The influence of firm characteristics and economic factors on capital structures: A comparison between book value and market value leverage

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ABSTRACT

The goal of maximising shareholders' wealth implies that financial managers must structure a firm's financing sources in an optimal manner. Various factors can have an effect on these financing decisions. The objective of this study was to investigate the effect of firm characteristics and economic factors on the capital structures of South African listed industrial firms. Panel data methodology was applied to a sample of 280 firms, covering the period from 1995 to 2008. The results indicate that some of the identified firm characteristics and economic factors do have an effect on capital structure formation. The combined effect of these factors is even stronger when their values for the preceding year are included. Management therefore appears to take some of the factors into consideration when making capital structure decisions. Furthermore, capital structure adjustments are, in some cases, introduced over time by incorporating both the current and past values of these factors.

INTRODUCTION

The overriding financial goal of almost all firms is the maximisation of shareholders' wealth and the overall value of the firm. Many theoretical and empirical studies have provided evidence that capital structure decisions may have an effect on the value of a firm (Correia and Cramer, 2008). This evidence indicates that financial managers may be able to influence the value of a firm by varying its ratio of debt and equity (Bolton and Scharfstein, 1996; Harris and Raviv, 1991; Titman and Wessels, 1988). Financial managers are expected to decide on an optimal combination between debt and equity (target leverage ratio) that will minimise the weighted average cost of capital (WACC) of the firm and maximise its share price. This combination may ultimately lead to the maximisation of shareholders' wealth and subsequently, the value of the firm.

A number of theories on capital structure formation have been developed in an attempt to explain the capital structure of firms since the seminal contribution of Modigliani and Miller's paper on the irrelevance of capital structure in 1958. The reconciliation of theoretical and empirical research in this area in subsequent years has resulted in two major theories of capital structure, namely the trade-off theory and the pecking-order theory (Myers, 1984).

According to the trade-off theory, an optimal capital structure exists. Management will set a target leverage ratio and then gradually move towards it. According to this theory, management will trade off the benefits of using debt against the costs associated with debt (Hart and Moore, 1995; Stulz, 1990; Ross, 1977; Jensen and Meckling, 1976; Modigliani and Miller, 1963). In terms of the pecking-order theory, management will consider all the available financing sources and then use the least expensive source first, implying that there is no optimal debt-equity ratio (Myers, 1984).

An understanding of the most important sources of financing and the dominant capital structure theories is, however, not sufficient in explaining how managements make their final financing decisions. Several research studies indicate that there must be more to capital structure decisions than only the specific theory that a firm follows. Empirical results indicate that the economic environment of countries, as well as firm-specific attributes, may also have an effect on the leverage of firms (Hall, Hutchinson and Michaelas, 2004; Booth, Aivazian, Demirgüc-Kunt and Maksimovic, 2001; Rajan and Zingales, 1995; Myers, 1984). These findings may explain variations in capital structures between countries, industries and even firms in

the same industry. Management should, therefore, consider the unique characteristics of their firm and the economic environment in which they operate, before making their financing decisions.

Various South African studies have been conducted on the topic of capital structure. The majority of those studies, however, have focused only on a specific industry on the Johannesburg Securities Exchange Ltd (JSE), or the focus has been predominantly on the theory of capital structure applied by South African firms. Furthermore, the majority of these studies were conducted before the political transition took place in 1994 (Jordaan, Hamman and Smit, 1993; Harry, 1990; Louw, 1983).

The objective of this study was, therefore, to assess the effect of firm characteristics and economic factors on the capital structure of South African listed industrial firms for the period 1995 to 2008. Based on previous theoretical and empirical research (Drobetz, Pensa, and Wanzenried, 2007; Eriotis, Vasiliou and Ventoura-Neokosmidi, 2007; Baral, 2004; Hall *et al*., 2004; Wald, 1999; Hutchinson and Hunter, 1995; Harris and Raviv, 1991), six firm characteristics (size, growth, asset structure, liquidity, profitability and business risk) and three economic factors (interest rate, inflation and economic growth) were investigated in an attempt to explain more effectively the financing decisions of firms.

THEORETICAL OVERVIEW

According to Modigliani and Miller (1958), the capital structure that the management of a firm chooses does not affect the value of the firm. This conclusion from Modigliani and Miller's seminal paper in 1958 was based on certain restrictive assumptions. Numerous theoretical and empirical studies followed, in which researchers focused on the relaxation or removal of some of these assumptions. By including variables such as taxes, industrial characteristics, agency costs and bankruptcy costs in subsequent studies, researchers were able to provide empirical evidence that capital structure decisions may have an effect on the value of a firm (Correia and Cramer, 2008). This evidence indicates that financial managers may be able to maximise the value of the firm by optimising its capital structure.

In an attempt to set up an optimal capital structure, financial managers need to take note of the advantages and disadvantages of each source of financing available to them. Financial managers have three main sources of financing at their disposal to fund new investment opportunities, namely retaining earnings (internal equity), issuing new shares (external equity) or borrowing money through debt instruments, known as 'debt capital' (Brigham and Daves, 2004: 296). These sources of financing are often referred to as 'capital components', and together they constitute the capital structure of a firm (Huang and Vu Thi, 2002: 20). Financial managers should use their knowledge of the different capital components to decide on an optimal combination of the main sources of financing. Any sub-optimal financial decision can have a negative impact on the future prosperity and success of a firm as well as on the wealth of its shareholders.

A further important aspect to consider in this decision is related to the costs of each capital component. All these costs are included in the calculation of the weighted average cost of capital (WACC). WACC is one of the most important considerations in corporate finance, since it is used in valuation, goal-setting, capital budgeting and performance measurement (Cooper and Davydenko, 2001). The objective of financial managers should be to minimise a firm's WACC as this will maximise its share price. This objective can be realised if management is able to choose the optimal combination of debt and equity. An optimal combination of debt and equity may minimise the WACC of the firm and maximise its share price, which may ultimately lead to the maximisation of shareholders' wealth and subsequently the value of the firm.

