

COMPANY DETERMINANTS OF CAPITAL STRUCTURE ON THE JSE LTD AND THE INFLUENCE OF THE 2008 FINANCIAL CRISIS

Marise Mouton*

University of Johannesburg

Nico Smith*

University of Johannesburg

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Abstract

The optimal capital structure and value of a company is in constant evolution, taking into account both the external and internal environment. This study examines company-related determinants of capital structure and investigates whether the 2008 financial crisis exerted any significant influence on the capital structure and the identified determinants in a sample of top 40 JSE Ltd listed companies in South Africa. A panel regression model was applied to identify the most significant capital structure determinants and variance in them. Panel regression accounts for cross-sectional data and time series data simultaneously. It was found that the 2008 financial crisis did not exert a significant difference on the capital structures of the sample companies. The most significant company-related determinants of capital structure before the 2008 financial crisis were risk, tangibility and profitability. Risk and tangibility had a stronger influence on capital structure after the 2008 financial crisis but profitability became insignificant. The significant factors should be closely monitored to detect change in capital structure and the valuation of a company.

Keywords

Capital structure, debt, determinants, financial crisis, panel regression

*Ms M Mouton is a lecturer in the Department of Commercial Accounting, University of Johannesburg, South Africa [mmouton@uj.ac.za].

*Prof NJ Smith is professor in the Department of Finance and Investment Management, University of Johannesburg, South Africa.

1. INTRODUCTION

The essence of corporate finance is to create and maximise shareholders' value (Gowd, 2014:8). Capital structure decisions can have a direct impact on the valuation of a company and its share price (De Wet & Dhanraj, 2007:29; Bhayani, 2009:43; Piaw & Jais, 2013:458). It is therefore important for management and investors to gain a better understanding of the significant determinants of an ideal capital structure (Chowdhury & Chowdhury, 2010:112).

The 2008 financial crisis demonstrated the vulnerability of companies through times of macroeconomic crisis. Those companies which did not have an ideal capital structure, adapted to the environment in which they operated, were at risk (Junevicius & Justinaviciene, 2010:98; Dang, Kim & Shin, 2014:230).

The ideal capital structure is dependent on the constantly evolving internal and external environments in which companies operate (Auret, Chipeta & Krishna, 2013:76; Piaw & Jais, 2013:457). Adding to the complexity is the fact that no universal theory fully explains the ideal capital structure (debt to equity) choices of companies (Myers, 2001; Gergelyné Kasà, 2016).

The problem is that determinants of the capital structure of a company are attributable to unique, company-related factors. These factors not only vary between countries but are also influenced by the constantly changing external environment in which companies operate (De Wet & Dhanraj, 2007:30; De Jong, Kabir & Nguyen, 2008:1954; De Vries & Erasmus 2011:3; Piaw & Jais, 2013:457).

Limited research has been carried out in South Africa on the influence the 2008 financial crisis had on the capital structure and the significant company-specific determinants of capital structure.

The goal of this paper is to determine the nature of the unique significant company-related determinants of the capital structure and to establish whether the 2008 financial crisis had an influence on the capital structure and capital structure determinants of the top 40 JSE Ltd listed companies in South Africa.

This study makes a new contribution by identifying the significant company-specific factors that influence the capital structure of the top 40 JSE Ltd listed companies in South Africa and by indicating if these factors changed after the 2008 financial crisis.

The remainder of the paper is structured as follows. Section 2 presents a review of the ideal capital structure determinants and the underlying theoretical philosophies. The research methodology, model specification and data are described in section 3. In section 4, the results are presented, and the paper concludes in section 5 with the significant determinants of capital structure.

2. REVIEW OF IDEAL CAPITAL STRUCTURE

To contextualise the principle of ideal capital structure, a brief review of optimum capital structure determinants is presented as well as the underlying theories. The basis of the optimum capital structure is the existence of a combination of debt and equity that will optimise the valuation of a company (De Vries & Erasmus, 2012:2).

