THE CAPITAL STRUCTURE PRACTICES OF LISTED FIRMS IN SOUTH AFRICA

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NOVEMBER 2009

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by

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Submitted in fulfillment of the requirements
for the degree of

MASTER OF COMMERCE

in the subject

BUSINESS MANAGEMENT

AT THE UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: DR M S NGWENYA

NOVEMBER 2009

DECLARATION

I declare that **THE CAPITAL STRUCTURE PRACTICES OF LISTED FIRMS IN SOUTH AFRICA** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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MR SJ KASOZI   DATE

ABSTRACT

This study examines the divide between finance theory and practice by analysing the significance of the determinants of capital structure choice among 123 listed firms on the JSE, to determine whether these firms follow the trade-off theory or the pecking-order theory.

Data obtained from McGregor's Bureau of Financial Analysis database was analysed using standard multiple regressions, stepwise regressions and ANOVA techniques to test for financing behaviour. The results indicated that the trade-off model has both cross-sectional and time-series explanatory power for explaining the financing behaviour, while tests on the pecking-order model were weak. The results further revealed a significant positive correlation between debt financing and financial distress, and a significant negative correlation between debt financing and the collateral value of assets during the period under study (1995-2005).

These findings suggest a divergence between finance theory and practice for JSE listed firms and manifest conflicting ideologies between finance practices of developed and developing economies.

Keywords: Financial distress; Capital structure; Trade-off theory; Pecking-order theory; Corporate finance theory; Corporate finance practice; target adjustment model; leverage, Profitability; Earnings volatility.

ACKNOWLEDGEMENTS

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CHAPTER ONE

1.1   INTRODUCTION AND BACKGROUND

The main body of finance literature suggests that the continuing evolution of corporate finance reveals some divergence between finance practice and theory (Nguyen & Ramachandran, 2006: 193; Ross, 2005:5; Ryan & Ryan, 2002: 355 and Graham & Harvey, 2001: 233). This divergence has stimulated increased interest and research into the global aspects of corporate finance in order to establish the reasons for this anomaly and the common ground upon which theory may be modified and consistently applied to add value to the functioning of firms.

The reasons for the discrepancy between finance theories and practices vary and may be attributed to the legal underpinnings of finance as embodied in the differing laws and institutions of each country and to differences in each country's economic and other endowments (Claessens & Laeven, 2006: ix; Bancel & Mittoo, 2004: 103). From the local perspective, such differences may be explained by the effect of emerging markets and their influence on the economic, social and legal patterns that impact significantly on the financial development patterns of countries (Bancel & Mittoo, 2003: 103). According to Gilbert (2003: 11) and Beaumont-Smith (1991: 86) there is a lack of knowledge on the ground of the applicability of a wide range of financial theories. As a result, firms within the developing world tend to ignore such applications because of their complexity.

Pragmatically, each firm is unique in terms of its product, market, size, industry, management, culture and financial strength. Therefore, firms must tailor generic corporate financial strategies and techniques to their unique needs and circumstances. For most firms, the corporate finance function supports the creation of shareholder wealth through the management of corporate growth strategies, within a disciplined financial foundation that upholds the fundamental principles laid out in the financial literature (Asaf, 2004: xii). It is therefore pertinent and expected that finance practices will align closely with the finance literature.

However, in practice, this alignment is rare. Certain financial management benchmarks, such as the prescribed optimal capital investment standards or procedures, become sub-optimal or are applied inconsistently by management (Gilbert, 2003: 11). Various approaches and techniques, for instance, have been developed from the finance literature to guide the investment appraisal process for firms. Guidelines have been provided for the optimal dividend payout ratios and the optimal capital structure and yet empirical studies show that a gap exists between this theory and what is ultimately practiced by firms (Claessens & Laeven, 2006: ix; Gilbert, 2003: 16 and Beaumont-Smith, 1991: 85).

The question of how much debt a firm should have relative to equity has important implications for its value or its cost of capital. Likewise, it is a far from settled issue in established theory or practice (Ross, Westerfield, Jordan & Firer, 2001: 438-439). Nobel laureates Modigliani and Miller (1958) argued on pure theory that company value is not affected by the company's level of debt. Since then, numerous academics and researchers, including Chen and Strange, (2005), Fama and French, (2002) and Myers, (2001) have been drawn to examine this relationship in detail. The result is the advancement of a new body of knowledge which is not demonstrably at odds with observed practice and which provides operational guidelines for practicing managers (Pike & Neale, 1996: 527). Contrary to the observation of Modigliani and Miller (1958), this body of knowledge would suggest that under realistic conditions company borrowing has numerous implications for company value.

Despite the above-mentioned advance in knowledge, empirical research suggests that various aspects of finance practice related to the capital structure decisions of firms deviate from finance theory (Renneboog, 2006: 312; Graham & Harvey, 2001: 233). Various factors such as firm size, industry characteristics and management sentiment have been advanced to explain this deviation. A positive correlation has been cited to explain the relationship between firm size and the development of financial structures or practices. Gilbert (2003: 15) and Graham and Harvey (2001: 232) identified fundamental differences between the finance practices of large versus small firms. They concluded that the relationship between the size of a firm and its corporate practices was due to a certain level of "sophistication" among larger as opposed to smaller firms,

which explains the unequal distribution of the appropriate financial knowledge, resources and technology necessary to carry out accurate financial management practices.

Related literature further shows a correlation between size and the development of capital budgeting practices. Gitman, (2003:398), Graham and Harvey, (2001: 232) and Pike and Neale, (1996:176) found that smaller firms take a less sophisticated approach to their financial management and predominantly use the payback period (PB), a simple and conventional capital budgeting technique, in preference to more complex investment appraisal techniques like net present value (NPV) and internal rate of return (IRR).

The positive correlation between size and development patterns in finance practice suggests, albeit at a debatable level, that large firms are more sophisticated in their financial management approach than small firms. Hence, large firms are more likely to adopt and apply the latest trends advanced by financial theorists.

However, it should be noted that while a large body of supporting empirical evidence is available for the developed countries of Europe and America (Claessens & Laeven, 2006: 199), much less research has been conducted on developing countries like South Africa. It is interesting that the limited research published in this regard does not fully support the assumption that large but locally based firms in South Africa are more sophisticated than smaller firms, in their financial management approach, as observed from their counterparts in Europe and America (Gilbert, 2003: 11).

Another stimulating debate is whether the financial management practices that govern the financial structures of developing countries are, or should be similar to those of the developed countries. In a study conducted on the capital structures of developing countries by Booth, Aivazian, Demigrac-Kunt and Maksimovic (2001: 87), it was found that the debt ratios in developing countries are affected by the same variables that are significant in developed countries. However, they observed systematic differences in the way these ratios are affected by country-specific factors, such as Gross Domestic Product (GDP), inflation rates and the development of capital markets.

Booth *et al*. (2001: 106) developed a common world model of capital structure determinants in which they included such variables as the average tax rate, business risk, profitability, firm size and market-to-book ratios, among others. After testing this model with individual but similar country models of both developed and developing nations, they found that this model supports the conventional country models. However, apart from profitability, the regression coefficients of these models differed from country to country. They concluded that other institutional factors, like, regulation, business risk and tax policies accounted for the differences observed.

It is plausible to argue that the accurate translation of finance theory into practice by the firms of fast developing economies, like South Africa, has overall implications for the development patterns of the finance industry of Africa at large, since South Africa is one of the few African countries setting the pace of development on the continent.

A good example is Ghana, where corporate finance practices like the manipulation of capital structures by firms and the cost of equity capital estimation techniques have impacted positively on the performance of Ghanaian firms. According to a study on microfinance institutions in this country, Kyereboah-Coleman (2007: 56) found that "highly leveraged microfinance institutions perform better by reaching out to more clientele, enjoy economies of scale and are therefore better able to deal with moral hazard and adverse selection, enhancing their ability to deal with risk."

Such knowledge of new developments in finance theory could greatly enhance the performance of smaller African firms by providing them, through policies, better access to long-term financing and therefore, stimulate growth[1]. Nonetheless, such practices must have a reliable theoretical and empirical foundation for them to add value.

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[1]Nieuwenhuizen and Kroon (2003: 129) investigate the relationship between financing criteria and the success factors of small and medium enterprises. They find that finance institutions discriminate against owners of small and medium enterprises (SMEs) who do not have adequate security and collateral available.

It is therefore essential for finance and academic practitioners to take a "snapshot" of the current practice of corporate finance in South Africa in order to assess the level of deviation of such practice from theory, if any, the possible reasons for such deviation and, where necessary, which corrective measures to apply.

The aim of this study was to assess the current practice of corporate finance in South Africa as reflected in the capital structure decisions of firms. The study focused on listed, large and medium-sized firms and was inspired by, among others, the work of Beaumont-Smith (1991) which investigated the financial management techniques of 362 manufacturing firms within the Gauteng region of South Africa; Rajan and Zingales (1995) who investigated the determinants of capital structure choice through an analysis of the financing decisions of public, non-financial firms from the G-7 countries; Graham and Harvey (2001) who surveyed over 4000 firms throughout the United States and Canada; and Bancel and Mittoo (2004) who investigated the determinants of the capital structure choice of 16 European countries. A preliminary literature overview indicated that all these studies shared a common finding, namely, that a divergence existed between financial practices and published financial theory.

The study acknowledges its debt to the contributions made by these and other studies, and takes its originality from both its scope and its content. Firstly, it attempts to investigate the financing behaviour of listed firms in South Africa and to determine the factors which influence capital structure choices in the same study. It differs from the three above-mentioned studies because it specifically targets an economically less developed population and it is specific to one country. By using a sample from a less developed or developing country's population, it attempts to identify those critical aspects of the capital structure choice that can be regarded as specific to the less developed or developing countries of Africa. However, in many respects, the goals of this study can be likened to those mentioned above.

This study differs from the study conducted by Beaumont-Smith (1991) in that it attempts to cover a broader cross-section of firms defined by industry. Beaumont-Smith (1991) focused exclusively on firms selected from the manufacturing sector in South Africa. Conversely, this

study also attempts to capture the latest trends in the theory and practice of corporate finance in South Africa.

Secondly, since the bulk of empirical research in the field of corporate finance theories and practices is confined to the developed countries of Europe and America, it is likely that some developments in finance theory may have been adopted in the African setting without regard to local economic constraints that would limit their applicability.

This study attempts to assess the gap between capital structure theory and practice and to identify critical aspects about the financing patterns of listed firms in South Africa. It is hoped that this will create a point of departure for corrective measures where necessary.

1.2   THE PROBLEM AND ITS SETTING

The Chief Financial Officer (CFO)[1] has the pivotal role of aligning the firm's overall strategy with its financial capabilities. The CFO is a decision-maker who holds the financial key to critical decisions that affect the firm's value. Therefore, in order to satisfy shareholder demand for value creation, the CFO uses a variety of financial management techniques adopted from the financial literature and consistently applies them to achieve this objective.

Empirical studies show that certain company finance practices deviate from finance theory (Ryan & Ryan, 2002: 355; Graham & Harvey, 2001: 233). The logical explanations for this anomaly are numerous. At one extreme, where finance practice lags behind theory, the cited reasons include, among others, a communication gap between finance academics and practitioners (Beaumont-Smith, 1991: 4). The result is that finance practitioners opt for the ancient, tried and trusted, but simpler financial management techniques in preference to the recent, presumably more administratively complex techniques that are agreed to enhance the accuracy of financial management practice. At the other extreme, theory may lag behind practice where firms carefully modify existing finance theory to suit their unique needs and circumstances (Bancel & Mittoo, 2004: 131).

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[1] CFO, as used, refers to the head of the financial decision-making executive in a particular firm. However, for the purposes of this study, the CFO or the top financial decision-making executive can be taken to mean the same thing.

Either of these extremes can be considered appropriate depending on the unique business circumstances of a particular firm. It is also plausible that a misalignment between finance theory and practice could, in part, be due to a lack of knowledge regarding application, a lack of resources, or the various economic constraints within a particular firm's environment that make such alignment impossible.

Any deviation from an agreed norm should be cause for alarm if that deviation is not validated or justified by empirical research. According to Asaf (2004:2), when shareholder value maximization becomes the primary objective of a firm, optimal financial policy making and skillful financial management become the key drivers of value creation. Such practice has to be confined within a disciplined financial foundation.

This means that finance practices and finance theory have to be aligned fairly closely for firms to add value. Modifications that cause practice to differ from theory have to be applied consistently so as not to distort the underlying finance fundamentals. Sound financial management practices are essential to the survival and growth of a firm (Arnold, 2005: 3). This study examines the trends developing between empirical finance theory and company finance practices by investigating the capital structure practices of listed firms in South Africa. This will provide a point of departure for corrective measures where necessary.

1.3   HYPOTHESES

In order to examine trends in capital structure theory and practice, it was hypothesized that there is no significant relationship between the financing practices of listed firms on the Johannesburg Securities Exchange (JSE), and theories of financing behaviour as defined in finance theory. For this study to conduct an empirical study the null hypotheses and alternative hypotheses were further defined as follows:

H_{01} There is no significant relationship between the financing behaviour of listed firms on the JSE and the trade-off theory[1] as tested using proxies[2] that measure this kind of financing behaviour.

H_{02} There is no significant relationship between the financing behaviour of listed firms on the JSE and the pecking-order theory[3] as tested using proxies that measure this kind of financing behaviour.

The alternative hypotheses, H_1 and H_2 were stated as the exact opposite of the null hypotheses indicating that a significant relationship exists between the financing behaviour of listed firms on the JSE and the trade-off theory or the pecking-order theory using proxies that measure this kind of financing behaviour.

1.4   THE RESEARCH OBJECTIVES

1.4.1   THE PRIMARY OBJECTIVE

The primary objective for this study was to examine whether finance practice is aligned with finance theory by testing two conventionally recognized theories of capital structure choice (mentioned above) against the financing practices of listed firms in South Africa.

1.4.2   THE SECONDARY OBJECTIVES

To help achieve the primary objective, certain specific secondary objectives were identified. These included:

1.   To investigate the existence of target capital structures (the trade-off theory of capital structure choice) among listed firms in South Africa using proxies[2] that measure this kind of financing behaviour.

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[1] Under the trade-off theory firms maintain an optimal debt-equity ratio by trading-off the cost and benefits of debt financing against the costs of financial distress which result from the use of too much debt in their capital structures.
[2] Proxies as used in this study refer to a set of variables or capital structure determinants that have been reliably assigned from empirical literature to explain these forms of financing behaviour.
[3] Under the pecking-order theory firms have no optimal debt-equity ratio, but prefer to use the cheapest source of financing (retained earnings) before they can issue the more expensive form (either equity or debt).

2.   To determine the extent to which listed firms in South Africa follow the pecking-order theory when making financing decisions by measuring proxies that measure this kind of financing behaviour.

3.   To investigate whether determinants of capital structure choice as defined from empirical literature are similar to those influencing the financing choices of listed firms in South Africa.

1.5   METHODOLOGY

The methodology entailed a literature review and a causal empirical analysis to investigate the relationship between the dependent variable (leverage) and several explanatory variables which were identified as proxies to explain the financing behaviour of large and medium-sized firms consistently listed on the JSE for the period 1995-2005[1]. Information regarding corporate capital structure choices of such firms was obtained from secondary sources in the existing databases and supported using available company annual financial reports.

The initial population consisted of 315 firms[2] consistently listed during this period. This population included all firms that had consistent or partially reported data on the database and represented such major South African industries as banking, manufacturing, retail and transport, among others. Using a non-probability purposive sampling technique, the study then discarded anomalies which included; firms from the financial sector and foreign companies. The resulting total of 195 firms was then further cleansed to remove firms that had incomplete data and data with negative values. The final sample of 148 firms was finally cleansed to remove outliers prior to the main analysis. This left a final sample to 123 firms which were used to conduct the analysis.

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[1] Analysis based on more recent data (2006-2008) was excluded due to reporting lags on the BFA McGregor database. Most of the data for this period has not yet been captured on the database; hence analysis using this information was not feasible at the time this analysis was conducted.

[2] According to available data on the JSE (www.jse.co.za) all listed companies are graded as large or medium-sized. Only companies listed on the ALT X are regarded as small. These are mainly financial companies and they were not included because they did not meet the requirements of the study.

1.5.1   SECONDARY SOURCES

A review of finance literature and the empirical body of knowledge pertaining to the capital structure decisions was undertaken. Advances in finance theory and practice with regard to the existing capital structure theories were then used as a benchmark to investigate the capital structure practices of listed firms in South Africa. Common-sized annual financial statement data of listed firms was obtained from the Bureau of Financial Analysis (BFA McGregor) database. Data from the I-Net Bridge Database and the published annual financial reports of some firms were used to collate this information.

1.5.2   THE UNIT OF ANALYSIS

The unit of analysis comprised a purposefully selected, across industry sample of firms consistently listed on the JSE during the eleven year period from, and including 1995 to 2005. A final sample of 123 firms, containing data extracted from BFA McGregor database was used to conduct the main analysis and later split into various industries containing a significant number of firms by category. These were then used to conduct the across industry descriptive analysis.

1.5.3   DATA AND ANALYSIS

The study used both cross-sectional and time-series data constructs to investigate the relationship between the dependent and independent variables in order to examine the financing behaviour of listed firms during this period. Multiple and step-wise regressions, Pearson product-moment correlations and the analysis of variance (ANOVA) analytical techniques were conducted using the Statistical Package for Social Scientists (SPSS) analysis tool. Prior to this analysis, conditions that affect accurate regression output (multicollinearity and heteroscedasticity) were identified and controlled for, and findings from these analyses were then used to answer the research questions.

1.6   SCOPE AND DEMARCATION OF THE STUDY

1.6.1   LIMITATIONS OF THE STUDY

The study sample represented 39 percent of the entire population of listed firms on this database making the findings fairly representative. It covered a cross-section of listed firms defined by industry, but the industry descriptive analysis was limited to industries with a significant number of firms in that category, thereby excluding the rest. An empirical study was chosen to mitigate the effects of response error and non-response bias characterized by other forms of analyses.

However, some potential biases that characterize empirical studies involving regression analyses were acknowledged. These included the following;

- Firms with incomplete or missing data on the database were excluded from the analysis, potentially reducing the sample size. This did not significantly affect the findings.

- A high correlation between chosen explanatory variables (multicollinearity) was anticipated, which could potentially over score the regression coefficients and output. This effect was controlled for by using a collinearity diagnostics table. However, heteroskedasticity, or the variance in errors of financial data that tend to differ across observations was only partly controlled for in the study.

1.6.2   DELIMITATIONS OF THE STUDY

This study was delimited to focus on listed firms due to the availability of financial statement data on the relevant databases and it was for this reason that the findings could not be generalized to all firms in South Africa. However, listed firms on the JSE have well developed financial structures based on their performance to warrant listing, and their ability to comply with the most stringent financial regulatory requirements (accounting and corporate governance standards) as imposed by the Exchange. Therefore, analysis using these firms provided valuable insight into the capital structure practices of other firms within South Africa.

This study excluded certain topics which, although related to capital structures, did not have the theories being considered by this study as their central focus. These included literature or empirical studies dealing with call or convertible securities, dividends theories, bond covenants, debt maturity, bankruptcy law, pricing and methods of issuance of new securities and preferred stock. Similarly, certain unquantifiable extraneous variables and dummies were excluded from the models used in the analysis. The potential effects of these factors could not be entirely ruled out, but it was assumed that they could not affect the findings significantly.

Therefore, this study assumed that the value of a firm is a function of its equity plus the value of its interest-bearing debt so that although certain firms may have other non-working capital-type securities, this condition was implicitly ignored. This assumption was made to simplify the analysis.

1.7   SIGNIFICANCE OF THE STUDY

This study attempted to contribute to efforts at aligning finance theory with practice by providing valuable insight into the capital structure practices of developed and developing nations. This was achieved by investigating the various aspects of capital structure practices and how they relate to an array of factors like the size of the firm, industry, debt and profitability. This information will assist future researchers to advance or modify existing theories. The findings will provide a learning base for finance practitioners and policy makers on how listed firms and other firms in South Africa operate and what pitfalls need to be avoided for firms to be sustainable. They will also identify areas where academic recommendations have not been fully implemented.

1.8   THE OUTLINE OF THE STUDY

Following on from Chapter One above, Chapter Two presents the literature relating to capital structure theories and the empirical evidence in this regard. It also highlights the key determinants of capital structure choice and how they relate to the theories being examined.

Chapter Three discusses the causal empirical design of the models used to test for financing behaviour. It also discusses the planning, formulation and analysis of the variables used in the study. The results of the empirical study are reported and interpreted in Chapter Four.

Chapter Five discusses the summary of the findings, draws conclusions, discusses limitations of the study and indentifies areas where future research should focus.

CHAPTER TWO

A REVIEW OF THE RELATED LITERATURE

2.1   INTRODUCTION

The capital structure decisions of firms today have important implications for the value of the firm or its cost of capital.[1] Nevertheless, a firm can choose any capital structure it wants, with management's agreement, because the important elements that influence such a decision are easily identifiable. However, the precise measures of such elements are not so easily obtainable (Ross, Westerfield, Jordan & Firer, 2001:439). Consequently, the literature related to capital structure is reviewed here to ascertain whether a deviation does indeed exist between documented capital structure theories (which lay a foundation for best practice in capital structure decision-making) and the capital structure practices of listed South African firms.

This review will take the approach of citing the capital structure theories advanced in the literature together with the empirical evidence put forward to support those theories and comparing these with the capital structure patterns of South African firms. The review will focus on two conflicting capital structure theories, namely, the trade-off theory of capital structure choice and the pecking-order theory of financing hierarchy and this will lay the foundation for this study. The factors that influence the application of either of these theories, for example, the costs and benefits of debt financing and financial flexibility, among others, are examined, together with the supporting empirical evidence, and they are used as a benchmark against which to compare the current practices of firms in South Africa. This review will therefore begin with a brief account of these theories, followed by a review of the empirical literature that supports them, in order to set a benchmark for comparison with what listed firms in South Africa currently do.

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[1] The relationship between cost of capital and choice of capital structure is not under investigation during this study. Although its importance cannot be ignored, it will only be mentioned for review purposes here.

2.2   THE NEED FOR A THEORETICAL FRAMEWORK

One of the most important questions about capital structure today is whether firms have target debt ratios (Graham & Harvey, 2001: 209). The issue of how firms make their capital structure decisions is one of the most researched topics in corporate finance and yet little consensus exists among these studies (Nguyen & Ramachandran, 2006:193; Bancel & Mittoo, 2004: 103; Myers, 1984:575). In an effort to map out the current progress on capital structure theory and practice, Rajan and Zingales (1995: 1421) posed the question: "what do we really know about corporate capital structure choice?"

Rajan and Zingales (1995:1421) observed that capital structure theory has made much progress since the Modigliani and Miller (hereafter MM)[1] irrelevance theory of 1958, and yet there is little empirical evidence to support the different theories put forward. They also noted that although such empirical evidence has revealed important facts on capital structure choice, the major part of such research has been limited to firms in the United States of America and it is therefore unclear how these facts might relate to the different theoretical models tested outside this environment. They concluded that unless the robustness of these findings was tested by their application outside the United States, it would be hard to determine whether empirical irregularities were spurious correlations or whether they supported a particular theory.

In support of this observation by Rajan and Zingales (1995:1421), the lack of empirical research on the capital structure decisions of firms in the developing countries of Africa might explain, to a degree, the likelihood of a divide between capital structure theory and the practices of firms today (see also, Nguyen & Ramachandran, 2006:193). A theoretical framework is therefore necessary to track the development of capital structure theories and practices.

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[1]Modigliani and Miller (hereafter MM) (1958, 1963), criticized the traditional view on capital structure choice based on a restrictive set of assumptions. See; Abor (2007:365), Samuels *et al.*, (1997: 649) and Brigham and Gapenski (1994: 532).

2.3   CAPITAL STRUCTURE: THE TRADITIONAL VIEW

The traditional view of the choice of corporate capital structure is encapsulated by Samuels, Wilkes & Brayshaw (1997: 648). According to Samuels *et al.* (1997:648), the level of gearing or debt influences a firm's cost of capital or the value of a firm. They argue that there is an optimal level of debt at which a firm's cost of capital is minimised, or, the firm's value is maximised. Their logic, which is common to most finance literature, is that as the level of debt is increased over moderate ranges, the firm's average cost of capital falls because of the lower cost of debt capital (compared to equity capital) that is added to the capital structure.

However, as the proportion of debt increases over further ranges, equity shareholders realize that their investment is becoming high risk and they demand a higher rate of return from the business. Ultimately, the debt lenders who provide funds to an already geared company begin to require higher returns for the succeeding portions of debt advanced. This causes the firm's overall cost of capital to rise as its value falls (Brigham & Ehrhardt 2008: 568; Samuels *et al.*, 1997:649).

The practical relevance of this view is that managers can identify and maintain the optimal level of debt at which their firm's average cost of capital is minimised or their firm value is maximised in order to operate both profitably and effectively. This premise is the foundation upon which the controversies surrounding all capital structure decision-making are based.

The progression of empirical research is steering towards proving whether this is actually true and whether the process of determining and maintaining an optimal level of debt in a firm's capital structure is viable under normal business practice!

The first and most influential criticism of this capital structure choice approach was advanced by Modigliani and Miller (1958) who concluded that, under perfect conditions, the manipulation of a firm's capital structure has no relevance to its value. These two academics set in motion a train of research that continues to this day.

2.3.1   CAPITAL STRUCTURE IN PERFECT MARKETS

Based on a restrictive set of assumptions, according to, Brigham and Ehrhardt (2008: 575; Samuels *et al.* (1997: 649) and Brealey, Myers and Marcus (1995: 381), the MM irrelevance theory of 1958 criticized the traditional view of capital structure choice. This theory found that in well-functioning capital markets, the market value of a company does not depend on its capital structure. MM demonstrated that it was the income generated by the firm from its business activities and the risk from its underlying real assets that determined value, rather than the way this income was split between the providers of capital (Samuels *et al.*, 1997: 650; Ross *et al.*, 2001: 447).

Contrary to the claim of the traditional approach, this meant that financial managers could not increase firm value by manipulating the mix of securities used to finance the company. MM noted, in two of the three propositions of their theory, that the market value of the firm was independent of its capital structure since a variation in the value of any two firms (of similar business risk, but different financial risk levels) resulting from the manipulation of the capital structure would create arbitrage opportunities that would ultimately drive the value of these two firms to a common equilibrium total value (Pike & Neale, 1996: 562).

As a consequence, the rate of return on equity (in an all equity firm) would increase linearly with the debt ratio of a leveraged firm so that the advantage of adding lower-cost debt to the capital structure would exactly cancel out with a linear increase in the cost of equity (Brigham & Ehrhardt, 2008: 575, Samuels *et al.*, 1997: 650).

However, the argument advanced by MM on capital structure choice and firm value could not go without criticism since it was made under conditions that assumed a "frictionless" and therefore unrealistic world. Nevertheless, the notable contribution of their work was that by indicating the conditions under which capital structure was irrelevant, they provided researchers and practitioners with clues as to what was required for capital structure to be relevant and to affect a firm's value (Brigham & Ehrhardt, 2008: 575; Brealey *et al.*, 1995: 389 and Chew 1993: 130). Their work marked the beginning of modern capital structure research which today focuses on

relaxing some of their original assumptions in order to develop a more realistic theory on capital structure choice (Brigham & Ehrhardt, 2008:575).

2.4 MODERN CAPITAL STRUCTURE CHOICE

The development of capital structure theory today continues with a relaxation of some of the assumptions that were laid out in the original MM irrelevance theories. Some of those unrealistic assumptions include: the exclusion of taxes and transaction costs, and the assumption that all information pertaining to firm value or performance is available to all market participants at no cost. MM (1963)[1] and Miller (1977)[2] published follow-up papers in which they relaxed the assumptions that there were no corporate and personal taxes. They concluded that because tax regulation allows firms to deduct debt interest payments as an expense, firms are encouraged to use debt in their capital structures.

In other words, the tax deductibility of interest payments shields the pre-tax income of the firm and this ultimately lowers the weighted average cost of capital (WACC). In addition, the presence of taxes causes the cost of equity to rise less rapidly with debt than would be the case in the absence of taxes (Brigham & Ehrhardt, 2008: 613).

These findings lead to the illogical conclusion that firms should use up to 100% debt financing to maximise performance yet, in practice, firms do not go to this extreme (Brigham & Ehrhardt, 2008: 577; Chen & Strange, 2005: 14 and Ross *et al.*, 2001: 454).

2.4.1 CRITICISMS OF THE MODIGLIANI-MILLER AND MILLER MODELS

Finance academics and practitioners have voiced concerns over the validity of the MM and Miller models. According to Brigham and Ehrhardt (2008: 621) and Samuels *et al.* (1997: 653), MM and Miller assumed that personal and corporate borrowings were perfect substitutes, but in

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[1] Franco Modigliani and Merton H. Miller, 1963. Corporate income taxes and Cost of Capital: A Correction. *American Economic Review*, pp 433-443.
[2] Merton H. Miller, 1977 Debt and Taxes, *Journal of Finance*. pp 261-275.

practice the corporate sector (firms) has limited liability and the ability to borrow funds at better rates than the personal sector (individuals).

This means that in a case of bankruptcy, an individual investing in a leveraged firm, would be less exposed to loss owing to corporate limited liability than if he or she practiced arbitrage by recourse to personal borrowing in order to change the overall amount of financial leverage (home-made leverage[1]).

The resultant personal risk exposure borne by investors who undertake home-made leverage tends to restrain other investors from engaging in further arbitrage practices. The outcome is that the equilibrium levels and the cost of equity, for both leveraged and unleveraged firms, does not equate with those stipulated in the MM theories. Similarly, current restrictions on institutional investors to legally borrow and buy stocks would prohibit them from engaging in home-made leverage (Brigham & Ehrhardt, 2008: 621).

Secondly, MM and Miller assumed that brokerage costs could be removed from the equation rendering the arbitrage process of switching from leveraged to unleveraged positions "cost free". In reality, however, brokerage and transaction costs greatly impede the arbitrage process (Brigham & Ehrhardt, 2008: 621).

Thirdly, MM assumed that both corporations and individual investors borrow at the risk-free rate. Although risk has now been introduced into the analysis in order to reach the same conclusions as MM and Miller, it is necessary to assume that both individual investors and corporations can borrow at the same rate for their theories to stand. However, in practice, most individual investors today borrow at higher rates than large corporations (Brigham & Ehrhardt, 2008: 621).

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[1] Home-made leverage is the use of personal borrowing to change the overall amount of financial leverage to which an individual is exposed and in the process make a risk free profit.

Miller (1977) concluded that firms would issue a mix of debt and equity securities so that the before-tax yields on corporate securities and the personal tax rates of the investors who bought the securities would adjust until equilibrium was reached. However, for such a condition to occur the tax benefit from corporate debt has to be the same for all firms and it must be constant for an individual firm regardless of the amount of leverage used. The reality is that tax benefits vary from firm to firm. Highly profitable firms gain maximum tax benefit from leverage, while for smaller firms such benefits are less profitable (Brigham & Ehrhardt, 2008: 621).

