



# The financing behaviour of firms and financial crisis

The financing  
behaviour  
of firms

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1159

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## Abstract

**Purpose** – The purpose of this paper is to contribute to the capital structure literature by examining the determinants of capital structure from the context of South Africa and to provide evidence of the effects of the 2007/2008 global financial crisis on firm-level determinants of debt-equity choice.

**Design/methodology/approach** – This paper begins by embarking on an extensive review of literature on extant empirical research on capital structure. The panel econometric technique is further adopted to examine firm-level determinants of capital structure and also the impact of 2007/2008 financial crisis.

**Findings** – The findings of the paper suggest that theories of capital structure underpinning debt-equity choice of firms in developed economies are also applicable in the South African context. The authors also find a strong evidence of the effects of the financial crisis on the capital structure of firms in South Africa.

**Practical implications** – This paper serves as springboard on which further research can be grounded and also highlights the interaction between the South African economy and the global economy.

**Originality/value** – The paper provides a fresh evidence on the determinants of capital structure from the Sub-Saharan African context and to the authors' knowledge, this is the first paper that examines the effects of the 2007/2008 financial crisis on capital structure of firms in South Africa.

**Keywords** Capital structure, South Africa, Listed firms, Financial crisis

**Paper type** Research paper

## 1. Introduction

The role of financial resources in every firm cannot be underestimated as it serves as one of the important elements that drive the operations of firms. Thus, a wrong financing decision could have serious implications on the survival of the firm. This explains why firms devote significant amount of effort in their capital structure decisions. Following the path breaking work of Modigliani and Miller (1958) (hereafter M&M), studies on corporate financing decisions have made a significant contribution to the capital structure literature. However, it is important to emphasize that traditional analysis of capital structure of firms have concentrated mainly in the developed economies where there are readily available data. Certainly, there is incomplete evidence as to whether theories formulated in the developed economies can be applied to firms in a developing economy setting, which exhibits weak institutional arrangements. Given the limited validity of extrapolation from one context to another in examining financing decision of firms, we argue that a comparative approach is required. Thus, in this paper, we examine firm-level determinants of capital structure from the perspective of South Africa.

In spite of the economic importance of South Africa within the context of Africa, it is so surprising to note that little research has focused on the determinants of corporate capital structure in this context. Further, the topic of global financial crisis has also



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received tremendous ovation from many finance scholars (e.g. Campello *et al.*, 2010; Acharya and Schnabl, 2010; Campello *et al.*, 2011; Erken *et al.*, 2012), yet little has been done in examining the impact of the recent financial crisis on capital structure decisions of firms operating in a less developed market context. Indeed, due to the 2007/2008 global financial crisis, firms in many countries had to readjust their financing principles. However, the few recent analyses of capital structure of South African firms (e.g. Lemma and Negash, 2011/2013; Fosu, 2013) have overlooked the possible effects of this financial crisis on the capital structure decision process. This study seeks to fill this gap in our knowledge. Therefore, the noble contribution of this paper is to provide evidence of the determinants of capital structure and a preliminary evidence of the impact of the 2007/2008 financial crisis on financing decisions of firms operating the South Africa.

The choice of South Africa is motivated by the fact that it is the biggest economy in Africa and it is the only country within the Sub-Saharan Africa with a detailed readily available data on the Datastream to facilitate analysis. With a total population of about 51 million, South Africa is by far Africa's wealthiest nation (in terms of GDP). The country accounts for 30 per cent of the GDP of the entire African continent (Venture Africa, 2013). In 2011, the country was admitted to the BRIC (i.e. Brazil, Russia, India and China) group of countries. Further, South Africa has a well-developed modern manufacturing base and a properly regulated banking sector. The country is among the few African countries with robust democratic governance. In spite of these notable accomplishments and the country's dazzling mineral wealth, the country continues to face a host of developmental challenges including high unemployment rate and income inequality among others. Also, the 2007/2008 financial crisis had a diverse impact on South Africa's economy including a low demand of the country's export, a reduction of capital inflow, an increase in household indebtedness and above all, widening of the current account deficit (World Bank, 2012). South Africa is, therefore, a useful case example to show how the recent financial crisis impacted on capital structure decisions of firms operation in a less developed market context. This study therefore, sheds light on firm-level determinants capital structure and the impact of the recent global financial crisis on capital structure decisions of firms in South Africa in order to help understand how the financial crisis impacted on firms' capital structure decisions in other developing nations.

In the section that follows, the theoretical background and research hypotheses are presented. Next, we describe how the constructs were measured. This follows a description of methods and sources of data. We then present the results of the tests of our hypotheses. The study concludes with a discussion of its contribution to capital structure literature and the managerial implications.