Modigliani and Miller (1958) initially suggested that there is no one particular capital structure (combination of debt and equity) that influences a company's overall market value more than any other combination. They concluded that a company's capital structure is therefore irrelevant

to its market value (Vatavu, 2013:181). The irrelevance theory was not sustainable due to its perfect capital market conditions assumption. Perfect market conditions do not exist (Glen & Pinto, 1994:4; De Vries & Erasmus, 2012:3; Vatavu, 2012:286). For instance, the taxation-deductibility of interest provides the company with the opportunity to lower the cost of debt, which in turn lowers the weighted average cost of capital (WACC) and can positively influence the valuation of a company (De Vries & Erasmus, 2012:2). It was concluded that a higher debt ratio can give rise to an increase in a company's market value and that an ideal or optimum capital structure could exist (Modigliani & Miller, 1963:442).

The trade-off theory claims that the optimal debt-equity (DE) level is established at the specific debt level where the taxation benefits of the level of debt are in equilibrium with the costs of financial distress (Brealey, Myers & Allen, 2011:492; Myers, 2001:89; De Vries & Erasmus, 2012:3; Kraus & Litzenberger, 1973:918). The internal company-related factors that determine the debt and equity proportions according to the trade-off theory are taxation, risk, size, growth, profitability and asset tangibility (Rajan & Zingales, 1995; Frank & Goyal, 2003; Vatavu, 2012; Vatavu, 2013).

Myers (1984) and Myers and Majluf (1984) oppose the trade-off theory and indicate that companies would rather prioritise the different sources of finance to reach an ideal capital structure. This led to the pecking order theory, which indicates that the sources of finance are prioritised by first utilising retained earnings, turning secondly to debt, and using equity financing as a last resort (Myers, 2001:92; Vatavu, 2013:181). The pecking order theory indicate that profitability, liquidity, growth, size and risk are the company-related factors that influence an ideal capital structure (Fama & French, 2002; Frank & Goyal, 2003; Ngugi, 2008; De Jong et al., 2008; Vatavu, 2012).

The trade-off and the pecking order theories both propose that there is an ideal capital structure but disagree on how it is established (Fama & French, 2002; De Vries & Erasmus, 2012:2; Vatavu, 2013:181; Vatavu, 2012; Moyo, Wolmarans & Brummer, 2013; Auret et al., 2013).

It is important to note that these theories are conditional and only indicate that there is a preference to reach an ideal capital structure. The unique internal and external context of each company must be considered to understand the capital structure decisions companies make from a valuation and investment perspective (Myers, 2001:99; Gowd 2014:10).

2.1 Company-specific capital structure determinants

Company-related factors exert a significant influence on the capital structure of a company and should be taken into account when explaining the company's actual debt-equity choices to achieve an optimum capital structure (Bhayani, 2009; De Jong et al., 2008; Vatavu, 2012; De Vries & Erasmus, 2012:2; Ganguli, 2013:57; Tchuigoua, 2014).

The most important company-specific factors that influenced capital structure before the 2008 financial crisis were found by other researchers to be size, profitability, risk, taxation, tangibility, growth and liquidity (Wiwattanakantang, 1999; Niu, 2008; De Jong et al., 2008; Vatavu, 2012; Ganguli, 2013; Tchuigoua, 2014). There is however no consensus on the effect the different company-specific capital structure determinants have on capital structure. Research results of the most important company-specific determinants of the optimum capital structure are therefore summarised in TABLE 1.