Capital structure theories

Although prior studies on the debate of an optimal capital structure provide theoretical and empirical evidence that an optimal capital structure exists, the question still remains as to how firms should choose the optimal amounts of debt and equity in their capital structure. Research has not yet been able to provide a specific method that can be generally applied by the management of all types of firms, to realise an optimal capital structure. Many theories on capital structure have, however, been developed in an attempt to better explain financing decision-making.

As mentioned earlier, Modigliani and Miller's (1958) theory on the irrelevance of capital structure was based on restrictive assumptions such as perfect capital markets, homogeneous expectations, no taxes and no transaction costs. Since some of these assumptions are not realistic in the business world, new dimensions have been added to the debate on optimal capital structures. The reconciliation of theoretical and empirical studies has resulted in two major theories of capital structure, namely the trade-off theory and the pecking-order theory (Myers, 1984).

According to the trade-off theory, an optimal capital structure does exist. In the financing decision, management will select a target leverage ratio based on a trade-off between the costs and the benefits of increased leverage (Hart and Moore, 1995; Stulz, 1990; Ross, 1977; Jensen and Meckling, 1976; Modigliani and Miller, 1963). There are three factors that have an influence on the target leverage ratio: tax, financial distress costs and agency costs. In consideration of these factors, management should choose a combination of debt and equity that will lead to a balance between the benefits of debt (tax advantage) and the various costs associated with debt (financial distress costs and agency costs) (De Wet, 2006: 4).

In terms of the pecking-order theory, management will consider all the available financing sources and then use the least expensive source first. This view implies that there is no optimal debt-equity ratio, and that firms will rather use a specific order in their financing decision. First they will use internal equity (retained earnings), which is the least expensive source of financing. This source of financing will be followed by the use of debt, then convertible debt and preference shares, while external equity (issuing of new shares) will be used as a last resort. The focus of this financing policy is thus to minimise associated costs of financing instead of putting a target leverage ratio into place (La Rocca, Cariola and La Rocca, 2007).

Strong evidence has been found in favour of both theories (Wald, 1999; Rajan and Zingales, 1995; Friend and Lang, 1988; Kim, 1978; Jensen and Meckling, 1976). Myers (2001) concludes that there is no universal capital structure theory. Each of the two theories emphasises certain costs and benefits, and therefore each of these theories operates effectively under its own assumptions. These two dominant theories of capital structure should, therefore, not be evaluated in isolation, but rather viewed as being complementary approaches to optimising financing decisions. Studies conducted by Fama and French (2002), Frank and Goyal (2003) and Barclay and Smith (2005) report that firms may have target debt-equity ratios (trade-off theory) to obtain, and still prefer internal financing to external financing (pecking-order theory). This finding provides evidence that firms may view these two capital structure theories as being complementary approaches.

Characteristics of firms and the economic environment

It is evident from the literature that an understanding of the important sources of financing and the dominant capital structure theories is not sufficient in explaining how financial managers make their final financing decisions. Further research on the topic of capital structure indicates that capital structures differ between countries, industries, and even between firms in the same industries (De Jong, Kabir and Nguyen, 2008; Fan, Titman and Twite, 2008; Booth *et al.,* 2001; Harris and Raviv, 1991; Bradley, Jarrell, and Kim, 1984). These findings suggest that capital structure decisions may entail more than only implementing a specific theory.

It was mentioned earlier that the target capital structure is the ideal combination of debt and equity that results in the lowest possible WACC. WACC is a very important consideration in financing decisions, since the inputs that determine the WACC of a firm are affected by an ever-changing environment. In order for firms to adjust to this changing environment, they need to focus on external factors that can have an impact on their financing decisions. According to De Jong *et al*. (2008), there are certain economic factors that explain to a significant extent the variation in capital structures across countries. Hall *et al*. (2004), Booth *et al*. (2001), and Rajan and Zingales (1995) are just a few researchers who have reported results that concur with those of De Jong *et al*.'s (2008) argument. They also conclude that the institutional background and economic environment of countries have an effect on the leverage of firms.

The health of a country's economy is an extremely important variable since it is an important determinant of default risk and therefore of financing decisions (Drobetz *et al*., 2007). With specific reference to South Africa, it must be noted that the economy has undergone significant changes since the political transition in 1994 (Bhorat and Oosthuizen, 2005: 1). The removal of trade and financial sanctions, along with a successful political transition in 1994, contributed to a positive turnaround in the South African economy (Du Plessis and Smit, 2006: 15). Blanchard and Simon (2001) refer to the period after 1994 as "the great moderation". During this period the South African economy was characterised by lower and stable inflation rates and interest rates, positive GDP growth and fiscal deficits and debt (Du Plessis and Boshoff, 2007: 5). Based on this statement by Du Plessis and Boshoff (2007), the interest rate, inflation rate and economic growth rate of South Africa were selected as economic factors for this study, to assess their influence on capital structure.

Several studies also indicate that capital structures differ not only between countries, but also between industries and even firms in the same industries. These variations might further be explained by firm-specific attributes rather than real differences between countries (Hall *et al*., 2004; Myers, 1984). Several determinants have emerged from various theoretical and empirical studies to more effectively explain the financing decisions of firms. The consensus is that a firm's level of leverage increases with fixed assets, non-debt tax shields, investment opportunities and firm size (Harris and Raviv, 1991). Similarly, the level of leverage decreases owing to volatility, advertising expenditure, the probability of bankruptcy, profitability and the uniqueness of a product (Rajan and Zingales, 1995). These findings imply that firms should construct a capital structure according to their own unique characteristics, and that the decisions should be aligned with their objectives. For purposes of this particular South African study, the influence of six firm-specific characteristics were investigated, namely profitability, asset structure, liquidity, business risk, growth and size. These characteristics are deemed to be important factors in both developed and developing countries, according to the existing literature.