The existence of other tax shields like high depreciation, pension plan contributions and operating loss carry-forwards also reduce the tax savings from interest payments. In addition, the fact that large diversified companies can use losses in one division to offset profits in another implies that the tax shelter benefit is more certain in large diversified firms than in smaller single product companies (Brigham & Ehrhardt, 2008: 620).

Lastly, MM and Miller assumed that there were no costs associated with financial distress. They therefore ignored agency costs and assumed that all market participants have identical information about firm prospects (Brigham & Ehrhardt, 2008: 622). Evidently, none of these assumptions are reflected in the real business world.

2.4.2   THE TRADE-OFF THEORY: AN INTRODUCTION

Developments in capital structure theory today are dominated by the search for the optimal capital structure. Some theories suggest that firms select capital structures depending on attributes that determine the various costs and benefits associated with debt and equity financing (Faulkender & Peterson, 2005: 45; Bancel & Mitto, 2004: 103; Graham & Harvey, 2001: 209 and Shyam-Sunder & Myers, 1999: 219). Others suggest that there is no definitive optimal capital structure and assume that the attraction of interest tax shields and the threat of financial distress are second order (Shyam-Sunder & Myers, 1999: 220).

However, a survey of the finance literature shows that there is no universally accepted theory to explain the debt-equity choice because all of these theories fail to explain actual financing behaviour among firms (Myers, 2001: 81). According to Myers (1984: 575), "it seems presumptuous to advise firms on the optimal capital structure when we are so far from explaining actual financing decisions."

Secondly, the empirical evidence on capital structures comes from the developed economies of Europe and America with little or no evidence on economies within the developing countries of Africa. One noteworthy contribution on Africa is the study by Booth *et al.* (2001: 87-130) on whether capital structure determinants between developed and developing nations are similar. Their major finding was that a similar group of factors could explain capital structures, but that the persistent differences between the countries' capital structures could only be understood with reference to the unique institutional structures of each country.

Shifting the focus of research to Africa and, specifically, South Africa, this review is intended to investigate the actual financing decisions of South African listed firms by comparing their financing behaviour with the two ways of thinking about capital structure:

(i)   The static trade-off theory in which a firm is viewed as setting a target debt-to-equity ratio and is gradually moving towards it; and,

(ii)   the pecking-order theory in which a firm prefers internal to external financing and debt-to-equity if it issues securities. Under this theory the firm has no well defined target debt-to-equity ratio. It is argued that this theory performs at least as well as the static trade-off theory to explain the actual financing decisions of firms (Shyam-Sunder & Myers, 1999: 221and Myers 1984: 576).

2.4.3   THE TRADE-OFF THEORY DEFINED

The trade-off theory of the optimal capital structure choice assumes that firms acquire optimum capital structures through a trade-off between the tax advantages of borrowed money and the costs of financial distress that result when a firm borrows too much. In this traditional trade-off model, the chief benefit of debt is the tax advantage of interest deductibility, while the primary costs are those associated with financial distress and the personal tax expense incurred by bondholders when they receive interest income (Graham & Harvey, 2001: 210).

The static trade-off theory, which is a slight extension of this theory, argues that firms will attempt to balance the marginal present values of interest tax shields against the costs of financial distress, thereby predicting a reversion of the actual debt ratio towards a target or optimum (Shyam-Sunder & Myers, 1999: 220). It is referred to as "static" because it assumes that the firm is fixed in terms of its assets and operations and only changes in the debt-to-equity ratios are considered (Ross *et al.*, 2003: 544).

This means that firms reduce their debt levels if the costs of financial distress become high and are observed to maintain their leverage levels at optimums where the benefits from debt financing marginally exceed the costs of financial distress and their financial performance is maximized, or their risk is minimized. To elaborate more on this financing behaviour, it is essential to investigate the choices firms make regarding the costs and benefits presented by the use of debt in their capital structures.

2.4.4   THE PREDICTORS OF THE TRADE-OFF THEORY

When an organization takes on too much debt, it suffers the danger of failing to meet its financial obligations to its creditors with the result that this "financial distress" impacts negatively on the firm's value since it affects, among other things, any tax relief the firm may receive (Arnold 2005:529). Ultimately, the firm faces the danger of bankruptcy and liquidation.

(i)   Financial distress and agency costs

Financial distress includes but is not restricted to bankruptcy. It will quite often occur when a firm has taken on excessive debt and is unable to meet its financial obligations to its creditors, although oftenly, other various factors may contribute to this condition. The degree of financial distress varies among firms and may be temporary and short-lived. However, at its extreme, financial distress leads to bankruptcy and liquidation which involves large payments to lawyers, accountants, administrators and management. Severe limitations on management's freedom to operate become likely (Brigham & Gapenski, 1994: 548).

Ross *et al.* (2001: 456) contend that as the debt-to-equity ratio rises, so does the probability that the firm will be unable to pay its bondholders. Hence, ownership of the firm's assets is transferred from the shareholders to the bondholders. When the value of a firm's assets equals the value of its debt, the firm becomes bankrupt in the sense that its equity is rendered worthless. The legal and administrative expenses associated with bankruptcy proceedings are identified as direct costs which serve as a disincentive to debt financing.

Other indirect bankruptcy costs, or costs associated with avoiding bankruptcy, are incurred when a firm is financially distressed. These are less tangible and include costs that impact on the current and future operations of the business. The risk of bankruptcy will have an impact on the overall performance of a firm. Brigham and Ehrhardt (2003: 478) identify the following indirect costs of bankruptcy or the impending threat of bankruptcy:

- Financial distress hurts the productivity of workers and managers as they start to worry about the going concern of their business. Suppliers tighten their credit standards, which reduces the firm's accounts payable and causes the net operating working capital to increase. Ultimately, the free cash flows of the business are reduced.

- The risk of bankruptcy increases the cost of debt. With higher bankruptcy risk, debt holders insist on higher promised returns which increases the pre-tax cost of debt.

- Higher debt levels affect the behaviour of managers in one of two ways: on the upside, the risk of bankruptcy causes managers, whose reputation and wealth is usually tied to a single company, to control wasteful spending. However, the downside is that such managers also become more risk averse and reject positive Net Present Value (NPV) projects if they are risky, and this leads to an underinvestment problem and agency costs to the business.

Financial distress or the risk of bankruptcy is directly linked to the trade-off theory of capital structure by the costs that arise with the excessive use of debt. According to Faulkender and Peterson (2005: 45), firms for whom the tax shields of debt are greater, the costs of financial distress lower, and the mis-pricing of debt relative to equity more favourable, the leverage levels are usually high.

For the optimal capital structure to exist, the firm's net tax saving from an additional rand in interest should equate closely with the marginal increase in the expected financial distress costs (Ross *et al.*, 2001: 467). Therefore, in order for firms to follow the trade-off theory, they have to reduce their debt usage when the costs of distress or the probability of bankruptcy becomes high. Furthermore, since bankruptcy cost functions are specific to individual firms, these costs can be viewed as primary determinants of differences in capital structures across firms.

Several other traditional factors and theories can be factored into the trade-off model and linked directly or indirectly to the costs of financial distress or bankruptcy risk. For example, all other factors being equal, the greater the volatility of earnings or operating profits of a firm, the less the firm should borrow to lessen the chances of financial distress. Other costs of financial distress depend primarily on the firm's assets or on how easily ownership of those assets can be transferred, that is, how tangible or intangible they are (Ross *et al*., 2003:462). A safe, consistently profitable company, with few intangible assets or growth opportunities ought to find

a relatively high debt ratio profitable, yet a risky growth company ought to avoid excess debt financing altogether (Chew, 1993:150).

There is currently very little empirical evidence conducted on the impact of costs associated with financial distress but, again, most of this research was conducted on firms in Europe and America. Both Samuels *et al.* (1997: 659) and Brealey *et al.* (1995:393) cite the work of Warner (1977) and Altman (1984), who suggest that such costs are insignificant when compared with the overall market value of the business prior to bankruptcy.[1] They contend that a threat of bankruptcy forces some firms to use debt sparingly and that this practice occurs more often for smaller than larger firms.

Smart, Megginson and Gitman (2007: 486) also observe that differing costs of bankruptcy and financial distress between industries cause firms in one industry to employ less debt than comparable firms in other industries. They observe that firms that provide durable products or long-term services, firms with fewer tangible assets like pharmaceutical manufacturers that are involved largely in research and development and food distributors, tend to use debt sparingly in order to avoid financial distress or bankruptcy costs.

On the other hand, firms whose assets are mostly tangible and with well-established secondary markets should be less fearful of financial distress and can accommodate more debt in their capital structures. The controversy here is that, in certain instances, asset tangibility is positively related to an increase in firm size and may also translate into how profitable a firm is, yet it is observed that most profitable companies usually thrive when unencumbered by large debt (Brealey *et al.,* 1995).

In the financial management context, agency relationships are those that exist between shareholders and managers, and between debt-holders and shareholders (Brigham & Gapenski, 1997: 19). Agency conflicts that arise out of the ownership structure of firms constitute the relationship between managers and shareholders. When the owners or majority shareholders of a

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[1] Brigham and Ehrhardt (2008: 583) show that bankruptcy costs can be as much as 10% to 20% of the firm's value. See also Frank and Goyal (2003:7).

firm delegate the management and operations of their business to managers who own less than 100% of the firm's ordinary shares, a conflict of interest arises in which the management may or may not perform in the best interests of maximizing their shareholders' wealth.

Equity financing using ordinary shares has a residual claim on the assets and earnings of a firm (Myers, 2001:92), and hence it imposes fewer restrictions on financial performance. Firms are never obligated to return an owner's original investment and dividends are not mandatory. So, although such investors are looking for the best returns, managers of firms primarily financed by equity may become complacent in the absence if these deadlines.

Another disadvantage with new equity financing is that if investors believe a new equity issue is a signal that the company stock is overvalued, they will reduce the price they are willing to pay for all the company's shares in this situation (Emery, 1998: 685). This effect of asymmetric information affects a firm's debt-equity policy in the same way as taxes and distress costs. An announcement of a stock offering is taken as a signal that, in the opinion of its management, the firm's prospects are not bright. Conversely, a debt offering is taken as a positive signal (Brigham & Ehrhardt, 2008:580).

Conflicts that exist between debt-holders and equity-holders arise because a debt contract gives equity-holders or management the incentive to invest sub-optimally. If an investment yields above the face value of debt, equity-holders capture most of the gain. If, however, the investment fails, debt holders bear the consequences, so that equity-holders may invest in very risky projects even if they decrease value and are to the detriment of debt-holders.

Thus, the cost of the incentive to invest in value-decreasing projects created by debt is borne by the equity-holders/owners who issue the debt. This concept is referred to as risk shifting and is explained in more detail by Emery (1998:686). Therefore, debt financing gives the owners the opportunity to gamble with someone else's money (Emery, 1998: 686), leading to the asset substitution effect which is an agency cost to debt financing (Chen & Strange, 2005:16).

Agency costs are direct or indirect expenses that are used as an incentive to ensure that management acts in the best interests of the providers of capital, whether stock or bondholders, and to cover such costs as those of reporting and being accountable to the shareholders or bondholders, the costs of the providers of debt monitoring and the restriction of managers through covenants (Samuels *et al.*, 1997: 662).

The trade-off model expresses a leveraged firm's value in terms of the unleveraged firm's value, adjusted for the present values of tax shields, bankruptcy costs and the agency costs of debt and equity. Unfortunately, the individual components of this model are difficult to estimate. However, empirical research offers support for this model, which has been modified to include the agency costs of debt and equity, but the model has not been sufficiently developed to offer precise recommendations on the optimal capital structure of individual firms (Smart *et al.*, 2007: 499).

(ii)   Debt and taxes

There are certain observable facts that relate to the use of debt and the interest tax benefit that may accrue to a firm that uses it wisely. Firstly, the tax benefit from debt is obviously only important to firms that are in a tax paying position. Firms with substantial accumulated losses will get little value from the interest tax shield. Furthermore, firms that have substantial tax shields from other sources, such as depreciation, will get less benefit from leverage. Finally, not all firms have the same tax rate, but the higher the tax rate, the greater the incentive to borrow (Ross *et al.*, 2001:462).

The South African government taxes a statutory 28% levy on corporate income (*The Budget Review, 2008*), but interest paid on debt is a tax deductible expense, so that a tax paying firm that pays an extra rand of interest receives a partially off-setting interest tax-shield in the form of lower taxes paid. Financing with debt instead of equity therefore increases the total after-tax rand-return to equity investors and ultimately increases firm value.

To illustrate by assuming that debt is fixed and permanent, if a tax-paying firm borrows R1 000 000 in debt, then repurchases and retires R1 000 000 in equity and commits to make debt payments on the loan for an indefinite period, the net liability created by the R1 000 000 debt will be R720 000 because the government effectively pays 28% of these interest payments and so that the net tax gains under this arrangement equates to the NPV of R280 000.[1] Hypothetically, if this firm chose to borrow R50 million or R100 million, the gains from such an arrangement would be 28%. This outcome is now considered very unlikely for a number of reasons:

- Firstly, the firm may not always be profitable so that the average effective future tax rate is less than the statutory tax rate.
- Secondly, debt is not permanent or fixed, investors today cannot know the size and duration of future interest tax shields, making the inflows from the latter risky to investors.
- Thirdly, the corporate level tax advantages could be partially off-set by the tax advantage of equity to individual investors, namely, the ability to defer capital gains and then pay taxes at lower capital gains. The extra personal tax investors pay on their earnings will also offset more than half of the corporate interest tax shield (Myers, 2001: 87).

Since the primary benefit of debt is the tax shield it offers on interest paid, it is essential to review in detail the literature and empirical evidence on the factors that influence the appropriate mix of debt that firms can use.

2.4.5   CAPITAL STRUCTURE DETERMINANTS

Currently, a vast amount of literature is available on the determinants of capital structures across firms (Chen & Strange, 2005: 11; Akhtar, 2005: 321; Frank & Goyal, 2003: 1; Graham & Harvey, 2002: 187 and Rajan & Zingales, 1995: 1421). It is notable that the majority of empirical studies conducted to test for the robustness of these variables focused on the firms of Europe and America, with little or no evidence to support the financing behaviour of firms from

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[1] This concept is well illustrated by Myers (2001: 87).

less-developed continents like Africa. This empirical data on financing tactics confirms the importance of taxes, information differences, and agency costs and provides some support for the theories advanced to explain the capital structure practices of firms.

Whether or not these factors have first order effect on the overall levels of debt-to-equity, the question of choice remains open. Debt ratios of established American corporations tend to vary within similar industries. There is also a variation in debt ratios over time when taxation, information differences and agency problems are held constant (Myers, 2001: 82). In addition, Chen and Strange (2005: 14) argue that theories based on the consideration of the tax shield cannot explain why capital structures vary across firms that are subject to the same taxation rates. This suggests that capital structure decisions are affected by factors other than those put forward by these theories.

Smart *et al.* (2007: 504) and Brigham and Ehrhardt (2003: 503) developed a checklist of factors that influence the capital structure decisions of firms.[1] They cited firm-or industry-specific operating and financial variables, ownership structure variables and macro-economic or country variables. Insofar as some of these variables are concerned, the primary challenge for academics and practitioners alike has been the inability to accurately estimate their impact on the financing decisions firms make (Brigham & Gapenski, 1994: 571). Yet, their impact could possibly explain certain deviations between theory and current practices. They identified the following:

- Firms whose sales are relatively stable take on more debt and incur higher fixed charges than firms with unstable sales. The negative relationship between leverage and earnings volatility verifies the importance of bankruptcy costs in capital structure decision-making. Therefore, utility companies are expected to take on more debt than industrial firms.

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[1] Evidence provided from over 30 empirical studies regarding the relationship between corporate leverage and several operating ownership and macroeconomic variables. Refer to Smart, Megginson and Gitman (2007:504)

- Firms with tangible assets that can make good collateral tend to use debt rather heavily. So real estate companies take on more debt than companies involved in technology research.

- Firms with less operating leverage take on more financial leverage because they have less business risk, other factors held constant.

- Growth firms rely heavily on debt to finance their businesses because the flotation costs involved in issuing equity exceed those incurred when selling debt (Smart *et al.*, 2007: 504). However, using a more direct measure of future growth, Frank and Goyal (2003: 17) found that it is only the change in assets that is consistently, significantly and positively related to higher leverage. They concluded that this supports the idea that when a firm buys more assets, it does so by using debt financing.

- In the same study, using the market-to-book assets ratio (MTB), and other more direct growth measures like the change in log of sales and in capital expenditures, it was found that a negative relationship existed between leverage and future growth. These findings were interpreted to imply a firm's need to retain growth options in the sense that future growth is funded from other internal sources rather than from debt (Frank & Goyal, 2003: 22).

- Empirical studies also show that larger firms borrow more than smaller firms, perhaps because they have better access to debt markets and a more diversified pool of assets to use as collateral.

- Firms with unused depreciation allowances, tax loss carry forwards, investment and other tax credits or deductions (non-debt tax shields), have less incentive to shelter corporate profits from income taxes by paying interest on borrowed funds, which suggests that they have less debt in their capital structures.[1]

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[1] Harris and Raviv (1991: 334) found a positive relationship between non-debt tax shields and leverage. However, recent studies by Frank and Goyal, (2003: 28), and Smart *et al.,* (2007: 505) strongly support the contrary.

- Interest is a deductible expense, and deductions are more valuable to firms with high tax rates. Empirical studies show that firms facing high marginal tax rates use more debt than those without (Smart *et al.*, 2007: 506). Although corporate taxes in South Africa have been fairly stable, a recent study on American firms by Desai, Hines and Foley (2004: 2730) shows that an increase in corporate taxes encourages multinationals to finance their foreign subsidiaries with debt rather than equity. This is presumably because debt in the foreign domain becomes comparatively cheaper.

- A few empirical studies such as those of Bancel and Mittoo, (2004: 108) and Harris and Raviv (1991:333), examine the relationship between leverage and industry regulation. They suggest that industries that have been stringently regulated, such as banking, electric power, and transportation, have higher debt ratios than unregulated industries. One explanation for this is that regulation tends to reduce competition and the business risk of firms, thereby acting as a control on the chances of such firms facing financial distress or bankruptcy.

- Insider share-ownership, managerial control and entrenchment also have implications for the financing decisions of firms. On one hand, a manager holding a large amount of shares in a firm will tend to lower the use of debt for fear of putting the firm in financial distress, while on the other hand he/she may substitute debt for equity in the firm's capital structure in order to maximise his voting power on the shares held.[1] Entrenched management teams prefer to employ less debt even when this policy may be harmful to shareholders. Yet when a threat of takeover is perceived, they respond by increasing the level of debt. Overall, cases of management attitudes influence how much debt is used depending on how conservative or aggressive management is towards profits.

- Lenders' and rating agencies' attitudes towards firms frequently influence the choices firms make about their capital structures. As would be expected, firms that have a good credit rating with lenders have more access to debt finance, and this influences the decisions they make when financing new investments.

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[1] At present, empirical studies have not determined which of these two effects dominates (Smart *et al.*, 2007: 507).

- Lastly, firms with profitable investment opportunities need to be able to fund them. Such firms have to maintain financial flexibility in order to have adequate reserve borrowing capacity. According to Arnold (2005: 537), if a company is highly leveraged, it may encounter difficulty gaining access to more funds when the need arises. Financial slackness or the process of maintaining large cash and marketable securities or unused debt capacity ensures that firms restrict their debt levels below the optimal leverage level in order to reduce the risk of missing out on profitable investments as and when they occur.

The determination of an appropriate reserve borrowing is debatable, although it depends on the factors mentioned above, including the firm's forecasted need for funds, predicted capital market conditions, management's confidence in its forecasts and the consequences of capital shortage (Brigham & Ehrhardt, 2003:504).

The general consensus among academics and practitioners is that interest tax shields are valuable to a firm and should provide an incentive for increased corporate borrowing, and so firms should finance their projects with debt in order to maximise value. This contradicts business practice in that debt usually constitutes only a fraction of the firm's total capital (Chen & Strange, 2005:14). Evidently, there are certain factors associated with excessive borrowing that explain why firms do not use up to 100% debt in their capital structures.

The static trade-off theory rationalises moderate debt ratios and is consistent with certain observable facts, namely, that firms with relatively tangible assets tend to borrow more than firms with intangible assets and larger, diversified firms with better access to debt capital markets borrow more than smaller firms, but the theory still fails to explain the correlation between high profitability and low debt ratios.

High profitability means that a firm has more taxable income to shield and that it can service more debt without risking financial distress. Profitable firms are expected to have more debt in their capital structures, which is consistent with the trade-off theory (Pike & Neale, 2006: 505). However, studies on the determinants of actual debt ratios consistently find that the most

profitable companies in any industry tend to borrow the least (Smart *et al.*, 2007: 504; Frank & Goyal, 2003: 1; Myers, 2001: 89 and Rajan & Zingales 1995: 1457).

Therefore, the controversy about the determinants of the optimal capital structure as explained by the trade-off theory suggests among other reasons that:

(i)   There are other variables, both exogenous and endogenous, that affect the supply and demand for corporate debt and these variables influence the debt capacity of a firm.

(ii)   Certain variables are important for some firms under particular circumstances, but are unimportant to others elsewhere.

(iii)   There is good reason to suspect that patterns of corporate financing may have changed over the decades, as evidenced by "a surprising lack of lack of consensus even about many of the basic empirical facts" (Frank & Goyal, 2003: 1).

(iv)   Actual financing decisions of management may reflect motives, personal sentiment, forces and constraints whose effects are not easy to quantify.

(v)   Financial executives are much less likely to follow the academically proscribed factors and theories when determining capital structure (Graham & Harvey, 2001: 233).

It is therefore necessary to compare the literature available on these variables with actual financing practices.

2.5   EMPIRICAL STUDIES: AN INTRODUCTION

This review is intended to identify the most important empirical findings on the factors that influence the financing decisions of firms according to the trade-off theory. The findings are grouped factor by factor and consider the available empirical evidence at face value so that no effort is made to criticize the evidence based on those findings or the approaches used to arrive at such findings.

2.5.1 FACTORS AFFECTING DEBT POLICY

The main advantage of debt capital relative to equity capital centres on cost. The pre-tax rate of interest on debt is invariably lower than that required by shareholders due to the legal position of lenders who have prior claim on the distribution of the firm's income. Debt is also usually secured on the firm's assets to provide for security in case of default. In addition, the administrative and issuing costs of debt are normally lower since underwriters are usually not required. Lastly, debt interest may be set against profits for tax purposes. This upside to the use of debt means that firms can increase value by maximizing on the use of debt.

However, excessive use of debt can lead to the inability of a firm to meet its debt interest payments resulting in financial distress, the costs thereof and ultimately bankruptcy. Hence, firms have to control for the amount of debt they can accommodate in their capital structures. To this effect, some empirical evidence has found certain firms to be significantly under-leveraged (Ross *et al.*, 2003: 466; Graham, 2000: 190).

Prior work on leverage implicitly assumes that capital availability depends solely on firm characteristics. However, market frictions that make capital structure relevant also associate with the firm's sources of capital (private or public debt markets). These market frictions (information asymmetry and investment distortions) ensure that a firm's leverage is not entirely a function of the firm's demand for debt, but also relates to the lenders or suppliers of capital. Stated otherwise, firms are rationed by their lenders (Faulkender & Petersen, 2005:45).

An essential variable that influences the amount of debt a firm can use is the credit standard, credit rating or credit relationship the firm has with the providers of capital, especially in the form of debt. Chew (1993:127) notes that capital structure decisions change mainly due to market distortions or imperfections and a developing conflict of interest between lenders and management as the representatives of shareholders' interests. These agency conflicts also influence how a firm is graded by its lenders.

The literature has often described banks or private lenders as being particularly good at investigating firms and deciding who the viable borrowers are so that the source of capital becomes intimately related to a firm's ability to access debt markets. The higher transaction costs arising from the expenditure on monitoring firms makes this kind of debt higher than that from public debt markets (Faulkender & Petersen: 2005:46).

Since not all firms are able to choose their source of debt markets, those that do not have access to public debt markets, usually referred to as speculative-grade firms,[1] are constrained by lenders on the amount of debt they may raise. We see this manifest in the form of lower debt ratios. Conversely, firms that have a good credit rating or investment-grade firms tend to have higher debt ratios (Faulkender & Petersen, 2005: 47). Similarly, the immediate impact of a credit downgrade[2] is to raise the interest on borrowing (Pike and Neale, 2006: 507), which subsequently increases the costs on borrowing for such a firm and influences the amount of debt it can carry.

Graham and Harvey (2001: 211) found that firms are very concerned about their credit rating and viewed it as an indicator of financial distress. They noted that among utility firms and large firms that have rated debt, credit rating is a very important determinant of their debt policy.

In conclusion, therefore, firms that have a good credit rating, fairly stable earnings, a more tangible asset structure, are large sized or well-diversified and have easier access to debt markets, tend to accommodate higher debt levels in their capital structures. Ironically, as Pike and Neale (2006: 479) observe, smaller firms, which should not over-rely on debt capital, are usually forced to do so because of their inability to raise equity financing.

Debt ratios depend on firm characteristics as well, so that differences in leverage do not imply that firms are constrained by debt markets alone. The difference could be a product of firms with different characteristics optimally making different decisions about leverage (Faulkender &

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[1] Pike and Neale (2006: 507) show the credit ratings of Standard and Poor, and Moody's. These are international credit rating agencies. See also Graham and Harvey (2001: 194-5).
[2] A downgrade refers to a firm drops from a higher credit status to a lower one based on its ability to service interest payments.

Petersen, 2005: 47). So, for example, if debt capacity depends on the future profitability and value of the firm, a firm may be able to increase borrowing if it performs well or be forced to pay down debt if it performs poorly (Myers, 2001: 87).

2.5.2   FINANCIAL FLEXIBILITY

Financial flexibility refers to the process by which a firm builds and maintains adequate financial reserves in the normal course of operations to enable it take advantage of investment opportunities or deal with contingencies as and when they arise. It involves a process whereby firms reserve large amounts of cash (retained earnings) and marketable securities or have unused debt capacity to enable them to undertake projects without having to otherwise issue the more expensive form of equity financing. This process is also referred to as financial slack because it creates alternative options for a firm that would otherwise reject a viable project based on its financial constraints.

Like information asymmetry, financial flexibility is linked to the trade-off theory because it provides some rationale for the financing behaviour of firms. Firstly, the most profitable firms usually generate financial slack internally and therefore have little reason to issue new equity or debt when the need arises (Smart *et al.*, 2007: 461). Secondly, a firm that has unused debt capacity is provided with some financial flexibility when the need for further financing is required, and this can impact significantly on its increasing or decreasing levels of debt.

According to Brigham and Ehrhardt (2008: 632), because of information asymmetry,[1] firms reserve a borrowing capacity in order to take advantage of good investment opportunities. This causes the actual debt ratios observed to be lower than those suggested by the trade-off model, explaining why certain large and profitable firms usually have lower debt ratios. This is the major inconsistency associated with the trade-off theory's prediction and suggests the existence of an alternative form of financing behaviour among firms.

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[1] This is a situation where the availability of information differs between managers and shareholders. Managers are assumed to be better informed about their own firm's prospects than outside shareholders, so their actions may mislead shareholders about the performance of the business.

Bancel and Mitto (2004: 103) and Graham and Harvey (2001: 218) found financial flexibility was the most important factor affecting corporate decisions. Firms in their study claimed that they remain flexible in the sense of minimising interest obligations, so that they do not have to shrink their business activities during an economic downturn and can take advantage of future growth opportunities through acquisitions or expansions.

2.5.3   INTEREST AND TAXES

This study assumes that all firms pay corporate taxes. So, the following observations can be made:

(i)   Tax benefits are more valuable for firms with high tax rates.

(ii)   Firms can utilize tax loss carry forwards and carry backs, but the time value for money means that tax benefits are more valuable for firms with stable, positive pre-tax income (Brigham & Ehrhardt, 2008: 585; Chew, 1993: 145).

Empirical research supports certain theoretical predictions on corporate and personal taxes. These are outlined by Smart *et al.* (2007: 478) and include the following:

- The higher the corporate income taxes, the higher the equilibrium leverage level so that higher corporate taxes cause debt ratios to increase for most firms.

- The higher the personal tax rate on equity-related investment income (dividends and capital gains), the higher the equilibrium leverage level will be and this causes debt ratios among firms to rise. A high tax rate is consistently and positively associated with higher leverage (Frank & Goyal, 2003: 18).

- The higher the personal tax rate on interest income, the lower the equilibrium leverage level will be. When taxes are imposed at both the corporate and personal levels, the debt's tax advantage usually appears to be lower than when there is corporate income tax alone (Brigham & Ehrhardt, 2008:620). Notably, higher personal taxes on interest income may lead to a net tax disadvantage.

Higher corporate taxes lead to greater benefits from debt financing. Other factors held constant, high-tax rate firms carry more debt before the tax shield is offset by financial distress and agency costs (Brigham & Gapenski, 1994:565). Graham and Harvey (2001:210) found that the tax advantage is more important for large, regulated, dividend paying firms, those with a high corporate tax rate and large tax incentives to use debt. However, they found very little evidence to suggest that firms consider the impact of personal taxes when deciding on their debt policy.

The use of debt in the capital structure of firms has both implicit and explicit costs. The explicit cost is the rate of interest charged on debt, while the implicit costs arise when equity shareholders demand a higher return on their investment due to the inclusion of risky debt in the capital structure (Brealey et *al.*, 1995: 387). If interest rates increase, existing equity and existing debt drop in value, but because the former falls by more than the latter, a company is left seemingly highly leveraged. Thus, Frank and Goyal (2003: 8) predict that an increase in interest rates increases leverage.

Graham and Harvey (2001:210) also discovered that firms with foreign interests issue debt when foreign tax treatment is favourable. This reflects in their capital structures and explains the higher leverage ratios. In addition, a higher marginal tax rate increases the tax-shield benefit of debt. Non-debt tax shields are a substitute for the interest deduction associated with debt so that net operating loss carry forwards, depreciation expense and investment tax credits are negatively related to leverage (Smart *et al.,* 2007: 505 and Frank & Goyal, 2003: 8). This finding is consistent with the static trade-off theory of the optimal capital structure.

By contrast, the studies of Harris and Raviv (1991: 334) found that leverage is positively related to the non-debt tax shields. The rationale behind their finding is that assets that generate such tax shields act as collateral for additional debt (Smart *et al.*, 2007: 475) thereby giving the firm an incentive to use more. This contrasts with the predictions of the trade-off theory.

Consequently, Myers (1984: 588) admitted that it is impossible to classify firms based on their tax status without classifying them on other dimensions as well. This is because firms with tax loss carry forwards may also be those in financial distress, and have high debt ratios by

definition. Firms with high operating profitability and plenty of unshielded income may also have valuable intangible assets and growth opportunities, making it hard to classify them into either higher or lower leverage levels.