## 2. Theory and hypotheses

The irrelevance theory of M&M forms the basis for empirical and theoretical work on capital structure of firms. In the irrelevance theory, M&M argued that in a perfect market, how a firm is financed is irrelevant to its value. The M&M theory is based on a number of assumptions including no taxes, no transaction cost, debt being risk free and a perfect market where investors have the same information as management regarding the future states of affairs of the company. These assumptions do not, however, hold in reality and for that matter the irrelevance theory has been criticized for being purely theoretical. The criticisms levelled against the irrelevance theory led M&M to modify their model to reflect the idea that corporate tax system gives tax relief on the payments of interest (M&M, 1963).

Interestingly, M&M's (1963) theoretical assumptions inspired several other theories. The two most influential theories that followed M&M's irrelevance theory were the static trade-off models (static and dynamic) and the Pecking order model. The static trade-off theory is linked to the insight derived from M&M's irrelevance theory. Under the trade-off theory, an optimal capital structure is determined by the costs and benefits connected with the use of debt as against equity and accordingly firms must choose an optimal capital structure that trades off the marginal benefits and costs of debt after taking into consideration market imperfections such as agency costs, taxes and bankruptcy costs. The marginal benefit derived from debt reduces as the level of debts declines and at the same point the marginal cost of debts rises as debts increases. Thus, a rational firm will be optimized by the trade-off point to find out the level of equity and debt to finance its activities (Scott, 1977).

Further, with the dynamic trade-off theory, firms' financing decisions hinge on the financing margin that the firm expects in the following period since the optimum choice of finance today depends on what is expected to be optimal in the near future. Thus, depending on the expectation of the firm, debt or equity finance may be used (Luigi and Sorin, 2009).

The pecking order theory (Myers, 1984) is based on the existence of information asymmetry between company managers and shareholders about the future prospects of the company. Thus, a firm's capital structure is driven by the desire to finance new investment by using internally generated funds, followed by debt and finally equity. Myers (1984) observed that the hierarchy involved in the financing decision is driven by the financing cost.

Other theories of capital structure include the agency cost theory, the free cash flow theory, the market timing theory and the signalling theory. The agency cost theory (Jensen and Mackling, 1976) contended that an optimal capital structure of a firm is determined by the agency cost involved, which is a result of the conflict of interest among different beneficiaries. Also, the free cash flow theory (Jensen, 1986) observed that unless cash flow in a company is given back to its investors, managers are motivated to cause their firms to grow further than their optimal size by spending on activities or projects, even though such projects might yield negative net present value (NPV). Debt is therefore used as a device for controlling free cash that cannot be profitably invested in the company.

Further, Baker and Wurgler (2002) proposed that firms' attempt to "time the market" derives the capital structure of such firms. The market timing theory (Baker and Wurgler, 2002) is relatively new and for that reason, limited studies have been conducted to test its validity. Among those who have conducted studies in testing the validity of this theory include Elliott *et al.* (2007) who tested the effects of market timing on how a firm finances its deficit. Elliott *et al.* (2007) concluded that there is the high possibility that firms with overvalued equity will issue more equity to deal with the deficit than their counterparts that are undervalued.

Another theory of capital structure is the signalling theory (Ross, 1977). The signalling theory is also based on asymmetry information. According to Ross (1977), a higher level of debt is interpreted by investors as a signal of higher quality and higher future cash flow. Thus, unlike higher quality firms, lower quality firms are unable to take on more debt as any level of debt worsens their expected bankruptcy cost (Schoubben and van Hulle, 2004).

Empirical tests of the various theories of capital structure have yielded a set of firm-level factors that account for the capital structure of firms. First, Myers' (1984)

pecking order theory suggests that there is a negative relationship between profitability and leverage, since firms with high profit are expected to make use of less debt for their investment activities. Indeed, Myers and Majluf (1984) argued that because of the presence of informational asymmetry between firm managers and investors, a hierarchy of financing decisions exists among firms. Thus, firms prefer to use their internal earnings for any investment activity rather than employing debt, to avoid potential dilution of ownership and control. This suggests that a firm only resorts to external debt when internal earnings are insufficient for investment activities. Where external capital is needed, firm managers rely on debt capital before relying on equity capital. Indeed, several empirical studies (e.g. Titman and Wessels, 1988; Barton *et al.*, 1989; Wiwattanakantang, 1999; Shyam-Sunder and Myers, 1999; Myers, 2001; Fama and French, 2002; Cassar and Holmes, 2003; Hall *et al.*, 2004; Chen and Strange, 2005; Zou and Xiao, 2006) have revealed a negative relationship between profitability and leverage. Within the logic of the signalling theory, a high level of profit could also indicate a signal of quality and therefore profitable firms will take on less debt to distinguish themselves from lower quality firms (Schoubben and van Hulle, 2004). Following the above theoretical argument, we suggest that:

*H1.* Profitability is negatively related to leverage.