From the financial literature discussed above, it is evident that financial managers should consider their unique firm characteristics as well as the economic environment in which they operate, in order to make their financing decisions.

RESEARCH PROBLEM AND OBJECTIVES

In order for firms to maximise the wealth of their shareholders and the overall value of their firm, it is evident that financial managers should decide on an optimal combination between debt and equity (optimal capital structure), which will minimise WACC and maximise its share price. This decision requires firms to take note of various factors that may have an effect on capital structure decisions.

As previously mentioned, the capital structure of a firm may be determined by various internal and external factors. For the purpose of this study, six firm characteristics (profitability, asset structure, business risk, liquidity, growth and size) and three economic factors (interest rate, inflation rate and economic growth) were selected, based on previous theoretical and empirical studies by authors such as Drobetz *et al.* (2007), Hall *et al.* (2004), Baral (2004) and Harris and Raviv (1991).

Previous studies on capital structures have already been conducted in South Africa. The focus of the majority of these studies has been to determine which theory of capital structure is implemented by South African firms. The most recent of these studies on capital structures in South Africa was conducted in 1993 by Jordaan *et al*. As mentioned earlier, South Africa has undergone significant changes since the political transition in 1994. It might be expected that these favourable changes in the economy could lead to different results from those in studies prior to 1994. Furthermore, only limited South African research was found in which both firm characteristics and economic factors were incorporated into one study to determine the combined effect they might have on debt-equity decisions. In a recent South African study by Mans and Erasmus (2011), only one firm characteristic (profitability) was investigated, together with five economic factors. Kasozi and Ngwenya (2010), on the other hand, investigated only firm-specific variables in their study in order to test whether the two dominant theories of capital structure were aligned with financial practice.

The justification for the present study was, therefore, to investigate the combined effect of both firm characteristics and economic factors on the capital structures of listed industrial firms in South Africa, for the period 1995 to 2008. Besides this primary objective, three secondary objectives were also formulated, namely:

- to compare the results obtained for book-value leverage and the results obtained for market-value leverage, in order to determine if these two definitions of leverage were influenced by different factors;
- to compare the results after including the one-year lagged values of the identified factors, in order to investigate if capital structure changes took place over time; and
- to compare the results of the firms that remained listed on the JSE to the results of those firms that were delisted from the JSE during the selected period of 14 years, in order to consider whether the capital structures of the two types of firms were affected by the identified factors in the same way.

VARIABLES AND MEASUREMENT INSTRUMENTS

The dependent variable for the study was capital structure (operationalised in the next section). The independent variables were divided into six internal (firm characteristics) and three external (economic) factors. To define the dependent variable (capital structure) and the six firm characteristics, financial ratios were used as measurement instruments. Economic indicators were used as measurement instruments for the three economic factors.

A summary of the identified variables (dependent and independent variables) as well as the measurement instrument used to quantify each variable, is provided in Table 1.

Measurement instrument for the dependent variable: Capital structure

When deciding on a measure for capital structure, it is important to consider three aspects: which financial ratio to use, the type of debt used in the calculation, and lastly whether the measure of leverage will be based on the book value or the market value of equity. For the purposes of this study, the debt-equity ratio was used to quantify capital structure, and both interest-bearing short-term and long-term debt were included as part of debt.

The third aspect was very important in this study. As mentioned, leverage can be expressed relative to book values or market values of equity. Book values are determined by what has already happened in the past, while market values are influenced by gazing into the future (Frank and Goyal, 2003:12). Mackay and Phillips (2005) as well as Thies and Klock (1992) argue that book values reflect the target leverage of management more effectively since market valuations of equity are beyond the control of management. Modigliani and Miller (1958) and Welch (2004), however, argue that market value measures reflect the ownership between equity and debt holders better.

TABLE 1
IDENTIFIED VARIABLES AND MEASUREMENT INSTRUMENTS

Identified	Measurement instrument (Financial ratio or indicator)
Capital structure Debt-equity ratio (DE_{BV} & DE_{MV})	$DE_{BV} = \frac{\text{book value of total debt}}{\text{preference share capital + book value of ordinary equity + minority interest}}$ $DE_{MV} = \frac{\text{book value of total debt}}{\text{preference share capital + market value of ordinary equity + minority interest}}$
Total debt = long-term and short-term interest-bearing debt Book value of ordinary equity = distributable reserves plus non-distributable reserves + ordinary share capital Market value of ordinary equity = market capitalisation (market price x number of issued ordinary shares)	
Profitability Return on assets (ROA)	**ROA** = $\frac{\text{EBIT}}{\text{total assets}}$
EBIT = earnings before interest and tax Total assets = non-current assets + current assets	
Asset structure Fixed assets-to-total assets (FA/TA)	**FA/TA** = $\frac{\text{fixed assets}}{\text{total assets}}$
Fixed assets = property, plant and equipment at carrying value	
Liquidity Current ratio (CR)	**CR** = $\frac{\text{current assets}}{\text{current liabilities}}$
Current assets = total inventory + debtors + short-term loans + cash and bank + other current assets Current liabilities = short-term borrowings + creditors + bank overdraft + provision for taxation + provision for dividends	
Business risk Adjusted return on assets (adjusted ROA)	**Adjusted ROA** = $\frac{\text{operating profit + investment income}}{\text{total assets}}$
Growth Market-to-book ratio (M/B ratio)	**M/B ratio** = $\frac{\text{market value of equity}}{\text{book value of equity}}$
Market value of equity = preference share capital + market capitalisation of ordinary shares + minority interest Book value of equity = ordinary share capital + preference share capital + distributable reserves + non-distributable reserves + minority interest	
Size	**Ln[sales]** = Lognormal of sales
Interest rate	**PR** = Prime interest rates
Inflation	**CPI%** = Change in the consumer price index
Economic growth	**GDP%** = Change in the gross domestic product

Note: The abbreviations in the table (indicated in bold) will be used to describe the identified variables throughout the remainder of this study.

