valid measuring instrument produces consistent results if repeated. It, therefore, has to do with the accuracy of a measurement procedure (Emory, 1976:119). Measurements are reliable to the extent that they are free from random or unstable error (Cooper & Schindler, 1998). Various procedures can be used to ensure that measurements are reliable. These procedures include test-retest reliability, equivalent form reliability and internal consistency reliability (Cant *et al.*, 2005:235).

The measurement tools (financial ratios and economic indicators) that were used for this study were based on the measurement tools of previous empirical studies on similar topics. The use of these measures in previous studies could, therefore, be seen as indication of its reliability.

### 4.14.2 Validity

Validity refers to the extent to which a test measures what is actually wished to be measured (Emory, 1976:119). Financial literature mentions two types of validity to be concerned with, namely internal validity and external validity. These two aspects are discussed below.

- ***Internal validity.*** This form of validity is concerned with the inferences made regarding cause-effect relationships (Coldwell & Herbst, 2004:40). According to Emory (1976:120), internal validity is concerned with the extent to which differences found with a measuring tool reflect true differences among those being tested. In other words, it tests whether observed changes can be attributed to the specific study and not to other possible causes (random error). Internal validity will, therefore, proof that what was done in the study was the actual cause for the observations (outcomes). This means that the instruments really measured what was attempted to be measured in the study.

  Internal validity consists of three forms (Cant *et al.,* 2005:235–236):

  - *Content validity.* This refers to the extent in which the measurement instrument provides adequate coverage of the topic under study. Content validity is often established through the agreement between judges regarding the appropriateness of the measure.

  - *Criterion validity.* This type of internal validity reflects the success of measures used for estimation. To establish criterion validity, examination of the relationship between the measure and a criterion is used.

  - *Construct validity.* This measures the extent to which a measure behaves in a theoretically sound manner. Both the theory and the measuring instrument are therefore used to evaluate construct validity.

  As already mentioned, the measure instruments used in this study were based on previous empirical studies which showed that these measures do

behave in a theoretically sound manner. Construct validity was, thus, used to test internal validity for this study.

- ***External validity.*** This form of validity refers to the quality of the research findings. More specifically, it is concerned with the ability of the data to be generalised to other situations (Coldwell & Herbst, 2004:41). In other words, would the conclusions of this study hold for other persons in other settings at other times? There are two dominant approaches to provide evidence for a generalisation, namely sampling model and proximal similarity (Coldwell & Herbst, 2004:41–42).

  In step 6, the research frame was discussed and it was mentioned that a census was used for this study. All the firms that complied with certain requirements were included in the study. The census, therefore, included all the elements of the target population. This means that the census is representative of the population that was of interest for a particular study. It is expected that capital structures differ between industries and sectors, however, the industrial sector is representative of the vast majority of firms operating in the South African business environment.

## 4.15 STEP 9: REPORT THE RESEARCH FINDINGS

The last step in the research process is for the researcher to interpret the information, draw conclusions and to communicate the findings of the study (Cant *et al.,* 2005). It is important to prepare a report to formally communicate the findings and recommendations to management for their decision-making process. A report on the findings of this particular study is provided in the next chapter.

## 4.16 CONCLUSION

In this chapter, the focus was placed on the methodology of this study. Firstly, business research, as a principal instrument to facilitate effective management, was highlighted. This was followed by an elaborate discussion on the research process (consisting of nine steps). The research process is vital for any research study, since

it conveys, step by step, how the primary and secondary objectives of the study will be reached.

Secondary and primary research had to be conducted in order to achieve the outcomes of the study. For this study, a census, rather than a sample, was used to obtain information about the target population, since all firms that complied with certain requirements were involved. The census consisted of all firms listed in the industrial sector of the JSE, as well as those industrial firms that delisted during the selected period of 14 years.

Financial ratios and economic indicators were used as measure instruments for the firm characteristics and economic factors, respectively. Firms had to provide complete financial data for at least five of the selected 14 years, to be included in the study. This requirement resulted in the exclusion of 163 firms, leaving the final census with a total of 280 firms with 2 684 observations.

Descriptive and inferential statistics were required for this study. Descriptive statistics indicate the nature of the specific data set and it includes the following measures: mean, median, range, variance, standard deviation, skewness and kurtosis. Descriptive statistics were followed by inferential statistics which entailed correlation analysis and regression analysis. The correlation analysis had to determine whether a relationship exists between the dependent variable and each of the independent variables. The regression analysis provided statistical evidence to describe the nature of the relationships that exist.

Finally, a discussion was provided with regard to the reliability and validity of the measures that were used in the study to ensure that the measures that were used were valid for the specific characteristics. This had to ensure the trustworthiness of the results. The research findings of this study will be discussed in the next chapter.

# Chapter 5

# RESEARCH RESULTS

## 5.1 INTRODUCTION

The previous chapter contained a detailed discussion of the research process that needs to be conducted in order to be able to address the research question. This chapter will focus on the research results obtained through the various steps of the research process that were discussed in Chapter 4.

The first section of this chapter discusses the results from the descriptive statistics in order to investigate the nature of the data set. This will be followed by the results of the inferential statistics, which include Spearman Rank Order correlation analyses, simple regression analyses and multiple regression analyses. These statistical tests were applied to determine the nature and the strength of the relationships between the dependent variables and the independent variables and, furthermore to determine whether the independent variables can explain the variation in capital structure. The results of the inferential statistics will be provided in the context of each objective identified in the previous chapter.

It was mentioned in the previous chapter that a total of 280 firms were included in this study, which consisted of 170 listed firms and 110 delisted firms. It was also mentioned that both book value and market value leverage were used as dependent variables, since both presents its own strengths and weaknesses. In this chapter, distinctions will, therefore, be made between the results obtained for listed and delisted firms, as well as between the results for book value and market value leverage.

## 5.2 DESCRIPTIVE STATISTICS

Numerical descriptive measures were used to summarise the data. These measures provide a better understanding of the nature of the data which is very important for

statistical inference. Knowing the nature of the data will also indicate which further measures should be applied in inferential statistics. The descriptive measures used in this study included the mean, median, minimum and maximum (range), variance, standard deviation, and tests of skewness and kurtosis. These measures were applied to the full data set, which includes both listed and delisted firms for the entire period under investigation.

In this section, a detailed discussion will be provided on the results from the means, medians, minimums, maximums, variances and standard deviations. Each of these measures will be individually discussed. This will be followed by a discussion on the tests for skewness and kurtosis for the variables included in this study.

### 5.2.1 Mean, median, minimum, maximum, variance and standard deviation

The full data set contained a total of 2 684 observations for the dependent variable and each of the firm characteristics, and 14 observations for each of the three economic factors. The descriptive statistics of the variables are provided in Table 5.1.

**Table 5.1: Descriptive statistics of the full data set containing all firms (listed and delisted)**

| Variables | N | Mean | Median | Minimum | Maximum | Variance | Std Dev |
|---|---|---|---|---|---|---|---|
| $DE_{BV}$ | 2 684 | 1.83 | 1.00 | -61.84 | 590.82 | 157.23 | 12.54 |
| $DE_{MV}$ | 2 684 | 2.34 | 0.63 | 0.00 | 650.25 | 380.28 | 19.50 |
| ROA | 2 684 | 0.12 | 0.14 | -17.90 | 19.09 | 0.55 | 0.74 |
| FA/TA | 2 684 | 0.29 | 0.24 | 0.00 | 1.00 | 0.05 | 0.22 |
| CR | 2 684 | 1.79 | 1.44 | 0.00 | 104.57 | 6.03 | 2.46 |
| Adjusted ROA | 2 684 | 0.25 | 0.22 | -7.14 | 35.99 | 0.84 | 0.92 |
| M/B ratio | 2 684 | 3.24 | 1.60 | -125.58 | 729.34 | 401.30 | 20.03 |
| ln (sales) | 2 684 | 13.32 | 13.37 | 0.69 | 18.68 | 4.98 | 2.23 |
| PR | 14 | 15.82 | 15.17 | 10.50 | 22.66 | 12.54 | 3.54 |
| CPI% | 14 | 6.41 | 5.80 | 1.40 | 11.50 | 5.43 | 2.33 |
| GDP% | 14 | 3.46 | 3.12 | 0.52 | 5.32 | 1.68 | 1.29 |

The results in the above table will be discussed in detail in the following sections.

#### *5.2.1.1 Capital structure ($DE_{BV}$ & $DE_{MV}$)*

The first variable of importance is the debt-equity ratio, which was used to quantify the dependent variable, namely, capital structure. As mentioned in Chapter 4, this study included both book value and market value measures of leverage since both of these measures present their own strengths and weaknesses.

The mean $DE_{BV}$ is 1.83, which implies that for every R1 of shareholders' equity a firm has R1.83 of debt in its capital structure. This average ratio implies that the firms included in the data set are mainly financed with debt capital. Compared to the mean $DE_{BV}$ value, the median value is relatively lower at 1.00, which could indicate that there are possible outliers in the data set. The minimum and maximum debt-equity ratios are -61.84 and 590.82 respectively. The negative minimum value was found for AECI in 1995. A negative debt-equity ratio may be the result of a share repurchase, leaving a firm with negative reserves in the balance sheet. The maximum value was reported by ZCI in 2004 and it indicates that this particular firm has R590.82 of debt for every R1 of shareholders' equity, indicating that the firm relies heavily on debt financing. A debt-equity ratio rarely, if ever, has a negative value, and it is also not expected to be as high as the maximum of 590.82. The standard deviation of 12.54 substantiates the fact that the data set may contain outlier values.

Due to the existence of outliers in the data set, the medians, rather that the mean values, are considered in the remainder of the study, since the median is not as sensitive to extreme values as the mean. Book value leverage of 1.00 is, therefore, considered as the median $DE_{BV}$ ratio for firms included in the data set. It thus indicates that firms use more or less equal amounts of debt and equity to finance their assets/investment opportunities (R1 debt for R1 equity) when measured in book value terms.

$DE_{MV}$ varies from a low of 0.001 to a high of 650.25 and presents an even higher standard deviation (19.50) than book value leverage. The median $DE_{MV}$ ratio is 0.63, which indicates that firms have R0.63 of debt for every R1 of shareholders' funds. The assets are thus primarily financed through equity, which means that firms have

more shareholders' equity available to meet their financial obligations. This median value for $DE_{MV}$ is lower compared to the median $DE_{BV}$, which reflects the difference between the book value of equity (according to a firm) and the value the market attributes to the equity of a firm. Annual median values for both $DE_{BV}$ and $DE_{MV}$ are provided in Figure 5.1 to graphically illustrate the difference between these two measures over time.

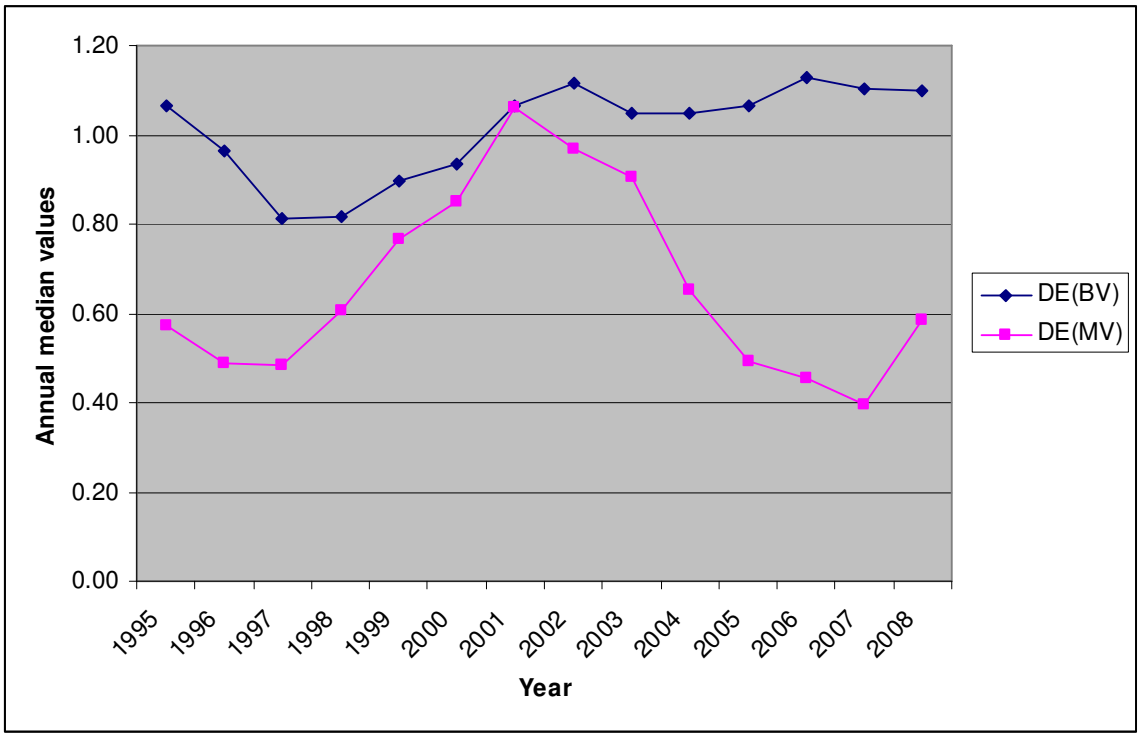


**Figure 5.1: Annual median values for $DE_{BV}$ and $DE_{MV}$ from 1995 to 2008**

Figure 5.1 clearly illustrates that the median values for $DE_{MV}$ are lower than for $DE_{BV}$. It also appears that the annual median values for $DE_{MV}$ are more variable than the values for $DE_{BV}$. The market value of equity depends on the market price, which can fluctuate all the time. That may explain the variability of $DE_{MV}$ compared to $DE_{BV}$. Furthermore, since the market value of shares is usually higher than the value in the balance sheet (book value), it could have been expected that the median $DE_{MV}$ will be lower than the median $DE_{BV}$.

#### *5.2.1.2 Profitability (ROA)*

Return on assets (ROA) was used to estimate profitability and was defined as the earnings before interest and tax (EBIT) divided by total assets. The mean ROA of all the firms included in the full data set is 12%, with a median value of 14%. The ROA ranges from a low of -1790% to a high of 1909%, which represents extreme outliers in the data set. ROA values like these are an exception to the rule and there may be various reasons for such extreme values. These include extreme losses or abnormal profits during a particular year or comparatively low amounts of assets in the balance sheet compared to the earnings before interest and tax. This is most often the case for firms that have to delist from a stock exchange or for start-ups, because of financial difficulties that have been encountered.

A standard deviation of 74% indicates that the profitability of the firms exhibit considerable variability. Due to the extreme outliers, the median of 14% is, therefore, a more reliable and valid indication of the profitability ratio for all firms included in the data set. This value implies that firms generate a return (EBIT) of 14% on their utilised assets. The median profitability of 14% is at par with various developed and developing economies. Compared to the results from a study conducted by De Jong *et al.* (2008), this ROA of 14% is one of the highest ROA ratios amongst both developed and developing countries. The results by De Jong *et al*. (2008) convey that the average ROA ratio for developed countries ranges from a low of 3.3% in Hong Kong to a high of 13.7% in New Zealand and that the developing economies' average ROA values range from 6.5% in the Philippines to a high of 23.2% in Turkey.

#### *5.2.1.3 Asset structure (FA/TA)*

To measure the asset structure of the firms, the amount of fixed assets in the balance sheet was divided by total assets (FA/TA). Considering the median as the measure for central tendency, it conveys that the full data set has a median FA/TA of 24%. This means that, on average, the total assets of a firm comprises of 24% fixed assets, which is generally considered as potential collateral to obtain debt financing.

This variable has a standard deviation of 22%. It ranges up to a maximum value of 100%, which implies that some of the firms' asset structures consist almost

exclusively of fixed assets. The median percentage of fixed assets to total assets for the group of all firms is relatively low compared to other countries. This is illustrated in Figure 5.2 where the median FA/TA of 11 different countries is provided. Developing countries are denoted in pink and developed countries in blue.