Under the trade-off hypothesis, firms which have high inconsistency in earnings (a proxy for firm risk), have a greater risk of not being able to meet their debt commitments. Such firms are likely to encounter situations where cash flow could be too low which would, therefore, increase the probability of failing to pay creditors and to meet other financial commitments. In a situation where bankruptcy costs are higher, a rise in volatility of earnings leads to a decrease in a company's debt ratio. Accordingly, De Angelo and Masulis (1980) observed that the cost of debt is high for companies whose earnings are variable as a result of the fact that investors can predict with less accuracy their future earnings based on the information that is publicly available. Besides, under the pecking theory, earnings volatility also worsens the asymmetric information problem and therefore creditors are likely to protect themselves by strengthening the conditions surrounding debt acquisitions (Schoubben and van Hulle, 2004). Building on the above argument, Titman (1984) observed that stakeholders' fear of bankruptcy places limitations on the amount of debt that a company may be willing to take on. Often times, financial lenders are reluctant to extend any meaningful financial help to firms with earning volatility due to the fear of default. Thus, firms with high degree of risk are less likely to use much debt (Bradley *et al.*, 1984; Kim and Sorensen, 1986; Wiwattanakantang, 1999; Johnson, 1997). In the light of the above theoretical discussion, we hypothesize that:

*H2.* Earnings volatility will be negatively related to leverage.

Besides, asset tangibility remains as one of the important determinants of capital structure of firms, especially in developing economies where there are inadequate institutional structures for protecting creditors' right. In such places assets serve as collateral in the acquisition of debt. This suggests a positive relationship between tangibility and leverage. Indeed, both the trade-off theory and the pecking order theory agree on this positive relationship of asset tangibility on leverage. Bradley *et al.* (1984) observed that firms with more tangible assets are more likely to have higher financial

leverage. This effect is derived from the fact that lenders are more willing to lend to firms with tangible assets, as these assets serve as guarantee in case of possible liquidation of the firm. In general, asset tangibility provides more room for cheap borrowing and in the view of some scholars (e.g. Wiwattanakantang, 1999), firms with fewer tangible assets could be subjected to severe lending conditions. These restrictive conditions constrain the ability of such firms to borrow more and instead they are forced to issue equity rather than debt (Scott, 1977).

The importance of asset tangibility in the acquisition of loans in developing economies is evident in a number of empirical studies (e.g. Fosu, 2013; Sheikh and Wang, 2011; Viviani, 2008; Huang and Song, 2006; Deesomsak *et al.*, 2004). Based on the discussion above, we propose that:

*H3.* The relationship between assets tangibility and leverage should be positive.

The size of a firm may affect its capital structure. According to the trade-off hypothesis, large firms are more diversified and have less volatile earnings than smaller firms. Therefore, larger firms have lower bankruptcy risk and therefore lower bankruptcy cost. This condition allows large firms to take on more debt (Antoniou *et al.*, 2002). Thus, firm size is expected to have a positive relationship with leverage. Further, some studies (e.g. Deesomsak *et al.*, 2004; Schoubben and van Hulle, 2004) argued that large firms have less information asymmetries and this facilitates their access to debt finance. Many other studies from the context of less developed market economies (e.g. Sheikh and Wang, 2011; Deesomsak *et al.*, 2004; Wald, 1999; Wiwattanakantang, 1999) have shown a positive relationship between firm size and leverage. Thus:

*H4.* We anticipate firm size to be positively related to leverage.

Both the pecking order and the trade-off theories predict a negative relationship between non-debt tax shield and leverage since firms with larger non-debt tax shield are expected to use less amount of debt in their capital structure. In debt financing, De Angelo and Masulis (1980) argued that non-debt tax shield serves as a substitute for tax benefit since non-debt tax shield reduces the debt tax benefit that is derived by a firm. In the same vein, Fama and French (2002) observed that the presence of larger non-debt tax shield reduces the amount of taxable income. Consequently, the expected payoff from tax shield is lowered. The above discussion leads us to predict:

*H5.* A negative association between non-debt tax shield and leverage.