The majority of previous South African studies have focused on one measure of leverage only. Mans and Erasmus (2011) focused only on book-value leverage as their measurement of capital structure. In a study by De Vries and Erasmus (2010), the focus was on market-value leverage only. It was decided to investigate both the book value and the market value of equity in this study, to determine whether these two measures are influenced by different factors.

RESEARCH METHOD

The sample and data

In this study the focus was on the industrial sector of the JSE as well as other sectors such as forestry and paper, industrial metal, chemicals, consumer goods, consumer services, healthcare, industrials, oil and gas, technology and telecommunications. Firms included in the mining and

financial sector were excluded since their financial characteristics and their use of leverage differ considerably from firms in the above-mentioned sectors. Firms that operate in these two sectors incorporate different types of business activities, and their financial statements are different to those of firms in the other sectors. Including these two sectors would make comparisons between firms more difficult. The sample was therefore restricted by excluding firms from the mining and financial sector.

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

Finally, firms had to provide financial data for a period of at least five years in order to be included in the study. This requirement was incorporated into the study because the data set contained cross-sectional and time-series dimensions. A data set that contains both of these two dimensions is classified as 'panel data' (Keller, 2005: 650). Since the data set in this study contained observations on different firms over a series of time periods, a period of at least five years was required to obtain sufficient observations. This requirement also reduced instability amongst firms, thus contributing to more reliable results.

To conclude: the sample for this study included both listed firms on the JSE and those firms that were delisted from the JSE during the study period of 14 years, namely 1995 to 2008. By applying the above requirements, the final sample for this study included a total of 280 firms, comprising 170 listed and 110 delisted firms. For the firm characteristics, 2 684 complete observations were obtained. A total of 14 complete observations for the economic factors were analysed.

Data analysis

External databases were used to obtain the data needed for statistical analysis. The McGregor BFA (2008) data base was used to gain access to the income statements, balance sheets, and sundry data items in a standardised format. This database was also used to obtain the year-end share prices of all the firms included in the study. The data obtained from the external database was in raw form and needed to be converted into a usable format, which was done by using Microsoft Excel (2007). The South African Reserve Bank (SARB) website, INET-Bridge (2005), and Statistics South Africa (2006) were also used to obtain the measures for the economic factors.

Once the data had been prepared and the accuracy verified, Statistica Version 9 (2009) and SAS® software (2008) were used for further analysis. Both descriptive and inferential statistical analyses were conducted in this study to address the research question.

Specifications for the regression model

As already mentioned, the data set for this study contained a variety of units (nine independent variables) that were observed over a period of 14 years for 280 different firms (panel data). For panel data, the time-series-cross-section regression procedure (TSCSREG) in SAS® was considered as an appropriate technique to be used to conduct both simple and multiple regression analyses.

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

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

Where:

i = 1,…, N;
t = 1,…, T;
N = number of cross-sections
T = length of the time series for each cross-section
K = number of independent variables
y = dependent variable
x = independent variable
β = regression coefficient
μ = error term

When panel data is used, it is important to address concerns of autocorrelation and multicollinearity amongst the independent variables used in the regression equation. Multicollinearity can cause increased standard errors of estimates and can sometimes result in misleading results. According to Fox and Weisberg (2010), it is generally implausible to assume that errors are independent in time-series regression, and therefore, the generalised least square (GLS) estimation is a common application in these situations. GLS regression extends ordinary least-squares (OLS) estimation of the normal linear model, by providing for possible unequal error variances and for correlation between different errors (Allen, 1999). For the purpose of this study, a two-way random effects model (RANTWO) in SAS was used, in which the parameters were estimated by using the GLS method. Therefore, the effects of multicollinearity were addressed by the use of the TSCSREG procedure.

Before concluding all the statistical analyses, it was decided to lag all the variables in the data set with one year. The multiple regression equation was, therefore, extended to include the values of the preceding year. The variables

were lagged with one year to assess whether the capital structure of a firm was also affected by the performance of the particular variables in the preceding year.

EMPIRICAL RESULTS

Descriptive statistics

The descriptive measures used in this study included the following: mean, median, standard deviation, skewness and kurtosis. These descriptive measures were applied to the full data set containing both firms that remained listed and those firms that were delisted during the study period. Table 2 provides the results from the descriptive statistics.

Because of the existence of outliers in the data set (substantiated by the relatively large standard deviations, and statistics for skewness and kurtosis) the median rather than the mean values were analysed for this study. The median value for DE_{MV} is lower than for DE_{BV}. These results reflect the difference between the book value of equity (according to the financial statements of the firm) and the value the market attributes to the equity of a firm. The median value for DE_{MV} ratio is 0.63, indicating that the assets are primarily financed through equity (R0.63 of debt for every R1 of shareholders' funds). With a median value of 1.00 for DE_{BV} ratio, it appears that firms use more or less equal amounts of debt and equity to finance assets or investment opportunities (R1 debt for every R1 of shareholders' funds) when book values are considered.

Based on the relatively large standard deviations it is evident that ROA (0.74), adjusted ROA (0.92) and the M/B ratio (20.03) are fairly volatile. The three economic variables (PR, CPI% and GDP%) also suggest some variability, indicating that the South African economy did not produce stable economic indicators over the study period of 14 years.

The important conclusion from the results of the descriptive statistics, and in particular the skewness and kurtosis results, was that the data set contained non-parametric data. This conclusion was important, since the methods used for further analyses depend on the nature of the raw data.