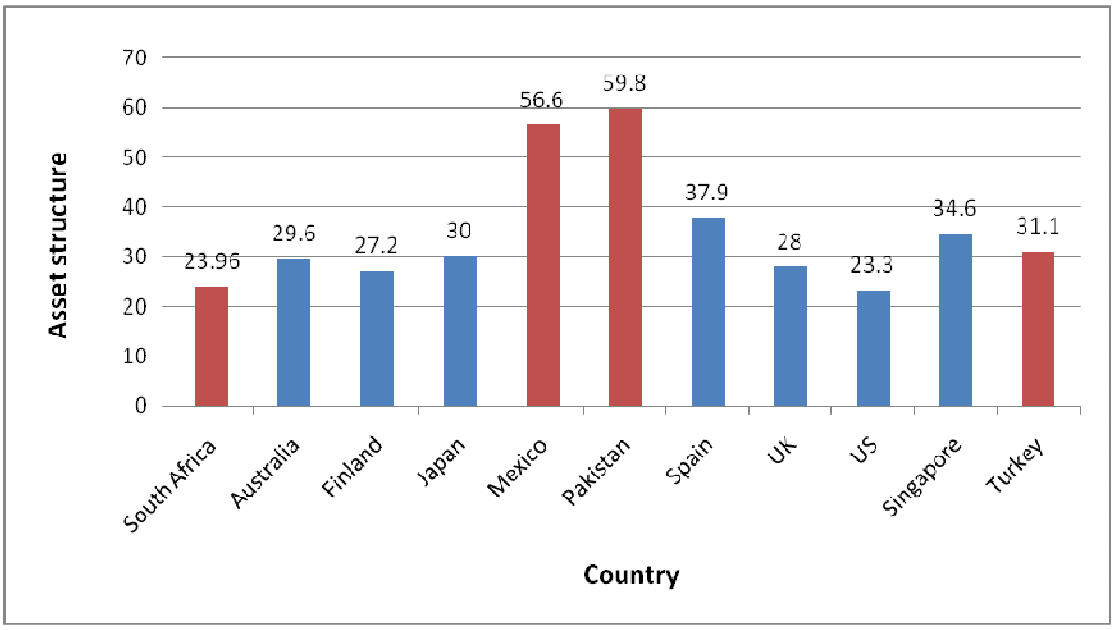


**Figure 5.2: Median values for FA/TA in different countries.**

Source: Adapted from De Jong *et al*. (2008:1957–1958)

The values presented in Figure 5.2, except for South Africa, were obtained from the study conducted by De Jong *et al.* (2008). The result for South Africa (23.96%) was obtained from the descriptive statistics results for this study. The countries in the figure were randomly selected from the 42 countries included in De Jong *et al.'s* (2008) study, as examples to give an indication of how firms in South Africa compare to other countries.

Figure 5.2 illustrates that the FA/TA result for South African firms is relatively lower compared to various countries, especially compared to Mexico (56.6%) and Pakistan (59.8%), which are also developing economies like South Africa. These results indicate that the proportion of the fixed assets to the total assets of the firms included in this study is relatively small. Firms with less fixed assets may not be able to obtain as much debt since the collateral value of their assets might be relatively lower. This does not necessarily mean that FA/TA is not a strong determinant in the financing

decisions of South African firms. Collateral value of assets may not be the only consideration by financial institutions when firms apply for debt financing.

#### *5.2.1.4 Liquidity (CR)*

The current ratio (CR) was used as a measure of liquidity. This ratio indicates the ability of a firm to fulfil its short-term obligations. The mean value of the CR for the full data set was 1.79 with a median value of 1.44. The CRs vary from a minimum value of 0.00 to a maximum value of 104.57. This maximum CR was reported by Indequity Group Ltd in 1999. This was during their first listed year on the JSE. The value of their current assets was R19 868 000, while the value of their total current liabilities was only R190 000.

This ratio has a standard deviation of 2.46 and its values, therefore, are relatively spread out around the mean. The median is once again considered as the measure for central tendency, due to outliers in the data set. The median value of the CR for the full data set is 1.44. This value indicates that for every R1 of current liabilities, firms have R1.44 of current assets to cover their short-term obligations. It is reassuring to observe that firms (both those listed and those previously listed on the JSE) have sufficient current assets to fulfil their short-term obligations. The median of 1.44 for this South African study is also, more or less, at par with other countries. This is illustrated in Figure 5.3, by again considering the same countries that were included in Figure 5.2. Developing countries are denoted in pink and developed countries in blue.

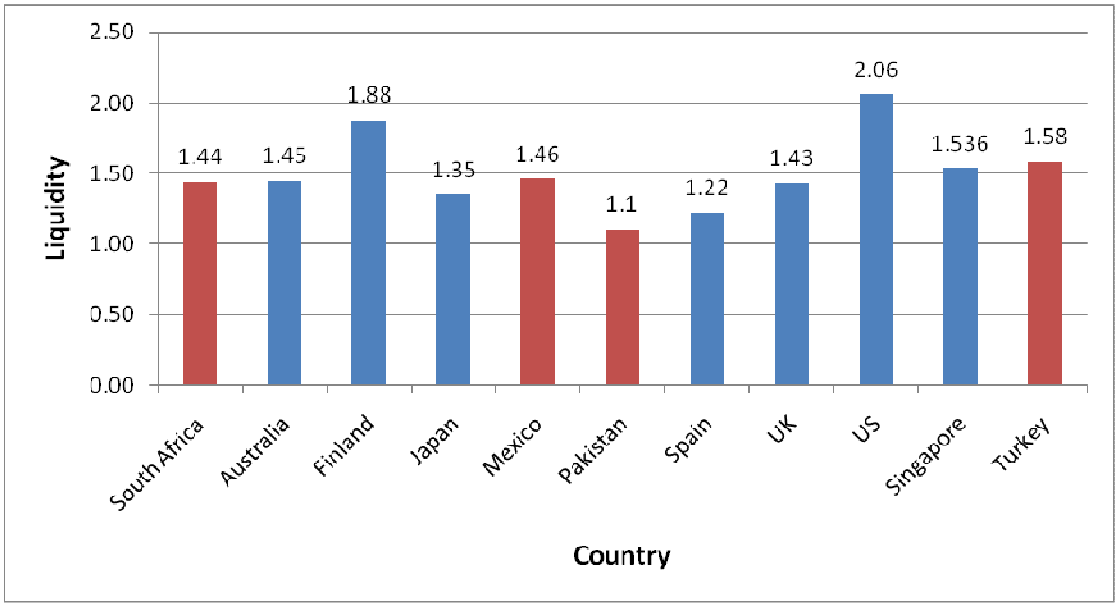


**Figure 5.3: Median values for CR in different countries.**

Source: Adapted from De Jong *et al*. (2008:1957–1958)

Figure 5.3 illustrates that all of the above-mentioned countries have a median CR ratio of between 1 and 2, except for the United States, which has a ratio of 2.06. The majority of the countries' ratios are just above or below the 1.5 margin.

#### *5.2.1.5 Business risk (adjusted ROA)*

In Chapter 4, it was mentioned that an adjusted ROA was used to measure the business risk of firms. The adjusted ROA ratio used for this particular variable excluded non-recurring items, such as profit on the sale of property, plant and equipment (PPE). The adjusted ROA was determined by dividing the operating profit plus investment income by total assets. When focusing on the adjusted ROA, firms produce a mean adjusted ROA ratio of 25%. This ratio contains a considerably large range, which ranges from a minimum of -714% up to a maximum of 3599%. These extreme values result in a large standard deviation of 92%, which again is an indication of outliers in the data set. The median of 22% is therefore again considered as the measure for central tendency.

An interesting observation from the descriptive results is that the median value for the adjusted ROA (0.22) is relatively higher than for ROA (0.14) used to measure

profitability. Figure 5.4 represents a graphical illustration of the annual median values for both ROA and adjusted ROA.

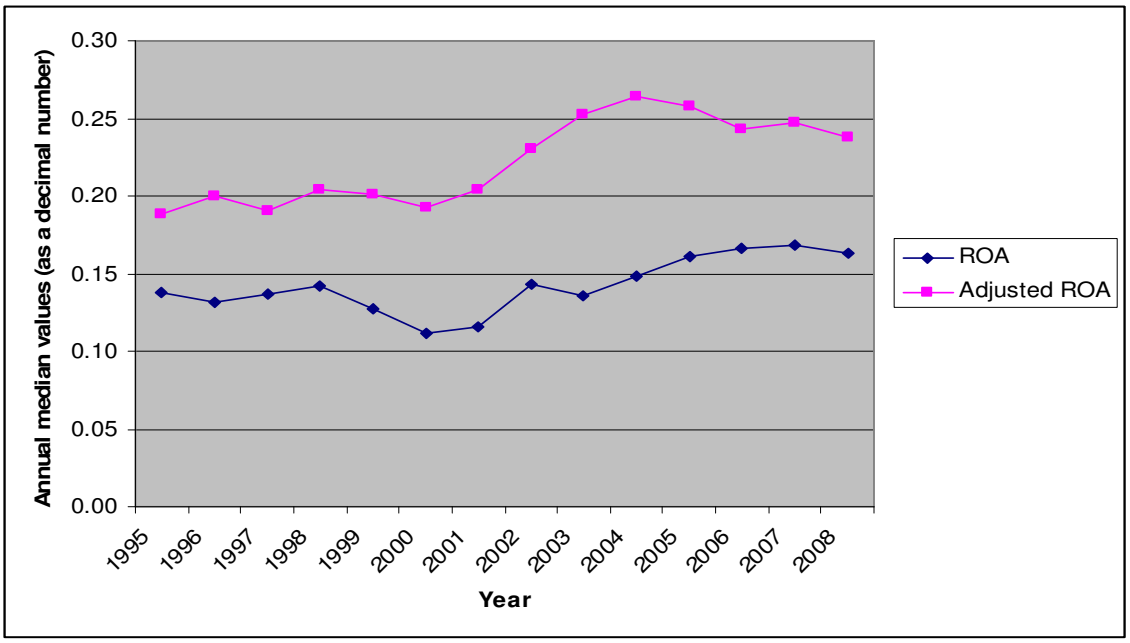


**Figure 5.4: Annual median values for ROA and adjusted ROA**

Figure 5.4 indicates that the median values for the adjusted ROA are constantly higher than the median values for ROA for the study period of 14 years. As mentioned earlier, non-recurring items were excluded from the calculation of the adjusted ROA, which could be the reason for the difference between these two measures of ROA. These results indicate the effect non-concurring items could have on profitability. Firms should, therefore, take this effect of non-concurring items into consideration when making financial decisions or recommendations with regard to ROA.

What is also interesting to note is that the adjusted ROA shows a general increasing trend up to 2008. The research period for the current study ends at 2008, just before the economic crisis took its effect in South Africa. It would be interesting to know whether the economic crisis would change this increasing trend in business risk, since business risk generally refers to the effects of uncertainties in the environment on the earnings ability of a firm.

#### *5.2.1.6 Growth (M/B ratio)*

The independent variable, growth, was measured by the market-to-book ratio (M/B ratio). The mean M/B ratio is 3.24, which indicates that the market is predominantly prepared to pay more for a firm's shares than its book value. This could be seen as a sign of growth amongst the firms included in the study or, alternatively, as a sign of expectations of future growth. Once again, the median value is considered as the measure for central tendency due to the existence of outliers. The median M/B ratio for the firms included in this particular study is 1.60. This indicates that investors are willing to pay, on average, R0.60 more for a firm's share than what the actual book value of that particular share is.

This ratio exhibits considerable variation, with a minimum of -125.58 and a maximum of 729.34. A standard deviation of 20.03 conveys that the values for this particular ratio are, therefore, relatively spread around the mean of 3.24.

De Jong *et al.* (2008) also used the M/B ratio to quantify growth for the 42 countries included in their study. Figure 5.5 provides the median M/B ratio for 11 different countries, including the ratio for South Africa. The result for South Africa was obtained from the descriptive statistics of the study under investigation and the results for the other countries were obtained from De Jong *et al.'s* (2008) study.

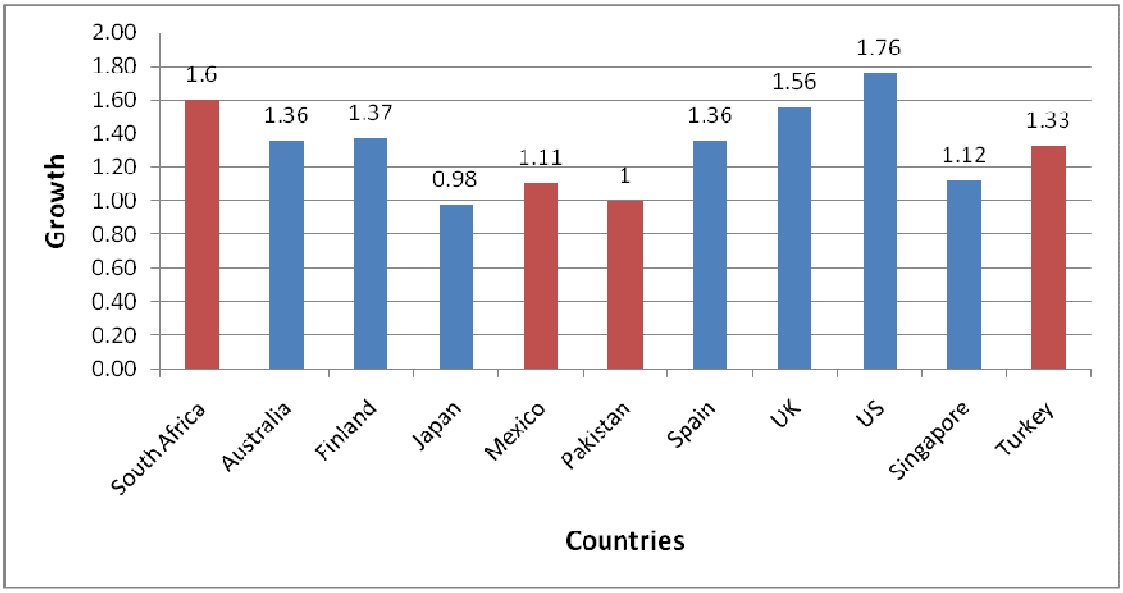


**Figure 5.5: Median values for M/B ratio in different countries.**

Source: Adapted from De Jong *et al.* (2008:1957–1958)

From Figure 5.5, it can be seen that the median value of the M/B ratio for the firms included in this study are relatively high compared to other developing countries such as Mexico, Pakistan and Turkey. The M/B ratio for South Africa is just short of being the highest amongst the 11 countries, with the United States at the top with a median M/B of 1.76. According to Myers (1977), a high M/B ratio indicates the presence of growth opportunities. Based on this argument, it can be assumed that the firms included in this study contain considerable growth opportunities. This, however, might not necessarily indicate that South Africa has higher growth opportunities compared to other countries. The differences in the M/B ratios of countries could also indicate that this ratio might be more country-specific than firm-specific. The reason why the M/B ratio for the South African firms is relatively high compared to other countries might be because investors are willing to accept higher risk and, therefore, are prepared to pay more for the shares. If this is the reason for the higher M/B ratios, it does not necessarily portray signs of growth, but rather of the risk-adverseness of investors.

#### *5.2.1.7 Size (ln [sales])*

Size was measured by the natural logarithm of sales (ln [sales]). The results report a mean value of 13.32, which implies that the average sales of firms in this study are approximately R609 million. The sales of firms vary from a relatively low R2 000 (0.69) to a high of almost R129 942 million (18.68). The low sales amount of R2 000 was reported by Queensgate Hotel and Leisure Ltd in 2004.

Taking the mean, minimum and maximum values into consideration, it is evident that the data set contains extreme outliers. The median value of 13.37, representing sales of approximately R640 million, is therefore considered as the measure for central tendency of size for the firms. Despite the extreme outliers, the standard deviation of 2.23, however, indicates that the values are not spread out too much from the mean. It has to be taken into consideration that the natural logarithm was used in order to reduce variability of the sales amounts.

De Jong *et al.* (2008) also included firm size as a variable in their study of 42 countries. However, it is difficult to compare the values across countries, since each country's sales are denominated in its own local currency.

#### *5.2.1.8 Interest rate (PR)*

In this study, the prime rate (PR) was used to estimate interest rates in South Africa since this rate represents the price, which the firms would most probably have to pay on borrowed funds. The mean PR for the selected period of 14 years is 15.82%, with a median value of 15.17%. The median value implies that firms can obtain debt financing at an interest rate of 15.17%. The PR ranges from a low of 10.50% in 2005 to a high of 22.66% in 1998. The maximum of 22.66% is relatively high since a level of more that 20% was only reached once during the selected period of 14 years. The measure reported a standard deviation of 3.54%. The average PR for each of the 14 years included in this study is illustrated in Figure 5.6.

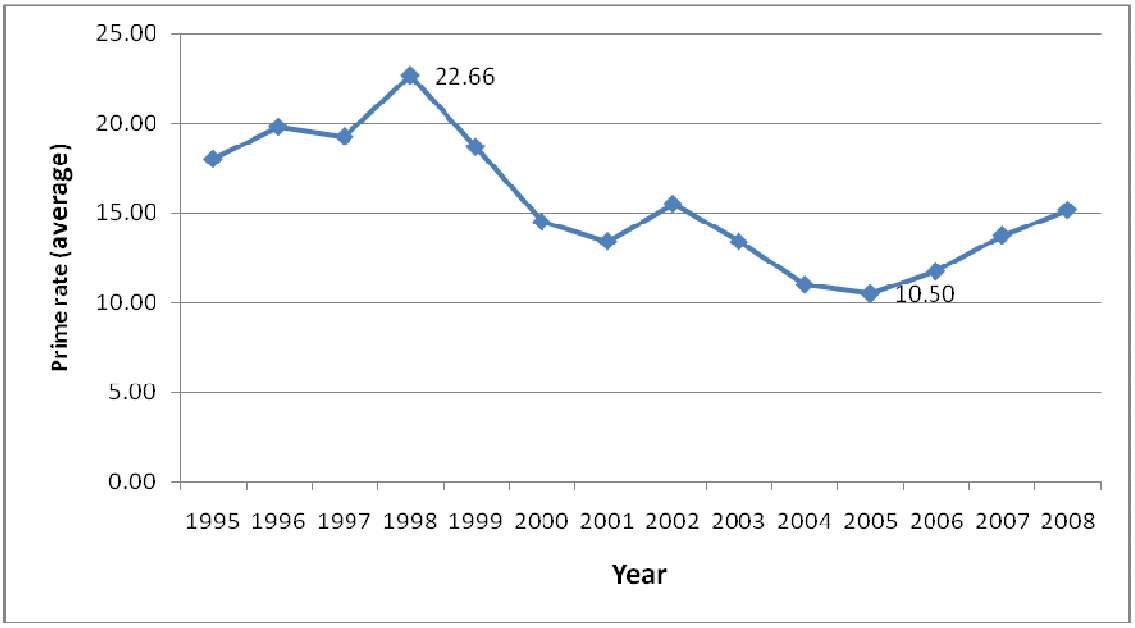


**Figure 5.6: Average annual PR for the period 1995 to 2008**

The figure above shows the relatively high PR of 22.66% in 1998. Since 1998, the PR experienced an overall downward trend until it reached a minimum rate of 10.5% in 2005. The average PR for South Africa has increased annually from 2005 to 2008. The variation in the PR is expected to have an effect on firms' financing choices, since the PR determines the interest rate firms have to pay on borrowed money.