From the perspective of the trade-off theory, firms with higher liquidity are expected to use more debt. The logic behind this argument is due to their ability to meet their debt obligations on time (Sheikh and Wang, 2011). Several studies (e.g. De Jong *et al.*, 2008) have shown a positive relationship between liquidity and leverage. Against this background:

*H6.* We hypothesize a positive relationship between liquidity and leverage.

Table I provides a summary of predicted relationship between leverage and firm-level variables discussed above.

### 3. Measure of constructs

The current study relies on previous research for items to measure key variables examined. This is important to enable us compare our results with other empirical studies. All the variables and their measurements are provided in Table II.

### 4. Method

#### 4.1 Sample and data

This paper explores firm-level determinants of capital structure and also examines the impacts of the 2007/2008 financial crisis on the determinants of capital structure of 202 firms in South Africa. The annual financial data from listed firms in this country were obtained from the Datastream global database for the period 2003-2012. The selection of the firms was guided by the availability of data. Further, the firms in the financial sector such as banks, insurance and investment companies were not considered due to the fact that financial firms tend to have a distinct capital structure from other industrial firms (Zou and Xiao, 2006).

The general form of the model used is indicated as:

$$Y_{i,t} = \alpha + \beta X_{i,t} + e_{i,t} \quad (1)$$

The double subscript attached to the variables differentiates the regression equation from ordinary time-series regression or cross-section regression. The subscript *i*

Dependent variable: Leverage

Independent variable	Predicted sign
Profitability (PRO)	-
Earnings volatility (VOL)	-
Asset tangibility (TAN)	+
Firm size (SIZ)	+
Non-debt tax shield (NDT)	-
Liquidity (LIQ)	+

**Table I.**  
Summary of the hypotheses tested

Variable (Abbreviation)	Measurement	Literature
Leverage (LEV)	Ratio of total debt to total assets	Delcoure (2007); Cheng and Shiu (2007)
Profitability (PRO)	Ratio of operating income to total assets	Deesomsak <i>et al.</i> (2004)
Earning volatility (VOL)	Ratio of standard deviation of operating income to total assets	De Jong <i>et al.</i> (2008)
Asset tangibility (TAN)	Ratio of fixed assets to total assets	Deesomsak <i>et al.</i> (2004); Cheng and Shiu (2007)
Firm size (SIZ)	Log of total assets	Cassar and Holmes (2003); Ramlall (2009)
Non-debt tax shield (NDT)	Ratio of depreciation expense to total assets	Sheikh and Wang (2011)
Liquidity (LIQ)	Ratio of current assets to current liabilities	Sheikh and Wang (2011)

**Table II.**  
Variables and their measurements

represents the cross-sectional dimension and  $t$  time-series dimension. Further,  $Y$  in the equation represents the dependent variable (i.e. Leverage),  $\beta$  denotes the coefficients,  $X$  denotes the explanatory variables (which have already been explained in the Table II) in the estimation model,  $\alpha$  is the constant and finally  $e$  is assumed to be the randomly distributed error term.

Using the variance inflation factor (VIF), we investigate whether the independent variables are likely to be subject to collinearity problems. The results indicate that there is no issue with multicollinearity. All regressions are made robust and use the cluster (firm) option to control for possible heteroskedasticity and autocorrelation within firms. In addition to this and following other scholars (e.g. Deesomsak *et al.*, 2004; Zou and Xiao, 2006), the explanatory variables are lagged one period in order to isolate the analysis from the potential reverse causality between independent and dependent variables and to provide a more robust test of the theory.

## 5. Results and discussion

As indicated in the introductory section, this paper has two distinct objectives. These are:

- (1) to provide a fresh evidence of firm-level determinants of capital structure in the context of South Africa; and
- (2) to analyse the possible effects of the 2007/2008 financial crisis on these firm-level determinants of capital structure.

In order to achieve the above objectives, the analysis is divided into two. The first part uses the data that covers the whole sample period (i.e. from 2003 to 2012). The second part of the analysis splits the data into two sub-groups. The first sub-group uses data from 2003 to 2006 (i.e. pre-crisis period) and the second sub-group uses data from 2009 to 2012 (i.e. post crisis period). Data for the years 2007 and 2008 is excluded since this was the period of the financial crisis. We begin by looking at the whole sample period (2003-2012).