The use of a Spearman Rank Order correlation analysis was considered for the study, but there were some concerns with regard to the use of correlation analyses. The greatest concern was that the correlation analysis does not take panel data into consideration. The results reported by die correlation analysis may, therefore, not provide a true indication of the relationships between the dependent and the independent variables. Since the data set is large and contains both time-series and cross-section observations, it was decided to conduct simple regression analyses rather than a correlation analysis. The simple regression analysis should provide a better indication of the strength of relationships between the dependent variable and each of the nine independent variables.

TABLE 2
DESCRIPTIVE STATISTICS FOR THE FULL DATA SET
1995 - 2008

Dependent variable	Mean	Median	Standard deviation	Skewness	Kurtosis
DE_{BV}	1.83	1.00	12.54	39.84	1832.96
DE_{MV}	2.34	0.63	19.50	24.61	679.42

Independent variables	Mean	Median	Standard deviation	Skewness	Kurtosis
ROA[a]	0.12	0.14	0.74	5.29	473.55
FA/TA[a]	0.29	0.24	0.22	0.87	0.01
CR[a]	1.79	1.44	2.46	28.80	1155.20
Adjusted ROA[a]	0.25	0.22	0.92	28.16	996.18
M/B ratio[a]	3.24	1.60	20.03	27.11	854.27
ln (sales)[a]	13.32	13.37	2.23	-0.57	0.94
Pr[b]	15.82	15.17	3.54	0.31	-0.94
CPI%[b]	6.41	5.80	2.33	-0.05	0.09
GDP%[b]	3.46	3.12	1.29	-0.55	-0.10

Note: [a]2684 observations [b]14 observations

Simple regression analysis

Owing to the use of a panel data set, the time-series cross-section regression procedure (TSCSREG) in SAS® was used to conduct the simple regression analyses. Table 3 provides the results of the simple regression analyses for the full data set, containing data from all firms. It reports the R^2 values, as well as the sign of the relationship between each independent variable and DE_{BV}/DE_{MV} respectively (based on the regression coefficients).

The results of the simple regression analysis for the full data set reveal only one statistically significant relationship at the 1% level, and this is between the M/B ratio and DE_{BV}. FA/TA and ln (sales) and PR report statistically significant relationships with DE_{MV} at the 5% level.

One of the six firm characteristics (adjusted ROA) and one of the economic factors (GDP%) returned a R^2 value of 0.000, both for DE_{MV}. This result indicates that these two variables cannot explain any variance in DE_{MV}. Although the R^2 values are relatively low, the remaining R^2 values are all above 0.000. Therefore, except for these two variables, it appears that the remaining firm characteristics and economic factors may be able to explain some of the variation in capital structures.

Based on the results provided in Table 3, it may be concluded that the growth opportunities of firms might be an important firm characteristic considered by management when making financing decisions based on the book value of equity. In terms of the economic factors, it appears that the interest rate in South Africa, specifically the prime interest rate, is an important economic factor to consider when measuring leverage in terms of market values. Asset structure and size are also considered when making capital structure decisions based on market value leverage.

Multiple regression analysis

Although the simple regression analyses yielded relatively low R^2 values (for both DE_{BV} and DE_{MV}) all the variables combined should explain more of the variation in DE_{BV} and DE_{MV} than being evaluated independently. TSCSREG multiple regression analyses were, therefore, conducted for both DE_{BV} and DE_{MV} to determine how much of the variation in these two versions of the dependent variable can be explained by the variation in the independent variables. The results returned by the TSCSREG multiple regression analyses are provided in Table 4.

The multiple regression analyses reported weak results for both measures of leverage, as indicated by the relatively low R^2 values. The regression model did, however, return stronger results for DE_{BV}. According to the reported results, the independent variables explain almost 6% of the variation in DE_{BV}. Two of the nine independent variables seem to explain unique variation in DE_{BV}. The first variable is the current ratio (CR), which reveals a slightly significant inverse relationship with DE_{BV} at the 10% level. According to prior research, firms with high liquidity tend to borrow less, thus a negative relationship was expected. In the case of high liquidity, financial managers would rather use the cash inflows from the current assets to finance investment opportunities than using debt. The M/B ratio reveals a statistically significant positive relationship with DE_{BV} at the 1% level. A positive relationship indicates that the growth of firms is predominantly financed with

TABLE 3
SIMPLE REGRESSION ANALYSIS R^2 VALUES
(FULL DATA SET)

Independent variables	R^2 values Full data set	
	DE_{BV}	DE_{MV}
ROA	0.0013*(-)	0.0002(-)
FA/TA	0.0002(-)	0.0016**(-)
CR	0.0011*(-)	0.0006(-)
Adjusted ROA	0.0001(-)	0.0000(-)
M/B ratio	0.0563***(+)	0.0001(-)
ln (sales)	0.0001(-)	0.0016**(+)
PR	0.0004(-)	0.0015**(-)
CPI%	0.0003(+)	0.0009(-)
GDP%	0.0002(+)	0.0000(+)

Notes: The following regression equation was conducted: $DE_{MV} = b_0 + b_1X_i$; where X_i is one of the nine independent variables.
*** Significant at the 1% level ** Significant at the 5% level * Significant at the 10% level
(-) Indicates a negative relationship between DE_{BV} / DE_{MV} and a respective independent variable
(+) Indicates a positive relationship between DE_{BV} / DE_{MV} and a respective independent variable

TABLE 4
TSCSREG REGRESSION ANALYSIS RESULTS FOR DE_{BV} AND DE_{MV} (FULL DATA SET)

Independent variable	Regression coefficient		p-value	
	DE_{BV}	DE_{MV}	DE_{BV}	DE_{MV}
Intercept	4.434	9.527	0.166	0.133
ROA	-0.524	-0.418	0.173	0.475
FA/TA	-1.361	-5.770	0.206	0.022**
CR	-0.165	-0.188	0.093*	0.240
Adjusted ROA	0.094	0.084	0.761	0.858
M/B ratio	0.148	-0.011	0.000***	0.545
ln (sales)	-0.094	0.467	0.382	0.078*
PR	-0.134	-0.432	0.286	0.056*
CPI%	0.218	-0.155	0.102	0.500
GDP%	-0.107	-0.914	0.738	0.102
R^2	**0.060**	**0.007**		

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

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

debt financing. Since it is not possible for firms to finance everything with equity, it can be expected that growing firms will be more dependent on debt capital. The capital structure of growing firms will, therefore, utilise more debt than that of a mature firm.