Similarly, transaction costs or costs of issuing debt impact more on smaller than on larger firms, because transaction costs discourage the use of debt among smaller firms. Graham and Harvey (2001:215) found limited evidence to support the notion that firms consider transaction costs as a limiting factor when issuing debt.

2.5.4 EARNINGS VOLATILITY AND PROFITABILITY

The trade-off theory predicts that more profitable firms carry more debt since they have more profits that need to be protected from taxation (Frank & Goyal, 2003: 7). Highly profitable firms have a lower expected probability of bankruptcy because they are more asset-intensive and have the necessary collateral should they default on debt. This suggests that highly profitable firms should have the capacity to carry more debt.

Empirical evidence, however, shows that highly profitable firms in any given industry tend to borrow the least (Chen & Strange, 2005: 29; Frank & Goyal, 2003: 3 and Myers, 2001: 89). The logical explanation for this observation is that profitable firms like Merck, Microsoft and major pharmaceutical companies have the ability to retain a significant amount of their profits as retained earnings which they then use to finance future growth opportunities without the need to issue new debt or equity. This implies that such firms exhibit an alternative financing behaviour which contrasts to the trade-off theory.

Nonetheless, a progression of empirical literature shows a lot of controversy regarding the exact effect profitability has on leverage. According to Smart *et al.* (2007:505), "recent research finds no such negative relationship between firm or industry profitability and leverage...," and this leaves the labelling of the relationship unclear.

Frank and Goyal (2003: 3) found a positive relationship between profitability and book-value leverage, yet the relationship is negative when they use market-value leverage. They also note that over the decades, evidence has been gradually moving into conformance with the predictions of the trade-off theory. A recent study by Abor (2005: 438) on firms listed on the Ghanaian stock exchange confirms this prediction. He found that profitable firms do use more debt in their capital structures.

Myers (2001: 89) concludes that the trade-off theory cannot account for the correlation between high profitability and low debt ratios, but suggests the reasons for this anomaly lie in the extremes of managerial conservativeness or aggressiveness. He states that: "the trade-off theory is in immediate trouble on the tax front because it seems to rule out conservative debt ratios by tax-paying firms. If the theory is right, a value-maximizing firm should never pass up interest tax shields when the probability of financial distress is low …"

In conclusion, the relationship between profitability and leverage is uncertain in terms of the trade-off theory and it is plausible that other theories, like the pecking-order theory, explain it better.

The negative relationship between leverage and earnings volatility highlights the importance of bankruptcy costs in the capital structure decision-making process. Earnings volatility relates to higher business risk which results in the increased variability of a firm's cash flows. Firms with more volatile cash flows face higher expected costs of financial distress and should accommodate less debt (Bancel & Mitto, 2004: 128; Frank & Goyal, 2003: 8). Volatile cash flows reduce the probability that tax shields are maximally utilised. Bancel and Mitto (2004:128) conclude that firms with higher earnings volatility are less likely to attract investor financing as this is an indication that such firms have poor credit ratings.

Evidence shows that firms are concerned about their earnings volatility which is consistent with the trade-off theory's prediction that firms reduce their debt usage when the probability of bankruptcy is high (Graham & Harvey, 2001: 211). Therefore, the tentative conclusion is that

higher earnings volatility varies inversely with leverage and that firms with volatile cash flows tend to accommodate less debt in their capital structures.

2.5.5   GROWTH, SIZE AND ASSET TYPE

Growth, size and asset type are variables that tend to be linked. In most cases, in order for a firm to grow in size, it has to accumulate its asset base. This can only be achieved if the firm has available growth options on which to capitalize. For the purposes of this discussion, however, these three variables are looked at individually and efforts are made to link them where necessary.

The trade-off theory predicts that larger, more mature firms use more debt in their capital structures (Frank & Goyal, 2005:3). Such an observation incorporates size, but does little to explain either the growth or the asset structure of such firms. According to Smart *et al.* (2007: 506), "empirical evidence on the relationship between leverage and the firm's growth rate is mixed." Some studies found that rapidly growing firms use more debt than slow growing firms (Brigham & Ehrhardt, 2003: 503 and Brigham & Gapenski, 1994: 592), while other studies, (Frank & Goyal, 2003: 10) label this relationship unclear because it depends on whether growth is by physical capital, in which case high debt ratios are implied, or by human capital, which implies low debt ratios.

High sales growth and increased debt usage are positively correlated so that high sales allow for more debt usage (Frank & Goyal, 2003:10) if we assume that such sales are fairly predictable. Therefore, firm characteristics are important for leverage decisions. So, for instance, the level of sales is particularly important for non-dividend paying firms, younger firms and small firms, while larger firms are more concerned about tax factors than are smaller firms (Frank & Goyal, 2003: 30).

In contrast, growth as measured by the market-to-book assets (MTB) ratio (a measure of the firm's growth options) is negatively related to leverage. Growth options depend more on intangible than on tangible assets, so that the expenditures of growth companies, such as those

involved in advertising or research and development (R & D) tend to have less debt (Smart *et al.*, 2007: 504). Graham and Harvey (2001: 194) define growth firms as smaller companies with lower credit ratings, a higher proportion of management ownership or a greater chance of being privately owned. These firms also have a lower incidence of paying dividends and a lower proportion of foreign revenue.

There is a positive relationship between leverage and firm size in that larger firms borrow more than smaller firms. The trade-off theory predicts that larger, more mature firms use more debt. Size, measured by assets and sales, is an inverse proxy for earnings volatility (Frank & Goyal: 2003:7). Larger firms, it is anticipated, are well-established and have a greater diversified pool of assets; less earnings volatility and lower financial distress that enable them to carry more debt (Smart *et al.*, 2007: 506; Rajan & Zingales, 1995: 1422).

Asset tangibility measures tangible assets as a fraction of total assets. The positive relationship between asset tangibility and leverage shows that tangible-asset-rich firms use more debt than do firms that rely more on patents, copyrights and other intangibles (Akhtar, 2005: 326; Frank & Goyal, 2005: 21; Brigham & Ehrhardt, 2003: 503 and Samuels *et al.,* 1997:663). The logical conclusion here is that firms or industries with more tangible assets, like real estate industries/firms, use more debt in their capital structures than firms/industries with intangible assets, like R and D or advertising industries/firms. This is in agreement with the prediction of the trade-off theory.

Other empirical evidence points out that the level of regulation of firm or industry will have an impact on the amount of leverage used. Frank and Goyal (2003: 8) found that regulated or state-owned firms are highly leveraged, because they tend to have more stable cash flows arising out of the lower business risk or competition within that industry, which reduces the expected costs of financial distress.

Similarly, Smart *et al.* (2007:508) observe that most state-owned firms are heavily indebted because they cannot raise equity capital from private investors in the same way that privately owned firms can. The process of privatization usually impacts on the operating and financing

policies of privately owned firms thereby lowering the amount of leverage they can use. State-owned firms tend to have more debt than do comparable privately owned firms.

2.5.6   MANAGERIAL ENTRENCHMENT AND OWNERSHIP STRUCTURE

Managerial entrenchment refers to the extent to which managers fail to experience the full range of corporate governance and control mechanisms including monitoring from the board, threats of dismissal or takeover, and stock- or compensation-based performance incentives. Entrenched managers, by definition, have discretion over their firms' leverage decisions (Berger, Ofek & Yermack, 1997: 1411).

Smart *et al.* (2007: 507) claim that the evidence on the relationship between managerial entrenchment and leverage is fairly clear-cut. Entrenched management teams prefer to employ less debt, even when this policy is harmful to the firms' shareholders, yet under unexpected events, such as a takeover threat, they respond by increasing their debt levels (Berger *et al.,* 1997: 1411).

It is therefore impossible to tell with certainty whether such decisions are made in the interests of all shareholders. However, Arnold (2005: 539) argues that among firms without a dominant shareholder or a diffuse shareholder base, recapitalization that substitutes equity for debt can result in a concentration of shares in the hands of a smaller but more proactive group. This means that if managers are made part of the shareholder owning group there is likely to be greater alignment of shareholder and manager interests.

Managerial entrenchment is also linked to long tenure in office and other compensation-based incentives that are provided to top management, including the rights to share firm ownership. It therefore relates closely to the ownership structure of a business and influences the attitudes or decisions made by management about the welfare of their business.

If management has voting control, for instance, but is not in position to acquire any more stock, it may choose debt over equity for new financing. Conversely, it may decide to use equity if the firm's financial position is weak and the use of debt would increase the risk of default (Brigham & Ehrhardt, 2003: 503). By choosing the latter course of action, management will have less debt in its capital structure and will thereby run the risk of a takeover bid. Similarly, a manager wishing to protect his/her tenure in office could do so by increasing debt for equity in the company's capital structure, because this could maximise the voting power of his/her own shareholding (Smart *et al.*, 2007: 507). Such decisions are usually taken without regard to the common interests of other shareholders and may be detrimental to the business.

2.5.7   INDUSTRY

Empirical studies show that wide variations in the use of financial leverage occur both in firms across industries and in firms within the same industry (Brigham & Ehrhardt, 2008: 574; Chen & Strange, 2005: 14 and Brigham & Gapenski, 1994:596). Yet specific industry characteristics like asset risk, asset type, the level of regulation or competition and, therefore, levels of business risk, are roughly the same for any industry.

Firms within one industry share more similarities than those in different industries and particular industries tend to retain a relative leverage ratio ranking over time. Firms in the pharmaceuticals, instruments, electronics and food industries will tend to have low leverage ratios, while firms in the paper, textile, mill products, steel, airlines and cement industries will tend to have a consistently higher leverage (Harris & Raviv, 1999: 334).

This means that firms within a given industry are expected to operate at fairly similar levels of leverage in order to be competitive. Empirical evidence by Brigham and Ehrhardt (2008: 564), Myers (2001: 82) and Brigham and Gapenski (1994: 596) does not support this trend for firms within a given industry which suggests that there are other firm-specific variables that affect the financing decisions of firms and which would purportedly explain this variation in debt usage. Therefore, the trade-off theory fails to explain this anomaly by asserting that debt ratios should be clustered within industries. Furthermore, actual debt ratios vary from firm to firm, and over

time, when the amount of debt a firm has is measured relative to the market value of equity,[1] and firms do not necessarily rebalance their optimal debt ratio with changes in equity prices (Brigham & Ehrhardt, 2008: 583; Graham & Harvey, 2001: 211). Myers (1984: 577) contended that there must be costs and therefore lags in adjusting to the optimum because firms cannot immediately off-set random events that bump them away from this optimum. This results in an observed cross-sectional dispersion of actual debt ratios across a sample of firms even within the same industry.

2.5.8   LIMITATIONS OF THE TRADE-OFF THEORY

The trade-off theory is the "mainstream" capital structure theory of today because it is regarded as the superior explanation for certain actual financing patterns compared to the other theories put forward (Smart *et al.*, 2007: 500). It argues that neither "no debt" nor "all debt" is necessarily bad, while a moderate level of debt is good. It also predicts a reversion of actual debt ratios towards a target or optimum and a cross-sectional relationship between average debt ratios and asset risk, profitability, tax status and asset type (Myers & Shyam-Sunder, 1999: 220). However, the critical question to ask is whether this model explains the actual financing behaviour observed among firms (Fama & French, 2002:29; Brigham & Gapenski, 1994:565).

Firstly, empirical studies show that this model provides some explanation for the financing behaviour of firms (Frank & Goyal, 2003:7). Several studies have examined models of financing behaviour to see whether firms' financing decisions reflect adjustments toward a target capital structure. The studies of Hovakimian (2004: 1049), Fama and French (2002: 23) and Myers and Shyam-Sunder (1999: 220) provide some evidence that this occurs, but the explanatory power of the models is very low, suggesting that the trade-off theory only captures part of the actual financing behaviour and its empirical support is weak.

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[1] Increased leverage relative to equity results in a decline in equity prices relative to the cost of debt or is due to increased debt usage.

Secondly, it is extremely difficult for financial managers to quantify all the costs and benefits of debt financing which makes it impossible to establish the capital structure that truly maximises firm value. Some researchers believe such a structure exists for every firm, but that it changes substantially over time as firms' operations and investors' preferences change, without materially affecting a firm's value (Brigham & Gapenski 1994: 571). Other research provides mixed support for the notion that firms trade-off costs and benefits to derive an optimal debt ratio (Graham & Harvey, 2001: 211).

Thirdly, the trade-off theory suggests that firms will reduce their debt levels when financial distress becomes high or the chances of bankruptcy increase. However, some empirical studies by Chen and Zhao (2004: 24) and Frank and Goyal (2003: 7) have argued that it is unlikely firms will reduce their debt levels when their bankruptcy levels (or levels of financial distress) are moderate or low. Warner (1977) and Altman (1984) suggested that such costs are insignificant when compared with the overall market value of the business prior to bankruptcy meaning that a confirmation of such a relationship could produce conflicting results.

Smart *et al*. (2007:500) identify three empirical irregularities which the trade-off theory fails to explain. These include the following:

- Empirical studies find that the most profitable firms in an industry have the lowest debt ratios. This violates the fundamental prediction of the trade-off model that firms with more profits should use more debt to shelter their income from taxation.

- Leverage-increasing events almost certainly signal an increase in share prices while leverage reducing events reduce share prices. This observation goes against the trade-off theory because it implies that firms systematically use less debt in their capital structures.[1]

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[1] Hovakimian (2004) explains the effect of leverage increasing and decreasing events on the firm's capital structure.

- In practice, debt can be issued more frequently than equity since the latter invariably signals a decline in the firm's share price. In contrast, the trade-off theory argues that firms will adjust their equity or debt levels more frequently in order to attain an optimum capital structure.

The inability of the trade-off theory to explain certain dominant observations of capital structure choice, like firm profitability or the variation of debt ratios across firms in the same industry, suggests that:

(i)   there are other firm and economic variables that influence the decisions firms make in their choice of financing; and,

(ii)   evidence of alternative or actual financing behavioural patterns can be better explained by other theories such as the pecking-order theory, the signalling theory and the windows of opportunity theory. A review of these theories is therefore critical to explaining variations in the financing behaviour of firms.

Finally, the majority of empirical research today has been conducted on the more industrialized countries in Europe and America. The lack of adequate empirical work on the financing decisions observable among the less-industrialized or less-developed countries of Africa raises unanswered questions about these findings. This study seeks, in part, to establish whether such findings, theoretical or empirical, apply equally to the less-developed setting of Africa, particularly to South Africa.

2.6 THE PECKING-ORDER THEORY

2.6.1   INTRODUCTION

There is an argument that firms do not try to reach the 'optimal' target capital structure as directed by theory. This is because managers tend to follow the line of least resistance and finance their operations with the least costly form of financing (Arnold, 2005: 536).

According to Frank and Goyal (2003: 218), the pecking-order theory is among the most influential theories of corporate finance and it derives its influence from the view that it fits naturally with certain facts about how firms obtain and use external financing. The pecking-order theory presents the strongest challenge to the trade-off theory because it offers some explanation for the alternative financing patterns found among firms and which the trade-off theory has failed to explain (Smart *et al.*, 2007: 406; Myers & Shyam-Sunder, 1999: 219).

2.6.2   THE PECKING-ORDER THEORY DEFINED

The following corporate financing habits are typical of the pecking-order theory:

(i)   Firms prefer internal financing (retained earnings) to external financing and that information asymmetries are assumed relevant for external financing.

(ii)   Managers tend to maintain dividend payments and they neither increase nor decrease them in response to temporary fluctuations in profits.

(iii)   If the firm must obtain external financing, it will issue the safest security first, that is, debt before equity. If the internally generated cash flows exceed capital investment opportunities, the excess will be used to pay down debt rather than retire equity.

(iv)   If the internally generated cash flows are exhausted, firms will work down the pecking-order, from safe to riskier debt.

(v)   The firm's debt ratio reflects its cumulative requirement for external financing (Frank & Goyal, 2003: 4; Graham & Harvey, 2001: 235; Myers & Shyam-Sunder, 1999: 92 and Samuels *et al.*, 1997: 661).

Loosely defined, the capital structure decisions of firms under this theory are driven by the firm's desire to finance new investments with internally generated funds then with low-risk debt, and then new equity as a last resort.

Under this theory, there is no optimal capital structure that maximises firm value (Chen & Strange, 2003: 13; Myers & Shyham-Sunders, 1999: 220). The attraction of interest tax shields

and the treatment of financial distress are assumed second-order, so that debt ratios change when there is an imbalance of internal cash flow, net of dividends and real investment opportunities. Highly profitable firms with limited investment opportunities work down to low debt ratios, while those firms whose viable investment opportunities exceed internally generated funds borrow more and more. Hence, changes in the firm's debt ratio are driven by the need for external financing and not by the need to reach the optimal capital structure (Myers & Shyam-Sunder, 1999:221).

The pecking-order theory is based on two assumptions: firstly, according to informational asymmetry, managers are better informed about their own firm's prospects than are outside investors. So, when they decide to issue new equity to finance new projects it is almost invariably taken by outside investors as a signal that the firm's prospects, as seen by management, are not good and that the said issue is therefore overvalued (Brigham & Ehrhardt, 2008: 580; Smart *et al.,* 2007: 501 and Samuels *et al*., 1997: 661). This causes the firm's share price to fall (Brigham & Ehrhardt, 2008: 567).

Conversely, management's decision to offer new debt to finance a project is taken, by outside investors, as a positive signal that the firm's prospects are good. Empirical evidence supports the rationale that most firms with extremely bright prospects prefer not to finance new projects through new share offerings, while firms with poor prospects sell shares, because the latter means bringing in new investors to share the losses if and when they arise.[1]

Secondly, the pecking-order assumes that managers act in the best interests of their existing shareholders, maximizing the value of existing shares, so that, they will even forego positive NPV projects if accepting them forces the firm to issue undervalued equity at higher issuing costs to new investors which would, in part, disadvantage their existing shareholders (Smart *et al.*, 2007: 461; Samuels *et al*., 1997: 661).

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[1] The effect of asymmetric information causes investors to make inferences about the financing decisions of firms based on the choice of financing. See Brigham and Ehrhardt (2008: 567), Brigham and Ehrhardt (2003: 491) and Myers (1984: 585). Myers (2001: 92) asserts that the fall in price is about 3% of the pre-issue market capitalization of the firm and depends on the magnitude of the informational asymmetry.

Therefore, in order to capitalize on viable future investment opportunities and to avoid subjecting themselves to the discipline of capital markets, firm managers decide to maintain a reserve borrowing capacity of retained earnings comprising cash and marketable securities or an unused debt capacity. Such financial slack provides them with the necessary financial flexibility to take on projects without having to issue external financing.

By maintaining financial slack, firms control for the expected flotation costs that arise with refinancing through equity. Also, transaction costs associated with debt issue, although lower, inevitably increase with any additional financing because the risk levels and the chances of default also increase.

The most notable contribution of the pecking-order theory is that it offers some explanation for the negative relationship between past profitability and the debt ratios of firms, a practice that the trade-off theory fails to explain. By retaining past profits or having cash and marketable securities, profitable firms develop significant financial slack to enable them to target viable investment opportunities as and when they arise, without the need to issue either new debt or equity.

The pecking-order model helps to explain why these profitable firms often borrow so little. It is not that they have very low target ratios but that they do not need outside financing. Less profitable companies, with an extensive investment programme, issue debt because they do not have sufficient funds available for these capital investment programmes and because debt is first in the pecking-order for externally raised financing (Arnold 2005: 536). Nonetheless, recent studies are gradually finding a positive relationship between profitability and leverage, thereby shifting their focus to the trade-off theory as a better predictor of this financing pattern (Frank & Goyal, 2003: 29).

2.6.3 PREDICTORS OF THE PECKING-ORDER THEORY

The pecking-order theory is based primarily on the existence of informational asymmetry between firm managers and outside investors (Chen & Strange, 2005: 13). If, for example, a firm announces an issue of ordinary shares, this will be assumed to be good news for investors as it reveals a growth opportunity with positive NPV.

However, it would be a bad signal if the managers believe that the assets-in-place are overvalued by investors and decide to try and issue overvalued shares (issuing shares at too low a price transfers value from existing shareholders to new investors with the reverse here also true). Therefore, share prices will eventually fall because an announcement to issue new shares is usually taken as a signal that management have lost confidence in the firm's prospects (Smart *et al.*, 2007: 501; Myers, 2001: 91).[1]

Conversely, a debt offering is usually taken as a positive signal (Brigham & Ehrhardt, 2008: 580). Investors in debt are less exposed to errors in valuing a firm, since debt has the prior claim on assets and earnings. Therefore, an announcement to issue debt has a smaller impact on the stock price than an announcement to issue equity. For investment-grade issues, where the default risk is very small, the share price impact should be negligible (Myers, 2001:92).

The pecking-order theory also attempts to explain the stock market's reaction to leverage-increasing and leverage-decreasing events.[2] According to Smart *et al.* (2007: 501), firms with valuable investment opportunities finance projects internally or use the least risky form of debt if they have to obtain external financing. If they issue equity, however, investors will most likely translate this into an indication that the firm's shares are overvalued. This results in a decline of the firm's share price (Brigham & Ehrhardt, 2008:580).

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[1] The dilemma that confronts managers and investors regarding the mis-pricing of stock due to informational asymmetries is clearly explained by Myers and Majluf (1984). See also Brigham and Ehrhardt (2008:579), Smart *et al*, (2007: 501), Pike and Neale (2006:505) and Harris and Raviv (1991:306)

[2] Leverage increasing events include stock repurchases and debt for equity exchange offers, while leverage decreasing events constitute stock issues or equity for debt exchange offers.

As a control measure, therefore, managers, who act in the best interests of their existing shareholders, maintain an adequate reserve borrowing capacity in order to otherwise control for decisions that could affect their firm's share price. However, with insufficient reserves they pass up viable investment opportunities.

So the important questions to ask here are:

(i)   Do firms issue debt securities when internal funds are not sufficient to fund their activities?
(ii)   Do firms issue equity when debt and other cheaper sources of financing are exhausted?
(iii)   Do firms consider financial flexibility to be important?

Graham and Harvey (2001:218) found that firms value financial flexibility and argued that they do so in order to make provision for future acquisitions and expansions. However, they also found that the importance of financial flexibility is not related to informational asymmetry or growth options in the manner suggested by the pecking-order theory.

The pecking-order theory reflects the firm's cumulative requirement for external financing. Hence, each year's requirement is expected to equate with the internally generated cash flows minus the cash spent on capital investments and dividends, assuming that the financial deficit is covered entirely by borrowing at low or moderate debt levels. It also explains why the bulk of external financing comes from debt (Myers, 2001:93). Accordingly, more profitable firms borrow less, not because they have low debt ratios but because they have more internal financing available. Less profitable firms have no choice but to seek external financing and consequently accumulate more external debt (Myers, 2001: 93).

Capital expenditures or investments represent outflows and directly increase the financing deficit as discussed by Myers & Shyam-Sunder (1999: 223). These expenditures are positively related to debt under the pecking-order theory. In addition, R and D expenditures increase the financing deficit and correlate positively with leverage (Frank & Goyal, 2003:5).

Brigham and Ehrhardt (2008: 582) found that the firm's optimal capital structure is related to its set of investment opportunities. Firms with many profitable investment opportunities maintain their ability to invest by using low levels of debt which is consistent with maintaining a reserve borrowing capacity. Firms with fewer investment opportunities, but no financial slack, have higher levels of debt and substantially higher interest payments.

Dividend payments also form part of the firm's financing deficit. By holding constant the amount of debt and investment an increase in equity issues results in greater dividends and, in turn, gives rise to higher burdens of personal taxation. Since financing under this theory is assumed to be with debt, it implies that dividend-paying firms have greater leverage (Frank & Goyal, 2003: 22).

Fama and French (2002:4) also contend that firms with large expected investments maintain low-risk debt capacity to avoid foregoing future investments or face the danger of financing them with new risky securities. It is therefore expected that other factors being equal, firms with larger expected investments have less current leverage. However, it is also possible that the balancing of financing costs may force many firms with persistently large investments to have high leverage. This seems unlikely for dividend payers since they are assumed to have retained earnings (low payouts) that can help to maintain less leverage.

On the other hand, Fama and French (2002:5) discovered that dividend-paying firms have higher earnings relative to investments, while non-dividend-paying firms show the reverse, so that, for the latter, a positive relationship between leverage and investments, of the simple pecking-order theory, tends to dominate. They also predict that a volatility of cash flows affects both dividends and debt. In order for firms to lower the chance of issuing new risky securities or foregoing profitable investments when cash flows are low, firms with more volatile net cash flows maintain lower dividend payouts and hence, less leverage.

Finally, we might expect firms with volatile stocks to be those whose beliefs and therefore financing decisions are quite volatile too and it seems plausible that such firms have higher leverage (Frank & Goyal: 2003: 5).

2.6.4 LIMITATIONS OF THE PECKING-ORDER THEORY

Despite the growing efforts by academics to justify the relevance of the pecking-order theory as an explanation for certain financing behavioural patterns, this theory fails to explain certain capital structure regularities. Smart *et al.* (2007:502) assert that it fails to account for the effect that taxes, bankruptcy costs,[1] security issuance costs and investment opportunities have on the amount of debt a firm uses.

Furthermore, they claim that it ignores the agency problems that arise when too much financial slack makes managers immune to market discipline. They also question its relevance in explaining the negative relationship between leverage and profitability, one of the key underpinnings of this theory. Frank and Goyal (2003: 29) found this relationship to be quite different from common belief, showing that the sign on profit is moving in the direction of the predictions according to the trade-off theory.[2] It is therefore necessary to review the empirical evidence pertaining to this theory in order to determine its relative strengths and weaknesses in explaining financing practices.

2.6.5 EMPIRICAL STUDIES

Empirical evidence on the pecking-order theory centres on establishing whether firms' financing decisions are driven by the desire to finance new investments in the following order: first, through the use of internally generated funds, then with low risk debt, and then, when internal funds are insufficient to fund further growth, with equity as a last resort, because an issuance of equity is perceived by the market as a bad signal and results in new equity financing being relatively expensive.

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[1] Chen and Liang (2004: 24) found that the strength of the pecking-order theory varies with the relative costs of debt-equity financing and the concerns over bankruptcy risk.

[2] Frank and Goyal (2003: 217-248) also disprove the pecking-order's prediction that net debt issues mirror the financing deficit, and found that net equity issues almost perfectly follow the financial deficit and that net debt issues are essentially uncorrelated with the financial deficit as predicted by the pecking-order theory. In contrast to this observation, Leary and Roberts (2005:1) found that over 36% of firms in their sample comply with the pecking-order's prediction that firms will issue debt before equity.

In a typical firm, influenced by informational asymmetries, the capital structure is driven by the need for external financing and not by the need to maintain an optimal capital structure.[1] In other words, observed leverage is a sum of past events (Frank & Goyal, 2003:5).

The approach followed by most researchers is to identify and link together certain essential, exogenous and endogenous variables that possibly indicate or influence financing behavior in terms of theory. The behaviour or movement of such variables observed singularly in correlation or regression assists researchers to determine whether such a theory applies to observed practice. The evidence supporting this theory is mixed. Some studies find the pecking-order theory convincingly describes certain aspects of financing behaviour, while others find it less credible. According to Myers and Shyam-Sunder (1999:242), the pecking-order is a much better first-cut explanation of debt-equity choice, at least for mature public firms. They assert that the strong performance for the pecking-order theory does not occur because firms plan to fund unanticipated cash needs with debt in the short run, but that they actually plan to finance all anticipated deficits with debt, a practice consistent with this theory. They doubt, however, that this theory would do well at explaining the financing behaviour of a sample of growth firms investing heavily in intangible assets.[2]

Similarly, Frank and Goyal (2003: 237) found that the pecking-order theory performs worse for firms that are commonly thought to be subject to adverse selection problems such as small and high growth firms. Their results show that the pecking-order theory does in fact perform better for larger firms, that is, dividend paying firms, or firms with moderate leverage, which are usually confronted with less severe adverse selection problems. They conclude that firm size is critical and that the accuracy of the pecking-order theory at predicting financing behaviour increases with the size of the firm.

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[1] Under the pecking-order theory, the variation in a firm's leverage is driven by the firm's net cash flows (cash earnings minus investment outlays), while the trade-off theory is driven by the need to maintain an optimal capital structure. See Fama and French (2002:1).
[2] The empirical approach used by Myers and Shyam-Sunder to reach these findings is strongly contested by Chirinko and Singha (2002: 417-425) who cast a shadow over the findings.

Regarding other variables that influence financing behaviour according to the pecking-order theory, Baskin (1989: 33) found that leverage varies positively with past growth and inversely with past profitability so that large mature firms which paid higher dividends in the past tend to borrow more. The basic premise here is that such firms borrow because they need funds and since information asymmetries place limitations on equity finance, debt becomes their incremental source of financing.

Fama and French (2002:2) examined the predictions about how long-term leverage and the dividend payout ratios vary across firms, using profitability and investment opportunities as their main variables. They find that pecking-order considerations affect dividend decisions. More specifically, since it is expensive to finance new investments with new risky securities, dividends become less attractive for firms with less profitable assets-in-place, large current and expected investments and high leverage. After controlling for other effects, they found that more profitable firms pay out more of their earnings as dividends but that the payout ratio is negatively related to investment opportunities and leverage.

When they investigated the pecking-order considerations about leverage, they found that debt increases if investments exceed retained earnings and falls when investments are less than retained earnings. Holding investments fixed, leverage is lower for more profitable firms and given profitability, leverage is higher for firms with more investments (Fama & French, 2002:2).

Their observation concurs with that of Frank and Goyal (2003:29) who found that dividend-paying firms have lower leverage than non-dividend-paying firms. They argue that although dividends are an exogenous part of a firm's financing deficit and that according to the pecking-order theory, should be associated with higher leverage, firms may endogenously pay dividends when they have good current cash flow and relatively poor internal investment opportunities. This would cut back on the need for refinancing. Conversely, Fama and French (2002:5) found that non-dividend-paying firms may have higher investment opportunities relative to earnings and this justifies their need to use more debt.

Empirical evidence regarding the relationship between financial flexibility, information asymmetry and the pecking-order theory is largely inconclusive. Graham and Harvey (2001:219) found that financial flexibility is more important for dividend-paying than non-dividend-paying firms. This contrasts with the predictions of this theory that dividend-paying firms have more stable earnings and, hence, less information asymmetry. They found that financial flexibility is not related to information asymmetry or growth options in the manner suggested by the pecking-order theory. So they concluded that financial flexibility is not driven by the factors behind the pecking-order theory. They however made the following observations:

(i)   Having insufficient internal funds is of relative influence to the decision to issue debt. Smaller rather than larger firms, which suffer from a greater degree of information asymmetry, are more likely to issue debt in the face of insufficient internal funds.