### 5.1 Summary statistics for the sample period

Table III presents the descriptive statistics for both the dependent and the independent variables under consideration. The information is confined to 202 firms from South Africa. A few findings are worth noting. Generally, there is an indication that total debt

	Mean	Median	Min	Max	SD
LEV	0.1834164	0.1352423	0	2.054651	0.1876293
PRO	0.1122789	0.0884437	-0.8789182	0.9474747	0.1207774
VOL	0.0541921	0.0168472	0	12.10052	0.3748368
TAN	0.3297081	0.2412836	0	0.9963068	0.2853859
SIZ	15.8653	15.79713	10.38065	21.15702	1.681701
NDT	0.0287881	0.0250108	0	0.1983127	0.0262972
LIQ	2.299051	1.409453	0.2893037	522.4272	15.58275

**Notes:** Leverage (LEV) defined as ratio of total debt to total assets; Profitability (PRO) defined as ratio of operating income to total assets; Volatility (VOL) defined as ratio of standard deviation of operating income to total assets; Asset tangibility (TAN) defined as ratio of fixed assets to total assets; Size (SIZ) is the log of total assets; Non-debt tax shield (NDT) defined as ratio of depreciation expense to total assets; and finally Liquidity (LIQ) defined as the ratio of current assets to current liabilities

**Table III.**  
Summary statistics  
for the whole sample  
period (2003-2012)

constitutes less than one-fifth of the capital structure of the selected companies (i.e. a mean value of 18 per cent). Thus, companies in South Africa appear to be mainly equity financed. Previous empirical studies from developing economies tend to observe a lower leverage ratio which is in line with the current study. For instance, De Jong *et al.* (2008) reported a mean value of 17 and 19 per cent for Pakistan and Indonesia, respectively.

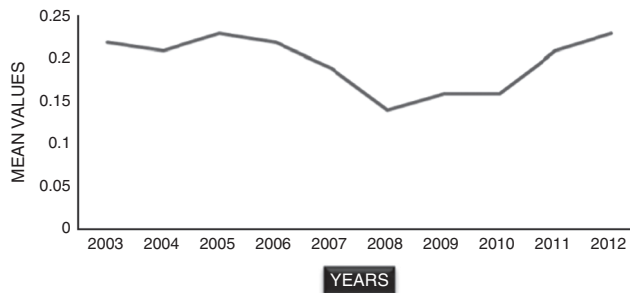
Figure 1 provides mean value of leverage from 2003 to 2012.

From Figure 1, the downward trend in leverage from 2007 to 2010 indicates that there was a decrease in the amount of debt available to firms during the financial crisis period as lenders were careful of bankruptcy risk of firms. Thus, lenders were more cautious in extending credit to firms. In Figure 2, we provide the percentages of long-term debt and short-term debt (as a proportion of the total amount of debt) for the period 2003-2012.

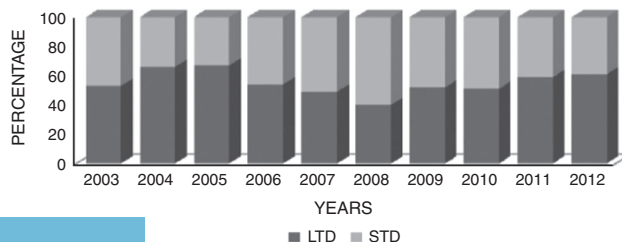
Figure 2 shows that the average percentage of short-term debt increases and the long-term debt decreases between the year 2007 and 2009. The pattern suggests due to the financial crisis, there was a higher default risk among firms and that financial lenders were cautious in issuing long-term debt.

### 5.2 Effects of firm-level variables on leverage over the whole sample period (2003-2012)

We begin our analysis by looking at the results based on the whole sample period (i.e. from 2003 to 2012). This is important as it provides a fresh evidence of firm-level determinants of capital structure. Three main estimation methods are employed in this study. These are the OLS, the fixed effects and the random effects estimation models. First, we estimate the OLS on the basis that there are no group or individual effects among the sample firms. However, since the data used in the study is obtained from different firms and over time, there could be the issue of cross-sectional effects on a set of firms or on each firm. Accordingly, random and fixed effects models are employed to



**Figure 1.**  
Mean values of leverage  
from 2003-2012



**Figure 2.**  
Proportion of long-term  
and short-term debt



deal with those aforementioned effects (Sheikh and Wang, 2011). The results of all the estimation methods are presented in Table IV. We employed the Hausman specification test to test the appropriateness of the fixed effects or the random effects model. The Hausman specification test indicates that the fixed effects model is better than the random effects model. Thus, we interpret our results based on the fixed effects model.