#### *5.2.1.9 Inflation (CPI%)*

Changes in the consumer price index (CPI%) were used to measure inflation in South Africa. The CPI% varies from a minimum of 1.40% in 2004 to a maximum of 11.50% in 2008, which is considerably higher compared to the other years. This was the only time during the selected period of 14 years that the CPI% was above a 10% level. On average, the CPI% for the selected period was 6.41% with a median value of 5.80%. Since the inflation target for South Africa is between 3% and 6%, the median value for CPI% falls just within that target. Even though the CPI% is not spread out too much around the mean, the standard deviation of 2.33% is an indication that South Africa struggles to maintain a relatively stable inflation rate. The average CPI% rate for each year included in this study is illustrated in Figure 5.7.

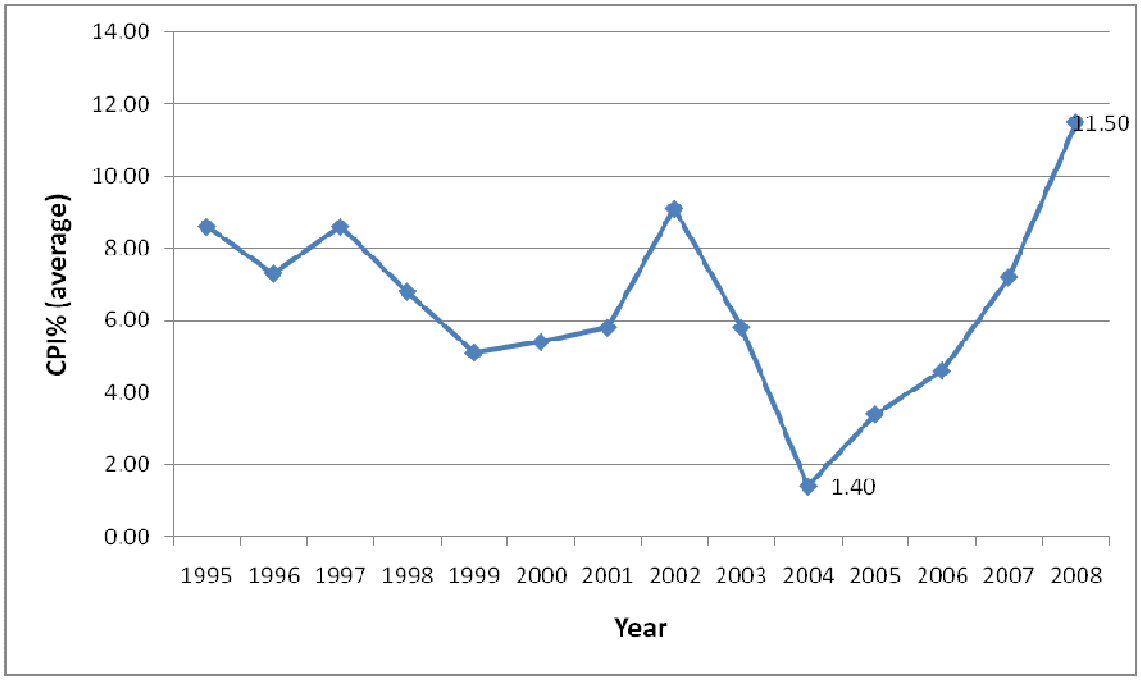


**Figure 5.7: Average annual CPI% rate for the period 1995 to 2008**

Figure 5.7 shows the maximum CPI% rate of 11.50% in 2008 as well as the minimum of 1.40% in 2004. The figure also illustrates that the average CPI% rate in South Africa is quite variable and that during only seven of the fourteen years CPI% rates fell within the target inflation rate of 3% to 6%.

### *5.2.1.10 Economic growth (GDP%)*

The final economic variable is the economic growth of South Africa and it was measured by changes in the gross domestic product (GDP%) economic indicator. The GDP% ranges from a minimum rate of 0.52% in 1998 to a maximum of 5.32% in 2006. Based on the median value for GDP%, South Africa experiences annual economic growth of approximately 3.12%. Figure 5.8 illustrates the average GDP growth rate for the period 1995 to 2008.

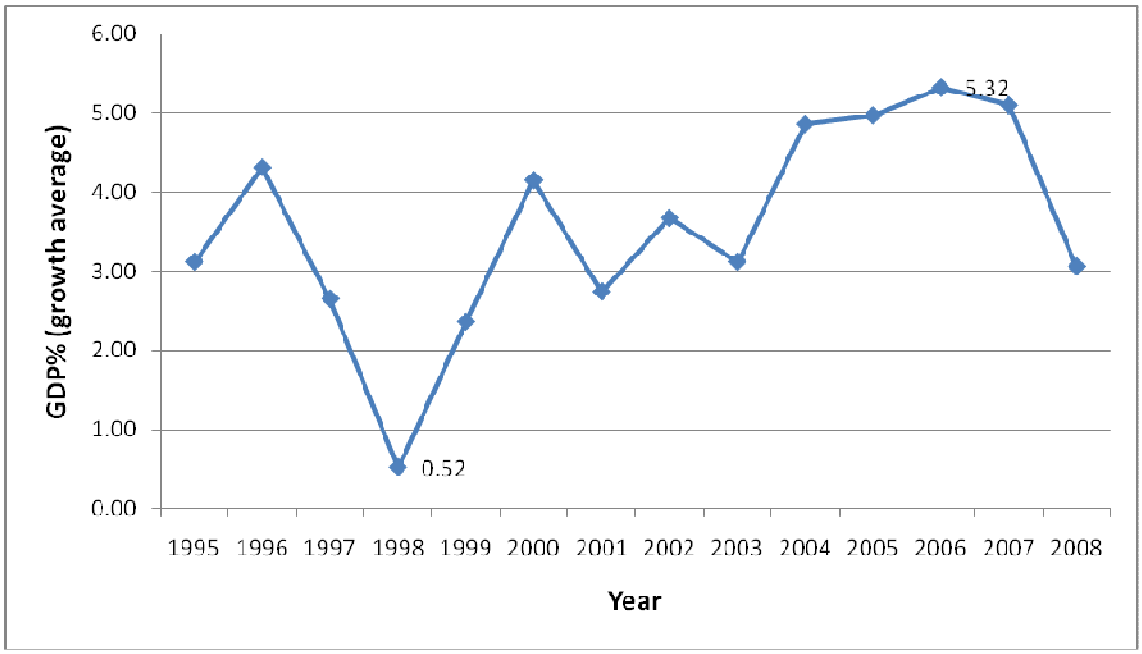


**Figure 5.8: Average annual GDP growth rates for the period 1995 to 2008**

The figure above represents the average GDP growth rate for each year from 1995 to 2008. It is evident from the graph that the South African GDP growth rate is constantly changing year on year. South Africa's average GDP growth rate of 3.46% is lower than that of other developing economies such as Pakistan (4.80%), Malaysia (4.80%), Brazil (3.54%) and Turkey (4.19%). In general, the average South African GDP growth rate is higher in comparison to many developed economies such as the United States (2.49%), Japan (1.30%) and the United Kingdom (2.61%) (Source: World Development Indicators).

To conclude the discussion on the results of the means, medians, ranges, variances and standard deviations, a summarised figure is provided to illustrate all the different

variables for this study. Figures 5.9 and 5.10 provide illustrations of the median values of the dependent and each of the nine independents variables for all the firms included in the study (listed and delisted firms). The variables were separated and plotted on two different graphs in an attempt to provide a better illustration of the volatility of each of the different variables, because their values differ.

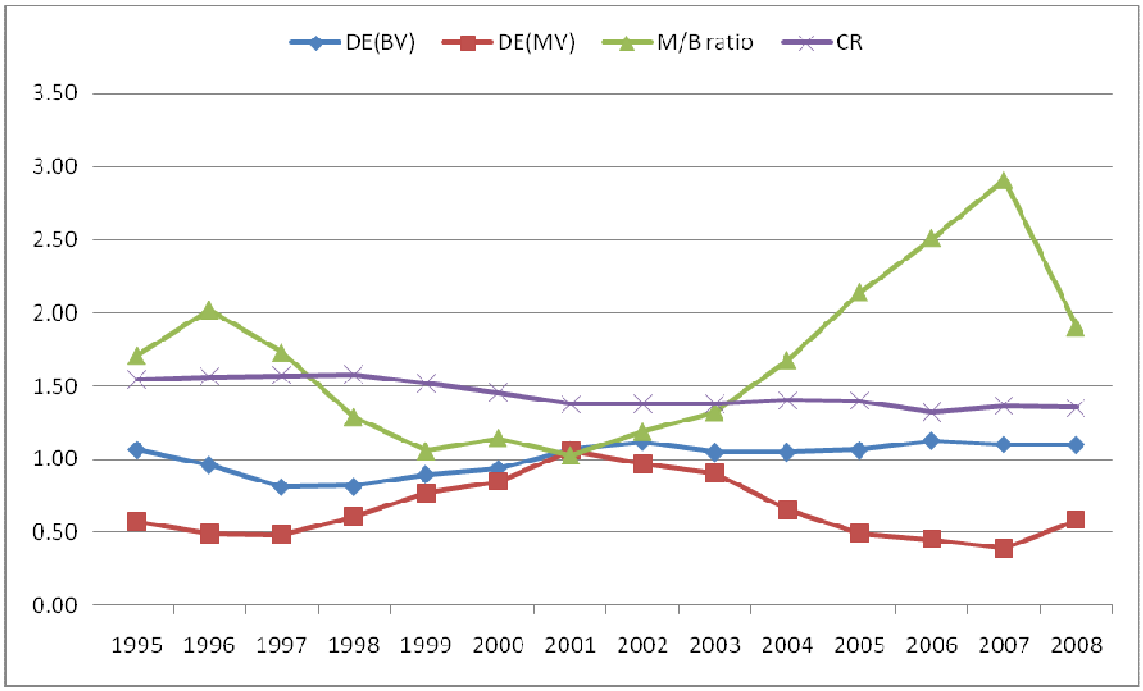


**Figure 5.9: Annual median values for $DE_{BV}$, $DE_{MV}$, CR and M/B ratio from 1995 to 2008**

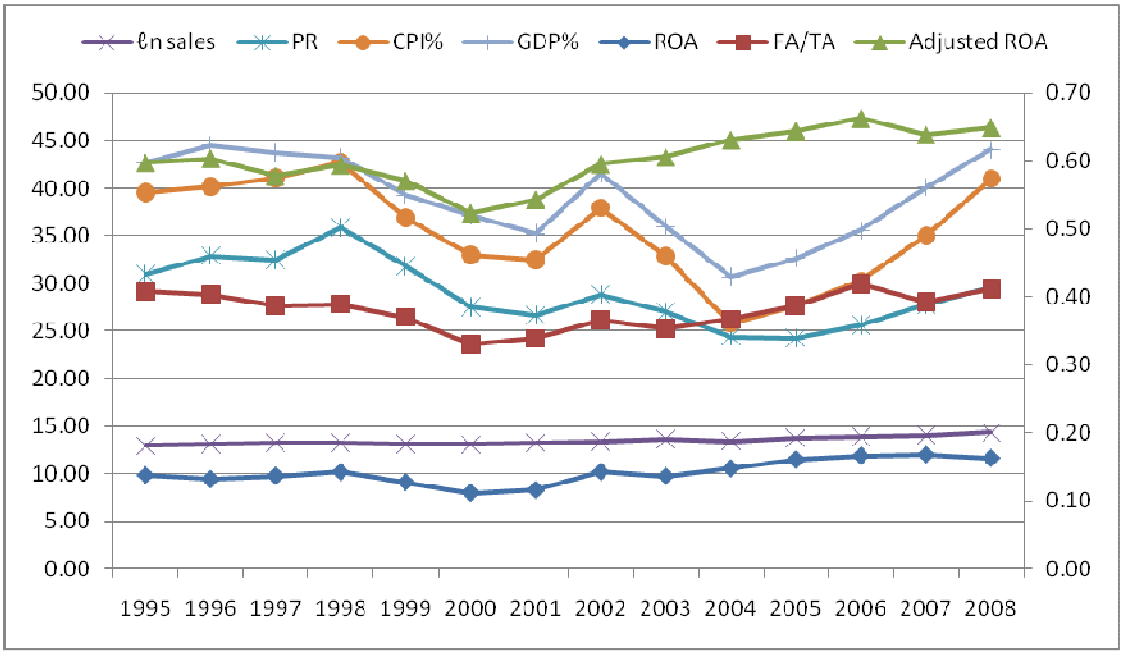


**Figure 5.10: Annual median values for ln (sales), PR, CPI%, GDP%, ROA, adjusted ROA and FA/TA from 1995 to 2008**

These two figures again illustrate that all three economic variables (PR, CPI% and GDP%) are quite volatile in terms of annual median values. The M/B ratio and the adjusted ROA show the most volatility in annual median values amongst the firm characteristics. The other four firm characteristics (ROA, ln(sales), FA/TA and CR) remain relatively stable during the selected period of 14 years.

### 5.2.2 Skewness and kurtosis

Skewness and kurtosis are descriptive measures used to describe the shape of a data set's distribution. These two measures are of importance, since many statistical tests depend on the nature of a data set's distribution. Table 5.2 provides the skewness and kurtosis measures for all the variables (dependent and independent) included in this study.

**Table 5.2: Skewness and kurtosis measures for the full data set**

| Variables | N | Skewness | Kurtosis |
|---|---|---|---|
| $DE_{BV}$ | 2 684 | 39.84 | 1832.96 |
| $DE_{MV}$ | 2 684 | 24.61 | 679.42 |
| ROA | 2 684 | 5.29 | 473.55 |
| FA/TA | 2 684 | 0.87 | 0.01 |
| CR | 2 684 | 28.80 | 1155.23 |
| Adjusted ROA | 2 684 | 28.16 | 996.18 |
| M/B ratio | 2 684 | 27.11 | 854.27 |
| ln (sales) | 2 684 | -0.57 | 0.94 |
| PR | 14 | 0.31 | -0.94 |
| CPI% | 14 | -0.05 | 0.09 |
| GDP% | 14 | -0.55 | -0.10 |

Skewness is an instrument to measure the symmetry of a data set. A data set is normally distributed (symmetric) if the two halves on either side of the centre point appear as mirror images to one another. A normal distribution has a skewness of zero. Referring to Table 5.2, it is evident that the data set for this particular study is not normally distributed, since none of the variables have a skewness of zero. The dependent variable (as measured by both $DE_{BV}$ and $DE_{MV}$) and six independent variables are skewed to the right, i.e. the distributions are positively skewed. This entails that most of the values for these variables are relatively small, but there are a few significant large values, which pull the mean to the right. The tails of these distributions are, thus, longer on the right and extend to more positive values. CPI%, GDP% and ln (sales) are the only variables that report negative skewness. This implies that the tails are longer to the left and that it contains results below the mean that are more extreme. These extreme values pull the mean to the left.

Kurtosis indicates whether the distribution of a data set is peaked or flat relative to a normal distribution. The kurtosis for a normal distribution is usually equal to three. However, some sources use a different definition, which considers the kurtosis of a normal distribution to be equal to zero. This is referred to as excess kurtosis. The software program Statistica (2006) was used to determine the census kurtosis and this software operates on a normal distribution kurtosis value of zero. Table 5.2 provides the kurtosis values of the dependent variable and each of the independent variables. The debt-equity ratio (as measured by both $DE_{BV}$ and $DE_{MV}$), all the firm characteristics as well as one economic factor (the CPI%) have a kurtosis greater

than zero. These values indicate distributions that are leptokurtic, indicating that the distributions are more peaked than, and have flatter tails than a normal distribution. In other words the distribution of these variables has more data points clustered around the mean and more data points with large deviations from the mean (referring to the fatter tails). This can also be seen in the standard deviations of each of these variables (refer to Table 5.1).