(ii)   Most firms in their study sample agree that they are reluctant to issue stock when they feel it was undervalued and that they issue convertible debt instead. They note that the impact of a stock undervaluation is most likely to be felt among large dividend-paying firms than small non-dividend paying firms. They conclude that in equity decisions, the relative importance of stock valuation on equity issuance is not related to information asymmetry as indicated by the small size of the firm and non-dividend-paying status, though it is more important for firms with low executive ownership.

They also note that having insufficient internal funds has some relative importance on the decision to issue debt, which is consistent with the pecking-order model since smaller, rather than larger, firms indicate that they issue debt when internal funds are insufficient. This observation seems to support the conclusion that smaller firms suffer from information-asymmetry-related equity undervaluation problems. However, when they examine how equity undervaluation affects financing decisions, the support for the pecking-order wanes (Graham & Harvey, 2001: 219).

In general, these findings are not consistent with the pecking-order theory that undervaluation, caused by information asymmetry, will cause firms to avoid equity financing. Helwege and Liang (1996: 457) and Roberts and Leary (2004: 36) find that asymmetric information variables have no power to predict the relative use of bonds over equity.

The credibility of the pecking-order to indicate certain financing patterns among firms falls short at a number of instances. Frank and Goyal (2003:217) challenge the view that debt almost always constitutes a firm financing deficit as suggested by the pecking-order theory. These researchers find that contrary to the pecking-order theory, net equity issues track the financing deficit more closely than do net debt issues. They also note that while some large firms exhibit some aspects of pecking-order behaviour, the evidence is not robust.

Moreover, until of late, the pecking-order theory has been highly regarded because of its ability to explain why profitable firms have observably lower debt ratios. The rationale that such firms have accumulated internal cash reserves to enable them finance expansion, and hence, justify their lower debt levels, has since been disputed. Frank and Goyal (2003: 29) found a positive relationship between profitability and book-value leverage. Similarly, Hovakimian, Opler and Titman (2001: 3) presented empirical evidence that profitability may be positively associated with leverage increasing financing decisions.

2.6.6   SUB-CONCLUSION

In conclusion, the extent to which firms adhere to the pecking-order theory of financing hierarchy is uncertain. The controversy surrounding the credibility of this theory as explaination for financing behaviour suggests that there are other additional (and unaccounted for) economic forces that drive the pecking-order behaviour and generate the numerous inconsistencies observed.

2.7   ALTERNATIVE CONSIDERATIONS

It is plausible to argue that the financing decisions of firms are affected by a variety of factors other than those explained in both the trade-off theory and the pecking-order theory. The rigidity of these two theories as explanations for financing decisions in their totality is due largely to the exclusion of alternative considerations (Roberts & Leary, 2005: 34). A progression of finance literature has therefore come up with other less significant theories that try to explain the deviations of financing behaviour from those most commonly described by these two theories. A brief review of these is warranted.

2.7.1   SIGNALLING AND MARKET-TIMING MODELS

The signalling theory is based on information asymmetries between managers and outside shareholders or investors. It assumes that managers with favourable inside information have the incentive to convey this information to outside investors in order to increase their share price. However, they cannot simply convey this information because shareholders will be skeptical about the statements they make. So they act in a way, or adopt a financing policy, that is prohibitively costly for less valuable firms to mimic (Smart *et al.*, 2007:502).
Shareholders are interested in obtaining information about the company's prospects and changes to financing can act as a representative signal of how management assesses the future. Increased share prices occur if managers show future optimism (Arnold, 2005:538).

Suppose, for example, managers have inside information that their firm's investment will generate abnormal returns in the future, they can consequently adopt a heavily leveraged capital structure which commits them to paying large sums to bondholders. Since investors believe that only firms with good prospects can afford to take on debt, they recognize the debt issuance as good news and bid up the firm's share price (Harris & Raviv, 1999: 311).

Conversely, equity issues are, more often than not, perceived as a negative signal and usually cause the share price to fall. The signalling theory can be regarded as instrumental in explaining the behaviour expected in terms of the pecking-order theory since both theories are strongly

influenced by information asymmetries. According to Brigham and Ehrhardt (2008: 630), the net effect of signalling is to motivate firms to maintain a reserve borrowing capacity to meet future investment opportunities with debt if internal funds become insufficient.

The literature would suggest that the signalling models have intuitive appeal, but very little empirical support. This is because they imply a positive relationship between profitability and leverage, yet most of the current empirical literature suggests a negative relationship between these two. Similarly, they posit that companies rich in growth opportunities and other intangible assets should employ more debt than mature firms rich in tangible assets for the reason that growth firms have more severe information asymmetry problems and thus a greater need to signal (Smart *et al.*, 2008:503).

2.7.2   THE MARKET-TIMING MODEL

According to the market-timing model, firm managers attempt to time the market by issuing equity when the share prices are presumed high and issuing debt when interest rates are presumed abnormally low. This means that the firm's capital structure simply reflects the cumulative effects of its manager's attempts to issue equity opportunistically (Smart *et al.*, 2007: 504; Brigham & Ehrhardt, 2008: 582).

This theory differs from the signalling theory because no asymmetric information is involved, but managers base their inference on market consensus. One suggestion put forward by this model is that high leverage levels of firms could be those that arose when the share prices were low and vice versa. However, because this theory is relatively new, few empirical studies have tested it.

2.7.3   FREE CASH FLOWS THEORY

The free cash flow theory argues that firms seek to maintain dangerously high levels of debt because they believe these high levels will increase value, despite the threat of financial distress. Free cash flows occur when a firm's operating cash flow significantly exceeds its profitable

investments and is a common practice for mature firms that are prone to over-invest (Myers 2001: 81).

According to Brealey *et al.* (1995:584), the free cash flow theory predicts that mature, "cash cow" companies are the most likely targets for leveraged buyouts (LBOs), yet they do not endorse this theory as the sole explanation for the existence of LBOs. However, for the purposes of this review free cash flows provide an alternative explanation for financing behaviour among firms.

2.8 OBSERVED CAPITAL STRUCTURES

There are varied as well as consistent observations about the capital structures of firms around the world. Smart *et al*. (2007: 455) surveyed these capital structures and observed the following:

(i)   Firms in the same industry have similar capital structures regardless of the home country.

(ii)   Capital structures vary across countries.[1]

(iii)   Leverage ratios vary inversely with financial distress costs.

(iv)   Corporate and personal taxes influence capital structures, but taxes alone cannot explain differences in leverage across firms, industries or countries.

(v)   Markets interpret leverage-increasing events as "good news" and leverage-decreasing events as "bad news."

(vi)   Corporations strive to maintain target capital structures.

(vii)   There is some evidence that within an industry, leverage varies inversely with profitability.

2.9   CONCLUSION

From the review of the related literature, it is evident that theories advanced to explain the financing behaviour of firms fall short of that objective. These theories clearly fail to explain certain financing patterns among firms, and the possible explanations for this are numerous. It is

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[1] See Booth *et al.* (2001), and Rajan and Zingales (1995).

logical to suggest that there are other numerous economic variables that these theories do not incorporate that may have an influence on the observed financing patterns.

Graham and Harvey (2001: 233) contend that the relatively weak support for many of the capital structure theories indicates that it is time to critically reevaluate the assumptions and implications of these mainline theories. Alternatively, perhaps the theories are valid descriptions of what firms should do, but corporations ignore the theoretical advice (Graham & Harvey, 2001: 233). Against this observation, it is important to investigate the capital structure patterns of listed firms in South Africa in order to check for any variations or consistencies in the capital structure patterns with what has so far been presumed from theory.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1   INTRODUCTION

As the previous chapter demonstrates, corporate capital structure choice remains a controversial issue in modern corporate finance. Despite decades of intensive research there is a surprising lack of consensus about many of the basic empirical findings (Bancel & Mittoo, 2004: 103; Frank & Goyal, 2003: 1). Existing theoretical and empirical studies do not provide clear and consistent answers to the financing patterns of firms.

As observed, existing theory and empirical tests of existing theory come predominantly from the developed and emerging markets of Europe and the United States of America with scanty evidence to explain the financing patterns of the less-developed countries of Africa (Nguyen & Ramachandran, 2003: 193). This study attempts to provide some research into the anomalies of corporate capital structure choice with regard to listed firms in South Africa.

The research methodology was designed to investigate, in part, the determinants of capital structure choice among firms currently listed on the JSE by determining whether they follow either of the two theories stated below when financing their business activities:

(i)   The trade-off theory in which firms trade-off the costs and benefits of debt financing against the costs of financial distress in order to set a target debt-to-equity ratio or gradually move towards it.

(ii)   The pecking-order theory in which firms prefer internal to external financing and debt to equity if they issue securities. Under this approach, firms have no well defined target debt-equity ratio.

The methodology was structured into a two-part empirical analysis to investigate, using the same sample, one aspect of financing behaviour from another based on these two theories and as prescribed in finance literature.

While it was evident that part of the adequate data analysis was to understand the assumptions underlying this methodology and to select the techniques best suited for a certain set of conditions, other criteria for test selection depended on the simplicity of the procedure, the ability to generalize the conclusions drawn up and the availability of computer software packages and datasets that could facilitate this procedure.

This chapter also covers the methodology applied to describing the population under scrutiny, the sources and data-types to be analysed, the choice of the appropriate sampling strategy and the data processing and analysis techniques.

3.2 TRADE-OFF THEORY

This study used the basic approach of identifying and linking together certain essential exogenous and endogenous variables that act as indicators of, or influence, the financing behaviour pertaining to the trade-off theory.

The behaviour or movement of such variables observed singly in correlation or regression assists researchers to determine whether such theory applies to observed practice. The process of testing this theory as an explanation of the financing behaviour of South African listed firms followed this approach.

3.2.1 DEFINING THE VARIABLES

This methodology followed an analysis of a set of factors that indicate financing behaviour according to either of these theories as considered in the literature. Much of the analysis was devoted to determining which factors are reliably assigned and important for presuming the optimal leverage level as specified under the trade-off theory.

In order to test the study hypotheses (section 1.3, Chapter One), it was necessary to identify the variables to be used during the study. This study identified two dependent variables and several independent or explanatory variables that act as proxies for the financing behaviour according to both the trade-off and the pecking-order theories.

3.2.2   THE DEPENDENT VARIABLE

This study used one definition for capital structure decisions as measured by the amount of leverage/debt in order to simplify the analysis. Several alternative definitions of leverage have been used in literature. Abor (2005: 441) for instance used three measures of leverage all based on book values. These include short-term debt to total capital, long-term debt to total capital, and total debt to total capital.

Chen and Strange (2005:19) used two measures of leverage based on both market and book values. These include total debt to total assets, a book value measure, and total debt to the market value of total assets, a market value measure. Frank and Goyal (2003: 12) used five alternative definitions of leverage that include those mentioned above and others that consider the interest coverage ratio instead of a debt ratio. These ratios differ based on whether book value measures or market value measures of leverage are used. They also differ in whether all debt, or only long-term debt, is considered.

Measures of leverage based on either book or market values have their relative strengths and weaknesses. According to Chen and Strange (2005: 19) and Frank and Goyal (2003: 12), market values are forward looking although their estimates may be flawed and therefore inaccurate. This study chose one broad measure for leverage based on book values for the following reasons:

(i)   Book value measures are readily available on most databases and accounting financial statements and are usually reliably assigned based on the accounting standards which can be assumed universal in the case of South African listed firms.[1]

(ii)   These values are backward looking, that is, they account for what has already taken place (Frank & Goyal, 2003: 12). This was considered ideal for the purposes of this study. Forward looking market values are usually hard to estimate and could result in spurious correlations[2] (Chen & Strange, 2005: 19).

(iii)   According to Graham and Harvey (2002: 232), financial managers focus more on book values than market values when designing their financial structure. Furthermore, firms are likely to be most concerned about book value leverage ratios because bank loan covenants are written in terms of book value (Harvey, Lins & Roper, 2004: 8).

Most studies focus on a single measure for leverage. However, it is also common to report that the crucial results are robust to an alternative definition (Frank & Goyal, 2003: 12). The following measure for leverage (the dependent variable) was therefore chosen for this study:

$$\text{Leverage } 1^3 = \frac{\text{Total liabilities}}{\text{Total book value (equity + debt)}} = \frac{\text{Total debt}}{\text{Total assets}}$$

In the interests of testing for robustness, however, this study also tested the market value measure for leverage with certain explanatory variables that provide contradictory results according to the finance literature. This measure was adopted from Chen and Strange (2005: 19) and is defined as follows:

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[1] McGregor's Bureau of Financial Analysis (BFA) provides standardized, annually audited financial statement data that facilitates a comparison of firms with differing accounting procedures and practices using the same accounting benchmark.

[2] This is a correlation that misleadingly points towards associations between variables (Defusco *et al.*, 2004: 707).

[3] Rajan and Zingales (1995: 1428) identified this measure as the broadest definition of leverage and argued that it can be used as a proxy for what is left for shareholders in case of liquidation. However, they contend that it does not give a good indication of whether the firm is at risk of default in the future and since it includes account payables, it may tend to overstate the amount of leverage.

$$\text{Leverage } 2^1 \quad = \quad \frac{\text{Total liabilities}}{\text{Total liabilities} + \text{Market value of ordinary shares}}$$

3.2.3   THE INDEPENDENT (EXPLANATORY VARIABLES)

Cooper and Schindler (1998: 41), DeFusco, McLeavey, Pinto and Runkle (2004: 703), and Kumar (2005: 60) loosely define an independent variable as that factor responsible for bringing about change in a phenomenon or situation. As far as the independent variables are concerned, this study selected several that appear in the empirical literature and are thought to impact on the dependent variable (leverage) and, thereby, reliably explain financing behaviour. It is notable that in the process of determining a relationship between the dependent and independent variables through correlation and regression analysis, certain other extraneous variables[2] were identified and assumed constant for purposes of determining any relationships.

Although such extraneous variables influence leverage and cannot be totally ignored, much of this analysis is concentrated on those factors that are reliably assigned and important for predicting leverage levels according to either of the two theories, as evidenced from the finance literature. Other extraneous or dummy variables that are not readily available or easily measurable on the available databases were excluded from the analysis and it was assumed they will remain constant.

The following is a listing of the explanatory variables that were assigned to influence financing behaviour (leverage) according to the trade-off theory. In order to test this theory, it was necessary to make judgments about the connection between observable data and the theory's expectations. While many of these judgments are uncontroversial, there was room for significant disagreement (Frank & Goyal, 2003: 4).

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[1] This measure is common to various studies that include Fama and French (2002), Opler and Titman (1994) and Bradley *et al.* (1984).
[2] Extraneous variables are factors operating in a real life situation that may affect changes in the dependent variable (Kumar, 2005: 60). These were not considered during this study, since it was assumed they will remain constant.

(i)   Financial distress

Financial distress includes, but is not restricted, to bankruptcy. Certain empirical literature uses the probability of bankruptcy as a proxy for financial distress. Bankruptcy risk is then measured using the modified Altman Z-scores[1] (Frank & Goyal, 2003: 8). Other studies, such as that of Akhtar (2005: 325), measured bankruptcy risk using the standard deviation of the first difference in operating earnings as a ratio to the mean value of a firm's total assets.

This study uses the JH de la Rey's model to test for financial distress. This model was developed by Dr JH de la Rey of the Bureau of Financial Analysis (BFA) to mirror Altman's model, but customized it to suit the South African market. This model specifies that the point of separation between financially failed and financially sound firms is zero. The further a firm's values move away from zero, the more financially sound that firm will be while the reverse here is also true. This model has achieved a success rate of 96% when classifying firms in a given sample as either financially failed or financially sound (see www.mcgregorbfa.com/financialdistress).

The trade-off theory presumes that higher costs of financial distress cause firms to lower their leverage levels overall. This theory posits a negative relationship between financial distress and a firm's debt ratio. However, higher profitability also implies lower expected costs of financial distress. Similarly, size as measured by assets or sales is an inverse proxy for earnings volatility and bankruptcy risk. High growth firms measured, using the change in natural log of assets/sales experience a higher level of financial distress and have lower expected debt levels (Frank & Goyal, 2003:7).

It was expected that, controlling for profitability, firm-size, earnings volatility, firm regulation and asset tangibility, a correlation between this book value measure of financial distress and leverage would produce a negative relationship.

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[1] Using multiple discriminant analysis, Altman (1968) shows that a combination of factors such as liquidity (working capital / assets), cumulative profitability (retained earnings / assets), productivity (earnings before interest and tax / assets), capital-turnover ratio (sales / assets), and leverage ratio (market value of equity / book value of debt) can predict more than 90% of corporate failures. A linear combination of these variables is used to create the Z-score. See Chen and Zhao (2004: 6).

(ii)   Size

Size, as measured by the amount of assets, sales or market capitalization, is an inverse proxy for volatility and for costs of bankruptcy. The trade-off theory contends that larger and more mature firms will use more debt (Chen & Strange, 2005: 20; Frank & Goyal, 2003:7). Both Akhtar (2005: 326) and Chen and Strange (2005: 20) measure size as the natural logarithm of total assets and predict it to have a positive impact on leverage. This study used the same measure and predicted a similar outcome.

(iii)   Earnings volatility

Various studies have shown that a firm's optimal debt level is a decreasing function of the volatility of its earnings (Smart *et al.,* 2007: 505; Chen & Strange, 2005: 20 and Frank & Goyal, 2003: 7). Chen and Strange (2005: 20) used the standard deviation of the return on equity over three years as a proxy for business risk and predicted this variable would have a negative impact on leverage.

Fama and French (2002: 8) assumed that larger, more diversified firms are less likely to have volatile earnings and net cash flows and therefore used firm size, measured using the natural logarithm of total book assets (ln A_t) as a proxy for volatility. However, they also acknowledged that firm size may proxy for other factors such as age and ease of access to capital markets that could affect financing decisions. Titman and Wessels (1988: 6) used the percentage change in operating income as their proxy for earnings volatility.

It was important to note the distinct link between financial distress, business risk and earnings volatility since each of these impact negatively on the use of debt. This study used the coefficient of variation of profit before tax and expected it to vary negatively with leverage (Reilly & Brown, 2003: 339; Nguyen & Ramachandran, 2006: 197).

(iv)   Profitability

This study agrees with the observation made by Nguyen and Ramachandran (2006: 194) in which they claim that there is no consistent relationship between profitability and capital structure choice (leverage). According to the trade-off theory, more profitable firms should carry more debt since they have more profits that need to be protected from taxation (Frank & Goyal, 2003: 7; Fama & French, 2002: 20). The evidence on profitability is quite different from common beliefs. Frank and Goyal (2003: 29) found that profitability only varies positively with book value leverage and not with market leverage.

Most empirical studies, however, found that profitability is negatively related to leverage (Chen & Strange, 2005: 11; Abor, 2005: 443; Fama & French, 2002; 20; Myers, 2001: 89 and Rajan & Zingales, 1995: 1457). This study measured book value profitability as the ratio of earnings before interest and tax (EBIT) to equity or (ROE),[1] and expected it to vary positively with leverage according to the predictions of the trade-off theory. However, tests on this variable were also expected to produce some conflicting results.

(v)   Industry

Firms within a particular industry share exposure to many of the same forces which lead to similar trade-offs regarding the use of debt. Furthermore, product-market competition creates pressure for firms to mimic the average leverage ratio of firms in the industry (Frank & Goyal, 2003: 8). Empirical studies show that wide variations in the use of financial leverage occur both across industries and among individual firms in the same industry (Brigham & Ehrhardt, 2008: 574; Chen & Strange, 2005: 14). Yet, specific industry characteristics like the asset risk, asset type, the level of regulation or competition and the levels of business risk are roughly the same by industry.

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[1] This measure is adapted from Abor (2005: 441) whereby he investigated the effect of capital structure on profitability for firms listed on the Ghanaian Stock Exchange. Frank and Goyal (2003: 16) used two measures for profitability: the ratio of operating profit before depreciation to assets and the ratio of income before extraordinary items to assets and found the former to perform more reliably than the latter.

Therefore, in order to test the trade-off theory, the mean (median) industry average should be positively related to firm leverage (Frank & Goyal, 2003: 7).

(vi)   Asset type

Asset tangibility, or the collateral value of assets held by a firm, has been found to be a determinant of leverage (Rajan & Zingales, 1995: 1454). The trade-off theory contends that firms with a high collateral value of assets often borrow on relatively more favourable terms than firms with high intangible assets or assets without collateral value. This suggests that there is a positive relationship between leverage and the collateral value of assets. This study adopted a measure by Nguyen and Ramachandran (2006: 197), Akhtar (2005:326) and Rajan and Zingales (1995: 1451) in which they measure collateral value of assets (CVA) as the ratio of fixed assets to total assets and expected it to vary positively with leverage.

(vii)   Growth

Growth as measured by the market-to-book assets (MTB) ratio (a measure of the firm's growth options), is negatively related to leverage. Growth options depend largely on intangible rather than tangible assets, so that growth companies such as those involved in advertising or research and development (R & D) expenditures tend to have less debt (Smart *et al.*, 2007: 504).

The trade-off theory assumes that a higher MTB ratio implies higher growth opportunities and thus higher costs of financial distress (Frank & Goyal, 2003: 7). Rajan and Zingales (1995: 1451) used the market value of assets to the book value of assets ratio as a proxy for growth/investment opportunities and found it to be negatively related to leverage. Bancel and Mittoo (2004: 122) used the price earnings (P/E) ratio as a measure for growth opportunities, while Nguyen and Ramachandran (2006: 197) and Titman and Wessels (1988: 4) used the percentage change in total assets. All these studies documented a negative relationship between their proxies and leverage.

In the interests of the available data and in order to simplify the analysis, this study used the market value of total assets to the book value of total assets ratio as a proxy for growth and expected it to vary negatively with leverage. This measure was adopted from Rajan and Zingales (1995: 1451).

(viii)   Non-debt tax shields (NDTS)/ operating loss carry forwards/ depreciation

A higher marginal tax rate increases the tax shield benefit of debt. However, non-debt tax shields(NDTS) act as substitutes for the interest deduction associated with debt, so that net operating loss carry forwards, depreciation expense and investment tax credits should vary negatively with leverage[1] (Smart *et al.*, 2007: 505; Frank & Goyal, 2003: 8, 18). This finding is consistent with the static trade-off theory of the optimal capital structure.

This study used a NDTS measure adopted from Akhtar (2005: 329) and Fama and French (2002: 8), and expected it to vary negatively with leverage. These scholars used the ratio of a firm's total annual depreciation expense to its total assets. Akhtar (2005:333) found no significant relationship between NDTS and the amount of firm leverage. However, Frank and Goyal (2003: 23) found a negative relationship. The study expected NDTS to vary negatively with leverage.

(ix)   Interest rates

If interest rates increase, existing equity and existing bonds both drop in value, but because the former falls by more than the latter, a company is left seemingly highly leveraged. Thus, it is predicted that an increase in interest rates increases leverage (Frank & Goyal, 2003: 8).[2]

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[1] Firms with unused depreciation allowances, tax loss carry forwards, investment tax credits and other tax credits or deductions (non-debt tax shields), will have less incentive to shelter corporate profits from income taxes by paying interest on borrowed funds (Smart *et al.,* 2007: 505).

[2] Frank and Goyal (2003: 23) found no channel by which this observation would fit with any of the considered theories. It is therefore not specifically tested during this study and is considered as one of the extraneous variables.

(x)   Other extraneous variables

This study identified certain other extraneous variables that could impact on firms' leverage levels. These include asset intangibility, industry or firm regulation, tax effects and other macroeconomic variables. For the purposes of this study, these variables are ignored or assumed to remain constant since there is no accurate means to measure them.

3.3   THE EMPIRICAL APPROACH

3.3.1   TEST ONE

The study used a multiple regression approach to analyse the relationship between the dependent variable, leverage and the several explanatory variables mentioned above. According to Defusco, McLeavey, Pinto and Runkle, (2004: 442), and Cooper and Schindler (1998: 562) multiple linear regression is a tool that allows us to determine the effect of more than one independent variable on a particular dependent variable and it is a good test for explaining causal theories. Although dummy variables, usually coded 0 or 1, are normally assumed in the analysis, all other variables are measurable on either interval or ratio scales (Cooper & Schindler, 1998: 562). This was consistent with this study.

The study follows the literature and uses multiple linear regressions to study the effect of eight (8) explanatory variables on leverage (LEV). These include growth (GROW), non-debt tax shields (NDTS), asset type (ASSET), industry (IND), profitability (PROF), size (SIZE), earnings volatility (VOL) and financial distress (DIST). All these variables are assigned to influence financing behaviour according to the trade-off theory.

Following the literature on model specification, Defusco *et al*. (2004: 477), the study adopted a regression model to investigate the explanatory behaviour of the above-mentioned variables on leverage (the dependent variable) in order to determine whether they influence financing behaviour according to the trade-off theory as evidenced from the finance literature. To confirm the existence of this financing behaviour, it was anticipated that the designed model and the

coefficients of the individual variables therein, would be statistically significant and in alignment with the predictions of this theory (see Chapter Four). The model is depicted in equation 1 below:

Equation 1

LEVERAGE $1_{i,t}$ = β_0 + β_1ASSET TYPE$_{i,t}$ + β_2INDUSTRY$_{i,t}$ + β_3SIZE$_{i,t}$ + β_4FINANCIAL DISTRESS$_{i,t}$ + β_5PROFITABILITY$_{i,t}$ + β_6GROWTH$_{i,t}$ + β_7NON-DEBT-TAX-SHIELDS$_{i,t}$ + β_8VOLATILITY$_{i,t}$ + ERROR TERM$_{i,t}$

Where:

LEVERAGE $1_{i,t}$ is the book value leverage measure of firm i in time t measured as a ratio of total liabilities to total assets (dependent variable).

LEVERAGE $2_{i,t}$ is the market value leverage measure of firm i in time t measured as the ratio of total liabilities to the sum of total liabilities plus the market value of existing ordinary shares (dependent variable that was used only to test for robustness with the findings. (Therefore both LEVERAGE 1 and LEVERAGE 2 were used interchangeably in the above equation).

ASSET TYPE$_{i,t}$ is the collateral value of firm i's assets in time t measured as the ratio of fixed assets to total assets (+ correlation to leverage).

INDUSTRY$_{i,t}$ is the median (mean) industry leverage (+ correlation to leverage).

SIZE$_{i,t}$ is the size of firm i in time t measured using the log of total assets (+ correlation to leverage).

FINANCIAL DISTRESS$_{i,t}$ is the measure of financial distress for firm i in time t measured using JH de la Rey's model (- correlation to leverage).

PROFITABILITY$_{i,t}$ is the measure of profitability for firm i in time t measured using the ratio of earnings before interest and tax (EBIT) to equity (+ correlation to leverage).

GROWTH$_{i,t}$ is the measure of growth opportunities (future growth) for firm i in time t measured by the market-to-book assets ratio (- correlation to leverage).

NON DEBT TAX SHIELDS$_{i,t}$ is the measure of non-debt tax shields for firm i in time t measured as the ratio of the total annual depreciation expense to the firms' total assets (- correlation to leverage).

VOLATILITY$_{i,t}$ is the earnings volatility for firm i in time t measured using the coefficient of variation of profit before tax (- correlation to leverage).

$\epsilon_{i,t}$ is the error term which for purposes of computation was assumed to be zero (Cooper & Schindler, 1998: 562).

β_1-β_8 represent the regression coefficients associated with each of the independent variables.

β_0 is a constant.

In order to simplify the process of analysis and to control for multicollinearity,[1] the study identified and removed those factors whose relationship to the dependent variable as predicted by the theory is weak. This involved a traditional approach of selecting through step-wise regressions those variables whose relationship to the dependent variable is highly significant to add to the model. The step-wise regressions were taken forwards by regressing one variable after another while holding the rest constant.[2] By using step-wise regressions, the ordinary standard errors reported in the final regression are understated (Frank & Goyal, 2003: 15).

3.3.2   TEST TWO

Using a time-series data construct of firms' debt ratios from 1995-2005, this study tested the target adjustment model[3] adapted from Myers and Shyam-Sunder (1999: 226) to investigate the presence of financing behaviour according to the trade-off theory. The static trade-off theory predicts that managers seek to maintain the optimal capital structure. However, random events bump them away from it and they (the managers) gradually work back to the optimum.

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[1] Cooper and Schindler (1998: 564) define multicollenearity as a situation where two or more independent variables tend to be highly correlated, thereby affecting the regression output.
[2] See also Frank and Goyal (2003: 15), and Coetzee (2003:69).
[3] The trade-off theory implies a target adjustment model. See Myers and Shyam-Sunder, (1999), Jalivand and Harris, (1984) and Taggart, (1977).

Therefore, if the optimum debt ratio is stable this study expected to see mean-reverting behaviour of firms' debt ratios towards a target debt ratio (Myers & Shyam-Sunder, 1999: 226). The study expected this kind of pattern to be exhibited among the sampled listed firms in South Africa in confirmation of the financing behaviour described by the trade-off theory. Myers (2001: 93) argued that this target debt ratio cannot be observed directly, but proxies can be calculated. The simplest proxy is the firm's average debt ratio over the relevant sample period.

DeFusco *et al.* (2004: 532) define "mean reversion of a time series" as that condition where the time series tends to fall when its level is above its mean, and rise when its level is below the mean. The simple form of the target adjustment model states that changes in the debt ratio are explained by deviations of the current ratio from the target and is depicted in the equation 2 below:[1]

Equation 2

$$\Delta D_{i,t} = a + b_{TA}(D_{i,t} - D_{i,t-1}) + \text{€}_{i,t}$$

Where:

$D_{i,,t}$ is the target debt level of firm i at time t which was obtained by the historical mean debt ratio of the firm multiplied by the total capital.
$(D_{i,t-1})$ is the debt ratio of the firm lagging one year.
b_{TA} is the target adjustment coefficient.
a is the sample wide coefficient.
$\text{€}_{i,t}$ is an error term

If the b_{TA} is greater than zero, the study would confirm adjustment towards a target. However, if the b_{TA} is less than zero, it would imply positive adjustment costs (Myers & Shyam-Sunder, 1999: 226).

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[1] Myers and Shyam-Sunder (1999: 226) tested and found mean reverting behavior among the157 firms in their sample, in order to confirm presence of financing behaviour according to the static trade-off theory.

3.4   THE PECKING-ORDER THEORY

This study used the basic approach of identifying and linking together certain essential exogenous and endogenous variables that act as indicators of, or influence, the financing behaviour pertaining to the pecking-order theory.

The behaviour or movement of such variables observed singly in correlation or regression assists researchers to determine whether such theory applies to observed practice. The process of testing the pecking-order theory as an explanation of the financing behaviour of South African listed firms followed this approach. It was observed how much controversy still surrounds the numerous tests that have been conducted to explain financing behaviour according to this theory.[1]

Therefore, this study used an approach by Frank and Goyal (2003: 4) in which explanatory variables that may influence financing behaviour (leverage) according to the pecking-order theory were chosen and tested in order to make the necessary judgments about the connection between the observable data and the theory's predictions.