The results reported for DE_{MV} were much weaker compared to $DE_{BV,}$ with the independent variables not being able to explain even 1% of the variation in DE_{MV}. Again, only two variables seem to explain unique variation in DE_{MV}, namely size (ln [sales]) and interest rates (PR). A positive relationship emerged between ln (sales) and DE_{MV}, indicating that larger firms include more debt in their capital structures than their smaller counterparts. As larger firms are more diversified, they have a lower risk of bankruptcy, which lowers their financial distress costs, and they have easier access to capital markets. Larger firms will thus use more debt in their capital structure to take advantage of the lower financial distress costs and lower interest rates provided by financial institutions. PR, however, returned a significant negative relationship with DE_{MV} at the 5% level. A negative relationship may indicate that firms in South Africa use less debt in their capital structures during periods of high interest rates. This decision may be due to the fact that an increase in interest rates may cause a subsequent increase in a firm's cost of capital, which will result in higher risk of bankruptcy.

Since the results obtained from the TSCSREG multiple regressions were weaker than expected, it was decided to include one-year lag variables in the data set. One-year lag variables were included since it was expected that the current capital structure might be partly determined by the situations under which the firm operated in the past, and that capital structures might adjust over time. The new regression model included the values of the independent variables for the current year as well as their values during the previous year. The DE_{BV} ratio and the DE_{MV} ratio of the previous year were also included to assess what effect the previous year's capital structure had on the current year's capital structure.

Table 5 provides the TSCSREG regression analysis results for the lagged data set.

If the results in Table 4 and Table 5 are compared, it is evident that the inclusion of one-year lag variables did not produce results for DE_{BV} that were drastically different (an R^2 value of 0.066 compared to the R^2 value of 0.060 for the previous regression model). Similar to the previous regression model, CR and the M/B ratio still explain statistically significant unique variations in DE_{BV}. There are now, however, other independent variables that are also statistically significantly related to DE_{BV}, such as ln $(sales)_t$ and ln $(sales)_{t-1}$, $CPI\%_t$ and $GDP\%_{t-1}$. $CPI\%_t$ reported a significant positive relationship with DE_{BV}. This result implies that firms tend to employ more debt in their capital structure when the current year's inflation rate increases, and vice versa. During inflationary periods, the value of debt decreases in real terms, and the firm requires less real cash flow to fulfil its debt obligations (Lambrechts, 1992: 567). Thus an increase in inflation will reduce the cost of debt and increase the borrowing capacity of the firm, meaning that the firm is able to source more debt capital. Since an increase in inflation may result in a

TABLE 5
TSCSREG REGRESSION ANALYSIS RESULTS FOR THE LAGGED DATA SET

Variable	Regression coefficient		p-value	
	DE_{BV}	DE_{MV}	DE_{BV}	DE_{MV}
Intercept	11.670	16.861	0.028**	0.028**
$DE_{BV;\,t-1}$	0.026		0.225	
$DE_{MV;t-1}$		0.765		0.000***
ROA_t	-0.581	3.846	0.278	0.000***
ROA_{t-1}	0.332	0.193	0.608	0.890
FA/TA_t	-1.572	-2.510	0.685	0.599
FA/TA_{t-1}	-0.282	-2.656	0.942	0.578
CR_t	-0.495	-0.341	0.018**	0.226
CR_{t-1}	-0.026	-0.031	0.821	0.830
Adjusted ROA_t	0.038	-0.572	0.914	0.178
Adjusted ROA_{t-1}	0.120	-1.314	0.890	0.220
M/B $ratio_t$	0.150	-0.006	0.000***	0.698
M/B $ratio_{t-1}$	-0.003	-0.001	0.836	0.972
ln $(sales)_t$	-1.568	0.037	0.020**	0.965
ln $(sales)_{t-1}$	1.423	-0.037	0.033**	0.964
PR_t	-0.014	-0.660	0.945	0.012**
PR_{t-1}	-0.305	0.080	0.140	0.770
$CPI\%_t$	0.352	0.061	0.058*	0.803
$CPI\%_{t-1}$	-0.106	0.243	0.646	0.424
$GDP\%_t$	-0.129	-1.030	0.738	0.043**
$GDP\%_{t-1}$	-0.823	-0.096	0.049**	0.862
R^2	**0.066**	**0.269**		

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

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

t -1 indicates a lagged variable

decrease in cost of capital, it may therefore encourage financial managers to increase their usage of debt capital. In terms of economic growth, the reported negative relationship was contrary to what was expected. A negative relationship between GDP_{t-1} and DE_{BV} implies that less debt is required by firms when the country has experienced an increase in economic growth in the preceding year. Most firms benefit when the economy is growing, since an increase in economic growth implies that firms produce more, and possible opportunities to grow present themselves. This negative relationship may indicate that if firms benefited from growth in the economy, they might rather prefer to use their profits to lower their debt levels, or use more internal financing to finance business activities.