### 5.3 Discussion

**5.3.1 Results of firm-level factors across the whole sample period.** Based on the fact that there are a limited number of studies from the context of South Africa that examine firm-level determinants of capital structure, a set of hypotheses were formulated to test the effects of firm-level factors on leverage. Table IV shows the outcome of our regression analyses. The study argues that profitability (PRO) is negatively related to leverage (i.e. *H1*). This hypothesis is supported in that profitability has a significant and negative relationship on leverage ( $\gamma = -0.0135$ ;  $p = 0.000$ ). This confirms the prediction of the pecking order theory that profitable firms prefer to use more of their internal sources of funds rather than debt. This outcome is also in line with the logic of the signalling theory that profitable firms take on less debt to distinguish them from lower quality firms (Schoubben and van Hulle, 2004). The current result could also be attributed to the high cost involved in raising debt capital in most African countries (including South Africa). Thus, firms depend much on internally generated funds. The current result is consistent with other empirical studies. For instance, Wiwattanakantang (1999) and Sheikh and Wang (2011), conducted a similar study in Thailand and Pakistan, respectively and found a negative relationship between profitability and leverage. Other studies that have shown similar results include Fama and French (2002), Hall *et al.* (2004) and Zou and Xiao (2006).

In addition, we proposed a negative relationship between earnings volatility and leverage. This relationship is supported in that volatility (VOL) has a negative and a statistically significant relationship on leverage ( $\gamma = -0.0028$ ;  $p = 0.000$ ). Thus, we find support for the notion that firms with inconsistency in earnings (as a proxy for firm risk) are less likely to be extended any financial help by lenders due to a risk of default. Thus, according to Titman (1984), stakeholders fear of bankruptcy for firms with inconsistency in earnings places limitation on the amount of debt that such firms can take on. Our result also confirms other empirical studies (e.g. Kim and Sorensen, 1986; Wiwattanakantang, 1999; Sheikh and Wang, 2011).

Dependent variable: Leverage

Independent variables	OLS	Random effects	Fixed effects
PRO	-0.1275 (0.008)***	-1169 (0.000)***	-0.0135 (0.000)***
VOL	0.0142 (0.002)***	-0.2301 (0.005)***	-0.0028 (0.000)***
TAN	0.1598 (0.000)***	0.1309 (0.000)***	0.1052 (0.000)***
SIZ	0.0036 (0.502)	0.1071 (0.038)**	0.2001 (0.069)*
NDT	0.0135 (0.033)**	0.1021 (0.813)	-0.0056 (0.029)**
LIQ	-0.3995 (0.000)***	-0.2115 (0.000)***	-0.0263 (0.001)***
No. of observations	1,702	1,702	1,702
Prob > F	0.0000	-	0.0000
R <sup>2</sup>	0.1318	0.1306	0.1450

Notes: \*, \*\*, \*\*\*Significant at 10, 5, 1 percent levels, respectively. *p*-values are in parentheses

**Table IV.**  
Regression results  
for the whole sample  
period (2003-2012)

Further, we hypothesized that in an economy such as South Africa asset tangibility is likely to be positive related to leverage. The estimated coefficient of asset tangibility (TAN) has the predicted positive sign and is statistically significant ( $\gamma = 0.1052$ ;  $p = 0.000$ ). This positive and significant relationship underscores the importance of assets base as an added security in raising debt capital, especially due to the presence of weak creditors' right in South Africa. In other words, asset tangibility becomes a substitute for weak creditors' right as assets serve as a guarantee in case of default or possible liquidation of the firm (Cheng and Shiu, 2007; Bradley *et al.*, 1984). Thus, firms that are unable to provide any tangible assets may find it difficult to secure funds from lenders or in the view of Wiwattanakantang (1999), could be subjected to severe lending conditions. The current result is in line with the prediction of the trade-off and the pecking order theories. Our result is consistent with previous empirical studies including Fosu (2013), Viviani (2008) and Huang and Song (2006). Although the coefficient of size (SIZ) confirms our prediction, size is only significant at 10 per cent ( $\gamma = 0.2001$ ;  $p = 0.069$ ). This could be attributed to the fact that firms investigated in the current study are roughly of the same size and thus the non-significance of the size variables.

We argue that non-debt tax shield (NDT) is negatively related to leverage. The evidence as reported in Table IV shows that NDT has a negative and statistically significant (at 5 per cent) relationship with leverage ( $\gamma = -0.0056$ ;  $p = 0.029$ ). This current outcome confirms our prediction and also supports the prediction of the trade-off theory that predicts a negative relationship between non-debt tax shield and leverage. Our result provides support to several scholarly studies (e.g. Fama and French, 2002; De Angelo and Masulis, 1980) that NDT reduces the amount of taxable income and therefore the expected payoff from tax is lowered.