The kurtosis values for most of these variables are greater than zero. $DE_{BV}$ and the CR, for example, have a kurtosis of 1832.96 and 1155.23 respectively, which represents a considerable peaked distribution, relative to a normal distribution. The kurtosis of FA/TA (0.01), ln (sales) (0.94) and CPI% (0.09) is lower than one, which means that, although the distribution of these variables is still leptokurtic, it is very close to that of a normal distribution. The other variables, however, convey extreme excess kurtosis.

Only two variables, namely the PR and GDP%, report a kurtosis of less than zero. This indicates that the distribution of these two variables is platykurtic. Relative to a normal distribution, platykurtic distributions have a lower and wider peak around the mean (thus, thinner tails). The flatter peak is a result of data being less concentrated around its mean. Even though the kurtosis of these two variables is less than zero, it is extremely close to that of a normal distribution.

The important deduction from the above discussion on skewness and kurtosis is that the data set for this particular study is non-parametric, in other words it is not normally distributed. This is a very important observation for several reasons. For skewed distributions, the median rather than the mean should be considered to report on the central tendency of the data, since the mean is very sensitive for skewed data points. The median was, thus, used as the measure for central tendency for the different variables. Another reason why it is important to know whether data is parametric or non-parametric, is because the various methods of correlation analysis and regression analysis depend on the nature of the data. This will, for instance, determine whether the Pearson Product Moment correlation technique or the Spearman Rank Order correlation technique should be used for this study.

## 5.3 INFERENTIAL STATISTICS

It is necessary to conduct inferential statistics to achieve the objectives set out for the study. The results from the descriptive statistics indicated that the data set contains non-parametric data. This is a very important finding, since it indicates which statistical tests should be used for further analyses.

The Spearman Rank Order correlation technique should be used in this study instead of the Pearson Product Moment correlation technique, because the data set contains non-parametric data. Significance levels of 1%, 5% and 10% were considered to determine how significant the relationships between the dependent and the independent variables are.

There are some concerns with regard to correlation analysis, which was discussed in Chapter 4. The greatest concern was that the correlation analysis does not take panel data into consideration. The results reported by die correlation analysis may, therefore, not provide a true indication of the relationships between the dependent and the independent variables. Since the data set is large and contains both time-series and cross-section observations, it was decided to also conduct simple regression analysis. The simple regression analysis will provide a better indication of the strength of relationships between the dependent variable and each of the nine independent variables.

The next statistical step was to conduct a multiple regression analysis to determine how much of the variation in capital structure can be explained by the variation in all nine independent variables combined. This procedure is, thus, used to examine the relationship between a single dependent variable and several independent variables. Again, it must be mentioned that this study investigated a panel data set, since the data set contains observations on a variety of units which were observed over a series of periods and cross-sections. Due to the focus on a panel data set, the Time-Series-Cross-Section regression analysis (TSCSREG procedure) was used to conduct multiple regression analysis through the software program SAS®.

The following multiple regression equation was formulated to describe the relationship between the dependent variable and the nine independent variables:

$$DE_Y = b_o + b_1ROA + b_2FA/TA + b_3CR + b_4\text{Adjusted ROA} + b_5\text{M/B ratio} + b_6\ln(\text{sales}) + b_7PR + b_8CPI\% + b_9GDP\%$$

Where:

| | | |
|---|---|---|
| $DE_Y$ | = | the book value debt-equity ratio ($DE_{BV}$) or the market value debt-equity ratio ($DE_{MV}$); |
| ROA | = | profitability; |
| FA/TA | = | asset structure; |
| CR | = | liquidity; |
| Adjusted ROA | = | business risk; |
| M/B ratio | = | growth; |
| ln (sales) | = | size; |
| PR | = | interest rate; |
| CPI% | = | inflation; and |
| GDP% | = | economic growth. |

Before concluding on all the statistical analyses, it was decided to lag all the variables in the data set with one period. The previous regression model contained the values of the current year. The new model, thus, included the values of the current year ($t$) as well as the values of the previous year ($t - 1$). The $DE_{BV}$ and the $DE_{MV}$ ratio of the previous year were also included. The new regression model was, therefore, extended to include the values of the preceding year.

The equation for the new regression model was given by:

$$DE_Y = b_0 + b_1DE_{Y;t-1} + b_2ROA_t + b_3ROA_{t-1} + b_4FA/TA_t + b_5FA/TA_{t-1} + b_6CR_t + b_7CR_{t-1} + b_8\text{Adjusted ROA}_t + b_9\text{Adjusted ROA}_{t-1} + b_{10}\text{M/B ratio}_t + b_{11}\text{M/B ratio}_{t-1} + b_{12}\ln(\text{sales})_t + b_{13}\ln(\text{sales})_{t-1} + b_{14}PR_t + b_{15}PR_{t-1} + b_{16}CPI\%_t + b_{17}CPI\%_{t-1} + b_{18}GDP\%_t + b_{19}GDP\%_{t-1}.$$

Lagged values were included to determine whether the capital structure of a firm is also affected by the performance of the particular variables in the preceding year. The time-series length of the lagged data set is 13 years, which is one year less than for the original data set. The reason for this is that the first year of the study period

had to be excluded, since the preceding year's (1994) values were not obtained for purposes of this study. The main purpose of this procedure was to determine whether the inclusion of one-year lag variables would result in higher $R^2$ values and furthermore to see whether they are significant. This may indicate whether capital structures do take time to adjust.

The results obtained from the various statistical tests that were summarised above will now be discussed in detail. The results of each test will be reported in the context of each identified research objective.

## 5.4 DETERMINING THE EFFECT OF FIRM CHARACTERISTICS ON CAPITAL STRUCTURE

The first secondary objective was to determine whether the six identified firm characteristics can explain any variance in capital structure. This objective was, firstly address by conducting a Spearman Rank Order correlation analysis. Table 5.3 provides a correlation matrix of the dependent variable (as measured by both $DE_{BV}$ and $DE_{MV}$) and the six firm characteristics.

**Table 5.3: Correlation matrix for the full data set (listed and delisted firms)**

| | Dependent variable | | Independent variables | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Firm characteristics | | | | | |
| | $DE_{BV}$ | $DE_{MV}$ | ROA | FA/TA | CR | Adjusted ROA | M/B ratio | ln (sales) |
| $DE_{BV}$ | 1.000 | | | | | | | |
| $DE_{MV}$ | 0.523*** | 1.000 | | | | | | |
| ROA | -0.120*** | -0.418*** | 1.000 | | | | | |
| FA/TA | -0.106*** | -0.009 | -0.091*** | 1.000 | | | | |
| CR | -0.508*** | -0.309*** | 0.107*** | -0.319*** | 1.000 | | | |
| Adjusted ROA | -0.070*** | -0.318*** | 0.764*** | -0.069*** | 0.022 | 1.000 | | |
| M/B ratio | 0.239*** | -0.629*** | 0.369*** | -0.105*** | -0.124*** | 0.329*** | 1.000 | |
| ln (sales) | 0.228*** | 0.009 | 0.201*** | 0.086*** | -0.146*** | 0.101*** | 0.175*** | 1.000 |

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

Based on the results reported in Table 5.3, almost all of the firm characteristics have a statistically significant relationship with $DE_{BV}$ and $DE_{MV}$, respectively, at the 1% level. It was already mentioned that there were concerns with regard to correlation analysis, due to the large data set being used and the fact that it does not take panel data into consideration. It was, therefore, decided to rather conduct a simple regression analysis to obtain a better indication of the nature, as well as the strength of the relationships, between the dependent variable and each of the six firm characteristics.

This type of regression model, also known as bivariate regression, is a regression model with a single independent variable (Hair *et al.*, 2006). This statistical test is used to describe the relationship between one dependent variable and only one independent variable. The regression coefficient, therefore, explains the variation in the dependent variable in terms of one independent variable.

Since the data set included both listed firms and those firms that delisted from the JSE during the study period of 14 years, it was decided to also subdivide the full data set into two sub-sets of firms, namely a sub-set of listed firms and a sub-set of delisted firms. By doing this, it may provide an early indication if differences exist between listed and delisted firms.

### 5.4.1 Simple regression analysis results for the full data set

The first TSCSREG simple regression analysis was conducted for the full data set to determine the relationships amongst the dependent variable and each of the six identified firm characteristics. The analyses were conducted for both $DE_{BV}$ and $DE_{MV}$. The results for the full data set are provided in Table 5.4.

**Table 5.4: Simple regression analysis results for the full data set**

| Independent variables ($X_i$) | Regression coefficients | | $R^2$ | | *p*-Value | |
|---|---|---|---|---|---|---|
| | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ |
| ROA | -0.607 | -0.390 | 0.0013 | 0.0002 | 0.0642* | 0.4224 |
| FA/TA | -0.876 | -4.949 | 0.0002 | 0.0016 | 0.4243 | 0.0359** |
| CR | -0.171 | -0.197 | 0.0011 | 0.0006 | 0.0826* | 0.2097 |
| Adjusted ROA | -0.127 | -0.138 | 0.0001 | 0.0000 | 0.6296 | 0.7249 |
| M/B ratio | 0.149 | -0.010 | 0.0563 | 0.0001 | 0.0001*** | 0.5730 |
| ln (sales) | -0.068 | 0.527 | 0.0001 | 0.0016 | 0.5331 | 0.0402** |

The following regression equation was conducted: $DE_Y = b_0 + b_1X_i$; where $X_i$ is one of the six firm characteristics

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

Table 5.4 provides the regression coefficients, the $R^2$ values and the *p*-values for each of the six identified firm characteristics. It is again important to mention that simple regression analysis is a regression model with a single independent variable and is used to describe the relationship between one dependent variable and only one independent variable. The results in Table 5.4, thus, indicate the relationship between $DE_{BV}/DE_{MV}$ and each of the six firm characteristics. An elaboration of the simple regression results for each firm characteristic will now follow.

- **Profitability (ROA)**

The results report that ROA has an inverse relationship with both $DE_{BV}$ and $DE_{MV}$. The regression coefficient for ROA is slightly lower for $DE_{BV}$ (-0.607) than for $DE_{MV}$ (-0.390). ROA reports a statistically significant relationship with $DE_{BV}$ at the 10% level. ROA's relationship with $DE_{MV}$, however, is not significant at any level. A negative relationship between profitability and capital structure corresponds with the findings of prior studies such as Jensen and Meckling (1976), Titman and Wessels (1988) and Fama and French (2002). This finding is consistent with the pecking order theory. A negative relationship implies that the firms included in this study reduced its use of debt financing as its profitability improved. The regression coefficient of ROA for both of these two measures, however, did not show evidence

that the relationship is statistically significant at the 1% or the 5% level. The relationship between $DE_{BV}$ and ROA is, however, significant at the 10% level.

- **Asset structure (FA/TA)**

Based on the regression coefficients, FA/TA has a negative relationship with both $DE_{BV}$ (-0.876) and $DE_{MV}$ (-4.949). A positive relationship was, however, expected due to the fact that fixed assets are generally used as collateral when firms borrow funds. A larger proportion of fixed assets thus indicates lower risk for the lender. Various other international studies report a positive relationship between asset structure (tangibility) and both $DE_{BV}$ and $DE_{MV}$. The result for this South African study is, therefore, contradictory to what was expected and to the results from other countries. It, therefore, does not support the generally accepted prediction of the trade-off theory, which states that the debt-capacity increases with the proposition of tangible assets on the balance sheet (Drobetz *et al.*, 2007). This negative relationship is, however, consistent with the results of Bevan and Danbolt (2002) and Booth *et al.* (2001).

FA/TA reports a stronger relationship with $DE_{MV}$ than with $DE_{BV}$. Based on the *p*-values (0.4243 and 0.0359) it is evident that, although a relationship does exist between asset structure and leverage, the relationship is not statistically significant at the 1% level. The relationship between this variable and $DE_{MV}$ is, however, significant at the 5% level.

- **Liquidity (CR)**

An inverse relationship is reported between CR and both $DE_{BV}$ and $DE_{MV}$. The regression result obtained for liquidity, therefore, corresponds with the findings from various empirical studies such as Aggrawal and Nagarajan (1990), Eriotis *et al.* (2007) and Rao *et al.* (2007). This result also supports the pecking order theory which argues that firms with high liquidity (high amount of current assets) use the inflows from the current assets to finance investment opportunities instead of using debt. The regression coefficients for CR are more or less the same for $DE_{BV}$ (-0.171) and $DE_{MV}$ (-0.197). The *p*-values, however, indicate that the relationship between $DE_{BV}$ and CR is not statistically significant, whereas the relationship of this variable with $DE_{MV}$ is significant at the 5% level.

- **Business risk (adjusted ROA)**

As was expected, the relationship between this variable and both $DE_{BV}$ and $DE_{MV}$ is negative, implying that firms with high business risk borrow less. Firms with higher business risk have less capacity to sustain high financial risk and will, therefore, use less debt to reduce the risk of business failure. Other empirical studies that support a negative relationship are Mackie-Mason (1990), Graham and Harvey (2001) and Deesomsak *et al.* (2004). The regression coefficients of the adjusted ROA for both measures of leverage are relatively low (-0.127 and -0.138). The *p*-values indicate that the relationship between the adjusted ROA and both dependent variables, however, is not significant at any level.

- **Growth (M/B ratio)**

This variable reports different results for $DE_{BV}$ and $DE_{MV}$ and from these results it is again evident that differences do exist between these two measures of capital structure. In Chapter 4, it was mentioned that a negative relationship was expected between the M/B ratio and leverage. A negative relationship was reported between the M/B ratio and $DE_{MV}$. Previous studies by Rajan and Zingales (1995), Drobetz *et al.* (2007), Chen and Hammes (2005) and Chen and Shiu (2007) all report that growth is negatively related to market value leverage. This negative relationship corresponds with the trade-off theory and implies that high growth firms use less debt in its capital structure. This particular relationship is, however, not statistically significant.

The relationship between the M/B ratio and $DE_{BV}$, on the other hand, reports a positive relationship which is contradictory to the initial expectation. Furthermore, this relationship reports to be statistically significant at the 1% level, with a $R^2$ value of 0.0563. This positive relationship corresponds with the results from Drobetz *et al.* (2007). Various authors, such as Booth *et al.* (2001) and Baral (2004), argue that growing firms are extremely dependent on external financing, since its internal financing will most probably not be sufficient to finance investment opportunities. The capital structure of growing firms will, therefore, contain more debt than that of a stagnant firm. This result, therefore, appears to be more in support of the pecking order theory of capital structure.

- **Size (ln [sales])**

According to the results of the regression analysis, the nature of the relationships between size and leverage differs for $DE_{BV}$ and $DE_{MV}$. A negative relationship is reported between ln (sales) and $DE_{BV}$, with a regression coefficient of -0.068. This result does not correspond with the expectation of a positive relationship. This negative relationship is, furthermore, contradictory to various international studies (Drobetz *et al.*, 2007; Chen & Hammes, 2004; Rajan & Zingales, 1995; Cheng & Shiu, 2007) that report a positive relationship between size and book value leverage. Titman and Wessels (1988) and Chaplinsky and Niehaus (1993), however, support a general negative relationship between size and capital structure. This implies that larger firms have less debt in their capital structures, since larger firms have less information asymmetry. This results in its equity becoming more attractive to investors.

The regression coefficient is positive (0.527) for ln (sales) and $DE_{MV}$, which supports the trade-off theory. This positive relationship corresponds with other international studies and it implies that larger firms include more debt in their capital structures than its smaller counterparts. This relationship is statistically significant at the 5% level, implying that the size of firms has a stronger relationship with $DE_{MV}$ than with $DE_{BV}$.

- **Conclusion on simple regression analysis results for the full data set**

Table 5.5 provides a summary of the relationships reported between each of the firm characteristics and leverage (both $DE_{BV}$ and $DE_{MV}$). The table provides the nature of relationship that was initially expected, as well as the actual relationships reported by the simple regression analyses.

**Table 5.5: Summary of expected and actual simple regression analysis results for the six firm characteristics**

| Variables | $DE_{BV}$ | | $DE_{MV}$ | |
|---|---|---|---|---|
| | Expected | Result | Expected | Result |
| ROA | - | -* | - | - |
| FA/TA | + | - | + | -** |
| CR | - | -* | - | - |
| Adjusted ROA | - | - | - | - |
| M/B ratio | - | +*** | - | - |
| ln (sales) | + | - | + | +** |

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

Table 5.5 indicates that FA/TA, M/B ratio, and ln (sales) report the opposite nature of the relationship that was initially expected. It is interesting to note that these three variables are also the only variables that report a significant relationship with either $DE_{BV}$ or $DE_{MV}$ at the 1% or 5% level. M/B ratio and ln (sales), furthermore, report different results for $DE_{BV}$ and $DE_{MV}$. This again illustrates differences between the two measures of leverage.

The $R^2$ values for both $DE_{BV}$ and $DE_{MV}$ are low. This indicates that the specific regression model explains very little of the variation in each of the two dependent variables. The results from the simple regression analyses report only one statistically significant relationship at the 1% level, and this is found between M/B ratio and $DE_{BV}$. From the results, it may furthermore be derived that $DE_{BV}$ reports stronger results as opposed to $DE_{MV}$. None of the relationships between the six firm characteristics and $DE_{MV}$ is significant at the 1% level.