TABLE 1: Company-specific capital structure determinants

<i>Determinant</i>	<i>Conclusion</i>	<i>Reference</i>
Size	Larger size of a company leads to stable cash flows, low possibility of financial distress, better credit ratings and improved capacity to borrow. Trade-off (TO) theory supporters propose a positive relationship with debt financing, whereas the pecking order (PO) supporters advocate a negative relationship.	Titman & Wessels, 1988:5; De Jong et al., 2008:1960; Vatavu, 2013:181; Alzomaia, 2014:53; Kara & Erdur, 2015.
Profitability	Higher profitability leads to more debt financing because of the taxation shield it provides (TO theory). On the contrary, the supporters of the PO theory argue that companies with higher profits are more likely to refrain from taking on more external debt due to the availability of internal funds.	Myers, 2001:89; Mans & Erasmus, 2011:29.
Risk	Higher volatility of earnings causes debt levels to decrease. A negative relationship with debt-equity ratio is proposed.	Titman & Wessels, 1988:6; De Jong et al., 2008:1960; Tchuigoua, 2014; Alzomaia, 2014:61; Kara & Erdur, 2015.
Taxation	TO theory supporters argue that tax-deductibility will give rise to higher level of debt financing but mixed results were found on the influence of taxation on the capital structure of companies.	Myers, 2001:88; Negash, 2002; Ju, Parrino, Poteshman & Weisbach, 2005:1; Vatavu, 2012:289.
Asset tangibility	Companies with large amounts of tangible assets are able to access more debt with favourable conditions.	De Jong et al., 2008:1960; Vatavu, 2012:286; Ganguli, 2013:59; Moyo et al., 2013:664.
Growth	The TO theory supporters indicate that, in their growth stage, companies tend to refrain from taking on more debt based on the cost of financial distress. The PO theory supporters argue that through growth phases companies are forced to use external debt financing due to depleted internal financing sources.	Frank & Goyal, 2003:219; Brealey et al., 2011:487; Vatavu, 2012:287; Moyo et al. 2013:665; Kara & Erdur, 2015.
Liquidity	PO theory supporters propose that higher levels of liquidity cause companies to borrow less.	De Jong et al., 2012:1960; Vatavu, 2012:182; De Vries & Erasmus, 2012:9. Kara & Erdur, 2015.

Source: Authors' analysis

From the summary above it can be concluded that there are conflicting opinions on how company-specific variables influence the capital structure of a company. A country-specific view of the

company-specific variables and the effect of a specific macroeconomic occurrence could therefore contribute to the optimum capital structure literature.

2.2 Financial crises and capital structure adjustments

Changes in the macroeconomic condition of a country cause variation in the capital structure proportions of companies (Auret et al., 2013:76; Dang, Kim & Shin, 2014:230). When unfavourable macroeconomic conditions arise, like a financial crisis, companies find it difficult to achieve the optimal capital structure, especially if they are financially constrained. Due to declining collateral values in a weak state of the economy, debt capacity will decline and therefore a financially constrained company will find it difficult to take up further debt financing. This influences the capital structure proportions when refinancing is needed (Auret et al., 2013:77; Dang et al., 2014:230).

The impact of extremely high debt levels in the capital structures of companies and the consequent risk and vulnerability of companies were exposed in the 2008 financial crisis. The crisis negatively affected the financing policies of companies due to the decreased supply level of debt financing and the consequently higher cost of borrowing (Dang, et al., 2014:230). The seriousness of the crisis became evident with the publication of new regulation in the form of the Basel III framework. This reform was published in a response to the financial crisis (Dedu & Nitescu, 2012:12). The Basel III framework provides the banking sector with improved prudent capital requirements and is a movement towards the lowering of debt levels within capital structures internationally. The intention was to strengthen the financial system and to make it more resilient to financial shocks (Dedu & Nitescu, 2012:5).

The 1997 Asian crisis was very similar to the 2008 financial crisis. Extremely high debt levels were evident in the capital structures of companies preceding both the 1997 Asian crisis as well as the 2008 financial crisis, which implies that capital structure adjustments were inevitable (Piaw & Jais, 2013:455; Dang et al., 2014:230).

Companies displaying excessively high levels of debt in their capital structures before a financial crisis cause the current earnings to fail to service the high fixed interest payment requirements. This in turn causes the riskiness as well as the vulnerability of the company to increase (Piaw & Jais, 2013:1). With an increase in risk and vulnerability, the chances of bankruptcy are higher, which was the case for companies in the 1997 and 2008 financial crises (Glen & Pinto, 1994:4; Piaw & Jais, 2013:1; Hidayat & Abduh, 2012:79).

The constantly changing macroeconomic environment in which companies operate influences their capital structures (Piaw & Jais, 2013:457; Auret et al., 2013:76). To determine whether a major macroeconomic factor such as the 2008 financial crisis influenced the capital structure and the significant capital structure determinants of the top 40 companies on the JSE, the 2008 financial crisis was incorporated as a macroeconomic condition in this research.