In addition, liquidity (LIQ) has a negative and statistically significant effect on leverage ( $\gamma = -0.0263$ ;  $p = 0.001$ ). This result is not in line with our expectation. The current result confirms the logic of the pecking order theory that predicts a negative relationship between liquidity and leverage. According to Deesomsak *et al.* (2004), firm managers could manipulate liquid assets in favour of shareholders, as against debt holders. Thus, this leads to a negative relationship between liquidity and leverage. Studies in other developing countries (e.g. Sheikh and Wang, 2011; Viviani, 2008) have also shown a similar result between liquidity and leverage.

*5.3.2 Results of firm-level factors on leverage by pre and post financial crisis periods.* Our emphasis has been on examining the determinants of capital structure across the whole sample period. Although Africa may not have contributed to the 2007/2008 financial crisis, firms in this region may not have been spared in this crisis. The pattern of corporate financing decision of these firms may have changed due to the global financial crisis. However, the specific question of how the financing pattern has been affected by this global financial crisis is yet to be explored. Our argument is that firms are embedded within the broader economic environment (Roxas *et al.*, 2007). Therefore, events of the economic environment (e.g. financial crisis) are likely to impact on the activities of firms (Cheng and Shiu, 2007; Deesomsak *et al.*, 2004). To get an idea of the effects of the 2007/2008 financial crisis on capital structure decisions, we examine the changes in the behaviour of firm-level factors on leverage across different sample periods. Hence, the next section provides the regression results across the two sub periods (i.e. pre-crisis and post crisis periods).

The 2007/2008 financial crisis (also known as Global Financial Crisis) began in the western world and had a spill over to other economies including those in Africa.

Although, the results in the sub periods are similar (as indicated in Table V), there are a number of exceptions. First, the crisis affected the significance of some of the determinants of financing decision. For instance, profitability (PRO) seems to have been affected by the crisis as a result of the changes in its significance level during and after the crisis. Prior to the crisis, the role of profitability (PRO) was not significant (i.e.  $\gamma = -0.0806$ ;  $p = 0.141$ ). However, it became significant after the crisis (i.e.  $\gamma = -0.1207$ ;  $p = 0.017$ ). This could be attributed to the fact that during and immediately after the crisis, there was a reduction in the amount of credit available to firms as lenders became more cautious in granting financial assistance to firms. Consequently, profitable firms had to predominantly depend on their earnings for their activities rather than employing debt as a tool for shielding their profit. This leads to the negative and significant relationship between profitability (PRO) and leverage after the financial crisis.

The role of earnings volatility (as a determinant of leverage) was also affected by the crisis. The results (as indicated in Table V) show that volatility is positively related to leverage prior to the financial crisis (i.e.  $\gamma = 0.2687$ ;  $p = 0.001$ ). This positive relationship could be attributed to the fact that firms below their debt servicing capacity, coupled with a low risk of earnings volatility may overlook volatility in earnings and increase their debt ratios by taking on more debt to invest in other business operations that would eventually lead to stability in earnings. However, there is no doubt that with a high risk of default during the crisis period, lenders were careful in granting financial assistance to firms with earnings volatility. Thus, Table V shows that earnings volatility became a major determinant of capital structure during the crisis. This is an indication that financial lenders were careful in lending to firms with earnings volatility after the crisis due to the risk of default.

The role of asset tangibility (TAN) was also affected by the crisis. Prior to the crisis, tangibility (TAN) was significant at just 5 per cent level (i.e.  $\gamma = 0.0661$ ;  $p = 0.038$ ), but it became a major significant factor (i.e. at 1 per cent level) after the crisis and by far, it was the most significant factor among the determinants. This outcome is plausible in that with weak creditors protection coupled with the financial crisis, lenders were concerned about bankruptcy risk of firms. Therefore, tangibility (TAN) became a major collateral issue in lending decisions. With tangibility (TAN) becoming a major determinant in capital structure decision, firms that could not provide lenders with any form of assets structure could find it difficult in acquiring funds for their businesses.

Dependent variable: Leverage Independent variables	Pre-crisis period (2003-2006)	Post-crisis period (2009-2012)
PRO	-0.0806 (0.141)	-0.1207 (0.017)**
VOL	0.2687 (0.001)***	-0.0428 (0.000)***
TAN	0.0661 (0.038)**	0.2423 (0.000)***
SIZ	0.0056 (0.230)	0.0040 (0.521)
NDT	0.0141 (0.041)**	-0.0017 (0.706)
LIQ	-0.2684 (0.000)***	-0.0396 (0.000)***
No. of observations	600	600
Prob > F	0.0000	0.0000
R <sup>2</sup>	0.1346	0.2215
Root MSE	0.16158	0.14249

Notes: \*, \*\*, \*\*\*Significant at 10, 5, 1 percent levels, respectively.  $p$ -values are in parentheses