The following is an explanation of the explanatory variables that influence the dependent variable (leverage) according to the pecking-order theory. For the purpose of simplifying the analysis, certain extraneous variables that affect this form of financing behaviour were excluded and it was hoped that they did not affect the findings:

(i)   Profitability

The popularity of the pecking-order as an explanation of financing behaviour is centred on its ability to explain the observed negative relationship between profitability and leverage. A large body of the empirical literature, including the studies of Smart *et al.* (2007: 505), Chen and

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[1] For example, major findings by Myers and Shyham-Sunders about the pecking-order theory of financing behaviour are strongly contested by, among others, Chirinko and Singha, (2000), and Frank and Goyal, (2003). However, Chen and Zhao (2004), and Leary[a] and Roberts[b] (2005) provide extensive support for this theory based on the observed financing patterns of firms.

Strange (2005: 11), Abor (2005: 443), Fama and French (2002; 20, 27), Myers (2001: 89) and Rajan and Zingales (1995: 1457) supports this observation. However, Frank and Goyal (2003: 17) found leverage to be positively related to the book value measure of leverage and negatively related to the market value measure. Abor (2005: 443) obtained a positive relationship when he regressed profitability with leverage (short-term debt).

There is growing debate on the pecking-order's ability to explain this financing pattern. Nonetheless, this study used the profitability measure above[1] and expected it to perform inversely to leverage according to the predictions of the pecking-order theory.

(ii)   Market-to-book ratio (MTB)

Previous literature provides evidence of a general assessment of the pecking order theory. This literature contends that high growth firms, with large financing needs, end up with high debt ratios because of management's reluctance to issue equity (Frank & Goyal, 2003: 219).
Barclay, Morellac and Smith (2001) suggest precisely the opposite. High-growth firms consistently use less debt in their capital structure. Similarly, Frank and Goyal (2003: 22) found the MTB assets ratio to be negatively related to leverage and argued that since more profitable firms use less debt, these firms are expected to have a higher market value, which could explain the high MTB assets ratio and lower leverage.

The pecking-order's prediction of financing behaviour using the proxy growth is contradictory and plausibly depends on other extraneous factors or the different empirical approaches used. Frank and Goyal (2003: 219) found that information asymmetries affect small, high growth firms differently from large, high growth firms and that the pecking-order theory works best for only large, well-established firms. This study followed the general argument that a high MTB assets ratio, as measured above, will vary negatively with leverage (Frank & Goyal, 2003: 224; Rajan & Zingales, 1995: 1455).

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[1] Abor (2005: 441) defines profitability as the ratio of earnings before interest and taxes (EBIT) to equity.

(iii)   Dividends

Evidence, according to the pecking-order theory, suggests that dividends are an exogenous part of the financing deficit and are associated with greater leverage. However, dividend paying firms tend to have a lower leverage than non-dividend-paying firms (Frank & Goyal, 2003: 29). This is in conflict with the above observation. The probable reasoning is that firms endogenously pay dividends when they have good cash flows and relatively fewer investment opportunities. Fama and French (2002: 29) found a positive relation between leverage and firm size, and between dividend payout and firm size. This implies that dividend payments have a positive impact on leverage.

Following a key test for the pecking-order theory, Baskin (1989: 30) hypothesized that larger past dividends act to increase the firm's future cash needs and this, in turn, motivates for greater borrowing. After testing this hypothesis, using the book value dividend yield, he found the results to be statistically positively significant. Therefore, because of the controversy surrounding this variable, this study argued that dividends paid by dividend-paying firms increase the financing deficit (leverage) if profitability, size and investments are assumed constant.

(iv)   Interest rates

An increase in the Treasury Bill rate should have an effect on a firm that has not yet reached its debt capacity. However, the debt capacity might be a decreasing function of the interest rate since more cash is needed to pay for a given level of borrowing when the interest rate rises. When a firm reaches its debt capacity, it turns to the more expensive equity financing under the pecking-order theory. Hence, interest rate increases tend to reduce leverage under the pecking-order theory (Frank & Goyal, 2003: 6).

(v)   Capital expenditures

Capital expenditures represent outflows and directly increase the financing deficit as discussed in Myers and Shyam-Sunder (1999: 224). Fama and French (2002: 22) found that the complex pecking-order model predicts a negative relation between leverage and expected investment opportunities especially for dividend payers. However, in the simple pecking order model, they found a marginal positive relationship between leverage and investments.

This study used the Frank and Goyal (2003: 5) measure of capital expenditures (ratio of capital expenditure to total assets), and expected it to vary positively with leverage (Fama & French, 2002: 4).

In order to test for financing behaviour according to the pecking-order theory and to account for the conditions of model specification, this study adopted a regression model to investigate the explanatory behaviour of the above-mentioned variables on leverage (the dependent variable). To confirm the existence of this financing behaviour, it was anticipated that the designed model and the coefficients of the individual variables therein, would be statistically significant and in alignment with the predictions of this theory (see Chapter Four). The model is depicted in equation 3 below:

$$\text{LEVERAGE } 1_{i,t} = \mu_0 + \mu_1\text{PROFITABILITY}_{i,t} + \mu_2\text{GROWTH}_{i,t} + \mu_3\text{SIZE}_{i,t} + \mu_4\text{CAPITAL EXPENDITURE}_{i,t} + \mu_5\text{DIVIDEND YIELD}_{i,t} + € \text{ TERM}_{i,t}$$

Where:

> LEVERAGE $1_{i,t}$ is the dependent variable (measured as a ratio of total liabilities to total assets) of firm i at time t using book values.
> LEVERAGE $2_{i,t}$ is the market value leverage measure of firm i in time t measured as the ratio of total liabilities to the sum of total liabilities plus the market value of existing ordinary shares (dependent variable that was only used to test for robustness in the

findings. (Therefore both LEVERAGE 1 and LEVERAGE 2 were used interchangeably in the above equation).

PROFITABILITY $_{i,t}$ is the measure of profitability for firm i in time t measured using the ratio of earnings before interest and tax (EBIT) to equity (- correlation to leverage).

GROWTH $_{i,t}$ is the market-to-book ratio of firm i at time t measured using the ratio of market value of assets to book value of assets (- correlation to leverage).

SIZE$_{i,t}$ is the size of firm i in time t measured using the log of assets (+ correlation to leverage).

CAPITAL EXPENDITURE$_{i,t}$ is the capital expenditure of the firm i at time t measured as the ratio of capital expenditure to total assets (+ correlation to leverage).

DIVIDEND YIELD$_{i,t}$ is the amount of dividends paid by firm i at time t measured using the annual cash dividend paid (+ correlation to leverage).

€ $_{i,t}$ is the error term which for purposes of computation was assumed to be zero (Cooper & Schindler, 1998: 562).

μ_1-μ_5 represent the regression coefficients associated with each of the independent variables.

μ_0 is a constant.

3.5   MULTICOLLINEARITY AND HETEROSKEDASTICITY

Step-wise and multiple regressions are complicated by the presence of multicollinearity. This condition arises when high inter-correlations exist among the predictors or explanatory variables affecting the estimation of partial regression coefficients and increasing the amount of standard errors (DeFusco *et al.*, 2004: 473; Cooper & Schindler, 1998: 564 and Maholtra, 1998: 577). This study tested for multicollinearity by using a coefficients table housing collinearity statistics to investigate for standard errors (see section 4.2.1).

All measures were within normal bounds suggesting that multicollinearity was not present among the independent variables. Heteroskedasticity occurs when the calculated error variance correlates with values of the independent variables, thereby affecting statistical inference

DeFusco *et al.,* 2004: 465). This study corrected for this effect by accurately calculating the study variables and by using a large sample according to Berry and Feldman (1985:74).

3.6   DESCRIPTION OF THE POPULATION

The population covered by this study consisted of large and medium-sized firms currently listed on the JSE as of the base year, 2005, This population comprised of 388 firms[1] distributed across several industries which included Building and Construction, Paper, Chemical and Oil, Beverages, Hotel and Leisure, Motor, Transportation, Pharmaceuticals, Mining, Manufacturing, Financial and Utilities.

These sample elements (listed firms) were selected subjectively because they collectively contribute a significant amount of wealth to the South African economy and it was assumed that they adopt and practice various finance theories and practices as documented in the finance literature. Financial statement data about such firms is also readily available on several databases.

3.6.1   DESCRIPTION OF THE SAMPLE

The process of choosing the sample was done to maximise representativeness and minimise on the anticipated analytical errors. Cooper and Schindler (1998: 216) define a good sample as one which accurately represents the characteristics of the population it is intended to represent. Most researchers have found, however, that only rarely is there a perfect correspondence between the sampling frame and the target population in which they are interested (Nguyen *&* Ramachandran, 2006: 196).

In order to ascertain that the sample is a valid representation of the population, care was taken to ensure that no systematic variance existed in the chosen sample and that the under-estimators and the over-estimators were balanced among the members of the sample in order to limit bias. This

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[1] There were a total of 388 firms listed during this year. Of this figure, only 315 firms had partial or complete financial statement data and had been consistently listed during the period under study (1995-2005). This was then considered as the total population.

was achieved by ensuring a fairly equal distribution of the distinguishing characteristics among the chosen firms in the sample (see; Cooper & Schindler, 1998: 217).

3.6.2   SAMPLE CONSTRUCTION AND SAMPLING STRATEGIES

The initial sample was constructed from the population of 338 listed firms and comprised the entire population of firms that existed before or were listed on the JSE during the year 2005.[1] From this entire population, the BFA McGregor database had common-size annual financial statement data on 315 firms. This total included all the firms that had reported financial statement data for one or more years during the period 1995-2005[2]. Using this sample (315 firms), a process of data cleansing was then conducted during which the following was done:

- All firms from the financial sector, Standard Industry Classification (SIC) code 530-535, were excluded. This sector includes banks, insurance firms, unit trusts and other fund companies. Firms in this financial industry have capital structures that are determined by the level of deposits and financial regulation and so the determinants to capital structure choice may influence them differently from non-financial firms (Akhtar, 2005: 327). Also, financial intermediaries seemed inappropriate for testing the predictions of leverage models (Fama & French, 2002: 8).

- However, the study included utilities in this analysis. Fama and French (2002: 8) chose to exclude utility companies in order to avoid the criticism that their financing decisions are a by-product of regulation. For the purpose of establishing the effect of regulation on such companies, this study includes them although they do not form the main focus of the study.

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[1] The *JSE Bulletin* of 2005 places the number of firms at 388, of which 24 firms were foreign listings and 364 firms were domestic.
[2] At the time of this analysis, data on the more recent period (2006-2008) was excluded because it contained so many missing gaps that analysis was impossible. To date, some of the financial statement information for the 2008 financial year has not been captured on the database.

- The realized sample from the cleansing process (194 firms) was then further scrutinized to exclude firms that have incomplete data consistent with the period under evaluation, firms with negative book values and other firms that were regarded as foreign. Foreign firms were excluded because their capital structure practices are assumed to be influenced by other unique factors as compared to South African listed firms.

- The resulting sample (148 firms) was then reduced to a final sample of 123 firms by accounting for, and discarding, outliers. This sample comprised mainly non-financial firms and utilities which were then classified according to industry in order to facilitate the process of analysis. The exclusion of outliers (25 firms) and other firms that did not meet the requirements of this study (46 firms) meant that 37% of the firms in the original sample were not analysed, a factor that could potentially undermine the findings of this study. However, since this final sample represented 39% of the original population, it can be tentatively concluded that the findings are representative of listed firms in South Africa.

3.6.3   CLASSIFICATION OF FIRMS

The Standard Industry Classification (SIC)[1] guide for South African companies which defines an industry as a group of establishments engaged in the same or similar kinds of production activity or service was used. Most firms listed on the JSE are regarded as large-sized. Therefore it was impossible to classify them as such. Only firms listed on the ALT X, a branch of this listing, are graded as small and medium-sized, and as most of these firms were financial companies, they were excluded from the study.

3.6.4   SAMPLE SIZE DETERMINATION AND CRITERIA

This study followed the literature on sample size determination to ensure the reliability, validity and representativeness of the final sample to the population. The key considerations here included, determining an acceptable level of precision, a realistic confidence level and the choice

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[1] Look at the institutional sector classification guide. The South African Reserve Bank (SARB) (2005: 45).

of a less variable sample. Since the study could not follow the conventional numerical methods for estimating the appropriate sample size, a comparative study of the existing empirical literature on regression analysis was used.

According to Bartlett, Kotrlik and Higgins (2001: 48), and Brace, Kemp and Snelgar (2003: 208), multiple regression requires a large number of observations. The number of participants (sample) must substantially exceed the number of predictor variables one is using in the regression, especially if it includes continuous data. These scholars contend that the ratio of participants to the number of independent variables used in the study should not fall below five to one (5:1). A more acceptable level should be 10:1 (Bartlett *et al.*, 2001: 48) in order to control for over-fitting which could make the results too specific to the sample and, therefore, impossible to generalize.

Most empirical studies with comparatively large sample sizes have reported their findings as statistically significantly different from zero (Chen & Strange, 2005: 32; Frank & Goyal, 2003). Similarly, based on the chosen sample size, this study reported its findings as statistically significantly different from zero, meaning that the results were reported at 5% and 1% levels of significance in order to determine the predictive power of the explanatory variables at the different levels of risk.

3.7   DATA CONSTRUCTION

The sample used in this study included all firms listed on the JSE during the period 1995-2005 and the relevant data and accompanying information was obtained mainly from the Bureau of Financial Analysis (BFA McGregor) database. This data was corroborated by McGregor's *Who Owns Whom Manuals* (McGregor's Manuals) and a collection of available company annual financial reports, where necessary.

It was noted that the data obtained directly from this database and information sources was in its raw format and could not be used meaningfully to conduct this analysis. Hence, Microsoft Excel applications were used to calculate the necessary financial ratios and to refine the data required for this analysis (see appendix A for formulae used to calculate the study variables).

3.7.1   METHODS OF DATA PROCESSING

Subsequent to calculating the variables as indicated above, this study used the Statistical Software for Social Scientists (SPSS) program to conduct the main regression procedure. This analysis involved both a cross-sectional approach and time-series approach to data analysis in order to test for financing behaviour according to the pecking-order and the trade-off theories. Cooper and Schindler (1998: 132) argue that cross-sectional studies involve observations taken at a single point in time, for example, a comparison of firms' ratios taken at the end of a financial year. Chirinko and Singha (2000: 419) noted, however, that in testing the pecking-order model, time-series variation is the key to estimating the parameters. A time-series observation consists of those studies that are conducted on the same variables over an extended period (Cooper & Schindler, 1998: 419).

Furthermore, in order to counter the effect of missing or incomplete data and the measurement of errors that occur due to random year-to-year fluctuations in the variables, this study adopted the variables averaging technique as used by Titman and Wessels (1988: 8), and Nguyen and Ramachandran (2006: 198). These researchers used three and four year averages respectively for all the variables in their studies to increase the accuracy of their findings.

This study used eight (8) year averages depending on the consistency of the available data on the databases. Evidently, averages over longer periods of time increase the efficiency of a particular measure (Titman & Wessels, 1988: 8). The study also calculated the natural logarithms of certain variables in order to achieve normal distribution and linearity patterns (Nguyen & Ramachandran, 2006: 197).

3.7.2   DATA ANALYSIS PROCEDURE

This study reported on the descriptive statistics of both the dependent and independent variables for the sample over the period under consideration, using measures of tendency like mean, maximum values, minimum values and standard deviation in order to describe the general characteristic of the variables under study. The study also used Pearson's product-moment correlation techniques/tables to investigate for any correlation between the dependent and independent variables.

Frank and Goyal (2003: 14) used step-wise regressions in the interest of parsimony and in order to control for multicollinearity. They selected a simple backward selection step-wise procedure in which the variable with the lowest p value is removed and a new regression is run using the reduced set of variables. This study adopted a similar approach but also ran an analysis of variance (ANOVA) output for the regression. Scatter plots of these variables were also used to provide preliminary information about the expected outcomes. The models used to test for financing behaviour were constructed and adjusted to account for only those variables that are assigned to influence financing behaviour according to theory.

3.8   LIMITATIONS OF THE METHODOLOGY

This study was limited by certain factors which the preliminary analysis tried to mitigate. It was anticipated that the problem of high inter-correlations among the study variables could weaken the statistical power of the tests (Bancel & Mittoo, 2004: 130). Collinearity diagnostics were conducted to identify and control for this effect (see section 4.4.1).

Certain extraneous variables which include, measures of asset intangibility, the age or period of listing, measures of tax effects and managerial entrenchment or ownership structure were excluded from this study. These variables were not easily quantifiable although it is suspected that they influence capital structure decisions. Similarly, capital structure literature concerned with convertible debt, debt maturity, issues and repurchases, among others, was ignored for the purposes of this study.

3.9   CHAPTER SUMMARY

This chapter described the research methods used to determine whether listed firms in South Africa follow the trade-off or pecking-order theories when financing their businesses. It specifically developed the models to test for such financing behaviour, identified the empirical variables, the sample, and the techniques used to measure the study variables. The final part of this Chapter discusses some of the anticipated shortcomings and how they were controlled. The next chapter, Chapter 4, will discuss the process followed in the analysis of this data and the interpretations from these findings.

CHAPTER FOUR

ANALYSIS OF DATA

4.1   INTRODUCTION

The purpose of this study is to investigate the financing practices of firms consistently listed on the JSE during the period 1995-2005. The main objective was to determine whether these firms follow either of the two theories advanced in section 1.4.2 of Chapter One when financing their business activities.

This Chapter describes the detailed empirical approach and findings which helped to answer the research questions and objectives. In this analysis, standardised financial statement data, drawn from the BFA McGregor database and a collection of available company annual financial reports, is used. The data is initially collected from 315 firms consistently listed during this period (1995-2005). These firms are then adjusted to 194, local and non-financial firms which meet the initial requirements of the study and which have partial or consistently reported data on this database. A further adjustment to 148 firms is done to exclude firms without the consistent data required to calculate certain variables. Thereafter, this sample was further analysed to account for the effect of outliers, reducing the final sample to 123 firms. A discussion of the findings is based on this final sample which satisfied all the requirements of the methods used.

This Chapter is divided into three main parts:

Part 1 describes the detailed analytical approach, the data sorts and averages used, and the analytical procedure followed in controlling for such conditions as multicollinearity, heteroscedasticity and the removal of outliers.

Part 2 provides, using both measures of central tendency and dispersion, a detailed univariate description of the sample variables. It also presents the bivariate and multivariate sorts using scatter plots and correlation matrices. Finally, it identifies the significant observations amongst the variables studied and they are classified according to the various industries.

Part 3 provides a description of the main empirical analysis followed, and describes the regression procedure as well as output on the various regression models tested. It therefore provides inference on the research hypotheses and objectives of the study (see section 1.3 in Chapter One).

4.2   THE ANALYTICAL PROCEDURE

A preliminary assessment of the raw data required the calculation of several independent and dependent variables according to the specifications of the methodology (see section 3.3, details in Appendix A). These variables were then used as proxies to explain firms' financing behaviour according to the theories mentioned above.   Much of this analysis was devoted to identifying those variables which are assigned from the empirical literature and are important for flagging financing behaviour according to these theories.

The main analysis involved the use of a standard multiple regression approach in which all the independent variables in the chosen model were initially regressed with the dependent variable, leverage. Thereafter, step-wise, backward and forward regressions were conducted to ensure a model fit. Eight year averages of the variables (1998-2005) were used in conducting the cross-sectional analysis in which the main regression procedure was conducted, while data on all eleven years (1995-2005) was used to conduct the time-series analysis, in which mean reversion behaviour among firms' debt ratios and the descriptive behaviour of the study variables were investigated. The use of year averages increases the efficiency of a given measure and the accuracy of the findings (Nguyen & Ramachandran, 2006: 198). The procedure and output of the multiple regressions is detailed later in this Chapter.

Before conducting the main analysis using SPSS for Windows, it was necessary to take into account three conditions which affect the regression output, namely:

(i)   the existence and control of outliers,

(ii)   tests for correlations among variables (multicollinearity), and

(iii)   conditions of unequal variances or heteroscedasticity.

The following section explains the approach followed in order to identify and controlling for these effects.

4.2.1   TESTS FOR OUTLIERS AND MULTICOLLINEARITY

Outliers are abnormally high or low values that do not correspond with other values in a dataset. These values have a serious influence on statistical measures (e.g. measures of central tendency, correlations or regressions), thereby complicating the process of data generalization and inference. According to Lewis-Beck (1995:17), after detecting the existence of outliers, four basic ways of dealing with them are possible:

(i)   remove the outliers,

(ii)   transform the outliers,

(iii)   leave the outliers as they are, and

(iv)   report the results with and without outliers.

This study identified and removed outliers from the analysis in an attempt to fulfill regression assumptions.

Multiple regressions are usually preceded by assumption violations.[1] A violation of regression assumptions means the results obtained become meaningless. Fulfilling these assumptions, however, means the least square estimators become unbiased and stronger inferences can be made about the parameters of the multiple regression equation (Lewis-Beck, 1995: 72). In order to remediate assumption violations caused by the existence of outliers, this study used both case wise diagnostics tables and residual scatter plots. By running and re-running the regression output, large residual outliers with a standard deviation greater than 3 units were identified and removed from the analysis. Glantz and Slinker (2001: 126) argue that very large outliers with values of standard deviations of greater than 3 should be identified and eliminated.[2]

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[1] Lewis-Beck (1995:72) provides a list of these regression assumptions and explains their effect on accurate regression analysis.
[2] Other studies by Wilcox (2001: 34) and Maholtra (1998:571) exclude outliers with standard deviations greater than 2 units.

Table 1 and Figure 1 below show the outliers that were removed during the final regression output.

Table 1:   Case wise diagnostics showing the removed outliers

Case wise Diagnostics[a]

Case Number	Std. Residual	Leverage1	Predicted Value	Residual
20	8.022	8.5790	4.270663	4.3083372
108	-5.589	.8340	3.835937	-3.00194
118	-3.281	2.0800	3.842259	-1.76226

a. Dependent Variable: Leverage1

Figure 1:   Regression residual diagnostics scatter plot using leverage 1

Dependent Variable: Leverage 1 (Distance)
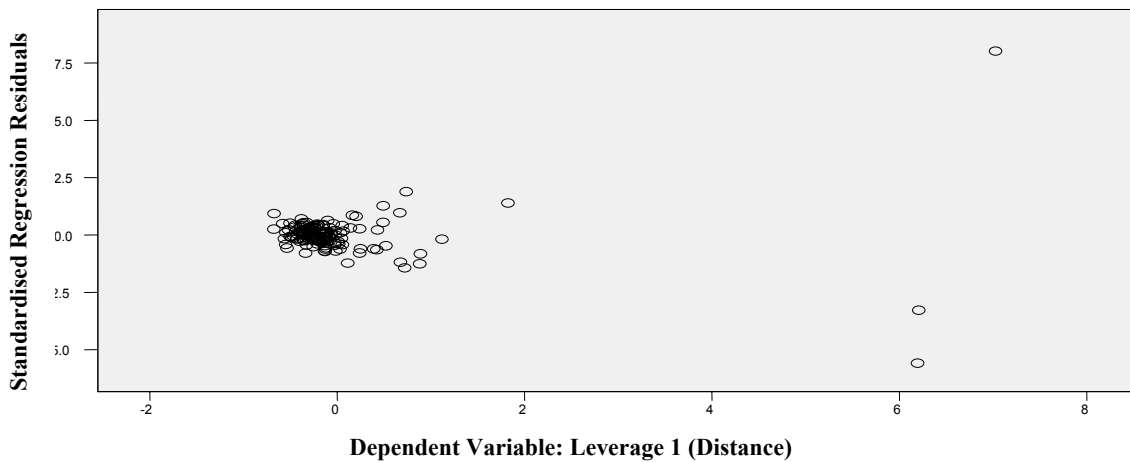
Notably, both procedures produced a similar outcome identifying the same outliers during every regression run. Three firms were excluded at the final analysis. These included AWETHU LTD (beverage sector), PALS HOLDINGS LTD (clothing and footwear sector) and SALLIES LTD (minerals and mining sector). These firms exhibited abnormal leverage levels that did not seem consistent with the normality assumption and could exert disproportionate influence on the estimates of the regression coefficients (Glantz & Slinker, 2001: 139).

Another important factor that would affect the regression output was multicollenearity or the degree of inter-correlations among the variables. According to Glantz and Slinker (2001: 185) and Malhotra, (1998: 577) multicollinearity affects multiple regressions in at least three ways:

(i)   Multicollinearity reduces the size of the multiple correlations,

(ii)   the confounding resulting from the high inter-correlations among the independent variables makes interpretation problematic, and

(iii)   multicollinearity increases the regression coefficient variance resulting in a more unstable regression equation.

Checking for multicollinearity should be a routine part of every regression analysis when the purpose of the analysis is to use regression coefficients to gain insight into the underlying theory that is the subject of the study (Glantz & Slinker, 2001: 193). This study used two diagnostic techniques to investigate for the presence of multicollinearity. Firstly, an inspection of the coefficients' table housing collinearity statistics was done. During this process, large values of standard errors among the coefficients were detected. Large standard errors reduce the precision with which the regression coefficient associated with a particular variable can be estimated, a term otherwise referred to as the variance inflation factor: VIF[1] (Glantz & Slinker, 2001: 195).

Tolerance values[2] or the reciprocal of VIF are also used to guard against very serious multicollinearity (Glantz & Slinker, 2001: 196). These values range between 0 and 1 and multicollinearity is indicated if the tolerance value is 0.01 or less. Conversely, VIF values exceeding 10 or R^2 values of 0.9 show signs of serious multicollinearity. Values of VIF exceeding 4 or R^2 values of 0.75 also warrant investigation (Glantz & Slinker, 2001: 197).

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[1] This is the measure of how much the estimate of the regression coefficient of a variable is "inflated" by the fact that other independent variables contain information related to it. This condition causes that particular variable's coefficient to be higher than expected (Glantz & Slinker, 2001: 196).
[2] Tolerance is defined as $(1-R^2)$ where R^2 is the multiple correlation of an independent variable with other independent variables (Glantz & Slinker, 2001: 196).

Table 2 below shows the obtained values of both VIF and tolerance. It is observable that the values of all independent variables were in excess of 0.01 in tolerance or less than 10 for VIF indicating that they were within acceptable bounds and suggesting that multicollinearity was not present among the independent variables.

Table 2: **Coefficients table of independent variables with Leverage 1**

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.206	1.526		.790	.431					
	Financial distress	.093	.009	.710	10.337	.000	.695	.694	.678	.913	1.095
	Size	-.108	.070	-.113	-1.535	.128	-.064	-.142	-.101	.797	1.255
	Earning volatility	2.68E-00	.000	.024	.320	.749	-.055	.030	.021	.765	1.308
	Profitability	-.003	.013	-.014	-.198	.843	-.005	-.018	-.013	.906	1.104
	Asset type	-.331	.304	-.095	-1.088	.279	-.186	-.101	-.071	.563	1.775
	Growth	-.135	1.505	-.009	-.090	.929	-.128	-.008	-.006	.464	2.154
	Non debt tax shields	3.467	3.033	.101	1.143	.255	-.130	.106	.075	.548	1.823

a. Dependent Variable: Leverage1

The second approach followed in investigating for the presence of multicollinearity involved the use of collinearity diagnostics as depicted in Table 3 shown below.

Table 3: **Collinearity diagnostics table investigating for multicollinearity**

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions							
				(Constant)	Financial distress	Size	Earning volatility	Profitability	Asset type	Growth	Non debt tax shields
1	1	4.832	1.000	.00	.00	.00	.01	.00	.01	.00	.01
	2	1.083	2.112	.00	.20	.00	.00	.54	.01	.00	.01
	3	.901	2.316	.00	.43	.00	.15	.28	.00	.00	.00
	4	.763	2.517	.00	.14	.00	.62	.07	.01	.00	.01
	5	.274	4.199	.00	.20	.01	.00	.05	.41	.00	.03
	6	.138	5.910	.00	.03	.00	.00	.03	.37	.00	.77
	7	.008	24.698	.03	.00	.98	.09	.03	.03	.02	.03
	8	.001	92.505	.97	.00	.01	.12	.02	.17	.98	.14

a. Dependent Variable: Leverage1

This approach involved an analysis of the condition index values shown in the third column of Table 3 above. This index measures how much one independent variable is associated with another. The condition index is calculated from eigenvalues and the latter indicate the degree of

multicollinearity among the variables. If the eigenvalue is one, there is no presence of multicollinearity. However, the closer the values tend to zero, the more multicollinearity increases to perfect collinearity. Since there are no precise guidelines for what "small" eigenvalues represent, one way to measure the relative magnitude of eigenvalues is to calculate the condition index. Condition index numbers above 100 will suggest serious multicollinearity (Glantz & Slinker, 2001: 228).

Alternatively, multicollinearity can be detected by studying the variance proportions associated with each independent variable. These are shown in the last 7 columns of Table 3 above. Multicollinearity is present if the condition index is greater or equal to 30 and at least two variance proportions of a particular variable are greater than 0.5 (Glantz & Slinker, 2001: 197). An inspection of these diagnostics suggested that no variable met these criteria so it was tentatively concluded that multicollinearity was not an inhibiting condition to the study.

Heteroscedasticity occurs when the error term in a regression model does not have a constant variance and increases when either of the independent variables in a regression model increases (Fox, 1991: 49). Berry and Feldman (1985: 74) argue that greater chances of heteroscedasticity occur when the dependent variable is measured with error. Similarly, this condition arises when the sample size used is very small, since larger samples sizes of individuals will reduce this measurement error. It was important that the condition of large sample size and the accurate of calculation of the variables were met by this study. Nevertheless, heteroscedasticity due to the interaction between an independent and an excluded variable could not be remedied (Berry & Feldman, 1985: 75).

After accounting for conditions that affect the regression output, the main analysis was conducted. This analysis starts with a descriptive overview of the study sample covering univariate, bivariate and multivariate descriptive statistics. Thereafter, the main empirical analysis is detailed. This output of standard multiple regressions revolves around four component parts which include coefficients' tables, collinearity diagnostics (already discussed), the model summary and the Analysis of Variance (ANOVA) output. Each of the last two processes will be discussed separately.

4.3   DESCRIPTIVE AND UNIVARIATE ANALYSES

The descriptive analysis starts with a careful examination of the key features of each variable since this provides useful insights into the overall findings (Lewis-Beck, 1995: 8). Two   aspects of this analysis are examined here, that is, measures of central tendency and measures of dispersion. While the former provides a "typical" score of a particular variable in the sample, the latter investigates the spread between this score and other scores providing inference on the differences in observations (Lewis-Beck, 1995: 8).

The initial analysis examines variables within the collective sample providing a general description of, for example, how much debt firms in the study used during the period under evaluation and how profitable these firms were during that period, to mention but a few. Thereafter, the sample is split into the various industries containing a significant number of firms, to identify the across-industry variations among the variables. Table 4 below provides an overall score of means and standard deviations among the variables used in the study.