### 5.4.2 Simple regression analysis results for the sub-set of listed firms

Simple regression analysis was also conducted for the sub-set of listed firms. This particular sub-set reports more or less the same results as the full data set. Table 5.6 provides the simple regression results for each firm characteristic. $DE_{BV}$ and $DE_{MV}$ were both used as the dependent variable to illustrate differences between these two measures.

**Table 5.6: Simple regression analysis results for the sub-set of listed firms**

| Independent variables ($X_i$) | Regression coefficients | | $R^2$ | | *p*-Value | |
|---|---|---|---|---|---|---|
| | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ |
| ROA | -0.958 | -0.025 | 0.0021 | 0.0000 | 0.0413** | 0.9577 |
| FA/TA | -0.792 | -5.945 | 0.0002 | 0.0034 | 0.5803 | 0.0099*** |
| CR | -0.169 | -0.101 | 0.0010 | 0.0003 | 0.1564 | 0.4373 |
| Adjusted ROA | -0.150 | -0.025 | 0.0001 | 0.0000 | 0.6572 | 0.9417 |
| M/B ratio | 0.144 | -0.007 | 0.0542 | 0.0001 | 0.0001*** | 0.6269 |
| ln (sales) | -0.066 | 1.332 | 0.0001 | 0.0105 | 0.6350 | 0.0001*** |

The following regression equation was conducted: $DE_Y = b_0 + b_1X_i$; where $X_i$ is one of the six firm characteristics

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

In terms of the nature of the relationships, $DE_{BV}$ reports the same results as those obtained for the full data set. ROA, FA/TA, CR, Adjusted ROA, and ln (sales) are all negatively related to $DE_{BV}$. The M/B ratio is the only variable that reports a positive relationship with $DE_{BV}$, and is once again the only measure which reports to be statistically significant at the 1% level. $DE_{MV}$ as the dependent variable also reports the same results as the full data set in terms of the nature of the relationships. All of the firm characteristics are negatively related to $DE_{MV}$, except for ln (sales).

Even though the nature of the relationships for the listed firms coincides with the full data set, two main differences are found between the results for these two data sets. Based on the results in Table 5.6, it can be seen that FA/TA and ln (sales) both report a statistically significant relationship at the 1% level with $DE_{MV}$. For the full data set, none of the firm characteristics reported a statistically significant relationship with $DE_{MV}$. This is an important observation since the results indicate that the asset structure and the size of listed firms may be important factors to consider when financing decisions are being made. Again, these results indicate that considerable differences exist between book value and market value leverage and that these differences should be considered for capital structure choices.

### 5.4.3 Simple regression analysis results for the sub-set of delisted firms

Finally, simple regression analyses were conducted for the sub-set containing only those firms which delisted from the JSE during the selected period of 14 years. The results for this particular group of firms are presented in Table 5.7.

**Table 5.7: Simple regression analysis results for the sub-set of delisted firms**

| Independent variables ($X_i$) | Regression coefficients | | $R^2$ | | *p*-Value | |
|---|---|---|---|---|---|---|
| | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ |
| ROA | 0.007 | -1.112 | 0.0000 | 0.0013 | 0.9699 | 0.3477 |
| FA/TA | -1.399 | -4.055 | 0.0029 | 0.0007 | 0.1549 | 0.4758 |
| CR | -0.202 | -1.155 | 0.0043 | 0.0039 | 0.0837* | 0.1000 |
| Adjusted ROA | -0.071 | -0.708 | 0.0002 | 0.0004 | 0.7380 | 0.5777 |
| M/B ratio | 0.452 | -0.217 | 0.2069 | 0.0013 | 0.0001*** | 0.3379 |
| ln (sales) | -0.094 | -0.134 | 0.0012 | 0.0001 | 0.3508 | 0.8354 |

The following regression equation was conducted: $DE_Y = b_0 + b_1X_i$; where $X_i$ is one of the six firm characteristics

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

The results obtained for the sub-set of delisted firms contain several differences compared to the sub-set of listed firms and the full data set. The relationship between $DE_{BV}$ and ROA is positive, which does not correspond with the results obtained for the sub-set of listed firms. A positive relationship supports the trade-off theory and it implies that firms with high profitability have higher leverage. This result may indicate that those firms which delisted during the period of 1995 to 2008, may have used more debt in their capital structures when they were more profitable. This may have resulted in considerably higher debt levels and consequently extreme debt obligations. Delisted firms may also have financial problems, which mean they would use more debt to support their business activities. The opposite direction also holds, in which these firms will use less debt when their profitability is low.

The model focusing on $DE_{MV}$ also reveal one firm characteristic, which reports contradictory results to the listed firms. Initially a positive relationship was expected

between ln (sales) and $DE_{MV}$. The result of the sub-set of listed firms corresponds with this expectation. The sub-set of delisted firms, however, reports a negative relationship. A negative relationship can best be explained in terms of information asymmetry. Larger firms have less information asymmetry, which results in their equity being more attractive to outside investors and the firms will, therefore, have more debt available. The result for ln (sales) may also indicate that the delisted firms may be smaller than the listed firms, which could result in their equity being less attractive to outside investors and the firms will, therefore, have less debt available.

The nature of the relationships between the dependent variable ($DE_{BV}$ and $DE_{MV}$) and the remaining firm characteristics all correspond with the results of the sub-set of listed firms. None of the six firm characteristics report a significant relationship at the 1% level with the $DE_{MV}$ ratio. M/B ratio is the only measure which reports a statistically significant relationship at the 1% level. This significant relationship is found between M/B ratio and $DE_{BV}$. The $R^2$ value for this relationship is considerably higher compared to the $R^2$ value reported by the listed firms. Variations in M/B ratio can explain 20.69% of the variation in $DE_{BV}$ for the sub-set of delisted firms as opposed to only 5.42% for the sub-set of listed firms. The delisted firms report several different results compared to the sub-set of listed firms, which may be an indication that the firm characteristics under investigation have different effects on the capital structures of listed firms and delisted firms.

### 5.4.4 Conclusion on simple regression analysis results obtained for the firm characteristics

To conclude on the results obtained for the six identified firm characteristics, a table with the $R^2$ values reported for each of the three data sets is provided below. This will better illustrate the differences in the results of the three sets of data.

**Table 5.8: Summary of $R^2$ values reported by each of the three data sets**

| Independent Variables | $R^2$ | | | | | |
|---|---|---|---|---|---|---|
| | Full data set | | Sub-set: listed firms | | Sub-set: delisted firms | |
| | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ |
| ROA | 0.0013 | 0.0002 | 0.0021 | 0.0000 | 0.0000 | 0.0013 |
| FA/TA | 0.0002 | 0.0016 | 0.0002 | 0.0034 | 0.0029 | 0.0007 |
| CR | 0.0011 | 0.0006 | 0.0010 | 0.0003 | 0.0043 | 0.0039 |
| Adjusted ROA | 0.0001 | 0.0000 | 0.0001 | 0.0000 | 0.0002 | 0.0004 |
| M/B ratio | 0.0563 | 0.0001 | 0.0542 | 0.0001 | 0.2069 | 0.0013 |
| ln (sales) | 0.0001 | 0.0016 | 0.0001 | 0.0105 | 0.0012 | 0.0001 |

The majority of the $R^2$ values provided in Table 5.8 are relatively low. The pink blocks in the table highlight those variables that report a $R^2$ value of 0.0000, indicating that it cannot explain any of the variance in $DE_{BV}/DE_{MV}$. An interesting observation is that the variables reporting a $R^2$ value of 0.0000 are ROA and adjusted ROA. These two measures are very similar in terms of their calculations. From the simple regression results, it thus appears that profitability and business risk may be of less importance compared to the other variables. Except for these two variables, it appears that the remaining four characteristics may be able to explain some of the variance in capital structures.

The simple regression analysis results indicate that two of the six characteristics cannot explain any variation in capital structures. It may, however, be possible that the six characteristics combined may explain more of the variance in $DE_{BV}$ and $DE_{MV}$ as opposed to being evaluated independently. The results from the multiple regression analyses discussed later in this chapter may support this conclusion. The above mentioned results, however, provide sufficient evidence that firm characteristics may be able to explain some of the variation in capital structure.

The next section focuses on the possible effects that economic factors may have on capital structure. The results from the statistical tests applied will be discussed in detail to provide an indication of whether the identified economic factors for this study do have an effect on capital structure.

## 5.5 THE EFFECT OF ECONOMIC FACTORS ON CAPITAL STRUCTURE

The second objective was to analyse whether economic factors can explain variance in capital structure. Three economic factors were identified as variables which may have an effect on the capital structure of a firm. In order to investigate the relationships between these economic variables and the dependent variables a Spearman Rank Order correlation analysis was conducted and the results for this statistical test are provided in Table 5.9.

**Table 5.9: Correlation matrix for the full data set (listed and delisted firms)**

| | **Dependent variable** | | **Economic factors** | | |
|---|---|---|---|---|---|
| | **$DE_{BV}$** | **$DE_{MV}$** | **PR** | **CPI%** | **GDP%** |
| $DE_{BV}$ | 1.000 | | | | |
| $DE_{MV}$ | 0.523*** | 1.000 | | | |
| PR | -0.072*** | -0.006 | 1.000 | | |
| CPI% | 0.003 | -0.004 | 0.572*** | 1.000 | |
| GDP% | 0.070*** | -0.106*** | -0.642*** | -0.293*** | 1.000 |

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

The results from the Spearman Rank Order correlation analysis reports that two of the three identified economic factors have statistically significant relationships with either $DE_{BV}$ of $DE_{MV}$. Since simple regression analysis was conducted for the firm characteristics in the previous section, the same was applied for the economic factors. The simple regression analysis was conducted to better determine the relationship with capital structure. As in the previous section, both $DE_{BV}$ and $DE_{MV}$ were used as estimates for the dependent variable and simple regression analyses were again conducted for the full data set as well as for the two sub-sets of listed and delisted firms.

### 5.5.1 Simple regression analysis results for the full data set

Table 5.10 provides the simple regression analysis results of the full data set for the three economic factors.

**Table 5.10: Simple regression analysis results for the economic factors**

| Independent variables ($X_i$) | Regression coefficients | | $R^2$ | | *p*-Value | |
|---|---|---|---|---|---|---|
| | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ |
| PR | -0.079 | -0.245 | 0.0004 | 0.0015 | 0.2955 | 0.0426** |
| CPI% | 0.096 | -0.275 | 0.0003 | 0.0009 | 0.3958 | 0.1121 |
| GDP% | 0.149 | 0.037 | 0.0002 | 0.0000 | 0.4707 | 0.9088 |

The following regression equation was conducted: $DE_Y = b_0 + b_1X_i$; where $X_i$ is one of the three economic factors

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

- **Interest rate (PR)**

As was expected from the existing literature, the regression coefficients of PR for both $DE_{BV}$ and $DE_{MV}$, report a negative relationship. This negative relationship corresponds with the predictions of the trade-off theory. It would appear that if the prime rate in South Africa rises, firms tend to use less debt and vice versa. This might be explained by the effect of changing interest rates on the cost of capital of firms. If interest rates increase, the cost of capital will subsequently increase, which will result in higher risk of bankruptcy. Firms will, therefore, use less debt in their capital structures during periods of high interest rates. With a *p*-value of 0.2955, however, it is evident that the relationship between $DE_{BV}$ and PR is not statistically significant at any level. The relationship between PR and $DE_{MV}$ is, however, significant at the 5% level, with a *p*-value of 0.0426.

- **Inflation (CPI%)**

A positive relationship was expected between CPI and leverage, since it is expected that a decrease in inflation will increase the cost of debt and therefore firms will employ less debt. The regression coefficient obtained for CPI%, however, indicated

a dissimilar relationship with $DE_{BV}$ and with $DE_{MV}$. The relationship between the CPI% and $DE_{BV}$ is positive. This relationship reports a regression coefficient of 0.096 and a *p*-value of 0.3958. These statistics convey that a positive relationship does exist between these two variables, but the relationship is, however, not statistically significant.

$DE_{MV}$ reports a negative relationship with CPI%, which contradicts the general expectation. This implies that when the capital structure of a firm is estimated by using the market value of its equity, instead of its book value, the firms tend to use less debt during inflationary periods and vice versa. Even though a negative relationship is reported, it is again not statistically significant.

- **Economic growth (GDP%)**

The GDP% does not report significant relationships with either $DE_{BV}$ or $DE_{MV}$. As mentioned in Chapter 4, the GDP growth rate in South Africa was used as a measure of economic growth. The GDP% is positively related to both the $DE_{BV}$ and $DE_{MV,}$ as was initially expected. This assumption was based on the expectation that an increase in economic growth will result in an increase in demand, and subsequently an increase in profits (free cash flow). This argument supports the trade-off theory, which states that more profitable firms have more capacity to borrow. The *p*-values are high (0.4707 and 0.9088 respectively), indicating that this variable does not have a statistically significant relationship with capital structure.

- **Conclusion on simple regression analysis results for the full data set**

To conclude the discussion on the results from the simple regression analysis, a summary of the nature of the various relationships is provided in Table 5.11. This table provides the expected signs of the regression coefficients for each economic factor, as well as the actual results obtained from the simple regression analysis.

**Table 5.11: Summary of the expected and actual simple regression analysis results for the three economic factors**

| Variables | $DE_{BV}$ | | $DE_{MV}$ | |
|---|---|---|---|---|
| | Expected | Result | Expected | Result |
| PR | - | - | - | -** |
| CPI% | + | + | + | - |
| GDP% | + | + | + | + |

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

Table 5.11 indicates that the CPI% reports different results for $DE_{BV}$ and $DE_{MV}$. The actual results for PR and GDP% correspond with the expected results. The positive relationship between the CPI% and $DE_{BV}$ corresponds with the relationship that was initially expected. The CPI%, however, reports a negative relationship with $DE_{MV}$, which is contradictory to the initial expectation. The PR is the only economic factor to report a statistically significant relationship with leverage. The relation between this variable and $DE_{MV}$ is significant at the 5% level.

### 5.5.2 Simple regression analysis results for the sub-set of listed firms

In the discussion on the results of the firm characteristics, the full data set was subdivided into two sub-sets of firms. This was done to observe whether the results would differ between those firms listed on the JSE and those firms that were delisted from the JSE during the study period. It was, therefore, decided to do the same for the economic factors. Simple regression analysis was, thus, conducted for the sub-set of listed firms and the sub-set of delisted firms. The results for the sub-set of listed firms are provided in Table. 5.12.

**Table 5.12: Simple regression analysis results for the sub-set of listed firms**

| Independent variables ($X_i$) | Regression coefficients | | $R^2$ | | *p*-Value | |
|---|---|---|---|---|---|---|
| | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ |
| PR | -0.064 | -0.220 | 0.0002 | 0.0018 | 0.5040 | 0.0580* |
| CPI% | 0.114 | -0.256 | 0.0004 | 0.0014 | 0.3724 | 0.1003 |
| GDP% | 0.091 | 0.196 | 0.0001 | 0.0002 | 0.7227 | 0.5285 |

The following regression equation was conducted: $DE_Y = b_0 + b_1X_i$; where $X_i$ is one of the three economic factors

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

In terms of the nature of the relationships between the dependent variable and the three economic factors, $DE_{BV}$ reports the same results as the full data set. PR is negatively related to $DE_{BV}$ and positive relationships are reported for CPI% and GDP%. The $DE_{MV}$ as dependent variable, also reports the same relationships as the full data set. The PR and CPI% are negatively related and GDP% positively related to $DE_{MV}$. The PR is, however, only statistically significant at the 10% level, as opposed to the 5% level reported for the full data set.

### 5.5.3 Simple regression analysis results for the sub-set of delisted firms

The simple regression analysis results for the sub-set of delisted firms are provided in Table. 5.13.

**Table 5.13: Simple regression analysis results for the sub-set of delisted firms**

| Independent variables ($X_i$) | Regression coefficients | | $R^2$ | | *p*-Value | |
|---|---|---|---|---|---|---|
| | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ |
| PR | -0.143 | -0.612 | 0.0033 | 0.0044 | 0.1289 | 0.0798* |
| CPI% | -0.019 | -0.557 | 0.0000 | 0.0010 | 0.9150 | 0.4021 |
| GDP% | 0.359 | -0.107 | 0.0029 | 0.0000 | 0.1533 | 0.8988 |

The following regression equation was conducted: $DE_Y = b_0 + b_1X_i$; where $X_i$ is one of the three economic factors

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

The results reported in the above table differ in two ways from the results of the other two data sets. The CPI% is the one economic factor for which contradictory results are obtained. This variable has a negative relationship with the $DE_{BV}$ ratio, whereas the full data set and the listed firms both report a positive relationship. A negative relationship implies that during inflationary periods, the delisted firms employ less debt in their capital structures, despite a possible decrease in the real cost of debt. This also implies that during deflationary periods those firms employ more debt in their capital structures. Both of these relationships are, however, not statistically significant at any of the three levels.