A last observation that can be made from the results of DE_{BV} relates to firm size. Both ln $(sales)_t$ and ln $(sales)_{t-1}$ returned statistically significant relationships with DE_{BV} at the 5% level. According to the new regression model, however, the size of a firm does not have a significant impact on DE_{MV} at all. This result is contrary to the results for ln (sales) in the initial regression model which only included the current year's values (see Table 4). Against expectations, a negative relationship emerged between ln $(sales)_t$ and DE_{BV}, indicating that larger firms had less debt in their capital structures. The size of firms in the preceding year, however, impacted positively on the book-value leverage in the current year. By focusing on the results of ln $(sales)_t$ and ln $(sales)_{t-1}$ for both measures of leverage, it is evident that some reciprocation occurs between DE_{BV} and DE_{MV} once one-year lag variables are included in the regression model. This reciprocation should not be disregarded, because it may be important when evaluating capital structure based on book-value leverage.

Even though the inclusion of one-year lag variables did not cause too many changes in the results for DE_{BV}, it did result in a few interesting changes in the results for DE_{MV}. First, with the inclusion of one-year lag variables,

a considerable difference in the R^2 value was observed for DE_{MV}. The variation in the independent variables now explains almost 27% of the variation in the DE_{MV}, meaning that the regression model provides an improved explanation of market-value leverage when the values of the preceding year are also taken into consideration.

A further interesting observation can be made with regard to the impact that some of the independent variables have on DE_{MV}. Firstly, $DE_{MV;t-1}$ returned a significant positive relationship at the 1% level of significance. This result implies that in terms of market-value leverage, the preceding year's capital structure plays a significant role in influencing the current year's capital structure. This was, however, not the case for book-value leverage. This result may support Modigliani and Miller's (1958) and Welch's (2004) argument that market value is a better measure of leverage than book value. Investors are interested in the current performance as well as the potential performance of firms in the future, since both provide an indication of their expected stock returns. Expected stock returns may be better reflected in market values than book values. This conclusion may explain why $DE_{MV;t-1}$ accounts for most of the unique variation in leverage.

When viewed in isolation (by means of the simple regression analyses), profitability did not have a significant impact on leverage. However, with the inclusion of one-year lag variables, a statistically significant positive relationship emerged between ROA_t and DE_{MV} at the 1% level. This positive relationship may support the trade-off theory in which firms with high profitability imply higher debt capacity and, therefore, less risk for providers of debt capital. Thus, changes in profitability may allow firms to obtain relatively more debt capital.

Similar to the results reported in Table 4, PR_t still explains some of the unique variation in market-value leverage. Another economic factor, namely $GDP\%_t$, also comes into play when one-year lag variables are included. A negative relationship between $GDP\%_t$ and DE_{MV} again indicates that firms tend to require less debt capital if the South African economy is experiencing higher economic growth. Another possible explanation for a negative relationship may be that an increase in economic growth may result in an increase in a firm's overall market value, thus resulting in a decline in its market value leverage. The fact that two of the three economic factors (PR_t and $GDP\%_t$) are significantly associated with DE_{MV} at the 5% level, indicate that changes in the economic environment in which firms operate have an impact on their future value (market value).

Multiple regression analysis for the sub-set of listed firms and the sub-set of delisted firms

In view of the differentiation between listed firms and those firms that delisted from the JSE, it was decided to divide the full data set into two sub-sets (a sub-set of listed firms and a sub-set of delisted firms). TSCSREG multiple regression analyses were, therefore, also conducted for both sub-sets of firms. This was done not only because the data were available, but also because delisting may in some cases be regarded as a sign of the financial failure of a firm. By comparing these two sub-sets of firms, it is also possible to investigate whether those firms that were delisted from the JSE during the period under reveiw financed their operations in a different manner to the listed firms. The results from the regression analyses for both sub-sets of firms returned very similar trends compared to the regression analysis results for all the firms reported in Table 4 and Table 5. It was therefore decided to provide only the R^2 values to indicate the quality of the regression model for both sub-sets of firms. Table 6 provides a summary of the R^2 values for both sub-sets, reported by both measures of leverage for both the initial and the lagged data set.

The R^2 values in Table 6 suggest that differences may exist between listed firms and those firms that were delisted from the JSE during the study period of 14 years. The trend in the R^2 values for the sub-set of listed firms is very similar to the results reported for the full data set in Tables 4 and 5. It is only when the current year's values are taken into consideration in the regression model that the variation in the independent variables explains more of the variation in book-value leverage than market-value leverage. A fairly radical change in the results, however, occurs when the values of the variables in the preceding year are also taken into consideration. The lagged data set results in the variation of market value leverage being considerably better explained by the variation in the independent variables than is the case for book-value leverage. When lagged values are included, the variation in the independent variables explains almost 54% of the variation in DE_{MV}, compared to only 6.62% of the variation in DE_{BV}. This turnaround in results for the sub-set of listed firms may indicate that financial managers and investors focus more on market-value leverage when assessing capital structures. Investors are interested not only in the historic information from the financial statements, but also in the current and potential future performance of firms. Investors can obtain this information by referring to the performance of a firm in preceding years. If a firm reports good growth and shows potential, investors may be willing to pay more for the shares than their book value. This result may explain why the inclusion of one-year lagged variables returned stronger results for the sub-set of listed firms.

In all the statistical tests conducted for the sub-set of delisted firms, variation in book-value leverage is constantly better explained by the variation in the independent variables than is the case for market-value leverage. The variation in the independent variables explains 21.60% of the variation in DE_{BV} and only 1.70% of the variation in DE_{MV}. A similar trend is observed when

TABLE 6
R^2 VALUES FOR THE SUB-SETS OF LISTED AND DELISTED FIRMS

	DE_{BV} (R^2)	DE_{MV} (R^2)
Listed firms	**0.058**	**0.017**
Listed firms with lag variables	0.066	0.539
Delisted firms	**0.216**	**0.017**
Delisted firms with lag variables	0.306	0.084

Note: The complete tables containing all the results from the regression analyses of both sub-sets of firms are available from the authors

lagged variables are included. It therefore appears that delisted firms may focus more on book-value leverage than market-value leverage. It could be expected that delisted firms focus more on book-value leverage, especially if these firms are struggling financially. Poor financial performance can result in investors extracting their capital from the firm, which will consequently result in a decrease in the market value of the firm's equity. This reaction of investors could result in the undervaluation of a firm's shares to such an extent that it would not make sense for these firms to focus on market value.