Table 4:   Measures of location and spread among variables for the overall sample

Variable	Mean Value	Standard Deviation	Minimum Value	Maximum Value
Financial Distress	2.382067	5.992427	0.1218	41.5088
Size	21.93	1.909	15.19	24.61
Volatility	0.340	3.607	-25.533	10.063
Profitability	0.303341	4.141684	-31.629	31.422
Asset type	0.290463	0.22633	0	0.9
Growth	1.045452	0.050405	1	1.2627
NDTS[*1]	0.06829	0.023019	0	0.129
Leverage 1	0.616	0.788114	0	8.579
Leverage 2	0.437691	0.197867	0	0.848
Dividends	123976.6	347010.7	0	2722475
Cap Expenditure[*2]	0.015725	0.047845	0	0.3871

NDTS[*1] refers to Non-Debt-Tax-Shields (Ratio of total annual depreciation to total assets). **Cap Expenditure**[*2] refers to Capital expenditures (Ratio of capital expenditure to total assets). **Leverage 1** refers to the book value leverage (ratio of total debt to book value of assets) while **Leverage 2** refers to the market value leverage (ratio of total debt to the market value of assets). **Size** is measured using the natural logarithm of total assets. **Volatility** is measured using the coefficient of variation of profit before tax. **Financial distress** is measured using JH de la Rey's model. **Profitability** is measured using the ratio of earnings before interest and tax to equity. **Asset type** is measured using the ratio of total fixed assets to the company's total assets. **Growth** is measured using the ratio of the market value of assets to the book value of assets **Dividends paid** and **retained earnings** are average annual values paid out by the company.

From Table 4, it can be observed that listed firms exhibited considerable variability in the values of both dependent and independent variables. Firm size, measured using the natural logarithm of total assets ranges from a minimum of 4 million rand to a maximum of almost 50 billion rand with an average value of almost 3.5 billion rand among listed firms. Earnings volatility is measured using the coefficient of variation of profit before tax (Reilly & Brown, 2003: 339). This measure of business risk indicates a higher variability and spread in the returns of JSE listed firms (34%) compared to 31% for firms listed on the Chinese Stock Exchange (Chen & Strange, 2005: 24).

Financial distress is measured using the de la Rey model in which the point of separation between financially failed and financially sound firms is zero. The further a firm's values move away from zero, the more financially sound that firm will be while the reverse here is also true.[1] The average measure (in k value units) for financial distress among listed firms is 2.38 with a large spread indicating variability among these values. However, according to Table 4, none of the firms' registered average negative k values which suggests that all firms in the sample were financially sound during this period.

The average debt ratios (using total debt) for the overall sample were 62% book value leverage and 44% market value leverage. These values are modest compared to Japanese firms (69% and 45%), German firms (73% and 60%) and firms from France (73% and 60%) (Rajan & Zingales 1995:1430). The results are also modest when compared to some countries within the developing economies like South Korea (73.4% and 64.3%) (Rajan & Zingales, 1995: 1430). However, the values are high when compared to firms from the United States (52% and 44%), China (53.07% and 30.38%), and the United Kingdom (54% and 40%) (Chen & Strange, 2005: 23). Notably, firms on the Ghanaian Stock Exchange reflect a comparatively similar book-value debt ratio (59%) with the listed firms in this study (Abor, 2005: 442).

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[1] Dr JH de la Rey of the Bureau of Financial Analysis (BFA) developed a financial distress model to mirror Altman's model, but customised it to suit the South African market. This model achieved a success rate of 96% when classifying firms in a given sample as either financially failed or financially sound (see www.mcgregorbfa.com/financialdistress).

The performance ratios are interesting. Listed firms registered an average annual profitability of 30% which is significantly high compared to Chinese firms at 2.38% (Chen & Strange, 2005: 23), and firms in the United States at 5.6% (Frank & Goyal, 2003: 39). The average growth rate among firms is 4.5% year on year with a high of almost 30%. On average, 30% of the asset structure of firms is comprised of tangible or fixed assets which is comparable to 34% for American and Canadian firms (Frank & Goyal, 2003: 39) and 29% for Swedish firms (Örtqvist, Masli, Rahman & Selvarajah, 2006: 286).

This value seems modest to support such high leverage levels, but indicated values on the average annual capital expenditure for listed firms also seem modest (1.57%). Still, these values are significant when compared to firms in Vietnam whose fixed assets represent a modest 19.73% of the total asset structure (Nguyen & Ramachandran, 2006: 200).

4.3.1   INDUSTRY CHARACTERISTICS

After identifying the general characteristics pertaining to the overall sample, an across industry description was done to identify the distinguishing characteristics among firms in each industry as measured using the variables in the study. Table 5 below depicts the measures of location and spread among firms from the various industries. This analysis is restricted to five industries which had a significant number of firms in their sub-category to evaluate. Several firms from excluded industries were discarded for failing to meet the requirements of the study.

Table 5 below provides some interesting observations about the firms from the various industries analysed. Firstly, capital intensive and therefore cyclical industries like General Mining, and Construction and Materials, posted the highest book-leverage values (85% and 53%). However, the market value leverage measure substantially reduces to 39% for the mining industry. The possible explanation for this variation is the component nature of the market value of equity included in calculating this variable (see Appendix A) which suggests that either firms in this industry consistently posted a higher average price in the value of their ordinary share or issued a larger component of ordinary shares during the 8 year period.

Table 5: **Measures of location and spread among variables in each industry**

Industry	Leverage 1			
	Mean	Standard Dev	Minimum	Maximum
General Mining	0.854	0.618	0.259	2.134
Construction and Materials	0.526	0.082	0.407	0.630
Food Producers	0.408	0.069	0.307	0.507
Travel and Leisure	0.488	0.136	0.311	0.714
General Retailers	0.411	0.063	0.328	0.509
	Leverage 2			
General Mining	0.390	0.169	0.153	0.627
Construction and Materials	0.562	0.113	0.390	0.697
Food Producers	0.421	0.099	0.278	0.554
Travel and Leisure	0.433	0.181	0.201	0.704
General Retailers	0.356	0.108	0.209	0.509
	Profitability			
General Mining	0.506	2.650	-1.264	19.92
Construction and Materials	0.389	0.704	-0.441	4.974
Food Producers	0.269	0.399	-1.686	1.970
Travel and Leisure	0.138	1.677	-12.97	3.093
General Retailers	0.297	0.182	-0.467	0.959
	Earnings volatility			
General Mining	0.401	3.080	-3.870	6.510
Construction and Materials	0.544	2.070	-4.900	4.990
Food Producers	0.340	1.010	-2.230	1.660
Travel and Leisure	0.580	1.170	-2.060	1.900
General Retailers	0.850	0.803	0.290	3.850
	Growth			
General Mining	1.0403	0.077	1.000	1.419
Construction and Materials	1.0614	0.049	1.000	1.238
Food Producers	1.0698	0.043	1.011	1.222
Travel and Leisure	1.0316	0.034	1.000	1.165
General Retailers	1.0227	0.020	1.000	1.116

The above observation is also consistent with how these industries performed regarding other measures in the study. According to the Table 5, both industries posted the highest profitability (50.6% and 38.9%), thereby supporting the theory that more profitable firms carry more debt (Frank & Goyal, 2003: 7). These firms also had comparatively low levels of business risk as measured using earnings volatility (40% and 54%) and exhibited relatively higher growth (4% and 6%) during the period under study.

The second important observation is that firms in the retail industry posted the lowest leverage values (41%, book value leverage, and 36%, market value leverage). These firms exhibited the highest level of business risk (85%), indicated the lowest growth levels (2.27%) and had moderately low profitability (29.7%). The general expectation is that firms in this industry normally have stable sales, hence low business risk, based on the non-cyclical nature of their products and services (Smart *et al.*, 2007:504). This is not the case here. Lastly, firms from the travel and leisure industry were least profitable based on their relatively high business risk or greater variability in sales. This industry performed poorly on almost all measures suggesting that it is the most unpredictable area in which to invest.

4.4   BIVARIATE ANALYSIS

After providing a general description of the variables in the sample and the across-industry observations among the variables, a bivariate analysis was conducted. The purpose of this analysis was to provide a preliminary descriptive correlation between the dependent and independent variables. This analysis starts with an expected summary of the correlation between the dependent and independent variables as supported by the empirical literature and outlined in the methodology. Thereafter, partial or bivariate regressions of these variables using scatter plots are presented (Kerr, Hall & Kozub, 2002:181). Finally, Pearson's Product Moment correlation matrices of the dependent and all independent variables are presented. A correlation is a way of indexing the degree to which two or more variables are associated or related to each other (Glantz & Slinker, 2001: 39). This concept is fundamental to understanding research design and statistical analysis and it is for this reason that the main empirical analysis starts with a discussion of the bivariate correlations among the variables.

Table 6 below provides a summary of the anticipated direction (assuming linearity) in the partial regressions between each of the independent variables and the dependent variable leverage 1 as provided by the empirical literature. Tests between the independent variables and the leverage 2 measure are done purely to investigate whether the findings are robust to one measure, to the other, or to both.

Table 6: **The explanatory variables and their expected impact on leverage 1**

Variable	Description	Predicted sign
Leverage 1	Ratio of total debt to total assets	Dependent variable
Leverage 2	Ratio of total debt to market value of total assets	Dependent variable
Financial Distress	JH de la Rey's model for financial distress	-
Profitability	Ratio of profit before interest and tax to equity	+/-
Growth	Market-to-book assets ratio	-
NDTS	Ratio of annual depreciation to total assets	-
Volatility	Coefficient of Variation of profit before tax	-
Asset type	Ratio of fixed assets to total assets	+
Size	Natural logarithm of total assets	+
Industry	Median industry average	+
Capital expenditure	Ratio of capital expenditure to total assets	+
Dividend yield	Annual cash dividend paid	+

The bivariate regressions are conducted between the dependent variables (leverage 1 and leverage 2) and all independent variables in the study. Initially, each of the independent variables is regressed with the dependent variables while excluding or holding constant the effect of other variables. The partial regression line for each regression is calculated by the following equation:

$$Y = a_y + (b_y) X + \varepsilon$$

Where:

Y represents the dependent variable leverage 1 or leverage 2.

a_y is the estimation of the Y intercept (point at which the regression line touches the Y axis).

b_y is the partial slope coefficient of the independent variable X and the dependent variable Y.

ε is an error term.

Positive and negative signs before the partial slope coefficients indicate the direction of the relationship between the dependent and independent variable so that a positive sign indicates the two variables co-vary in the same direction (positively correlated) and a negative sign indicates

that the two variables co-vary in opposite directions or are negatively correlated (Kerr *et al.*, 2001: 2002: 170). In order to interpret the reliability of the partial slope correlation coefficient (b_y), this study calculated the coefficient of determination (R^2 value) which is the proportion of the original variance in Y (dependent variable) that is "accounted for" by the regression equation. It is also equivalent to the square of the slope correlation coefficient (Berry & Feldman, 1985: 15). The results of the bivariate correlations using scatter plots are represented in the figures that follow. Only significant observations are presented here and the rest are detailed in Appendix B.

4.4.1   FINANCIAL DISTRESS

Figure 2 below depicts a bivariate scatter plot of leverage 1 against financial distress.

Figure 2:   A scatter plot of leverage 1 and financial distress
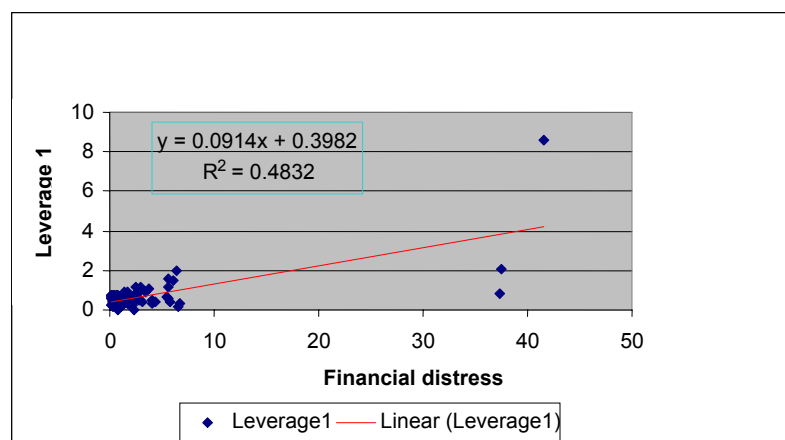
A preliminary review of this scatter plot indicates that leverage 1 correlates positively to financial distress with the strength of the relationship (R^2 value) almost 49%. This finding is unique since almost all documented literature (Smart *et al.,* (2007: 499); Frank and Goyal, (2003: 19) and Ross *et al.* (2001: 467), contends a negative correlation. This finding is also inconsistent with the trade-off theory of capital structure choice which states that firms will trade-off the costs and benefits of debt financing against the costs of financial distress (Graham & Harvey, 2001:209). One of the possible explanations for this result is that listed firms in this study did not

experience extremes of financial distress during the period under study to warrant a reduction in their debt levels. This observation is also consistent with the obtained average measure of financial distress (see section 4.3 above).

In order to test whether this finding is robust, an investigation of the relationship between leverage 2 and financial distress was carried out. However, this test did not produce a similar outcome. Figure 3 depicts a scatter plot of the bivariate regression between leverage 2 and financial distress.

Figure 3:   A scatter plot of leverage 2 and financial distress
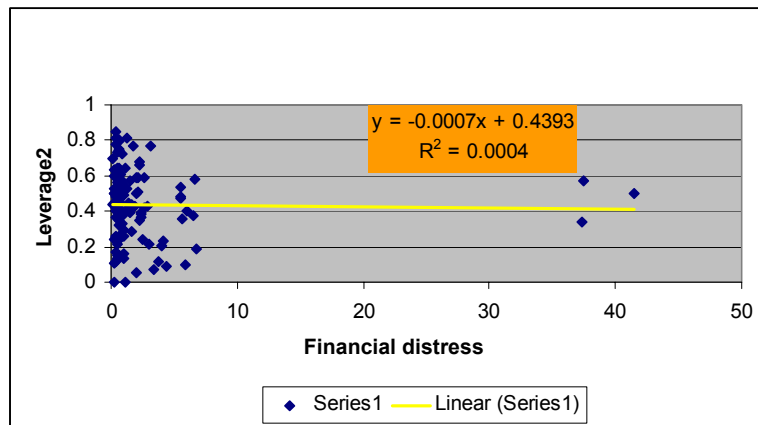
According to the regression line in Figure 3 above, the relationship between leverage 2 and financial distress is negative. However, this relationship is very weak ($R^2 = 0.0004$), so it was concluded that the total variation of the dependent variable is not explained by the independent variable, namely, financial distress.

4.4.2   PROFITABILITY

A significant number of empirical studies, Chen and Strange, (2005: 29), Frank and Goyal, (2003: 3) and Myers, (2001: 89) have documented a negative relationship between leverage and profitability. A bivariate regression of these measures using scatter plots produces conflicting

results. Figure 4 below depicts the relationship between leverage 1 and profitability for listed firms on the JSE.

Figure 4:   A scatter plot of leverage 1 and profitability
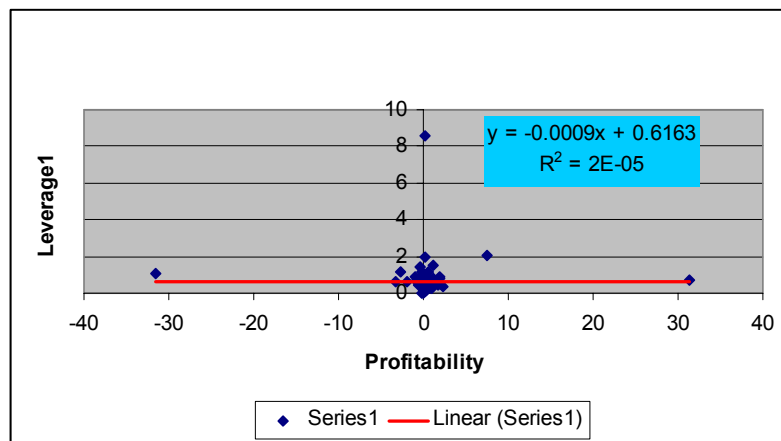
As documented by the finance literature, Abor (2005: 443) and Chen and Strange (2005: 11), the regression line in Figure 4 above is negative. However, the relationship is extremely weak, so much so that no practical relevance can be inferred from it. Similarly, a bivariate regression of leverage 2 and profitability produced a negative relationship that was, however, too weak ($R^2 = 0.0005$) to have any practical significance (see Appendix B). Therefore, the preliminary conclusion made was that for listed firms on the JSE, there is no meaningful relationship between profitability and leverage.

4.4.3   ASSET TYPE

Firms with a significant amount of tangible or fixed assets in their capital structure will normally carry more debt than those without (Smart *et al.*, 2007: 206). This is because they can use such assets as collateral for more debt. Figure 5 below depicts the relationship between leverage 1 and asset tangibility.

Figure 5:   A scatter plot of leverage 1 and asset tangibility
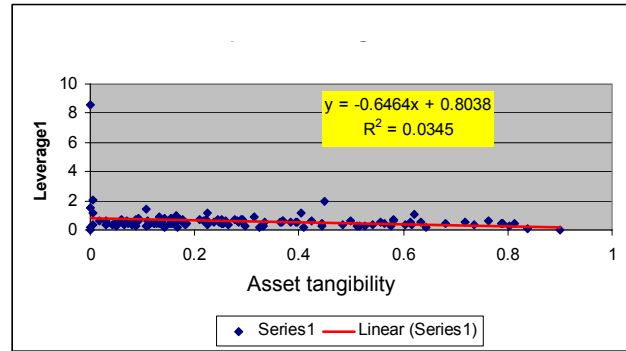
The above scatter plot shows that asset tangibility and leverage 1 are negatively correlated although the relationship is not strong enough (R^2 = 3.45%) to be of practical significance. This finding is similar to that obtained by Nguyen and Ramachandran (2006: 192) who investigated the capital structures of small and medium-sized enterprises in Vietnam. However, most other studies, such as those of Smart *et al.* (2007: 506) and Frank and Goyal (2003: 21), document a positive relationship between the two. This relationship is only obtained when leverage 2 is regressed with asset tangibility. However, the strength of this relationship is too weak to be statistically significant (see Appendix B).

4.4.4   OTHER BIVARIATE REGRESSIONS

Several other bivariate regressions were conducted between the independent variables and leverage using scatter grams. These regressions failed to produce significant results and are outlined in Appendix B. However, the important observation was that a weak direction in correlation between leverage 1 and each of the independent variables could be inferred.

Non-debt-tax-shields (NDTS) produce a weak negative relationship with both measures of leverage. NDTS negatively correlates to leverage 1, but only about 2% of this relationship may be considered meaningful. The negative relationship with leverage 2 is even weaker (about 1%). Size, as measured using the natural logarithm of total assets, produces a weak positive relationship when regressed with leverage 2, but the relationship becomes negative when leverage 1 is used.

Growth is negatively correlated with leverage 1 but a similarly weak positive correlation of 2% is obtained when it is regressed with leverage 2. Earning volatility produces a positive correlation with leverage 1 yet the relationship is negative when leverage 2 is used. Both dividends paid and capital expenditure produce weak negatively correlated results with leverage. In order to investigate these relationships further, a multivariate correlation analysis was conducted to investigate the relationship between leverage and the independent variables. This analysis was done to confirm the findings in the bivariate regression presented earlier, as well as provide preliminary evidence for conducting the multiple regression analysis.

4.5   MULTIVARIATE ANALYSIS

The multivariate analysis begins with a correlation of all independent variables with measures of debt, leverage 1 and leverage 2. Since all variables are measured on interval and ratio scales, this study uses Pearson product-moment correlation matrices to investigate these relationships (Kerr *et al.*, 2002: 172). This process is followed by the main analysis which includes the main regression output and the ANOVA for the regression output.

4.5.1   PEARSON PRODUCT-MOMENT CORRELATION

The Pearson product-moment correlation matrix is essential for investigating the relationship between two or more variables where one of the variables is the dependent variable and the other variables are independent variables (Salkind, 2000: 101). In order to confirm the findings of the partial bivariate regressions above, it was necessary to tabulate the relationship between these independent variables and the dependent variable leverage. Table 7 below depicts a correlation matrix of leverage 1 and all the independent variables.

Table 7: **Pearson product-moment correlation of independent variables with leverage**

Correlations

		Leverage1	Financial distress	Size	Earning volatility	Profitability	Asset type	Growth	Non debt tax shields
Leverage1	Pearson Correlation	1	.695**	-.064	-.055	-.005	-.186*	-.128	-.130
	Sig. (2-tailed)		.000	.478	.545	.959	.040	.158	.152
Financial distress	Pearson Correlation	.695**	1	.064	-.049	.060	-.224*	-.176	-.277**
	Sig. (2-tailed)	.000		.479	.592	.510	.013	.052	.002
Size	Pearson Correlation	-.064	.064	1	.353**	.224*	-.130	.046	-.147
	Sig. (2-tailed)	.478	.479		.000	.013	.151	.613	.105
Earning volatility	Pearson Correlation	-.055	-.049	.353**	1	.016	.119	.337**	.097
	Sig. (2-tailed)	.545	.592	.000		.859	.188	.000	.285
Profitability	Pearson Correlation	-.005	.060	.224*	.016	1	-.132	-.043	-.214*
	Sig. (2-tailed)	.959	.510	.013	.859		.145	.636	.018
Asset type	Pearson Correlation	-.186*	-.224*	-.130	.119	-.132	1	.605**	.537**
	Sig. (2-tailed)	.040	.013	.151	.188	.145		.000	.000
Growth	Pearson Correlation	-.128	-.176	.046	.337**	-.043	.605**	1	.585**
	Sig. (2-tailed)	.158	.052	.613	.000	.636	.000		.000
Non debt tax shields	Pearson Correlation	-.130	-.277**	-.147	.097	-.214*	.537**	.585**	1
	Sig. (2-tailed)	.152	.002	.105	.285	.018	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The Pearson product-moment correlation matrix as illustrated in Table 7 answers the most basic question about the correlation between two variables. In this analysis, an investigation of the relationship between the dependent variable leverage 1 and other independent variables as defined in the trade-off model was done (see section 3.2.3). The following observations were made from Table 7:

(i)   Two variables were statistically significantly correlated to leverage 1. Firstly, financial distress was positively significantly correlated to leverage 1 at the 1 percent level (**r = 0.695**). This means that an increase in financial distress was coupled with an increase in leverage for firms during the period under evaluation (1998-2005). Secondly, asset type, or the collateral value of assets, was negatively significantly correlated to leverage 1at the 5 percent level (**-0.186**). This preliminary observation means that a higher collateral value of assets does not necessarily increase leverage according to the trade-off theory.

(ii)   None of the other variables in this study had any significant positive or negative impact on leverage 1. However, profitability and firm size were negatively correlated with leverage 1 at a statistically insignificant level.

(iii)　　There were other salient relationships among the independent variables that were worth mentioning. NDTS produce significantly negative and positive bivariate correlations with financial distress and profitability and with asset type and growth respectively. Profitability is positively correlated to size, earnings volatility correlates positively with both size and growth, while asset tangibility correlates negatively with financial distress and positively with growth. The results become insignificant when these variables are tested against both measures of leverage.

This analysis was repeated using leverage 2 as the dependent variable. Table 8 below depicts the outcome of these correlations.

Table 8:　　Pearson product-moment correlation of variables with leverage 2

Correlations

		Leverage2	Financial distress	Size	Earning volatility	Profitability	Asset type	Growth	Non debt tax shields
Leverage2	Pearson Correlation	1	-.020	.043	.018	-.023	.094	.106	-.082
	Sig. (2-tailed)		.827	.639	.847	.804	.301	.243	.369
Financial distress	Pearson Correlation	-.020	1	.064	-.049	.060	-.224*	-.176	-.277**
	Sig. (2-tailed)	.827		.479	.592	.510	.013	.052	.002
Size	Pearson Correlation	.043	.064	1	.353**	.224*	-.130	.046	-.147
	Sig. (2-tailed)	.639	.479		.000	.013	.151	.613	.105
Earning volatility	Pearson Correlation	.018	-.049	.353**	1	.016	.119	.337**	.097
	Sig. (2-tailed)	.847	.592	.000		.859	.188	.000	.285
Profitability	Pearson Correlation	-.023	.060	.224*	.016	1	-.132	-.043	-.214*
	Sig. (2-tailed)	.804	.510	.013	.859		.145	.636	.018
Asset type	Pearson Correlation	.094	-.224*	-.130	.119	-.132	1	.605**	.537**
	Sig. (2-tailed)	.301	.013	.151	.188	.145		.000	.000
Growth	Pearson Correlation	.106	-.176	.046	.337**	-.043	.605**	1	.585**
	Sig. (2-tailed)	.243	.052	.613	.000	.636	.000		.000
Non debt tax shields	Pearson Correlation	-.082	-.277**	-.147	.097	-.214*	.537**	.585**	1
	Sig. (2-tailed)	.369	.002	.105	.285	.018	.000	.000	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

From Table 8, it can be observed that none of the variables in the study had a significant relationship with the dependent variable leverage 2. This led to the tentative conclusion that book value debt is a better measure of the determinants of capital structure choice than market value debt. Still, both measures produced weak results that warranted further investigation. It was necessary to test the validity of the models that explain the financing behaviour of firms.

4.5.2   THE REGRESSION OUTPUT

The main regression output is designed to test the usefulness of the proposed models for investigating the financing behaviour of firms listed on the JSE. Two models were investigated, namely, the trade-off theory of capital structure choice and the pecking-order theory of financing hierarchy (see section 1.4.2). This procedure follows an investigation of one aspect of financing behaviour/theory after another.

4.5.3   THE TRADE-OFF THEORY

The trade-off theory states that firms will trade-off the costs and benefits of debt financing against the costs of financial distress in order to maintain a target debt-to-equity ratio or gradually move towards it (Graham & Harvey, 2001: 210; Myers & Shyam-Sunder, 1999: 220). The various measures used to explain this kind of financing behaviour are regressed with leverage 1 in order to determine whether they follow specifications according to this kind of financing behaviour. The model used to investigate for this financing behaviour is depicted below (see section 3.3.1).

Leverage $1_{i,t} = \beta_0 + \beta_1 \text{Asset type}_{i,t} + \beta_2 \text{Industry}_{i,t} + \beta_3 \text{Size}_{i,t} + \beta_4 \text{Financial Distress}_{i,,t} + \beta_5 \text{Profitability}_{i,t} + \beta_6 \text{Growth}_{i,t} + \beta_7 \text{Non-debt-tax-shields}_{i,t} + \beta_8 \text{Volatility}_{i,t} + \text{error term}_{i,t}$

Two regression approaches were followed: the standard multiple regression approach, and the statistical or step-wise regression approach. During the standard multiple regression all the independent variables (IVs) were entered into the regression model at the same time. However, each IV was assessed as if it had entered the equation after all the other IVs had been entered. In other words, each IV was assessed in terms of what it adds to the prediction of the dependent variable (DV) that is different from that already covered by the other IVs. This type of multiple regression analysis is an elaborate application of a semi-partial correlation technique (Kerr *et al.*, 2002: 185). This process was coupled by a hierarchical regression in which IVs were entered according to the order specified by the researcher. This order was based on logical and theoretical considerations (Kerr *et al.*, 2002: 186).

Table 9 provides a regression summary of measures used to assess the success of the trade-off model at explaining financing behavoiur.

Table 9:   **Model summary of independent variables and leverage 1**

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Sig. F Change
1	.711[a]	.505	.475	.5711355	.000

a. Predictors: (Constant), Non debt tax shields, Earning volatility, Profitability, Financial distress, Size, Asset type, Growth

b. Dependent Variable: Leverage1

Table 9 above shows that the R value was 0.711 or 71.1%. This value is a Pearson correlation coefficient between all independent variables and the dependent variable. The overall strength of the relationship between the set of IVs and the DV is reflected by this multiple R statistic. The coefficient of determination or R^2 value provides an indication of the proportion of variance in the DV that is accounted for by the set of IVs (Kerr *et al.*, 2002:194). This R squared (R^2) value was 0.505 or 50.5%. The adjusted R^2 value, a conservative indicator of this variance, is used when the sample size is small (less than 60) and the IVs are numerous (Tabachnick & Fidell, 2007: 56). This value was 0.475 or 47.5%. However, since the sample used was large enough, this value was ignored. As indicated, all the results above were statistically significant from zero at both 5% and 1% levels of significance and it was concluded that about 50.5% of the DV's variance can be explained by the regression in the model.

In order to collate these results, the regression equation above was tested using the analysis of variance summary output. ANOVA in multiple regressions appraises the overall significance of the regression equation (Hamburg & Young, 1994: 518).

Table 10 provides a summary of the analysis of variance for the regression.

Table 10:   ANOVA summary of the regression equation

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	38.265	7	5.466	16.758	.000[a]
	Residual	37.513	115	.326		
	Total	75.777	122			

a. Predictors: (Constant), Non debt tax shields, Earning volatility, Profitability, Financial distress, Size, Asset type, Growth

b. Dependent Variable: Leverage1

This study uses both the p-value and the F-test to accept or reject the null hypotheses stated in Chapter One (see section 1.3.1). The F-value above is the ratio of the explained or regression variance to the unexplained or error variance, while the p-value represents the probability that if the null hypothesis is true it would be observed that a statistic that deviates by chance from the parameter being tested, by a greater degree than is observed (Hamburg & Young, 1994: 519). Accordingly, the significant F value was higher than one (F = 16.758), while the p-value was 0.000 which was less than both 0.05 and 0.01 levels of significance.

This finding indicated that a significant relationship exists between the weighted linear composite of the independent variables, as specified by the model and the dependent variable leverage 1. If this F-value was not statistically significant (less than 1) it could not be possible to proceed with further analysis because this would indicate that the prediction of the criterion variable by the model occurs purely by chance. The null hypothesis was rejected and it was concluded that there is a significant linear relationship between the financing behaviour of JSE listed firms and the developed trade-off theory model.

4.5.4 THE STEP-WISE REGRESSION OUTPUT

The step-wise regression approach was conducted to identify the variables within the model that attempt to collectively explain financing behaviour according to the trade-off theory. These variables are also regarded as the determinants of capital structure choice for listed firms. During this process the order of variable entry was based solely on statistical criteria. There are three types of statistical regressions that were conducted: forward selection, backward deletion and step-wise regression. During the forward selection, IVs were entered in the order of the magnitude of their bivariate correlations with the DV, starting with the highest and ending with the lowest. In the backward deletion all variables were entered initially and then deleted one at a time if they did not contribute significantly to the regression equation. During the step-wise regression IVs were added one at a time based on theoretical criteria, but they were also deleted if they made no significant contribution to the regression output (Kerr *et al.*, 2002:186). A summary of the statistical regression output identifying those independent variables which, according to Hamburg and Young (1994:57), reduce the remaining error variance in the regression output, is depicted in Table 11.