The other variable that reports a different result for the delisted firms is GDP%. All the other simple regression results for this particular variable reported a positive relationship, which was expected. A negative relationship is, however, reported between the GDP% and the $DE_{MV}$ ratio when the sub-set containing only the delisted firms is investigated. This could imply that the delisted firms use more debt when the country experiences a decrease in economic growth and vice versa. This could be the result of poor financial management, since a decrease in the GDP% implies that demand will fall, which leaves a firm with less free cash flow to fulfil its debt obligations. Again, neither of these two independent variables have a statistically significant relationship with market value leverage. The only variable amongst the nine independent variables that reports some significance is the prime rate with a *p*-value of 0.0798 (significant at the 10% level).

### 5.5.4 Conclusion on simple regression analysis results obtained for the economic factors

To conclude on the results obtained for the three economic factors, a table with the $R^2$ values reported for each of the three data sets is provided. This will better illustrate the differences in the results of the three sets of data.

**Table 5.14: Summary of $R^2$ values obtained for each of the three sets of data**

| Independent Variables | $R^2$ | | | | | |
|---|---|---|---|---|---|---|
| | Full data set | | Sub-set: listed firms | | Sub-set: delisted firms | |
| | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ |
| PR | 0.0004 | 0.0015 | 0.0002 | 0.0018 | 0.0033 | 0.0044 |
| CPI% | 0.0003 | 0.0009 | 0.0004 | 0.0014 | 0.0000 | 0.0010 |
| GDP% | 0.0002 | 0.0000 | 0.0001 | 0.0002 | 0.0029 | 0.0000 |

Overall, the $R^2$ values provided in Table 5.20 are relatively low. The pink blocks in the table highlight those variables that report a $R^2$ value of 0.0000, indicating that it cannot explain any of the variance in $DE_{BV}$ or $DE_{MV}$. These factors include the CPI% and GDP% for either $DE_{BV}$ or $DE_{MV}$. Although it is relatively low, the other $R^2$ values are all above 0.0000. It thus appears that economic factors may be able to explain only a small portion of the variation in capital structure.

As was mentioned in the conclusion for the firm characteristics, it may also be possible that all the independent variables together, may explain more of the variance in $DE_{BV}$ and $DE_{MV}$ as opposed to being evaluated independently.

The above assumption gave way to conducting a multiple regression analysis to determine whether the independent variables combined, may better explain the variation in $DE_{BV}$ and $DE_{MV}$. This was also done in an attempt to determine if differences may exist between $DE_{BV}$ and $DE_{MV}$.

## 5.6 DIFFERENT RESULTS OBTAINED FOR BOOK VALUE LEVERAGE AND MARKET VALUE LEVERAGE

Capital structure was the dependent variable for this study and the debt-equity ratio was used to quantify the capital structure. The debt-equity ratio can be based on book values or market values. Both of these measures present their own strengths and weaknesses. Researchers cannot find consensus on which measure of leverage better reflects the target leverage of management. It was, therefore, decided to use both measures in the study as a dependent variable to determine whether differences exist between $DE_{BV}$ and $DE_{MV}$.

For this purpose, TSCSREG multiple regression analyses were conducted for both $DE_{BV}$ and $DE_{MV}$ to determine how much of the variation in these two measures can be explained by the variation in the independent variables. The results reported by the TSCSREG multiple regression analyses are provided in Table 5.15.

**Table 5.15: Summary of TSCSREG regression analysis results for $DE_{BV}$ and $DE_{MV}$**

| Independent variable | Regression coefficient | | *t*-Statistic | | *p*-Value | |
|---|---|---|---|---|---|---|
| | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ |
| Intercept | 4.434 | 9.5270 | 1.39 | 1.50 | 0.1662 | 0.1326 |
| ROA | -0.524 | -0.4180 | -1.36 | -0.71 | 0.1729 | 0.4754 |
| FA/TA | -1.361 | -5.7700 | -1.27 | -2.29 | 0.2057 | 0.0219 |
| CR | -0.165 | -0.1880 | -1.68 | -1.18 | 0.0928* | 0.2396 |
| Adjusted ROA | 0.094 | 0.0840 | 0.30 | 0.18 | 0.7607 | 0.8581 |
| M/B ratio | 0.148 | -0.0110 | 12.54 | -0.60 | 0.0001*** | 0.5453 |
| ln (sales) | -0.094 | 0.4670 | -0.87 | 1.76 | 0.3818 | 0.0781* |
| PR | -0.134 | -0.4320 | -1.07 | -1.91 | 0.2858 | 0.0560* |
| CPI% | 0.218 | -0.1550 | 1.64 | -0.67 | 0.1015 | 0.5001 |
| GDP% | -0.107 | -0.9140 | -0.33 | -1.64 | 0.7384 | 0.1019 |
| $R^2$ | **0.0597** | **0.0065** | | | | |

*Notes:*

The following regression equation was conducted: $DE_Y = b_o + b_1ROA + b_2FA/TA + b_3CR + b_4Adjusted\ ROA + b_5M/B\ ratio + b_6ln\ (sales) + b_7PR + b_8CPI\% + b_9GDP\%$; where $DE_Y$ is $DE_{BV}$ and $DE_{MV}$ respectively.

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

The $R^2$ value provided in Table 5.15 indicates that the variation in $DE_{BV}$ is better explained by the independent variables than for $DE_{MV}$. $DE_{BV}$ reports an $R^2$ value of 0.0597, compared to the value of 0.0065 reported by $DE_{MV}$. Amongst all the independent variables, only the M/B ratio reports a statistically significant relationship with $DE_{BV}$. The $R^2$ value for $DE_{MV}$ is considerably weaker than for $DE_{BV}$, and the variation in the independent variables cannot explain even 1% of the variation in $DE_{MV}$. None of the independent variables report a significant relationship with $DE_{MV}$ at the 5% or 1% level. The results already indicate that differences may exist between these two measures of leverage.

Since the results obtained from the TSCSREG multiple regressions were weaker than expected, it was decided to include one-year lag variables in the data set. The previous regression model only contained the values of the current year. The new model included the values of the current year as well as the values of the previous

year. The $DE_{BV}$ and the $DE_{MV}$ ratio of the previous year, respectively, were also included to determine what effect the previous year's capital structure had.

Table 5.16 provides the TSCSREG regression analysis results for the lagged data set. The one-year lag variables are notated as *t*-1.

**Table 5.16: Summary of TSCSREG regression analysis results for the lagged data set**

| Variable | Regression coefficient | | *t*-Statistic | | *p*-Value | |
|---|---|---|---|---|---|---|
| | **$DE_{BV}$** | **$DE_{MV}$** | **$DE_{BV}$** | **$DE_{MV}$** | **$DE_{BV}$** | **$DE_{MV}$** |
| Intercept | 11.670 | 16.861 | 2.20 | 2.19 | 0.0282 | 0.0284 |
| $DE_{BV;\ t-1}$ | 0.026 | | 1.21 | | 0.2250 | |
| $DE_{MV;t-1}$ | | 0.765 | | 28.40 | | 0.0001*** |
| $ROA_t$ | -0.581 | 3.846 | -1.09 | 5.63 | 0.2777 | 0.0001*** |
| $ROA_{t-1}$ | 0.332 | 0.193 | 0.51 | 0.24 | 0.6080 | 0.8099 |
| $FA/TA_t$ | -1.572 | -2.510 | -0.41 | -0.53 | 0.6851 | 0.5985 |
| $FA/TA_{t-1}$ | -0.282 | -2.656 | -0.07 | -0.56 | 0.9420 | 0.5779 |
| $CR_t$ | -0.495 | -0.341 | -2.36 | -1.21 | 0.0184** | 0.2264 |
| $CR_{t-1}$ | -0.026 | -0.031 | -0.23 | -0.22 | 0.8210 | 0.8297 |
| Adjusted $ROA_t$ | 0.038 | -0.572 | 0.11 | -1.35 | 0.9144 | 0.1778 |
| Adjusted $ROA_{t-1}$ | 0.120 | -1.314 | 0.14 | -1.23 | 0.8901 | 0.2198 |
| M/B $ratio_t$ | 0.150 | -0.006 | 11.71 | -0.39 | 0.0001*** | 0.6983 |
| M/B $ratio_{t-1}$ | -0.003 | -0.001 | -0.21 | -0.04 | 0.8355 | 0.9718 |
| ln $(sales)_t$ | -1.568 | 0.037 | -2.32 | 0.04 | 0.0203** | 0.9645 |
| ln $(sales)_{t-1}$ | 1.423 | -0.037 | 2.13 | -0.05 | 0.0334** | 0.9638 |
| $PR_t$ | -0.014 | -0.660 | -0.07 | -2.51 | 0.9445 | 0.0122** |
| $PR_{t-1}$ | -0.305 | 0.080 | -1.48 | 0.29 | 0.1395 | 0.7695 |
| $CPI\%_t$ | 0.352 | 0.061 | 1.89 | 0.25 | 0.0583* | 0.8033 |
| $CPI\%_{t-1}$ | -0.106 | 0.243 | -0.46 | 0.80 | 0.6457 | 0.4240 |
| $GDP\%_t$ | -0.129 | -1.030 | -0.33 | -2.03 | 0.7380 | 0.0429** |
| $GDP\%_{t-1}$ | -0.823 | -0.096 | -1.97 | -0.17 | 0.049** | 0.8623 |
| | | | | | | |
| **$R^2$** | **0.0659** | **0.2693** | | | | |

*Notes:*

The following regression equation was conducted: $DE_Y = b_0 + b_1DE_{Y;t-1} + b_2ROA_t + b_3ROA_{t-1} + b_4FA/TA_t + b_5FA/TA_{t-1} + b_6CR_t + b_7CR_{t-1} + b_8$Adjusted $ROA_t + b_9$Adjusted $ROA_{t-1} + b_{10}$M/B $ratio_t + b_{11}$M/B $ratio_{t-1} + b_{12}$ln $(sales)_t + b_{13}$ln $(sales)_{t-1} + b_{14}PR_t + b_{15}PR_{t-1} + b_{16}CPI\%_t + b_{17}CPI\%_{t-1} + b_{18}GDP\%_t + b_{19}GDP\%_{t-1}$, where $DE_Y$ is $DE_{BV}$ and $DE_{MV}$ respectively.

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

The inclusion of one-year lag variables gave prominence to a few interesting observations. The first is the considerable differences in the $R^2$ values obtained for $DE_{BV}$ and $DE_{MV}$. The inclusion of the lagged data resulted in higher $R^2$ values for both $DE_{BV}$ and $DE_{MV,}$ compared to the initial data set without the one-year lag variables. The variation in the independent variables thus provides a better explanation for the variation in the dependent variable when the values of the preceding year are also taken into consideration.

Aside from the higher $R^2$ values, it furthermore indicates that variation in $DE_{MV}$ is better explained by the variation in the independent variables. In the previous section, it was mentioned that the initial data set reports an $R^2$ value of 0.0597 for $DE_{BV}$ and a lower $R^2$ value of 0.0065 for $DE_{MV}$. With the inclusion of one-year lag variables, $DE_{BV}$ reports a slightly higher $R^2$ value of 0.0659. $DE_{MV}$, however, reports a considerably higher $R^2$ value of 0.2693. This means that the variation in the independent variables explains almost 27% of the variation in the $DE_{MV}$, as opposed to only 6.59% in the case of $DE_{BV}$. As mentioned earlier, $DE_{BV}$ and $DE_{MV}$ of the previous year were also included in the lagged data set. Table 5.16 reports that the regression coefficient for $DE_{MV;t-1}$ is significant at the 1% level. The regression coefficient for $DE_{BV;t-1}$ however reports a *p*-value of 0.2250.

Not only does the lagged data set provide stronger $R^2$ values for both $DE_{BV}$ and $DE_{MV}$, but more of the independent variables report to be statistically significant with either $DE_{BV}$ or $DE_{MV}$ when one-year lag variables are included in the data set. In terms of $DE_{BV}$, these variables include $CR_t$, M/B ratio$_t$, ln (sales)$_t$, ln (sales)$_{t-1}$ and GDP%$_{t-1}$. In terms of $DE_{MV}$ the variables that report higher regression coefficients (or higher significance) in the lagged data set are $DE_{MV;t-1}$, $ROA_{t,}$ $PR_t$ and $GDP_t$. The stronger results reported by the lagged data set might be an indication that it takes time for capital structures to adjust.

### 5.6.1 Summary of the $R^2$ values for $DE_{BV}$ and $DE_{MV}$

Table 5.17 provides a summary of the $R^2$ values reported by both measures of leverage for both the initial and the lagged data set.

**Table 5.17: Summary of $R^2$ values for both $DE_{MV}$ and $DE_{MV}$**

| | $DE_{BV}$ ($R^2$) | $DE_{MV}$($R^2$) |
|---|---|---|
| Initial data set (without lag variables) | 0.0597 | 0.0065 |
| Lagged data set (with lag variables) | 0.0659 | 0.2693 |

Based on the $R^2$ values provided in Table 5.17, it appears that differences may exist between book value and market value leverage. Without the inclusion of one-year lagged variables, variation in $DE_{BV}$ is better explained by the variation in the independent variables. Variation in $DE_{MV}$ is, however, much better explained by the variation in the dependent variables when the values of the preceding year are included in the data set. As mentioned before, this may indicate that capital structures take time to adjust.

## 5.7 DIFFERENT RESULTS OBTAINED FOR LISTED AND DELISTED FIRMS

It was mentioned in Chapter 4 that both listed and delisted firms were included in the data set to reduce survivorship bias. Due to the inclusion of both listed and delisted firms, it was decided to divide the full data set into two sub-sets, namely a sub-set of listed firms and a sub-set of delisted firms. This was done to determine whether these two sub-sets provide different/contradicting results.

Multiple regression analyses were conducted to determine the significance of the independent variables for each sub-set. Furthermore, it was decided to repeat the analysis for both $DE_{BV}$ and $DE_{MV}$.

### 5.7.1 Listed firms

The results for the sub-set containing only listed firms are provided in Table 5.18.

**Table 5.18: Summary of TSCSREG regression analysis results for the sub-set of listed firms**

| Independent variable | Regression coefficient | | *t*-Statistic | | *p*-Value | |
|---|---|---|---|---|---|---|
| | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ |
| Intercept | 4.587 | -7.233 | 1.14 | -0.98 | 0.2558 | 0.3258 |
| ROA | -0.762 | -0.030 | -1.51 | -0.06 | 0.1324 | 0.0538* |
| FA/TA | -1.387 | -8.041 | -1.00 | -3.04 | 0.3194 | 0.0024** |
| CR | -0.156 | -0.069 | -1.31 | -0.53 | 0.1899 | 0.5987 |
| Adjusted ROA | 0.068 | 0.063 | 0.19 | 0.17 | 0.8507 | 0.8603 |
| M/B ratio | 0.143 | -0.008 | 10.54 | -0.56 | 0.0001*** | 0.5786 |
| ln (sales) | -0.088 | 1.325 | -0.63 | 4.45 | 0.5295 | 0.0001*** |
| PR | -0.146 | -0.179 | -0.91 | -0.68 | 0.3627 | 0.4986 |
| CPI% | 0.230 | -0.230 | 1.50 | -0.88 | 0.1330 | 0.3782 |
| GDP% | -0.137 | -0.471 | -0.34 | -0.71 | 0.7337 | 0.4785 |
| $R^2$ | **0.0579** | **0.0165** | | | | |

*Notes:*

The following regression equation was conducted: $DE_Y = b_o + b_1ROA + b_2FA/TA + b_3CR + b_4Adjusted\ ROA + b_5M/B\ ratio + b_6ln\ (sales) + b_7PR + b_8CPI\% + b_9GDP$; where $DE_Y$ is $DE_{BV}$ and $DE_{MV}$ respectively

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

The $R^2$ values reported in Table 5.6 are relatively weak. The variation in the independent variables explains 5.79% of the variation in $DE_{BV}$ and only 1.65% of the variation in $DE_{MV}$. According to these $R^2$ values for the sub-set of listed firms, it appears that variation in $DE_{BV}$ is better explained by the independent variables included in the regression model than $DE_{MV}$.

Due to the relatively weak results, it was again decided to include one-year lag variables in the data set. This was done to see if the performance of variables in the preceding year may result in stronger $R^2$ values for the sub-set in question. Table 5.19 provide the results for the TSCSREG analysis on the lagged data set for the sub-set of listed firms. The one-year lag variables are notated as *t*-1.