CONCLUSION AND MANAGERIAL IMPLICATIONS

The primary objective of this study was to assess the combined effect of firm characteristics and economic factors on the capital structures of South African listed industrial firms for the period 1995 to 2008. Six firm characteristics (profitability, asset structure, business risk, liquidity, growth and size) and three economic factors (interest rate, inflation rate and economic growth) were selected for the study, based on a literature review. The sample included a total of 280 firms (170 listed and 110 delisted firms). Based on the results returned by the simple and multiple regression analyses, it appears that these identified independent variables do have an effect on capital structure. It can further be concluded that some of the variables have a more significant effect on capital structure than others. These variables include growth (M/B ratio), profitability (ROA), asset structure (FA/TA), size (ln [sales]) and interest rates (PR). The fact that these variables appear to affect capital structure might provide insights about the factors that financial managers incorporate during a firm's financing decisions. It could provide an indication of the effect that changes in firm characteristics and the economic environment could have on a firm's capital structure.

Three secondary objectives were also addressed. The first secondary objective was to determine whether the effect of these identified firm characteristics and economic factors on capital structure will depend on which measure is used to quantify capital structure. From the literature it was concluded that some managers prefer to use book-value leverage and others prefer market-value leverage when evaluating a firm's capital structure. A multiple regression equation was formulated to assess the impact of the identified variables on both measures of leverage. It was evident from the results that differences exist between book-value leverage and market-value leverage. Not only were different R^2 values reported, but it also appeared that the variation in each of the two measures of leverage is uniquely explained by different variables. In terms of book-value leverage, liquidity and the growth of firms appear to explain most of its variation. On the other hand, it appears that firm size and the interest rate have a greater effect on market-value leverage. These results are important, since they indicate that financial managers may decide on a specific measure of leverage to implement when quantifying capital structure. Depending on the measure of leverage used by management, different factors could therefore play a role when capital structure decisions are made.

A further question that was raised was whether it is important to also consider the preceding year's values when making financing decisions. In an attempt to answer this question, the multiple regression equation was extended to include the values of the variables for the preceding year. This was done to determine whether the capital structure of a firm is also affected by the situations in which it operated during the preceding year. The results showed that the inclusion of one-year lag variables improved the results from the regression model for both book-value and market-value leverage. In terms of the R^2 values, the results for DE_{BV} were slightly stronger after the inclusion of the lagged values. However, there was a strong improvement in the result for DE_{MV}. Above and beyond the higher R^2 values obtained when including lagged values, it also appeared that more independent variables now had a significant effect on the two measures of leverage. An important observation from the results is that $DE_{MV,t-1}$ accounts for most of the unique variation in market value leverage. Thus, the preceding year's capital structure plays a significant role in the current year's capital structure. This was, however, not the case for book-value leverage. The improvement in the quality of the regression model provides a strong indication that financial managers do not focus only on the current year in isolation, but that they also incorporate the performance of certain variables in the preceding year in their decision-making process.

Lastly, a distinction was drawn between listed firms and those firms that were delisted from the JSE during the study period of 14 years. Although it is not always the case, the delisting of a firm is often associated with its financial failure. Consequently, it was decided to divide the full data set into two sub-sets of firms (listed and delisted) to serve as a proxy for financial failure. The question that arises was whether the results for these two sub-sets of firms would differ. Large differences in results were found between listed and delisted firms. The overall conclusion from the results was that the delisted firms tended to be more concerned with book-value leverage and the listed firms with market-value leverage. This is an important finding, since it indicates that the financial soundness of a firm could have an effect on how a capital structure is created and interpreted. This finding is also important for future research, since it indicates that researchers must be extremely careful that survivorship bias does not negatively influence their empirical results. Studying only those firms that remain listed on the JSE may result in inconsistent and invalid results.

LIMITATIONS OF THE STUDY

A few limitations were experienced during this study. Firstly, financial data of firms not listed on the JSE are very difficult, if not impossible, to obtain. This situation limited the study to the inclusion of only publicly listed firms in the data set.

A further limitation became apparent with regard to the inclusion of certain variables in the study. A vast set of variables may influence the capital structure decisions made by financial managers. For practical reasons it is difficult, if not impossible, to identify all these variables and include them in a single study. This problem limited the study to the inclusion of only the stated variables to address the research question. These were, however, based on an extensive literature review.

RECOMMENDATIONS FOR FUTURE RESEARCH

From the results presented in this study, some areas for future research were identified. It is evident that some of the identified firm characteristics and economic factors have an effect on capital structures. The question now remains why this is the case. A future research opportunity may be to obtain information from the financial managers themselves by means of personal interviews or questionnaires. This data may give an indication of why these variables have an effect on capital structures and which of these factors they take into consideration when making financing decisions. It may also provide an indication of whether they focus more on book values or market values to quantify capital structure.

This study included only one lag year, and the results clearly illustrated that the values of the preceding year may have an important impact on capital structures. It is suggested that further research may be undertaken to compare firms with different performance levels over a certain period. For example, a researcher could compare firms that report an improvement in profitability over a five-year period with firms that report a decline in profitability over the same period, and investigate differences in their capital structures.

Lastly, the study period that was focused on ended with the year 2008. This was just before the most recent global financial crisis started to influence firms. This particular crisis may have affected the financial performance and capital structures of firms. It would therefore be interesting to see whether the results differ when the time period of the study is adjusted to include the years following the financial crisis.

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