Table 11:   Step-wise regression summary of leverage 1 and independent variables

Model Summary[b]

Model	R	R Square	Adjusted R Square	R Square Change	F Change	Sig. F Change
1	.695[a]	.483	.479	.483	113.155	.000

a. Predictors: (Constant), Financial distress

b. Dependent Variable: Leverage1

It is important to note that the results obtained above were entirely consistent with values obtained during the standard multiple regression output with slight differences caused by the rounding off of figures. Table 11 indicates that only the variable financial distress met the default SPSS statistical regression criteria for inclusion into the model (p-value < 0.05). The overall strength of the relationship between the set of IVs and the DV, as reflected by the

multiple R statistic, was 0.695 while the R^2 value was 48.3%, adjusted to 47.9%. These values were statistically significant at the 1% and 5% levels of significance indicating the model had some correlation with the trade-off theory of financing behaviour and offer tentative support to the financing behaviour of firms listed on the JSE. However, since only one variable (financial distress) met the criterion for inclusion into the model, it was necessary to investigate the explanatory power of the other variables in the model.

Firstly, it was necessary to verify this finding using the ANOVA output discussed earlier. Table 12 below summarizes this output.

Table 12:   ANOVA summary of the step-wise regression equation

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36.619	1	36.619	113.155	.000[a]
	Residual	39.158	121	.324		
	Total	75.777	122			

a. Predictors: (Constant), Financial distress

b. Dependent Variable: Leverage1

The results of Table 12 confirm that the F-value (113.12) was statistically significant at both 1% and 5% levels of significance implying that this model had explanatory power as to the financing behaviour predicted by the trade-off theory and of listed firms on the JSE.

4.5.5   EXPLAINING THE MODEL

Explaining the model assists in the identification of the determinants of capital structure choice among firms listed on the JSE. This SPSS coefficients' Table 2 (on page 93) is used to describe the relative weights of the variables in the model. This coefficients' output table describes the relative importance of each IV in the regression model. This is achieved by examining the t-tests as well as the p-values for each measure's regression weight. In the output, financial distress contributed statistically significantly to the prediction of leverage 1 based on the alpha level of

0.01 while asset type, NDTS, size, volatility, profitability and growth made no significant contribution to this model.

The zero-order correlations in Table 2 are simple bivariate correlations between each of the independent variables and the dependent variable leverage 1. Unexpectedly, financial distress is positively correlated to leverage 1 (+0.695). By squaring and adjusting this semi-partial correlation, it was noted that this variable accounted for 45.97% of leverage 1's variance not explained by the other variables.

Now, recall that the R^2 value for the model was 0.505 or 50.5% (Table 9) which indicates the criterion's variance accounted for by the model. If one variable contributed 45.97% to this variance, then the rest of the variables contributed an insignificant 4.53% which explains the overlapping predictive work done by other variables.

The regression equation for leverage 1 is stated as follows:

Leverage 1 = 1.206 - 0.331 Asset type - 0.108 Size + 0.093 Financial distress - 0.003 Profitability - 0.135 Growth + 3.467 Non-debt-tax-shields - 2.68 E-008 Volatility + error term.

Therefore, in order to account for the only variable that had a significant impact on leverage 1 the statistical regression equation for the model was restated as follows:

Leverage 1 = 0.398 + 0.091 Financial distress

Table 13 below shows the coefficients' table of leverage 1 and financial distress. The coefficients for excluded variables are included in Appendix A.

Table 13:   Coefficients table for the adopted model

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.398	.055		7.210	.000					
	Financial distress	.091	.009	.695	10.637	.000	.695	.695	.695	1.000	1.000

a. Dependent Variable: Leverage1

4.5.6   ANALYSIS USING LEVERAGE 2

The above analysis was repeated using the market value of debt (leverage 2). This was done so as to establish whether the results are also robust to this measure of debt. The coefficients table of all IVs and leverage 2 indicated that none of the variables had a significant correlation to leverage 2. Therefore, part of this analysis was excluded and is contained in Appendix A.

The analysis of variance for the regression equation between leverage 2 and the measured variables indicated that there was no significant relationship between the weighted linear composite of the independent variables as specified by the model and the dependent variable leverage 2 as indicated by the obtained F-value (1.010) and the p-value (0.428>0.01), (see Table 14 below). Therefore, further analysis could not proceed because prediction of the criterion variable using this model could not be supported other than by chance.

Table 14   ANOVA summary of the regression with leverage 2

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.277	7	.040	1.010	.428[a]
	Residual	4.500	115	.039		
	Total	4.776	122			

a. Predictors: (Constant), Non debt tax shields, Earning volatility, Profitability, Financial distress, Size, Asset type, Growth

b. Dependent Variable: Leverage2

4.5.7   THE TARGET ADJUSTMENT MODEL

An alternative means of investigating for financing behaviour according to the trade-off theory is to test the target adjustment model. The trade-off theory predicts that managers seek to maintain the optimal capital structure and although random events bump them away from it, they gradually work back to the optimum (Myers & Shyam-Sunder, 1999: 226).

Therefore, using a time series of firms' debt ratios from 1995-2005, this study expected to see mean-reverting behaviour of firms' debt ratios towards a target debt ratio. The target debt ratio is determined as the average firm debt ratio over the relevant period (Myers 2001: 93). The simple form of the target adjustment model states that changes in the debt ratio are explained by deviations of the current debt ratio from the target and is depicted as follows:

$$\Delta D_{i,t} = a + b_{TA}(D_{i,t} - D_{i,t-1}) + \epsilon_{i,t}$$

Where:

> $D_{i,,t}$ is the target debt level of firm i at time t which was obtained by the historical mean debt ratio of the firm multiplied by the total capital.
> $(D_{i,t-1})$, is the debt ratio of the firm lagging one year.
> b_{TA} is the target adjustment coefficient.
> and a, is the sample wide coefficient.

If b_{TA} is greater than zero, it would confirm adjustment towards a target (Myers & Shyam-Sunder, 1999: 226). Figure 6 depicts a scatter plot of the target adjustment model. The regression equation for the model was Y = 538, 227, 000 + 0. 4619x and since the target adjustment coefficient was positive, mean reverting behaviour among the book value debt ratios of JSE listed firms was confirmed.

Figure 6: **Scatter plot of a target adjustment model using book values of leverage 1**
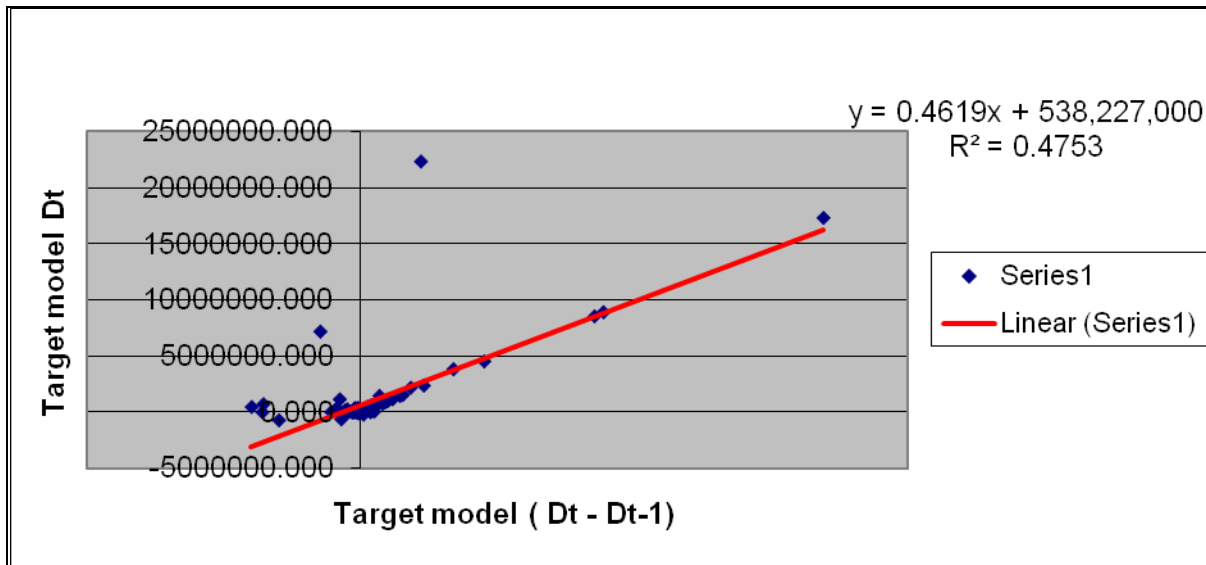
The results in Figure 6 indicate mean-reverting behaviour among sample firms' debt ratios, (R^2 = 0.475 or 47.5 %). However, this does not necessarily mean that firms were issuing or retiring debt during this period in order to move toward the optimal target debt ratio (Myers & Shyam-Sunder, 1999: 240). From a similar study, Myers and Shyam-Sunder (1999: 240) concluded that mean-reversion in debt ratios can generate plausible but false good fits and significant coefficients of target adjustment models even when mean-reversion has nothing to do with optimal debt ratios, but simply reflects pecking-order financing coupled with cycles or mean-reversion in financial deficits or surpluses.

Nonetheless, this finding is consistent with survey results from Graham and Harvey (2001: 211), who found that 44% of 392 surveyed firms claimed to have leverage targets, and Fama and French (2002: 23), who confirmed mean-reversion among over 3000 firms in their study.

4.6   TESTING THE PECKING-ORDER THEORY

The pecking-order theory states that firms do not maintain the optimal target capital structure that maximises firm value (Chen & Strange, 2003: 13; Myers & Shyham-Sunders, 1999: 220). Instead, capital structure decisions of firms under this theory are driven by the firm's desire to finance new investments preferably through the use of internally generated funds, then with low-risk debt and with new equity, only as a last resort.

In order to test for patterns of this kind of financing behaviour among listed firms on the JSE, the approach taken by Frank and Goyal (2003: 4) was followed whereby explanatory variables that are reliably assigned to influence this kind of financing behaviour are chosen and tested in order to make the necessary judgments about the connection between observable data and the theory's predictions. The model used to investigate this kind of financing behaviour is depicted below (see section 3.3.3).

Leverage $1_{i,t}$ = μ_0 + μ_1Profitability$_{i,t}$ + μ_2Growth$_{i,t}$ + μ_3Size$_{i,t}$ + μ_4Capital expenditure$_{i,t}$ + μ_5Dividend yeild$_{i,t}$ + error term$_{i,t}$

Similar to the above analysis, standard multiple and step-wise regressions are conducted in which the dependent variables leverage 1 and 2 are regressed with several independent variables in order to determine whether there is a correlation as predicted by the empirical literature (Frank & Goyal, 2003: 224; Fama & French 2002: 29 and Rajan & Zingales, 1995: 1455). A similar approach is also followed in controlling for violations to regression assumptions and other regression requirements. However, in order to control for repetition, some of these processes are detailed in Appendix A. Also, analysis using leverage 2 is excluded due to its low predictive power with independent variables in the model (see section 4.5.6 above). It is included in Appendix A.

This main analysis begins with an examination of the coefficients' table housing collinearity statistics. This is depicted in Table 15 below.

Table 15:   Collinearity statistics between leverage 1 and independent variables.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.945	1.595		1.847	.067					
	Profitability	.000	.018	.002	.021	.983	-.005	.002	.002	.942	1.061
	Growth	-1.884	1.442	-.120	-1.306	.194	-.128	-.120	-.119	.982	1.018
	Size	-.055	.094	-.058	-.584	.561	-.064	-.054	-.053	.859	1.164
	Expenditure paid	.612	1.531	.037	.400	.690	.043	.037	.037	.967	1.034
	Dividends paid	-5.7E-008	.000	-.025	-.263	.793	-.047	-.024	-.024	.921	1.086

a. Dependent Variable: Leverage1

Preliminary observations from Table 15 above indicated that both tolerance and VIF values (last two columns) were within normal bounds suggesting that multicollinearity was not present among the independent variables used in this analysis. Chances of heteroscedasticity were also mitigated by ensuring that the dependent variable was measured accurately and a large sample size (123 firms) was used (Berry & Feldman, 1985:74). Conditions of linearity and normality were assumed based purely on this large sample size (Dielman, 2001: 105).

This analysis starts with an examination of the coefficients' Table 15 above to identify the relative importance of each IV to the dependent variable leverage 1. Accordingly, none of the independent variables had any significant correlation to leverage 1. This was indicated by the t-tests and p-values for each independent variable's regression weight (columns 4 and 5). The preliminary conclusion inferred was that there is no significant relationship between leverage 1 and the independent variables stated in the model.

However, it was necessary to test other aspects of this analysis before the reliability of this model in explaining financing behaviour according to the pecking-order theory could be rejected or confirmed.

Table 16 below presents a Pearson product-moment correlation matrix between the independent variables and leverage 1.

Table 16: **Correlation matrices between leverage 1 and the independent variables**

Correlations

		Leverage1	Profitability	Growth	Size	Expenditure paid	Dividends paid
Leverage1	Pearson Correlation	1	-.005	-.128	-.064	.043	-.047
	Sig. (2-tailed)		.959	.158	.478	.637	.603
Profitability	Pearson Correlation	-.005	1	-.043	.224*	.022	-.010
	Sig. (2-tailed)	.959		.636	.013	.812	.914
Growth	Pearson Correlation	-.128	-.043	1	.046	-.102	.048
	Sig. (2-tailed)	.158	.636		.613	.264	.599
Size	Pearson Correlation	-.064	.224*	.046	1	.128	.262**
	Sig. (2-tailed)	.478	.013	.613		.159	.003
Expenditure paid	Pearson Correlation	.043	.022	-.102	.128	1	-.036
	Sig. (2-tailed)	.637	.812	.264	.159		.692
Dividends paid	Pearson Correlation	-.047	-.010	.048	.262**	-.036	1
	Sig. (2-tailed)	.603	.914	.599	.003	.692	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

This Table depicts the correlations of the pecking-order model as represented by leverage 1 and the set of independent variables. Preliminary evidence here suggests that this model had no explanatory power for the financing behaviour of firms listed on the JSE since none of the independent variables listed above had a significant relationship with leverage 1.

However, there was a significantly positive relationship between size and profitability, on one hand (at the 5% level), and size with dividends paid on the other (at the 1% level). This evidence seems to suggest that larger-sized firms are more profitable and have higher dividend payout ratios compared to smaller-sized firms, an observation similar to that made by Fama and French, (2002: 13), although according to them this finding is consistent with both theories of capital structure choice.

There was no correlation between either of these independent variables with leverage 1. Further analysis to test for the reliability of the model in explaining financing behaviour according to this theory is corroborated using the ANOVA summary for the regression output.

Table 17 below depicts a summary of the ANOVA for the main regression output.

Table 17: **ANOVA summary for the pecking-order model regression**

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.662	5	.332	.525	.757^a
	Residual	74.115	117	.633		
	Total	75.777	122			

a. Predictors: (Constant), Dividends paid, Profitability, Expenditure paid, Growth, Size

b. Dependent Variable: Leverage1

From Table 17 above, the F-value 0.525 (ratio of the regression variance to the error variance) was less than the acceptable ratio of one needed to reject the null hypothesis in Chapter One (see section 1.3.1). Similarly, the p-value of 0.757 was greater than both 0.01 and 0.05 levels of significance (Hamburg & Young, 1994: 410). These results indicated that there was no significant relationship between the weighted linear composite of the independent variables as specified by the model and the dependent variable leverage 1.

An insignificant F-value meant that it was not possible to proceed with further analysis since the interpretation of these multiple regression results would mean that further prediction of the criterion variable by the model occurs purely by chance. Hence, further analysis was abandoned.

In conclusion, it is acknowledged that the pecking-order model as designed above could have been mis-specified and thereby has little or no collective correlation to the financing behaviour of listed firms on the JSE. Currently, no empirical tests have produced an uncontested model to fully explain this kind of financing behavior (see Leary & Roberts, 2005; Frank & Goyal, 2003 and Myers & Shyam-Sunder, 2001). Hence, a more accurate model needs to be specified.

4.7   DETERMINANTS OF CAPITAL STRUCTURE CHOICE

The determinants of capital structure choice are deduced using a collaboration of several analytical procedures used in this Chapter. These include bivariate correlations, Pearson product-moment correlation matrices, the regression output and the analysis of variance for the regression. All these procedures provide consistent results that enable those variables that have an impact on debt usage among listed firms on the JSE to be isolated.

Accordingly, financial distress is the only variable statistically significantly correlated to the measure of debt (leverage 1) and varies positively with the latter. However, the Pearson product-moment correlation identifies the independent variable asset type as statistically significant with total debt, but the strength of this negative correlation is explained only 19% of the way. NDTS, size and growth options produce weak negative, weak positive and weak positive correlations respectively with total debt, while the rest of the variables have an extremely negligible impact on total debt. From the descriptive statistics, firms on the JSE exhibit a positive correlation on leverage. However, this evidence is not supported statistically since the correlation between leverage and profitability is too weak to support meaningful inference.

4.8   CONCLUSION

In conclusion, this study identified, in part, the determinants of capital structure choice among listed firms on the JSE while at the same time it investigated whether these firms follow either, the trade-off theory or the pecking-order theory when financing their business activities.

After controlling for a violation of regressions assumptions, standard multiple and step-wise regressions in collaboration with other analytical procedures were run on the two models designed to investigate for such financing behaviour. The findings indicate, to a given degree, that listed firms exhibited financing behaviour according to the trade-off model during the period under evaluation (1995-2005). However, these results were not conclusive.

Evidence according to the pecking-order theory was weak and this section of the analysis was abandoned as inconclusive. Nonetheless, this study provides useful insights into the financing behaviour of listed firms. The following Chapter outlines and discusses the main findings, identifies the limitations of the study and suggests areas where it might be fruitful to focus future research.

CHAPTER FIVE

CONCLUSIONS, LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

5.1   SUMMARY OF THE FINDINGS

This study examined whether finance theory is aligned with practice by testing two conventionally recognized theories of capital structure choice (the trade-off theory and the pecking-order theory) against the financing practices of a multi-industry sample consisting of 123 large local and non-financial firms listed consistently on the JSE during the period 1995-2005. The study used empirically tested determinants of capital structure choice to design two models which were then used to establish whether listed firms follow the trade-off theory where they trade-off the benefits of debt financing against the costs of financial distress, and appear to gradually adjust to the optimal debt ratio, or the pecking-order theory where firms' external financing is driven purely by the firm's internal finance deficit so that firms do not necessarily maintain the optimal debt-to-equity ratio in their capital structures.

After detecting and controlling for outliers and multicollinearity, the study employed standard multiple regressions, step-wise regressions and ANOVA techniques on the sample data to assess the usefulness of the two models as explanations of the financing behaviour of firms according to these theories and to answer the research hypotheses. In the process, other salient descriptive features about the capital structure practices of listed firms were observed. The study confirmed the following:

- The static trade-off model has both cross-sectional and time-series explanatory power for explaining the financing behaviour of listed firms although this explanation is not done in its entirety. Cross-sectional explanatory power is observed through the overall significance of the designed model, while time-series power is inferred using the target adjustment model in which firms' debt ratios indicate mean reverting behaviour towards an optimal debt ratio.

- Tests on the pecking-order model, according to the data, had no statistical power. Further analysis in this regard was abandoned due to the lack of sensitivity on all the variables in the preliminary analyses.

- The results indicated a unique but significantly positive correlation between debt financing and financial distress during the period under study (1995-2005).

- The results also indicated a significant negative correlation between debt financing and the collateral value of assets (asset tangibility) during this period.

- NDTS produce significantly negative and positive bivariate correlations with financial distress and profitability and with asset type and growth respectively. Profitability is positively correlated to size, and earnings volatility correlates positively with both size and growth, while asset tangibility correlates negatively with financial distress but positively with growth. The results become insignificant when these variables are tested using the designed models.

- There was a significantly positive relationship between size and profitability, on the one hand (at the 5% level), and size with dividends paid on the other (at the 1% level), using tests of the pecking-order model. This suggests that larger-sized firms are more profitable and pay out higher dividends compared to smaller-sized firms. This observation is similar to that obtained by Fama and French (2002: 13), although according to them this finding is consistent with both theories of capital structure choice.

- A positive correlation was inferred between debt usage and profitability based on descriptive statistics. However, this finding was not confirmed statistically since the negative correlation between leverage and profitability was too weak to support meaningful inference. None of the other variables in the models had any significant correlation to total debt.

- Although both measures of total debt produced many weak results, the book value measure of total debt had a stronger statistical explanatory power of the financing behaviour of listed firms compared to the market value measure of total debt. Nonetheless, the results were not robust with regard to both measures.

- It was tentatively concluded that listed firms on the JSE had comparatively higher debt ratios compared to listed firms in China, the United States and the United Kingdom during the period under study. In the same way, comparative figures indicated that JSE firms on average registered higher profitability compared to their counterparts.

- Capital intensive industries like General Mining and Construction and Materials had the highest amount of book value debt, but they also posted the highest profitability during this period.

- The retail industry registered the lowest debt levels, but results also showed that this industry is very volatile.

- The travel and leisure or hospitality industry was least profitable based on its relatively high business risk and greater variability in sales.

These findings are not entirely unique when compared to earlier studies. The study by Nguyen and Ramachandran (2006: 192) on the capital structures of small and medium-sized enterprises, for instance, found no significant correlation between profitability and debt while their tangible assets correlated negatively with debt and their measure of business risk correlated with it positively. Similarly, other studies by Örtqvist *et al.* (2006: 290), Chen and Strange (2005: 29) and Frank and Goyal (2003: 29) have reported inconsistencies and low sensitivities with their measures of debt or its impact on the several explanatory variables used in their studies. However, these findings represented some uniqueness in the capital structure practices of listed firms in South Africa which warrant further discussion.

5.2   CONCLUSIONS

The research hypotheses were as follows:

H_{01} There is no significant relationship between the financing behaviour of listed firms on the JSE and the trade-off theory as tested using proxies that measure this kind of financing behaviour.

H_{02} There is no significant relationship between the financing behaviour of listed firms on the JSE and the pecking-order theory as measured using proxies that measure this kind of financing behaviour.

Alternative hypotheses, H_1 and H_2 were stated as the exact opposite of the null hypotheses indicating that a significant relationship exists between the financing behaviour of listed firms on the JSE and the trade-off theory or the pecking-order theory using proxies that measure this kind of financing behaviour.

The null hypothesis H_{01} was rejected in place of the alternative hypothesis H_1 as these findings support the tentative conclusion that there is a significant relationship between the financing behaviour of listed firms on the JSE and the trade-off theory as tested using proxies that predict this kind of financing behaviour. Evidence to support the rejection of this hypothesis was gathered from the high statistical power of both the trade-off and the target adjustment models (see sections 4.5.3, 4.5.4 and 4.5.7).

However, the designed trade-off model could not explain the financing behaviour of listed firms in its entirety since only the variable financial distress met the SPSS step-wise regression criteria to be included in the model. In addition, this variable correlated positively with leverage in contrast to predictions of the trade-off theory.

Nonetheless, other salient features in the findings supported the trade-off theory of financing behaviour. Firstly, descriptive statistics indicated that more profitable firms carry more debt, a finding which was confirmed by the positive bivariate correlations between profitability and size for both measures of leverage (Tables 7 and 8). Secondly, results indicated mean reverting behaviour among listed firms' debt ratios according to predictions of this theory.

It was not possible to reject the null hypothesis H_{02} and this would suggest that there is no significant relationship between the financing behaviour of listed firms in South Africa and the pecking-order theory. Acceptance of this hypothesis was biased on the low sensitivity of the designed pecking-order model using leverage 1 and 2. It is plausible, based on these findings, that listed firms in South Africa do not exhibit financing behaviour according to this theory. However, it is also likely that the model was mis-specified thereby producing conflicting results.

In answer to the research question, it was tentatively concluded that there is misalignment between finance theory and the financing practices of listed firms in South Africa and, hence, the financing patterns of developed and developing economies because, for the larger part, these findings conflicted with many similar tests conducted in developed economies. In the same way, determinants of capital structure choice from empirical evidence were not significant using data on listed firms in South Africa.

5.3   DISCUSSION

The significantly positive correlation between debt financing and financial distress during the period under study (1995-2005) indicates that listed firms issued debt irrespective of the chances they could default on it and probably go bankrupt. This finding is inconsistent with most studies, including Frank and Goyal (2003: 1) and Graham and Harvey (2001: 211), and challenges the argument that firms trade-off the cost and benefits of debt financing against the fear of failing to meet their financial obligations or running bankrupt as defined by the trade-off theory of financing behaviour.

To investigate this relationship further, a time-series of scatter plots between debt and financial distress, for the period under study, were plotted. These tended to support this relationship (see Appendix A). It was noted that financial distress was lowest during the 1999 period, a time during which firms issued the most debt. This trend could in part suggest a negative relationship of firms' debt ratios and financial distress only that it occurs in isolation, because during the subsequent years (2000-2005) these values seemed to level out producing the observed positive effect.

Firstly, the conflicting finding above could be the result of the different measures used to test for financial distress between this and earlier empirical studies. There were no means by which to ascertain this.

Secondly, earlier studies by Chen and Zhao (2004: 24) and Frank and Goyal (2003: 7) have argued that it is unlikely firms will reduce their debt levels when their bankruptcy levels (or levels of financial distress) are moderate or low. It is therefore possible that bankruptcy risk or the levels of financial distress were minor to warrant a reduction in the debt levels of listed firms during this period. This explanation seems plausible considering that none of the listed firms registered average negative "k" financial distress values during this period.

Furthermore, a series of other factors may offer an explanation for this anomaly. Firstly, firms listed on the JSE undergo stringent governance and compliance rules that govern listings on this exchange (see www.jse.co.za). This regulation tends to reduce competition and business risk, thereby controlling for chances of debt default or bankruptcy (Bancel & Mittoo, 2004:108; Harris & Raviv, 1991: 333). This suggests that regulated firms will tend to carry more debt without fear of defaulting on it. In addition, it is suspected that these listed firms will have good credit ratings or better credit relationships with lenders by virtue of the fact that they are listed or have been consistently listed for a significant period. This could offer some explanation for the observed positive relationship between debt and financial distress during this period.

Secondly, this analysis covers the post-apartheid period (1995-2005) during which the South African economy experienced an economic boom supported by lower, although rising interest rates. These lower interest rates may have acted as an incentive for greater debt financing. Similarly, global interest rates for those firms that could issue foreign debt were low during this period, but it was not possible to coonfirm whether all debt was locally obtained. It is possible that in the context of the current global economic downturn and global credit crunch, an analysis of this relationship could produce conflicting results. Hence, subsequent research on current data is warranted.

Lastly, it is possible that the measure of debt used in this study over scored this amount creating the observed positive relationship. Rajan and Zingales (1995: 1428) argue that this measure overstates the amount of debt and does not give a good indication of whether firms are at risk of default in the future.

The significantly negative correlation between debt financing and the collateral value of assets indicates that the amount of tangible assets in a firm is not a determinant of capital structure/debt according to the trade-off theory. This is an interesting finding since growth options of listed firms were clearly a function of tangible assets as reflected by the positive significant relationship between asset tangibility and growth. This would imply that growth in investments was not funded by debt, but rather by equity. Nonetheless, it is also possible that listed firms used other factors including intangible assets like goodwill or good credit ratings to issue debt, as indicated by Chen and Strange (2005: 29). However, since an investigation of the effects of these variables was not done, this assumption could not be affirmed. Further studies are needed to investigate the effects of these variables on leverage.

Similarly, NDTS did not contribute to leverage as indicated by theory and it was concluded that they are not a determinant of capital structure. Nonetheless, it is possible listed firms accumulated NDTS, in part, through unused depreciation allowances as reflected by the significant positive relationship between NDTS and asset tangibility (see Smart *et al.*, 2007: 504).

With regard to industry, the high book value leverage levels for industries like General Mining and Construction could be a function of the growth in infrastructure for the overall economy as earlier noted. These industries also turned out to have the highest profitability during this period which seems unusual, but justifies the earlier observation that profitable firms carry more debt in their capital structures. Such industries are capital intensive and their sales are usually cyclical in nature, which would mean higher volatility in sales and therefore lower profitability. This is not what was observed.

In the same way, industries like retail, which are considered non-cyclical in nature, have more consistent or regular sales, posted the highest volatility and lowest profitability. The only tentative explanation here was that this industry is affected by fluctuating sales during changing seasons. This aspect was not categorically examined during the study and needs to be investigated further. A satisfying rationale could not be found to explain why the travel and leisure or hospitality industry was least profitable, had moderately low debt levels and high

business risk during this period. It is conceivable, however, that this industry is still at its inception and is characterized by many economic and social uncertainties. This assumption needs to be investigated further though.

Lastly, it was not possible to investigate the effect of firm size on leverage because all the listed firms in this study happened to fall in the large-firm category. Only firms listed on the ALT X were considered as medium or small, and since most of these were financial companies, they were excluded from the study. The effect of leverage on industry could not be fully investigated because many of the firms in certain industries did not have complete data and were excluded during the data cleansing process, thereby reducing the number of available firms to analyse by industry.

5.4   RESEARCH AND PRACTICAL IMPLICATIONS

The findings discussed above do not paint a very clear picture about the collective financing behaviour of listed firms on the JSE and based on this, it is suspected that some listed firms exhibited aspects of either of the financing behaviour patterns investigated by this study. It is also possible that financing decisions are a function of several other quantifiable or non-quantifiable variables uncommon to earlier empirical studies, and which are not included in these models so that an improvement of these models is warranted. Further research should focus on identifying these variables for testing on more current data.

Although the trade-off theory provides strong support of the financing behaviour of listed firms, such evidence is based purely on the overall strength of the model and is not exactly conclusive since most of the variables in the model (equation 1) offer no sensitivity as predicted by theory. Similarly, listed firms possibly exhibited other minor forms of financing behaviour like the free cash flows theory (Myers, 2001: 81), the signaling and market timing theory (Smart *et al.*, 2007: 502; Brigham and Ehrhart, 2008: 630), or a divide between all these theories and those investigated for in this study. This would point to the possible conclusion that finance theory on capital structures is not aligned with finance practice.

The low sensitivity of tests on the pecking-order theory means that this study could not accurately establish whether listed firms are concerned about financial flexibility and therefore create financial slack to cover their increasing demands for growth through investments. In the same way it was impossible to establish how information asymmetries affect these firms. However, the significantly positive relationship between debt and financial distress suggests that these firms did not consider these factors with high priority. This observation has practical implications about the spill-over effects of this trend.

Although tests on these theories were not exactly conclusive, they will stimulate further research on the current capital structure trends among listed firms or other firms within South Africa, especially during this period of global economic downturn. Debt, it is indicated, constitutes over 60 percent (see section 4.3) of the total assets for listed and global firms which is an alarming proportion and could have in part fuelled this current global economic and local recession.

Therefore, this research offers some important implications for policy makers and fund providers about the reasons behind current capital structures or levels of debt among listed firms. The positive relationship observed between debt and financial distress certainly calls for a safer banking system, in line with issuing loans or credit and capital structures that are customized to differing levels of risk. These measures need to be instituted promptly for local and global economies to reverse this trend.