**Table 5.19: Summary of TSCSREG regression analysis results for the sub-set of listed firms, with one-year lag variables**

| Variable | Regression coefficient | | *t*-Statistic | | *p*-Value | |
|---|---|---|---|---|---|---|
| | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ |
| Intercept | 14.365 | -3.021 | 2.24 | -0.46 | 0.0252 | 0.6437 |
| $DE_{BV;\ t-1}$ | 0.023 | | 0.96 | | 0.3366 | |
| $DE_{MV;t-1}$ | | 0.909 | | 44.30 | | 0.0001*** |
| $ROA_t$ | -0.985 | 6.132 | -1.45 | 12.68 | 0.1472 | 0.0001*** |
| $ROA_{t-1}$ | 0.375 | -0.151 | 0.49 | -0.29 | 0.6275 | 0.7730 |
| $FA/TA_t$ | -1.826 | -6.575 | -0.36 | -1.90 | 0.7206 | 0.0573* |
| $FA/TA_{t-1}$ | -0.056 | 2.075 | -0.01 | 0.60 | 0.9913 | 0.5479 |
| $CR_t$ | -0.580 | 0.040 | -2.10 | 0.18 | 0.0356** | 0.8564 |
| $CR_{t-1}$ | -0.025 | 0.009 | -0.19 | 0.10 | 0.8527 | 0.9193 |
| Adjusted $ROA_t$ | -0.031 | -0.484 | -0.08 | -1.83 | 0.9380 | 0.0673* |
| Adjusted $ROA_{t-1}$ | 0.957 | -2.812 | 0.63 | -2.50 | 0.5290 | 0.0127** |
| M/B $ratio_t$ | 0.145 | -0.004 | 10.05 | -0.39 | 0.0001*** | 0.6975 |
| M/B $ratio_{t-1}$ | -0.003 | 0.000 | -0.20 | 0.02 | 0.8448 | 0.9801 |
| ln $(sales)_t$ | -2.110 | 1.231 | -2.32 | 1.99 | 0.0206** | 0.0472** |
| ln $(sales)_{t-1}$ | 1.969 | -0.747 | 2.17 | -1.23 | 0.0304** | 0.2204 |
| $PR_t$ | -0.038 | -0.336 | -0.15 | -1.40 | 0.8797 | 0.1602 |
| $PR_{t-1}$ | -0.352 | 0.087 | -1.33 | 0.34 | 0.1837 | 0.7317 |
| $CPI\%_t$ | 0.424 | 0.023 | 1.93 | 0.11 | 0.0539* | 0.9147 |
| $CPI\%_{t-1}$ | -0.192 | 0.454 | -0.71 | 1.69 | 0.4793 | 0.0908* |
| $GDP\%_t$ | -0.207 | -0.178 | -0.41 | -0.37 | 0.6812 | 0.7077 |
| $GDP\%_{t-1}$ | -1.134 | -0.075 | -2.18 | -0.15 | 0.0295** | 0.8819 |
| | | | | | | |
| $R^2$ | **0.0662** | **0.5386** | | | | |

*Notes:*

The following regression equation was conducted: $DE_Y = b_0 + b_1DE_{Y;t-1} + b_2ROA_t + b_3ROA_{t-1} + b_4FA/TA_t + b_5FA/TA_{t-1} + b_6CR_t + b_7CR_{t-1} + b_8$Adjusted $ROA_t + b_9$Adjusted $ROA_{t-1} + b_{10}$M/B $ratio_t + b_{11}$M/B $ratio_{t-1} + b_{12}$ln $(sales)_t + b_{13}$ln $(sales)_{t-1} + b_{14}PR_t + b_{15}PR_{t-1} + b_{16}CPI\%_t + b_{17}CPI\%_{t-1} + b_{18}GDP\%_t + b_{19}GDP\%_{t-1}$. Where $DE_Y$ is $DE_{BV}$ and $DE_{MV}$ respectively

*** Significant at the 1% level
** Significant at the 5% level
* Significant at the 10% level

The results reported in Table 5.19 are different from the results in Table 5.18. The $R^2$ values are higher compared to the multiple regression analysis conducted on the full data set without the one-year lagged variables. According to the results, the variation in the independent variables can explain 6.62% of the variation in $DE_{BV.}$ The result

for $DE_{MV}$, however, is considerably stronger with a $R^2$ value of 0.5386. This implies that almost 54% of the variation in $DE_{MV}$ can be explained by the variation in the independent variables. These results are contradictory to the results provided in Table 5.18. The data set without the one-year lag variables reported that the variation in $DE_{BV}$ was better explained by the independent variables than $DE_{MV}$. By including the performance of the variables in the preceding year in the data set, the variation in $DE_{MV}$ is much better explained by the variations in the independent variables.

The higher $R^2$ value indicates that it may be important to take the performance of the variables in the preceding year into consideration when making financing decisions. Furthermore, it indicates that market value may be a very important measure for listed firms. Investors are not only interested in the information from the financial statements, but also in the current performance and potential of firms. Investors can obtain this information by referring to the performance of a firm in preceding years. If a firm reports growth and shows potential, investors might be willing to pay more for the shares than its book value. This may explain why the inclusion of one-year lag variables report stronger results.

### 5.7.2 Delisted firms

The same TSCSREG multiple regression analysis was conducted for the sub-set containing the delisted firms to determine whether the results differ from the sub-set of listed firms. Delisted firms are those firms that were listed on the JSE, but got delisted during the selected period of 14 years. Multiple regression analysis was conducted on only the delisted firms. These results are provided in Table 5.20.

**Table 5.20: Summary of TSCSREG regression analysis results for the sub-set of delisted firms**

| Independent variable | Regression coefficient | | *t*-Statistic | | *p*-Value | |
|---|---|---|---|---|---|---|
| | Book value | Market value | Book value | Market value | Book value | Market value |
| Intercept | 4.317 | 34.688 | 1.74 | 2.38 | 0.0818* | 0.0176 |
| ROA | 0.566 | -4.357 | 0.93 | -1.06 | 0.3528 | 0.2896 |
| FA/TA | -0.659 | -6.941 | -0.71 | -1.09 | 0.4809 | 0.2768 |
| CR | -0.214 | -1.159 | -1.94 | -1.56 | 0.0524* | 0.1202 |
| Adjusted ROA | -0.642 | 3.594 | -0.97 | 0.81 | 0.3319 | 0.4211 |
| M/B ratio | 0.446 | -0.195 | 13.11 | -0.85 | 0.0001*** | 0.3943 |
| ln (sales) | -0.056 | -0.298 | -0.57 | 0.68 | 0.5716 | 0.6609 |
| PR | -0.160 | -1.047 | -1.66 | -2.06 | 0.0970* | 0.0402** |
| CPI% | 0.146 | 0.114 | 1.04 | 0.15 | 0.2994 | 0.8773 |
| GDP% | -0.119 | -1.702 | -0.53 | -1.50 | 0.5982 | 0.1333 |
| $R^2$ | **0.2156** | **0.0168** | | | | |

*Notes:*

The following regression equation was conducted: $DE_Y = b_o + b_1ROA + b_2FA/TA + b_3CR + b_4$Adjusted ROA $+ b_5$M/B ratio $+ b_6$ln (sales) $+ b_7PR + b_8CPI\% + b_9GDP\%$; where $DE_Y$ is $DE_{BV}$ and $DE_{MV}$ respectively

*** Significant at the 1% level
** Significant at the 5% level
* Significant at the 10% level

The regression based on $DE_{MV}$ reports a similar $R^2$ value to the one reported by the listed firms. The $R^2$ value is relatively low, and the variation in the independent variables explains only 1.68% of the variation in the dependent variable. $DE_{BV}$, however, reports a considerably higher $R^2$ value compared to the sub-set of listed firms. As already mentioned in the previous section, the sub-set of listed firms reported a $R^2$ value of 0.0579. The delisted firms, however, report a $R^2$ value of 0.2156. This means that the variation in the group of independent variables, together, explain almost 22% of the variation in the $DE_{BV}$ ratio, which is a much stronger result. If a firm does not measure up to the standards of investors, the investors may lose confidence in that particular firm.

Since the listed firms report stronger results when the variables are lagged for one year, it would be interesting to see how the group of delisted firms performs under

the same circumstances. Table 5.21 provides the results for the sub-set of delisted firms with the inclusion of one-year lag variables. The one-year lag variables are notated as *t*-1.

**Table 5.21: Summary of TSCSREG regression analysis results for the sub-set of delisted firms, with one-year lag variables**

| Variable | Regression coefficient | | *t*-Statistic | | *p*-Value | |
|---|---|---|---|---|---|---|
| | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ | $DE_{BV}$ | $DE_{MV}$ |
| Intercept | 4.044 | 46.169 | 1.22 | 2.43 | 0.2212 | 0.0152 |
| $DE_{BV;\ t-1}$ | 0.204 | | 3.53 | | 0.0004*** | |
| $DE_{MV;t-1}$ | | 0.469 | | 5.96 | | 0.0001*** |
| $ROA_t$ | 0.800 | -3.970 | 1.27 | -0.96 | 0.2048 | 0.3376 |
| $ROA_{t-1}$ | 0.146 | 2.639 | 0.23 | 0.62 | 0.8209 | 0.5346 |
| $FA/TA_t$ | 0.061 | 1.697 | 0.03 | 0.11 | 0.9798 | 0.9143 |
| $FA/TA_{t-1}$ | -0.244 | -12.910 | -0.10 | -0.82 | 0.9199 | 0.4150 |
| $CR_t$ | -0.205 | -1.074 | -1.53 | -1.22 | 0.1276 | 0.2216 |
| $CR_{t-1}$ | 0.055 | -0.415 | 0.42 | -0.48 | 0.6734 | 0.6305 |
| Adjusted $ROA_t$ | -1.163 | 5.396 | -1.35 | 0.95 | 0.1766 | 0.3404 |
| Adjusted $ROA_{t-1}$ | 0.116 | -3.813 | 0.16 | -0.81 | 0.8710 | 0.4170 |
| M/B $ratio_t$ | 0.581 | -0.230 | 14.31 | -0.87 | 0.0001*** | 0.3848 |
| M/B $ratio_{t-1}$ | -0.033 | -0.114 | -0.76 | -0.47 | 0.4502 | 0.6355 |
| ln $(sales)_t$ | -0.660 | -1.493 | -1.56 | -0.54 | 0.1194 | 0.5920 |
| ln $(sales)_{t-1}$ | 0.619 | 0.580 | 1.51 | 0.22 | 0.1311 | 0.8293 |
| $PR_t$ | -0.211 | -0.700 | -1.32 | -0.77 | 0.1866 | 0.4393 |
| $PR_{t-1}$ | -0.050 | -0.075 | -0.40 | -1.12 | 0.6914 | 0.9072 |
| $CPI\%_t$ | 0.176 | -0.514 | 0.90 | -0.46 | 0.3694 | 0.6479 |
| $CPI\%_{t-1}$ | 0.245 | -0.588 | 1.11 | -1.76 | 0.2663 | 0.6510 |
| $GDP\%_t$ | -0.214 | -2.060 | -0.93 | -1.76 | 0.3525 | 0.0786* |
| $GDP\%_{t-1}$ | -0.123 | 0.709 | -0.46 | 0.51 | 0.6430 | 0.6136 |
| | | | | | | |
| $R^2$ | **0.3056** | **0.0844** | | | | |

*Notes:*

The following regression equation was conducted: $DE_Y = b_0 + b_1DE_{Y;t-1} + b_2ROA_t + b_3ROA_{t-1} + b_4FA/TA_t + b_5FA/TA_{t-1} + b_6CR_t + b_7CR_{t-1} + b_8$Adjusted $ROA_t + b_9$Adjusted $ROA_{t-1} + b_{10}$M/B $ratio_t + b_{11}$M/B $ratio_{t-1} + b_{12}$ln $(sales)_t + b_{13}$ln $(sales)_{t-1} + b_{14}PR_t + b_{15}PR_{t-1} + b_{16}CPI\%_t + b_{17}CPI\%_{t-1} + b_{18}GDP\%_t + b_{19}GDP\%_{t-1}$. Where $DE_Y$ is $DE_{BV}$ and $DE_{MV}$ respectively

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

The $R^2$ values for both measures are higher with the inclusion of one-year lag variables. This corresponds with the results from the sub-set of listed firms when one-year lag variables are included. The results from both multiple regression analyses that were conducted on the sub-set of delisted firms report that the variation in $DE_{BV}$ is consistently better explained by the variation in the independent variables than the variation in $DE_{MV}$. The results in Table 5.9 indicate that the variation in the independent variables can explain 30.56% of the variation in $DE_{BV}$. The result for $DE_{MV}$ is relatively weaker with a $R^2$ value of 0.0844.

Another interesting observation is that both $DE_{BV;t-1}$ and $DE_{MV;t-1}$ are significant at the 1% level when the ratio of the previous year was included. For the sub-set of listed firms, only $DE_{MV;t-1}$ was significant at the 1% level. This may also indicate that book value leverage may be an important measure for delisted firms.

### 5.7.3 Summary of $R^2$ values for the sub-set of listed firms and the sub-set of delisted firms

To conclude the discussion on this objective, a summary of the different $R^2$ values obtained for both sub-sets of firms are provided in Table 5.22. This table provides the results for both sub-sets with regard to both measures of leverage as well as for both the initial and the lagged data sets.

**Table 5.22: Summary of $R^2$ values for the sub-set of listed and of delisted firms**

| | $DE_{BV}$ ($R^2$) | $DE_{MV}$ ($R^2$) |
|---|---|---|
| **Listed firms** | **0.0579** | **0.0165** |
| Listed firms with lag variables | 0.0662 | 0.5386 |
| **Delisted firms** | **0.2156** | **0.0168** |
| Delisted firms with lag variables | 0.3056 | 0.0844 |

The $R^2$ values in Table 5.22 convey that differences may exist between listed firms and those firms that were delisted from the JSE during the study period of 14 years. The results indicate that the sub-set of listed firms may be more interested in market value leverage, since the variation in the independent variables can explain 53.86% of the variation in $DE_{MV}$ when one-year lag variables are included. The sub-set of delisted firms, however, consistently reports that these firms may focus more on book value leverage. From the different $R^2$ values it may be concluded that possible differences may exist between listed and delisted firms.

## 5.8 DO FINDINGS CORRESPOND MORE WITH THE TRADE-OFF THEORY OR WITH THE PECKING ORDER THEORY?

The last research objective was to conclude whether the firms included in this South African study correspond more with the trade-off theory or with the pecking order theory of capital structure. To determine which one of the two theories is more dominant amongst the firms, it is important to know the nature of the relationships between the independent variables and the dependent variable. The results reported by the simple regression analysis were used to address this objective since the simple regression analysis indicates whether the relationships between $DE_{BV}$ and $DE_{MV}$ and each of the nine independent variables are positive or negative.

Table 5.23 provides a summary of the identified independent variables and the sign of each relationship reported by the simple regression analysis results.

**Table 5.23: Summary of the findings from the simple regression analysis (based on table 5.4 and 5.10).**

| VARIABLES | $DE_{BV}$ | $DE_{MV}$ |
|---|---|---|
| | Regression coefficient | Regression coefficient |
| ROA | -0.607 | -0.390 |
| FA/TA | -0.876 | -4.949 |
| CR | -0.171 | -0.197 |
| Adjusted ROA | -0.127 | -0.138 |
| M/B ratio | 0.149 | -0.010 |
| ln (sales) | -0.068 | 0.527 |
| PR | -0.079 | -0.245 |
| CPI% | 0.096 | -0.275 |
| GDP% | 0.149 | 0.037 |

The blue cells in Table 5.23 indicate the negative relationships and the pink cells indicate the positive relationships reported by the simple regression analysis.

In terms of $DE_{BV}$, five of the six firm characteristics report a negative relationship. Growth is the only firm characteristic that reports a positive relationship with $DE_{BV}$. In terms of $DE_{MV}$, five of the six firm characteristics also report negative relationships. However, growth now reports a negative relationship, and size a positive relationship with $DE_{MV}$.

The negative relationships of the first three characteristics, namely profitability, asset structure and liquidity, may support the pecking order theory of capital structures, which would imply that the firms included in the data set prefer internal financing to finance investment opportunities rather than using debt. The negative relationship between business risk and leverage, however, tends to support the trade-off theory in which firms' trade-off the costs and benefits of using debt.

As mentioned above, growth and size report different results for the two measures of leverage. Firstly, the positive relationship between the M/B ratio and $DE_{BV}$ is considerably stronger than the negative relationship between the M/B ratio and $DE_{MV}$. It may, thus, be concluded that growth is generally positively related to leverage and, therefore, may support the pecking order theory. Secondly, the

strongest result for ln (sales) is its positive relationship to $DE_{MV}$ which supports the trade-off theory.

A negative relationship is reported between the PR and leverage, which may suggest that firms use less debt during periods of high interest rates to overcome the increase in the cost of capital. A positive relationship is reported between the GDP% and leverage, which may imply that firms employ more debt during periods of high economic growth. Lastly, the CPI% reports a stronger relationship with $DE_{MV}$ (negative) than with $DE_{BV}$ (positive). The results from these three economic factors may be more in support of the trade-off theory in which firms trade off the benefits of using debt with the costs of using debt. Changes in these economic factors may affect the cost of debt, which is an important consideration in financing decisions.

Based on the simple regression analyses results, the majority of the relationships between the independent variables and leverage are not statistically significant. The only significant relationship at the 1% level is reported between MB/ratio and $DE_{BV}$. Although most of the relationships are not statistically significant, the nature of these relationships may still provide an indication of which theory may be more applicable to the firms included in this study. According to the nature of the relationships, it appears that the firms listed in the industrial sector of the JSE, overall, could possibly lean more towards the pecking order theory in which firms prefer internal financing to external financing. It is, however, important to remember that both theories are used in practice and the results do not indicate a clear winner between the two theories.

## 5.9 CONCLUSION

In this chapter, the research objectives of the study were addressed. The results for the descriptive statistics were provided. These results indicated that the data set contains non-parametric data, therefore, implying that the Spearman Rank Order correlation technique should be used rather than the Pearson Product Moment correlation technique.