3. RESEARCH METHODOLOGY

Correlational research designs have been used in the past by researchers in other countries to establish the company-specific determinants of capital structure (Mans & Erasmus, 2011; De Vries & Erasmus, 2012; Hidayat & Abduh, 2012; Moyo et al., 2013; Vatavu, 2013; Alzomaia, 2014).

A quantitative, descriptive and correlational research design was therefore deemed to be appropriate for this study. The panel regression model was selected as a research instrument since it is a multiple regression model that accounts for cross-sectional data and time series data simultaneously.

3.1 Sample

The top 40 JSE Ltd listed companies from 2002 to 2013 were purposefully selected as the study sample. These companies make up almost 90% of the JSE Ltd in terms of market capitalisation (Marx 2008: ccclxxvi). These companies also have the largest selection of financing choices available and adjustments to financing choices can be carried out at a relatively low cost. According to Myers (2001:82), such characteristics make this a suitable target population for studying the capital structure of companies.

Secondary data on the top 40 companies listed on the JSE was collected from the Bloomberg LP (2014) database. This data is standardised by regulation and available for consecutive years.

3.2 Variables

Financial ratios were selected to address the goals of this study. Such ratios are commonly used to identify the possible impact of company-specific variables on the capital structure (De Jong et al., 2008; Bhayani, 2009; Vatavu, 2013; Piaw & Jais, 2013; Tchuigoua, 2014).

3.2.1 Dependent variables

The DE ratio was selected as the dependent variable which served as a proxy for the capital structure. The DE ratio measures long-term debt in relation to equity (Brealey et al., 2011:744).

3.2.2 Independent variables

Financial ratios for size, profitability, business risk, growth, liquidity, tangibility and taxation were selected as the independent variables. The independent variables were similar to those used in studies conducted in other countries by De Jong et al. (2008), Hidayat and Abduh (2012), Vatavu (2013), Ganguli (2013) and Tchuigoua (2014).

A dummy variable was used to control for the effect during and after the 2008 financial crisis. A zero indicates the pre-crisis period from 2002 to 2007. The during and post-crisis period, from 2008 to 2013, was distinguished with a one. A similar approach was used by Hidayat and Abduh (2012:82), Vatavu (2013) and Harrison and Widjaja (2014) to control for the effect of the 2008 financial crisis in Bahrain, Romania and the United States respectively.

The variables related to capital structure are summarised in TABLE 2.

TABLE 2: Summary of proxies for capital structure

Variable	Abbreviation	Proxy
Capital structure	DE	Debt-equity ratio = Total long-term debt / total equity
Size	SIZE	Log of sales
Risk	RISK	Standard deviation of EBIT / total assets
Growth	GROWTH	Growth in sales
Profitability	PFT	EBIT / total assets
Liquidity	LIQ	Current assets / current liabilities
Tangibility	TANG	Fixed assets / total assets
Taxation	TAX	Taxation / EBIT
2008 Financial Crisis	DUMCRISIS	Dummy variable for the 2008 financial crisis

Source: Authors' analysis

This study assumes that the dependent variable, capital structure (DE), can be explained by the independent variables of size, risk, growth, profitability, liquidity, tangibility, taxation and the effect of the 2008 financial crisis (De Jong et al., 2008; Mans & Erasmus, 2011; De Vries & Erasmus, 2012; Vatavu, 2012; Ganguli, 2013; Frank & Goyal, 2013; Vatavu, 2013; Dang et al., 2014; Alzomaia, 2014).

3.3 Model

Two panel regression models will be used. The first panel regression model will identify the most significant capital structure determinants and verify whether the South African top 40 companies made a significant change in their capital structures from before the 2008 financial crisis compared to during and after the 2008 financial crisis. The second panel regression will establish the development of the importance of the significant capital structure determinants identified in the first panel regression on the capital structure during and after the 2008 financial crisis.