**Table V.**  
Regression results  
across subgroups

Further, the role of firm size (SIZ) does not appear to have been affected by the crisis. This could be attributed to the fact that firms investigated are of the same sizes, thus making size less significant in our analysis. In addition, our findings suggest that the role of NDT appears to have been affected by the crisis. Prior to the crisis, NDT was positively related to leverage (i.e.  $\gamma = 0.0141$ ;  $p = 0.014$ ). There was, however a change in the direction and the level of significance of NDT after the crisis (i.e.  $\gamma = -0.0017$ ;  $p = 0.706$ ). Lastly, we argue that the role of liquidity appears not to have been altered by the crisis as the sign of the coefficient and the level of significance before the crisis and after the crisis remain the same.

Clearly, the 2007/2008 global financial crisis posed a threat to financial landscape in South Africa and this led to changes in the capital structure decisions of firms. To validate the above findings, we tested for the robustness of the results in a number of ways. We re-estimated each of the above equation by using logarithm of sales as a proxy for firm size. We also used an alternative measure of profitability defined as ratio of earnings before interest and tax to total assets. The results obtained were not qualitatively different from what is reported above. This indicates that the present findings are robust for different models.

## 6. Summary, conclusion and direction for future research

Following the seminal work of M&M (1958), empirical studies on capital structure have made significant contribution to the field of finance. With a few exceptions, however, as most prior studies on capital structure have predominantly focused in the context of developed economies where scholars have identified several firm-level factors that underline debt-equity choice of firms. In the current study, we examine the extent to which firm-level factors influence capital structure decisions in the context of Sub-Saharan Africa. Thus, the aim of this paper is two-fold. First, we provide evidence relating to the determinants of capital structure of South African firms. Second, we look at how the 2007/2008 financial crisis impacted on these firm-level determinants. Thus, we examine whether determinants of capital structure derived in the western context are applicable to the context of South Africa and whether the recent financial crisis impacted on these determinants. Using panel econometric techniques, we base our analysis on firm-level data obtained from 202 firms in South Africa and this represents a new setting for extending the knowledge of financial crisis beyond the boundaries of the developed economies. Our intuition is that firm-specific factors that account for variation in leverage in the developed economies are also applicable in the South African context and that the 2007/2008 financial crisis did impact on the capital structure decisions of firms. Our study yields some noteworthy results that are in line with previous studies. First, the results demonstrate that some of the theories of capital structure underpinning debt-equity choice of firms in developed economies are also applicable in the South African context. Particularly, we find support for both the pecking order and the trade-off theories.

Second, while the global financial crisis of 2007/2008 led to many economic hardships, it has also paved a way to examine the role of firm-specific factors in capital structure decisions when firms are financially constrained, due to the financial crisis. The study advances the current literature on capital structure by explicitly examining the effects of the recent financial crisis on the determinants of capital structure. Therefore, as an additional contribution of this paper, we find a strong evidence of the effects of the financial crisis on the capital structure of firms in South Africa. The role of profitability (PRO), volatility (VOL), tangibility (TAN) and non-debt tax

shield (NDT) in the determination firms' capital structure were affected by the financial crisis. In terms of the relative impact, assets tangibility (TAN) was the most influential determinant after the crisis. Our results support the fact that Africa was not isolated from the impact of 2007/2008 financial crisis. The findings of this study therefore stress on the interaction between the South African economy and the global economy.

We contend that this paper provides a good benchmark model for future studies. Indeed, our study has some inherent limitations that also offer several directions, which we think future research inquiry could be directed to. First, our research is based on South Africa, a single country in Sub-Saharan Africa. Although South Africa shares many common characteristics with other developing countries and this provides the basis for the generalizability of the results to other emerging economies, still, we wish to acknowledge that there could be institutional differences among emerging economies as developing economies may show varied contextual elements that warrant additional insight (Julian and Ofori-Dankwa, 2013). Thus, future studies could look at how the 2007/2008 financial crisis influenced the financing decisions of firms by comparing data across a number of emerging economies. Our study primarily uses data from listed firms. Unlisted firms could be affected differently by the financial crisis. Therefore, additional studies could overcome this limitation by exploring and comparing data from both listed and unlisted firms. In addition, an analysis of the effects of the financial crisis on small businesses could be fruitful. Besides, future studies that compare the direct and indirect effects of country-level factors (e.g. level of banking sector development, stock market development, inflation and quality of regulatory environment) on corporate leverage decisions in South Africa and other emerging markets within the Sub-Saharan region are warranted.

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### Further reading

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