The descriptive statistics were followed by inferential statistics. The different statistical tests that were conducted were Spearman Rank Order correlation analysis, simple regression analysis and multiple regression analysis. For the

regression analyses, the TSCSREG procedure was applied since it takes panel data into consideration. These tests were conducted to determine the nature and the strength of the relationships between the dependent and independent variables and, furthermore, to determine whether the independent variables could explain the variation in capital structure. The results of each of these analyses were discussed under the headings of the corresponding objectives.

In the next chapter, a summary of the complete study will be provided, the findings of the different results obtained in Chapter 5 will be reported and finally, recommendations will be made for future research areas.

# Chapter 6

# SUMMARY, FINDINGS AND MANAGERIAL IMPLICATIONS

## 6.1 INTRODUCTION

What do we know about capital structures? This question was raised by Rajan and Zingales (1995) almost thirty-seven years after Modigliani and Miller's article in 1958 on the irrelevance of capital structure. Many theories have developed since then to prove that capital structure is relevant to firm value. The existence of an optimal capital structure, however, is still being questioned.

The overriding goal for almost all firms is the maximisation of shareholders' value. To achieve this, firms need to determine their target capital structure. Many previous studies on the subject of capital structure provide statistical evidence that certain factors, such as firm characteristics and economic factors are highly correlated to firm leverage. The effect of a combination of firm characteristics and economic factors on capital structure has been researched in various countries, but limited research has been found for South African firms. The primary objective of this study was, therefore, to determine the effect of a number of firm characteristics (profitability, asset structure, liquidity, business risk, growth, size) and economic factors (interest rate, inflation, economic growth) on the capital structure of South African listed industrial firms during the period 1995 to 2008.

The remainder of this chapter consists of four sections. A summary of the results reported in the previous chapters will be provided in the first section. The second section will provide conclusions and managerial implications based on the results of the study. The final section will provide the limitations faced during this study as well as possible areas of future research.

## 6.2 SUMMARY

The primary objective of this study was to determine the effect of firm characteristics and economic factors on the capital structures of listed industrial firms in South Africa. Based on this primary objective, the following hypotheses were formulated:

$H_0$: Capital structure is not affected by firm characteristics and economic factors.

$H_A$: Capital structure is affected by firm characteristics and economic factors.

Furthermore, the following secondary objectives were formulated:

- analyse whether the firm characteristics can explain variance in capital structure;
- analyse whether the economic factors can explain variance in capital structure;
- determine if different results are obtained for book value leverage and for market value leverage;
- determine if different results are obtained for firms that remained listed on the JSE and firms that delisted from the JSE during the selected study period of 14 years; and
- conclude if the findings of the firms included in the study correspond more with the trade-off theory or the pecking order theory.

The debate on the existence of an optimal capital structure still continues after more than 50 years. Since Modigliani and Miller's (1958) article on the irrelevance of capital structure, numerous theories have developed to indicate that the financing decisions made by firms do have an impact on firm value. Two dominant theories have evolved from this debate on capital structures, namely the trade-off theory and the pecking order theory. Furthermore, researchers started to focus their intention on specific factors that may influence the financing decisions made by firms. These factors include both firm-specific and country-specific factors. Based on prior

empirical studies, six firm characteristics (profitability, asset structure, liquidity, business risk, growth, size) and three economic factors (interest rate, inflation, economic growth) were identified for this particular study.

Various South African studies have been conducted on the topic of capital structures, however, limited research was found in which both firm characteristics and economic factors were included in the same study. The majority of the South African studies, furthermore, focused only on a specific sector on the JSE or the focus was predominantly to determine which theory of capital structure is used by South African firms. Furthermore, most of the studies were conducted for the period prior to the demise of apartheid in 1994 (Louw, 1983; Harry, 1990; Jordaan & Smit, 1993). The current study was conducted over a period of 14 years, from 1995 to 2008. The focus, therefore, was on the post-1994 period. Since the South African economy has undergone significant changes following the demise of apartheid in 1994, it was expected that the results of the pre- and the post-apartheid periods would differ.

The census considered in this study included all firms listed in the industrial sector of the JSE. Focusing only on currently listed firms, however, could have exposed the study to survivorship bias. In order to reduce survivorship bias, it was important to include those firms that delisted during the selected period of 14 years. Furthermore, firms had to provide financial data for a period of at least five years in order to be included in the study. This requirement was incorporated in the study, since the data set contains cross-sectional and time-series dimensions. By incorporating all the requirements, the final census included a total of 280 firms (170 listed and 110 delisted firms), representing 2 684 complete observations for the firm characteristics. Due to the length of the study period (1995–2008), the census also represents 14 complete observations for the economic factors.

This particular study was a quantitative study since financial ratios and economic indicators were used as measuring instruments for the various independent variables. McGregor BFA (Pty) Ltd (2008) was used to obtain standardised financial statements, which was necessary to determine the different financial ratios. INET-Bridge (2005), Statistics South Africa (2006) and the South African Reserve Bank (SARB) (2007) website were used to obtain the required economic indicators.

Descriptive and inferential statistics were applied for this study. The descriptive statistics included the following measures: mean, median, range, variance, standard deviation, skewness and kurtosis. The descriptive statistics were followed by inferential statistics, which entailed correlation analyses and regression analyses. Spearman Rank Order correlation analyses were used since the results from the descriptive statistics indicated that the data set contains non-parametric data. Correlation analyses may be affected by outliers in the data set. It furthermore does not take panel data into consideration. It was therefore decided to also conduct simple regression analyses to obtain a more appropriate indication of the strength of the relationships between the dependent variable (as measured by both book values and market values) and the nine independent variables.

The simple regression analyses were followed by multiple regression analyses for the complete data set, as well as the two sub-sets containing only listed and delisted firms. Finally, the original data set was adapted to include one-year lag variables for each of the variables and another round of multiple regression analyses were conducted on this adapted data set. This was done to determine if the capital structures of firms are also affected by the performance of the particular variables in the preceding year. This might indicate whether it takes time for capital structures to adjust. Since the study contained panel data, the TSCSREG procedure was used to conduct all the regression analyses.

## 6.3 CONCLUSIONS AND MANAGERIAL IMPLICATIONS

Each of the research objectives stated in the first section, was addressed in this study. Numerous statistical tests were conducted in an attempt to obtain answers for the identified objectives. The results of the statistical tests were reported in Chapter 5. This section provides the conclusions and managerial implications in the context of each identified research objective.

### 6.3.1 The effect of firm characteristics on capital structure

The $R^2$ values obtained from the simple regression analyses between the dependent and each of the independent variables measuring firm characteristics, yielded relatively low values for both $DE_{BV}$ and $DE_{MV}$. This indicates that the simple

regression model explains very little of the variation in either $DE_{BV}$ or $DE_{MV}$. For the full data set, the M/B ratio was the only measure that reported a significant relationship with $DE_{BV}$ at the 1% level. A statistically significant positive relationship was reported. The result for the M/B ratio, that was used to quantify the growth of firms, indicates that the growth of a firm may be an important factor to be considered by management. This statistically significant positive relationship may imply that the majority of firms included in this study are growing firms and are, thus, relatively dependent on external financing.

The sub-set of listed firms reported that the M/B ratio has a statistically significant positive relationship with $DE_{BV}$ and FA/TA (negative) and ln (sales) (positive) both report a statistically significant relationship with $DE_{MV}$. All three of the mentioned relationships were significant at the 1% level. When market values are used to measure leverage, it appears that the management of firms, especially of listed firms, should pay careful attention to the effect that their asset structure and size can have on their capital structure. The positive relationship between the size of firms and leverage may indicate that it is to the advantage of a larger firm to use more debt in their capital structures. In terms of market value leverage, management should therefore consider their size before making any financing decisions.

The sub-set of delisted firms also reported that the M/B ratio was the only firm characteristic with a statistically significant positive relationship with $DE_{BV}$. None of the firm characteristics reported a significant relationship with $DE_{MV}$ at any level of significance. For the management of firms facing financial difficulties and consequently, possible delisting, it is very important to focus on the growth of their firm. The positive relationship indicates that growing firms use more debt in their capital structures. The use of too much debt could, however, result in extreme debt obligations. The management of these firms should, therefore, be careful to use too much debt, even though they do have good growth potential.

From the results of the full data set, as well as the two sub-sets containing listed and delisted firms, respectively, it may be concluded that the growth of firms might be the most important firm characteristic for management to consider when making financing decisions.

### 6.3.2 The effect of economic factors on capital structure

The $R^2$ values obtained from the simple regression analyses between the dependent and each of the independent variables measuring economic factors yielded relatively low values for both $DE_{BV}$ and $DE_{MV}$. This indicates that the simple regression model explains very little of the variation in either $DE_{BV}$ or $DE_{MV}$. Only one statistically significant relationship was reported by the simple regression analysis for the full data set. The negative relationship between PR and $DE_{MV}$ reported to be statistically significant at the 5% level. Neither CPI% nor GDP% reported a statistically significant relationship with $DE_{BV}$ or $DE_{MV}$, respectively.

The results reported by the sub-set of listed firms indicated that none of the economic factors have a statistically significant relationship with $DE_{BV}$ at any of the three levels of significance. PR did, however, report a statistically significant negative relationship with $DE_{MV}$ at the 10% level.

The sub-set of delisted firms reported different results to the sub-set of listed firms with regard to the nature of the relationships. Despite the differences in the nature of the relationships, PR was again the only economic factor that reported a statistically significant negative relationship with $DE_{MV}$ at the 10% level.

From these results, it may be concluded that the interest rate, specifically the prime interest rate, may be an important economic factor to be considered by management when making financing decisions. This is especially with reference to the use of market values to measure leverage. This statistically significant relationship, therefore, implies that during periods of high interest rates, management should use less debt in their capital structures to reduce the risk of possible bankruptcy.

### 6.3.3 Different results obtained for book value leverage and market value leverage

The $R^2$ values obtained from the multiple regression analysis that was conducted on the original data set (without the inclusion of one-year lag variables), reported that the variation in $DE_{BV}$ is better explained by the independent variables than by the variation in $DE_{MV}$. The variation in the independent variables explains 5.97% of the variation in $DE_{BV}$ as opposed to only 0.65% of the variation in $DE_{MV}$.

The $R^2$ values are relatively stronger for both measures of leverage when one-year lag variables are included in the data set. Not only are the results stronger, but there was a turnaround in the results from $DE_{BV}$ to $DE_{MV,}$ which is better explained by the independent variables. The variation in the independent variables explains almost 27% of the variation in $DE_{MV}$ as opposed to only 6.59% of $DE_{BV}$.

From the results it thus appears that differences do exist between book value and market value leverage (with or without the inclusion of one-year lag variables). An important observation though, is that the results were stronger when the performance of the variables in the preceding year was included. Not only were the $R^2$ values higher, but the independent variables also report to be more significant when one-year lag variables were included. These results may indicate to the management of firms that it may be important to focus on both market values and book values, since both provide strengths and weaknesses. The stronger results reported by the lagged data set may, furthermore, indicate to management that capital structure takes time to adjust.

### 6.3.4 Different results obtained for listed firms and delisted firms

Throughout all the statistical tests conducted for the sub-set of delisted firms, variation in book value leverage is constantly better explained by the variation in the independent variables than is the case for market value leverage. The variations in the independent variables explain 21.56% of the variation in $DE_{BV}$ and only 1.68% of the variation in $DE_{MV}$. The results are stronger when one-year lag variables are included in the data set ($R^2$ value for $DE_{BV}$ is 0.3056; $R^2$ value for $DE_{MV}$ is 0.0844).

The first multiple regression analysis that was conducted for the sub-set of listed firms also reported that book value leverage is better explained by the independent variables. A radical change in the results, however, occurs when the values of the variables in the preceding year are also taken into consideration. The lagged data set results in the variation of market value leverage being considerably better explained by the variation in the independent variables than is the case for book value leverage. The variation in the independent variables explains almost 54% of the variation in $DE_{MV}$, compared to only 6.62% of the variation in $DE_{BV}$. The results, furthermore, convey that more of the independent variables have significant

relationships with the dependent variable (both $DE_{BV}$ and $DE_{MV}$) when one-year lag variables are included.

According to the results, it appears that the sub-set of delisted firms may focus more on book value leverage. Delisted firms may be more concerned with book value leverage if the firm is struggling financially. If investors can predict financial problems in a firm, they will most probably retract their capital from that particular investment. Investors will furthermore lose confidence in such a firm, which will consequently result in sharp decreases in the market value of equity, causing the market value of equity to be lower than the book value of equity. Managers of firms facing financial difficulties and consequently possible delisting should, therefore, try to improve the financial performance of the firm in order to obtain the confidence of outside investors which may result in an increase in the market value of their equity.

It, furthermore, appears that the sub-set of listed firms should focus more on market value leverage than on book value leverage. It is usually expected that firms listed on the JSE perform well financially, thus investors are willing to pay more for the shares of the firm compared to the actual book value of those shares. The managers of these firms should therefore continue to maximise the wealth of their shareholders to maintain their confidence in the firm.

### 6.3.5 Do findings correspond more with the trade-off theory or with the pecking order theory?

The last research objective was to determine whether the results from this study correspond more with the trade-off theory or the pecking order theory. To achieve this objective, it is important to focus on the signs of the relationships between the independent variables and capital structure. Based on the signs of the relationships, it may be possible to conclude if the results correspond more with the trade-off theory or the pecking order theory.

The table below provides the following information:

- the identified independent variables;

- the sign of the relationships between the measures of each independent variable and capital structure (both book value and market value), as reported by the simple regression analyses results; and

- the capital structure theory to which the result of each relationship corresponds more.

**Table 6.1: Summary of the findings from the simple regression analysis**

| | BOOK VALUE | MARKET VALUE |
|---|---|---|
| **VARIABLES** | **RESULT** | **RESULT** |
| Profitability | -* | - |
| Asset structure | - | -** |
| Liquidity | -* | - |
| Business risk | - | - |
| Growth | +*** | - |
| Size | - | +** |
| Prime rate | - | -** |
| CPI% | + | - |
| GDP% | + | + |

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

According to the results in Table 6.1, five of the six firm characteristics reported negative relationships with both $DE_{BV}$ and $DE_{MV}$. Growth and size were the only two firm characteristics to report different signs between the two measures of leverage. The positive relationship between the M/B ratio and $DE_{BV}$ was considerably stronger than the negative relationship between the M/B ratio and $DE_{MV}$. It may, thus, be concluded that growth is generally positively related to leverage and, therefore, may support the pecking order theory. The strongest result for ln (sales) was its positive relationship with $DE_{MV,}$ which supports the trade-off theory. This implies that larger firms may use more debt in their capital structure to take advantage of the lower financial distress costs and the lower interest rates provided by financial institutions.

The negative relationships of the first three characteristics (profitability, asset structure and liquidity) may support the pecking order theory of capital structure,

which may imply that the firms included in the data set prefer internal financing to finance investment opportunities using debt. The negative relationship between business risk and leverage, however, tends to support the trade-off theory in which firms trade off the costs and benefits of using debt.

The results from the three economic factors may be more in support of the trade-off theory in which firms' trade off the benefits of using debt with the costs of using debt. Changes in these economic factors may affect the cost of debt, which is an important consideration in financing decisions.

Based on the simple regression analyses results, the majority of the relationships between the independent variables and leverage are not significant. Although most of the relationships are not significant, the nature of these relationships may still provide an indication of which theory may be more applicable to the firms included in this study. According to the nature of the relationships, it may appear that the firms included in this particular study overall, may lean more towards the pecking order theory. It is, however, important to notice that some of the independent variables, especially the economic factors, may also support the trade-off theory.

These mixed results in terms of capital structure theory may illustrate that these two competing models should not be evaluated in isolation, but should rather be viewed as complements. The management of any firm should, thus, take both of these capital structure theories into consideration when making financing decisions, instead of limiting themselves to only one particular theory.

## 6.4 LIMITATIONS AND AREAS OF FUTURE RESEARCH

The following limitations were faced during this study:

- Financial data of firms not listed on the JSE are very difficult, if not impossible, to obtain. This challenge limited the study to the inclusion of only publicly listed firms in the data set.

- A vast set of variables may influence the capital structure decisions made by financial managers. For practical reasons it is difficult, if not impossible, to identify

all these variables and include them in one study. This challenge, therefore, limited the study to the inclusion of only a few variables.

From the results presented in this study, some areas of future research were identified.

- It is evident that the identified firm characteristics and economic factors have an effect on capital structures. The question now remains why this is the case. A future research opportunity may be to obtain information from the financial managers themselves by means of personal interviews or questionnaires. This may give an indication of why these variables have an effect on capital structures and also which of these factors they take into consideration when making financing decisions. It may also provide an indication of whether they focus more on book values or market values.

- This study included only one lag year to determine if the results of the preceding year also have an effect on capital structures. The results clearly illustrated that it may have a great impact on capital structures. A further research opportunity may be to compare firms with different performances over a certain period. For example, compare firms that report an improvement in profitability over a five-year period with firms that report a decline in profitability over a five-year period.

- The six firm characteristics and three economic factors were identified based on previous empirical capital structure research. More variables may be included in future studies to determine if other variables also have an effect on capital structure decisions of firms in South Africa.

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