5.5   LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

This attempt to create new knowledge or to advance local knowledge on the capital structure practices of listed firms is not without its flaws. It is possible that certain aspects of this methodology may have limited the findings. However, this study ensured the following:

(i)   Firstly, for both theories, the variables used in the models to test for financing behaviour were adopted from the empirical literature and calculated with accuracy based on empirical specifications (see Appendix A). These chosen proxies were common to those used in earlier studies.

(ii)   Secondly, conditions of multicollinearity and the treatment of outliers were appropriately controlled for in order to assist in qualifying these findings. Similarly, empirical evidence suggests that using a large sample or calculating the model variables with accuracy reduces the chances of heteroscedasticity (Berry & Feldman, 1985: 74). This precaution was undertaken and it can be assumed that this condition did not influence the findings.

(iii)   Thirdly, this study followed the approach of scholars who have advocated for total debt as their measure of the dependent variable. Nonetheless, as indicated, total debt tends to over score the amount of leverage firms have, according to Rajan and Zingales (1995: 1428), and this could have affected the findings. Crucial results have been reported from alternative definitions of debt such as the ratio of long-term debt or short-term debt to total assets (see Örtqvist *et al.*, 2006, Akhtar, 2005, and Chen & Strange, 2005). In the same way, the effects of other aspects of debt financing like convertible securities or bond covenants that could have influenced these capital structure decisions and the findings were not considered. Future research should focus on testing these alternative definitions and variables.

In addition, the design of the models used was based purely on the researcher's discretion and was influenced largely by other empirical designs and theoretical under-pinnings. It is possible the pecking-order model was mis-specified, thereby contradicting some of the expected outcomes. Similarly, certain extraneous variables and dummies were excluded from the analysis because there was no satisfying empirical means by which to quantify them. The effect of managerial entrenchment, for example, affects the financing decisions of firms. Unfortunately, available data did not provide accurate ratios by which to test this assumption.

It is also argued by Chen and Strange, (2005: 11) that the period of listing (age), may benefit certain firms more than others for issuing debt since such firms, on assumption, have created better relationships with the lenders of capital based on their risk profiles. This study could not assess the effects of this factor or of such factors as asset intangibility and taxes which may influence capital structure decisions (see, Ahktar, 2005,

Frank & Goyal, 2003). The researcher came to the conclusion that an exclusion of these variables could not affect the findings adversely.

It was also observed that the process of data cleansing excluded a significant number of potential firms from the analysis (25 firms). The calculated variables of such firms produced extreme values when compared with those of other firms in the study. It is possible that the exclusion of these outliers could undermine the findings of this study, so that future analysis should investigate for alternative outcomes when these outliers are included.

Finally, this study uses several qualifying analytical techniques which include bivariate regressions, correlation matrices, the regression output and the analysis of variance for the regression and these provide consistent results to conclude that these findings are justified and credible. Further research should therefore focus on correcting some or all of these limitations and should focus on more recent data (2005-2008), which it is hoped has now become available.

5.6   CHAPTER SUMMARY

This Chapter presented the main findings on tests of the financing behaviour of listed firms in South Africa. It also discussed these findings and their limitations in light of earlier empirical studies and suggested practical implications for further research and for both academic and finance practitioners.

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ANNEXURE

APPENDIX A

Table defining variables and the Microsoft Excel coordinates used to calculate them

	Variable	Formula	Excel coordinates
1.	Leverage 1	$\dfrac{\text{Total liabilities (total debt)}}{\text{Total assets}}$	$\dfrac{(24+32+33+34)}{(40)}$
2.	Leverage 2	$\dfrac{\text{Total debt}}{\text{Market value of Total assets}}$	$\dfrac{(24+32+33+34)}{(24+32+33+34) + (150 \text{ X } 102)}$
3.	Profitability	Earnings B4 interest & tax (EBIT)/ Equity	$\dfrac{73}{9}$
5.	Financial Distress	J H de la Rey's Model	Financial Distress values pre-calculated
6.	Volatility	CV of Profit before tax	73
7.	NDTS*	$\dfrac{\text{Annual depreciation}}{\text{Total assets}}$	$\dfrac{65+66}{40}$
8.	Size	Natural log (ln) Total assets	40
9.	Growth	$\dfrac{\text{Market value of assets}}{\text{Book value of assets}}$	$\dfrac{118+40}{40}$
10.	Tangibility/ collateral value	$\dfrac{\text{Total fixed assets}}{\text{Total assets}}$	$\dfrac{14}{40}$
11.	Industry	Mean industry debt ratio	$\dfrac{(24+32+33+34)}{(40)}$
12.	Capital expenditure	Annual capital expenditure/ Total assets	$\dfrac{720}{40}$
13.	Dividends Paid	Dividends paid year to year	80
14.	Retained earnings	Retained earnings	82
15.	Capital	Total owners' interest	9

Table showing the coefficients of excluded variables in the designed Trade-off model

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		Minimum Tolerance
						Tolerance	VIF	
1	Size	-.110[a]	-1.689	.094	-.152	.996	1.004	.996
	Earning volatility	-.021[a]	-.322	.748	-.029	.998	1.002	.998
	Profitability	-.046[a]	-.709	.480	-.065	.996	1.004	.996
	Asset type	-.031[a]	-.467	.642	-.043	.950	1.053	.950
	Growth	-.006[a]	-.093	.926	-.008	.969	1.032	.969
	Non debt tax shields	.068[a]	1.002	.318	.091	.923	1.083	.923

a. Predictors in the Model: (Constant), Financial distress

b. Dependent Variable: Leverage1

Coefficients' table showing relationship between the Trade-off model variables and leverage 2

Coefficients[a]

| Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-.410	.529		-.775	.440					
	Financial distress	-.001	.003	-.036	-.383	.702	-.020	-.036	-.035	.913	1.095
	Size	.010	.024	.044	.429	.669	.043	.040	.039	.797	1.255
	Earning volatility	-1.5E-008	.000	-.055	-.528	.599	.018	-.049	-.048	.765	1.308
	Profitability	-.003	.005	-.064	-.675	.501	-.023	-.063	-.061	.906	1.104
	Asset type	.098	.105	.113	.933	.353	.094	.087	.084	.563	1.775
	Growth	.809	.521	.206	1.551	.124	.106	.143	.140	.464	2.154
	Non debt tax shields	-2.362	1.051	-.275	-2.248	.026	-.082	-.205	-.203	.548	1.823

a. Dependent Variable: Leverage2

Table showing the analysis of pecking-order variables using leverage1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.945	1.595		1.847	.067					
	Profitability	.000	.018	.002	.021	.983	-.005	.002	.002	.942	1.061
	Growth	-1.884	1.442	-.120	-1.306	.194	-.128	-.120	-.119	.982	1.018
	Size	-.055	.094	-.058	-.584	.561	-.064	-.054	-.053	.859	1.164
	Expenditure paid	.612	1.531	.037	.400	.690	.043	.037	.037	.967	1.034
	Dividends paid	-5.7E-008	.000	-.025	-.263	.793	-.047	-.024	-.024	.921	1.086

a. Dependent Variable: Leverage1

Scatter plot showing leverage 1 values over the period under evaluation (1995-2005)

Scatterplot of Years and Leverage1
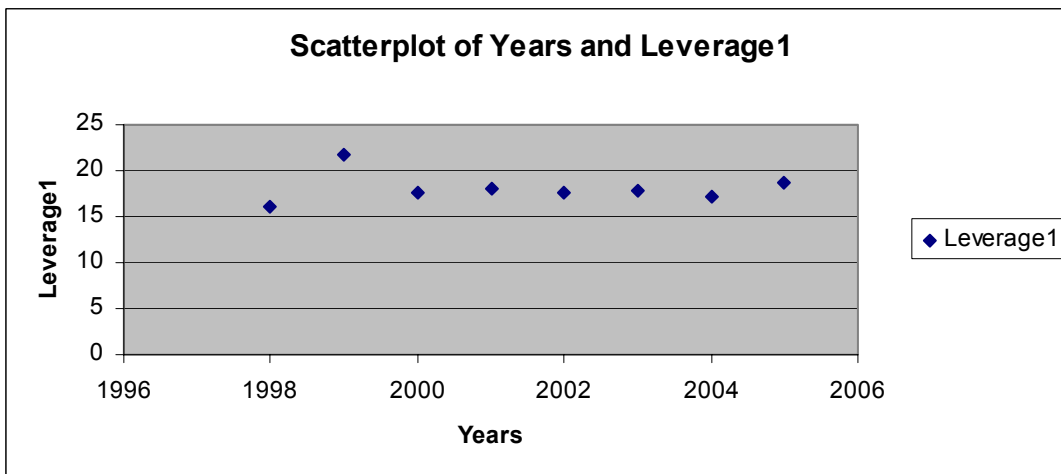
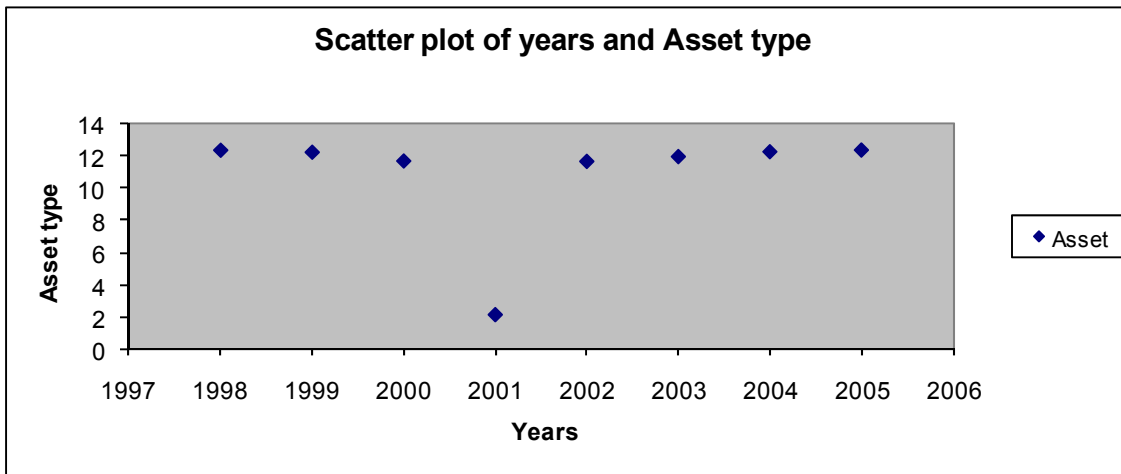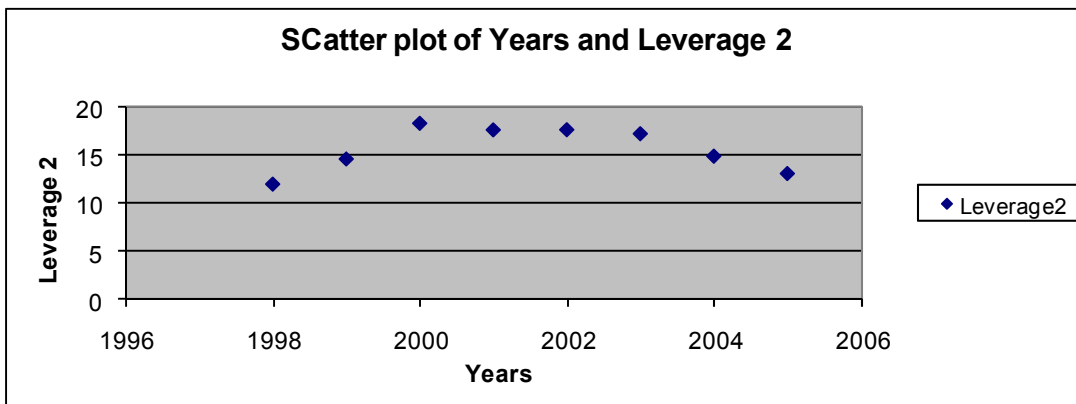**Scatter plot showing financial distress values over the period under evaluation (1995-2005)**
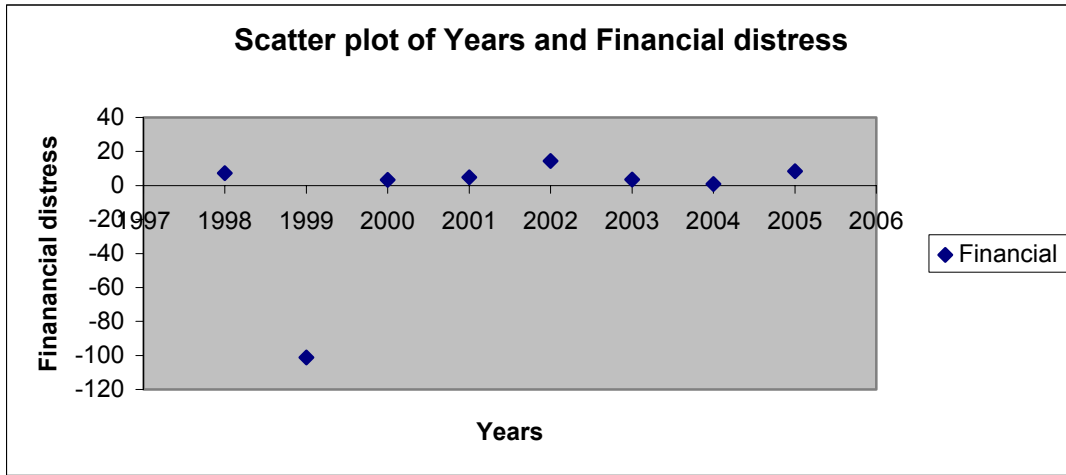
Scatter plot showing asset type values over the period under evaluation (1995-2005)

Scatter plot showing leverage 2 values over the period under evaluation (1995-2005)

Table showing the classification of firms according to industry

Code	Definitions	Number of firms	Percentage
501	Oil and gas producers	1	0.68
502	Chemical	2	1.35
503	Forestry and paper	2	1.35
504	Industrial metals	3	2.03
505	Coal	1	0.68
506	Diamond & gemstones	3	2.03
507	General mining	11	7.43
509	Platinum & precious metal	5	3.39
510	Construction & materials	11	7.43
511	General industrials	7	4.43
512	Electronic & electrical equip.	7	4.43
513	Industrial engineering	5	3.39
514	Industrial transportation	6	4.05
515	Support services	8	5.41
516	Automobiles & parts	2	1.35
517	Beverage	3	2.03
518	Food producers	10	6.76
520	Leisure goods	1	0.68
521	Personal goods	5	
522	Healthcare equip. & service	2	1.35
523	Pharmaceutical & Biotechnology	1	0.68
524	Food & drugs retails	3	2.03
525	General retailers	18	12.16
526	Media	7	4.73
527	Travel & leisure	9	6.08
528	Fixed line Tele.	1	0.68
536	Software & computer	3	2.03
537	Technology hardware	2	1.35
538	Altx	1	0.68
539	Development capital	4	2.70
540	Venture capital	3	2.03

APPENDIX B

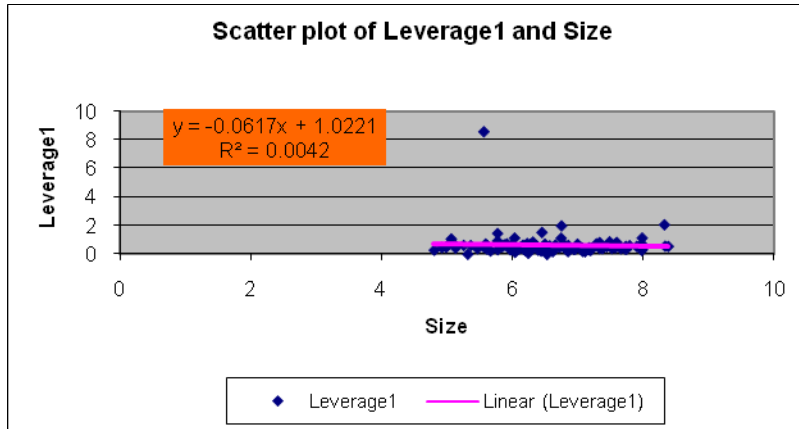**Table showing bivariate correlations of Leverage 1 and Size**
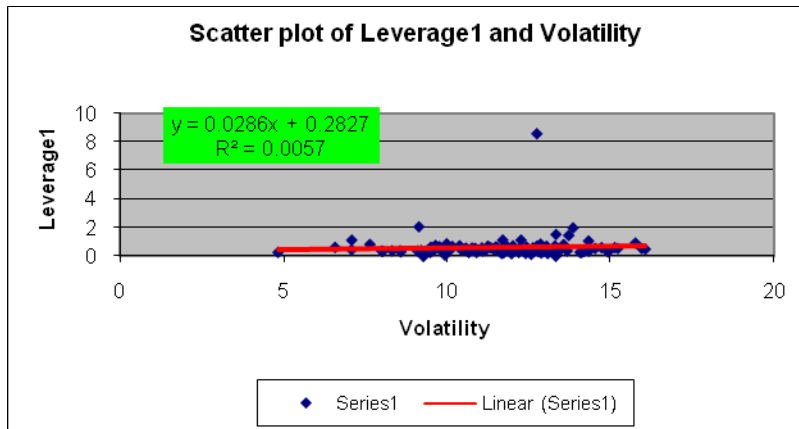
Scatter plot of Leverage1 and Size

$y = -0.0617x + 1.0221$
$R^2 = 0.0042$

Leverage1 — Linear (Leverage1)

Table showing bivariate correlations of Leverage 1 and Volatility

Scatter plot of Leverage1 and Volatility

$y = 0.0286x + 0.2827$
$R^2 = 0.0057$

Series1 — Linear (Series1)

Table showing bivariate correlations of Leverage 1 and Growth

Scatter plot of leverage1 and Growth

$y = -2.0041x + 2.7112$
$R^2 = 0.0164$

Series1 — Linear (Series1)
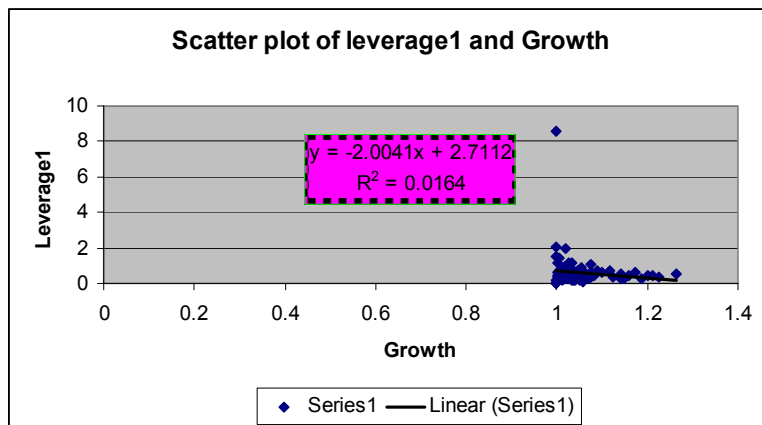
Table showing bivariate correlations of Leverage 1 and Non-debt-tax-shields (NDTS)
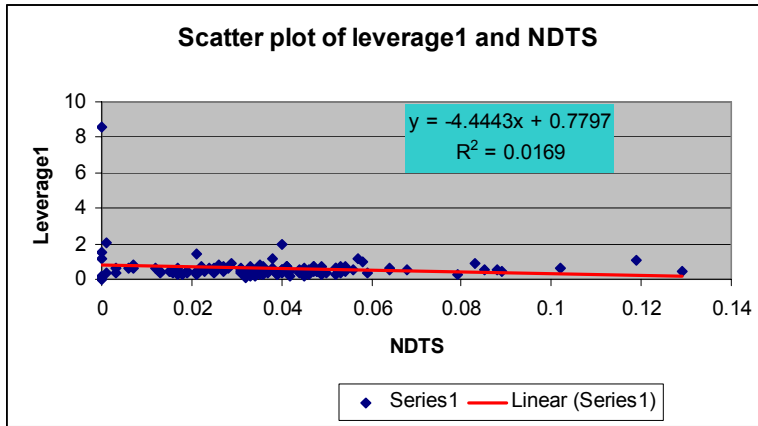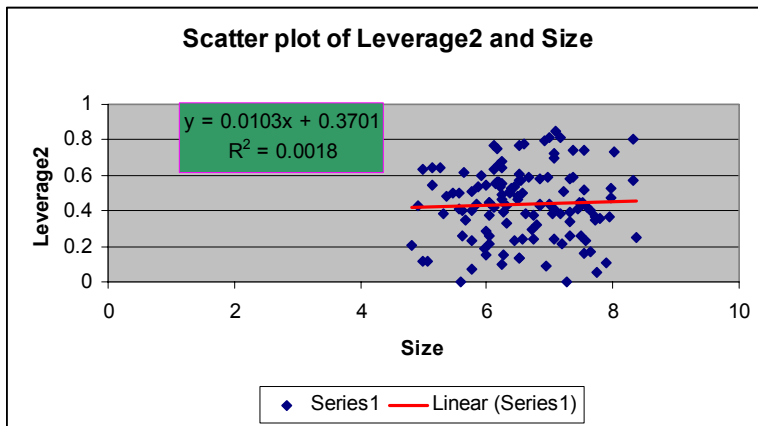
Scatter plot of leverage1 and NDTS

$y = -4.4443x + 0.7797$
$R^2 = 0.0169$

Leverage1 (y-axis), NDTS (x-axis)

Series1 — Linear (Series1)

Table showing bivariate correlations of Leverage 2 and Size

Scatter plot of Leverage2 and Size

$y = 0.0103x + 0.3701$
$R^2 = 0.0018$

Leverage2 (y-axis), Size (x-axis)

Series1 — Linear (Series1)

Table showing bivariate correlations of Leverage 2 and Volatility

Scatter plot of Leverage2 and Volatility

$y = -0.0091x + 0.5433$
$R^2 = 0.0091$

Leverage2 (y-axis), Volatility (x-axis)

Series1 — Linear (Series1)

Table showing bivariate correlations of Leverage 2 and Volatility

Scatter plot of Leverage2 and Profitability

$y = -0.0011x + 0.438$
$R^2 = 0.0005$

Leverage2

Profitability

Series1 —— Linear (Series1)

Table showing bivariate correlations of Leverage 2 and Profitability

Scatter plot of Leverage2 and Profitability

$y = -0.0011x + 0.438$
$R^2 = 0.0005$

Leverage2

Profitability

Series1 —— Linear (Series1)

Table showing bivariate correlations of Leverage 2 and Asset type

Scatter plot of Leverage2 and Asset

$y = 0.0822x + 0.4138$
$R^2 = 0.0088$

Leverage2

Asset

Series1 —— Linear (Series1)

Table showing bivariate correlations of Leverage 2 and Growth

Scatter plot of Leverage2 and Growth

$y = 0.4161x + 0.0026$
$R^2 = 0.0112$
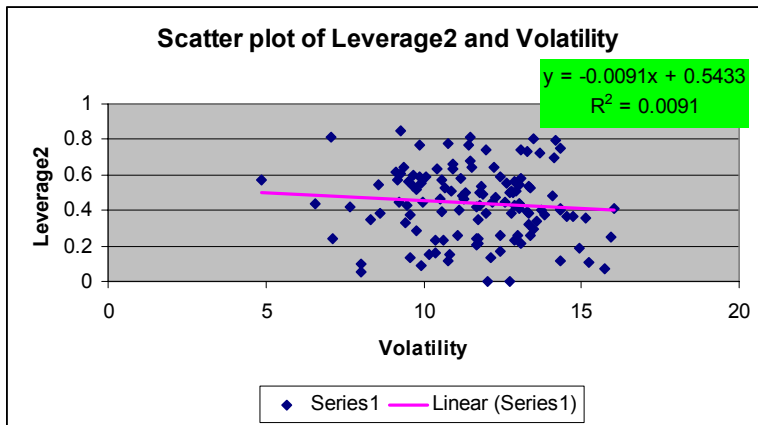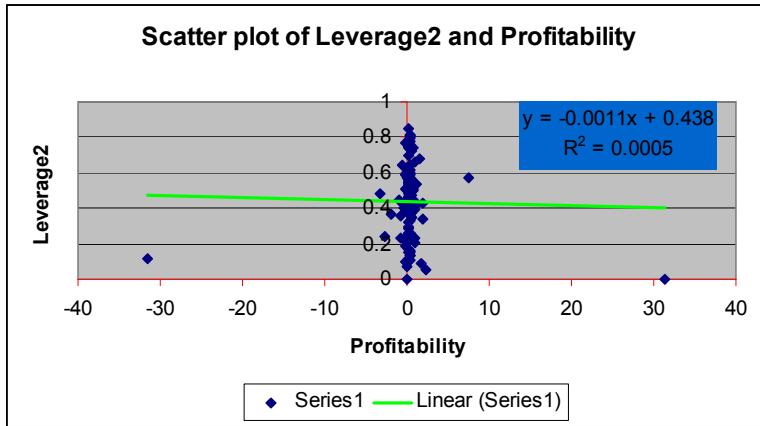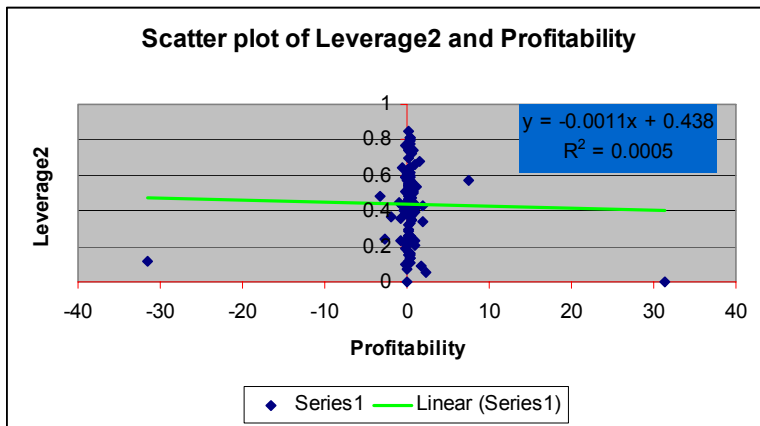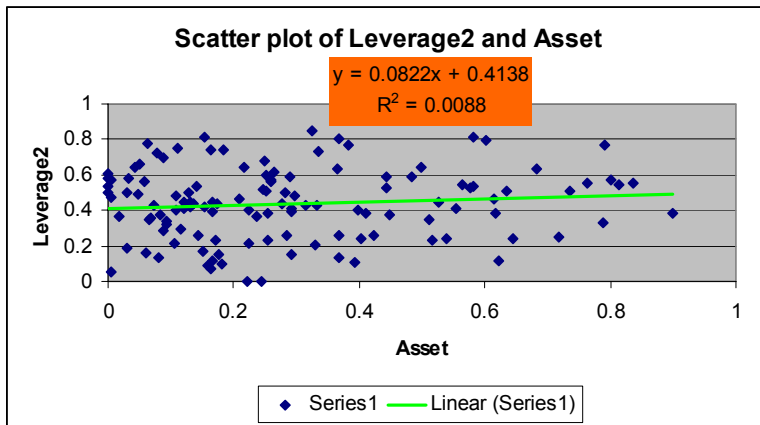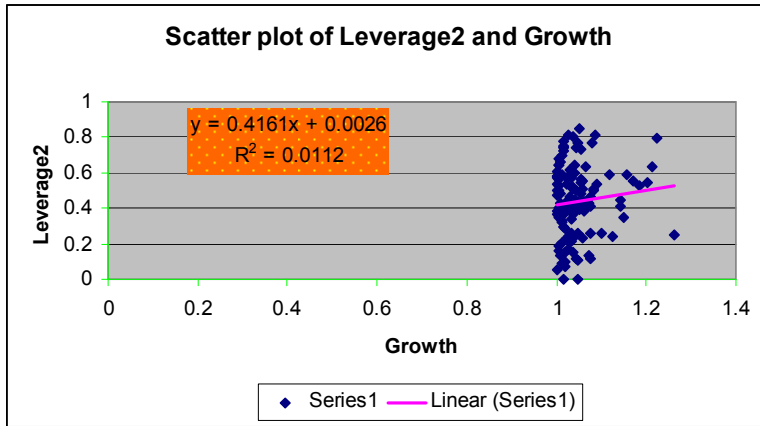
Table showing bivariate correlations of Leverage 2 and Non-debt-tax-shields (NDTS)
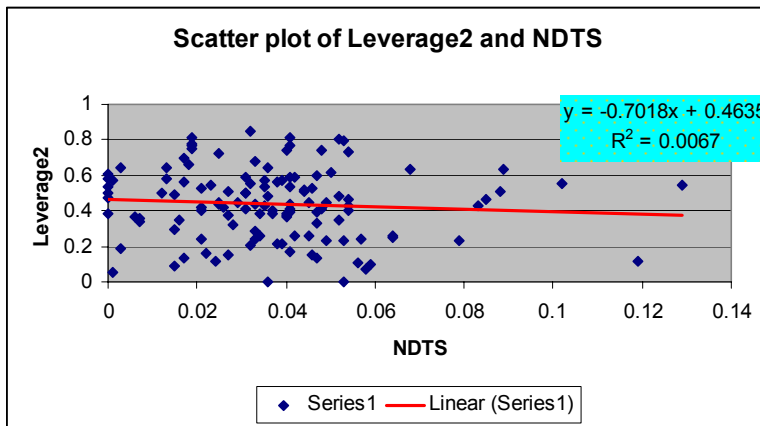
Scatter plot of Leverage2 and NDTS

$y = -0.7018x + 0.4635$
$R^2 = 0.0067$

Table showing bivariate correlations of Leverage 2 and Dividends paid

Scatter plot of Leverage2 and Dividends
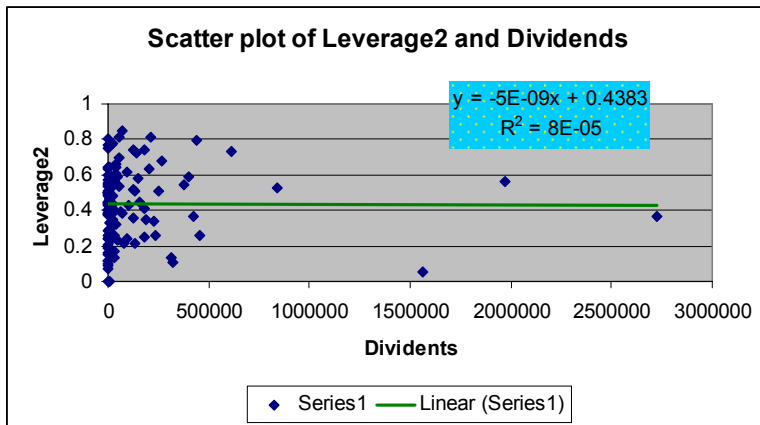
$y = -5E-09x + 0.4383$
$R^2 = 8E-05$

Table showing bivariate correlations of Leverage 2 and Capital expenditure (CAPEX)

Scatter plot of Leverage2 and Expenditure

$y = -0.3614x + 0.4434$
$R^2 = 0.0076$