The panel regression model was selected since it is a multiple regression model that accounts for cross-sectional data and time series data simultaneously (De Vries & Erasmus, 2012:3). This model also made it possible to account for heterogeneity and accommodate the uniqueness of each company (Brooks, 2008:489-490). Panel regression models have also been used in the capital structure studies of Ganguli (2013) in India and Ningsih and Djuaeriah (2013) in Indonesia.

The panel regression specification process was followed. Firstly, the pooled ordinary least square regression, then the fixed effects cross-sectional, and lastly, the random effect models were applied to determine the most suitable variation of the panel regression model for this study (Brooks, 2008:489-498).

The basic econometric model specification for the panel regression was stated as follows (Brooks, 2008:487):

$$y_{it} = \alpha + \beta x_{it} + \mu_{it}$$

Where,

y = dependent variable (DE)

x = independent variables (size, growth, risk, taxation, profitability, liquidity, tangibility and the 2008 financial crisis)

α = intercept term

β = vector of parameters to be estimated for independent variables

μ = error term

i = 1,...,449 (total number of observations of the independent variables)

t = 1,...,12 years.

Based on a diagnostic analysis of the models, the most accurate and significant model was selected to explain the effect of the independent variables, size (SIZE), risk (RISK), growth (GROWTH), profitability (PFT), liquidity (LIQ), asset tangibility (TANG), taxation (TAX) and the 2008 financial crisis (DUMCRISIS) on the dependent variable capital structure (DE) (Brooks, 2008:488-498; Chipeta, Wolmarans & Vermaak, 2012:1988).

To investigate the development of the significant capital structure determinants from the 2008 financial crisis until 2013, the significant capital structure determinants as identified in the chosen model will be applied to create interactive dummies. An interactive dummy is established by multiplying the significant capital structure determinant with the previously created dummy variable. As previously explained, the dummy variable differentiates between the first period from 2002 to 2007 and the second period from 2008 to 2013. A panel regression method will then be applied by only using the significant capital structure determinants with the newly created interactive dummy variables (Brooks, 2008:461). This panel regression will then indicate the development of the importance of the previously identified significant capital structure determinants during and after the 2008 financial crisis.

4. RESEARCH FINDINGS

The various panel regression models were analysed to determine if they identified the significant capital structure determinants.

4.1 Pooled ordinary least square regression model

The stacked pooled ordinary least square regression model is a rough, quick standard to compare more sophisticated panel regressions with (Hidayat & Abduh, 2012). The pooled ordinary least square regression model realised a low adjusted R -squared of 0.108. This indicates that the variables explained only 10.8% of the variability in (DE) by means of the pooled ordinary least square regression model. The low explanatory value can be attributed to the model assuming that all the companies in the sample are homogeneous (Brooks, 2008:488). Pooled regression does not account for cross-sections, and the expected cross-sectional differences were confirmed by the low R -squared value. The fixed effects regressions as well as the random effects regression were therefore explored.

4.2 Fixed effects cross-sectional model versus random effects model

The fixed effects regressions and the random effects regression are the two main approaches in the model estimation process when panel data is used (Hidayat & Abduh, 2012). These regression models take each company's uniqueness in alternative ways into account.

The random effects model decomposes the error term differently and captures the company-specific effects in the error term and not in the dummy, as is the case with the fixed effects model (Brooks, 2008:498). Hidayat and Abduh (2012) explained the difference between the two approaches in that the observed constant individual characteristics of each company are discarded in the fixed effects model whereas in the random effects model the characteristics remain.

The influences of the independent variable on capital structure after applying the fixed effects cross-sectional model and the random effects model are presented in TABLES 3 and 4.

TABLE 3: Fixed effects cross-sectional model results of the relationship between independent variables and capital structure

<i>Independent Variable</i>	<i>Coefficient</i>	<i>p-value</i>	
SIZE	2.635	0.716	
RISK	-44.384	0.016	**
GROWTH	0.073	0.280	
PFT	-87.262	0.012	**
LIQ	-0.123	0.958	
TANG	68.368	0.023	**
TAX	-0.967	0.856	
DUMCRISIS	4.646	0.230	
C	18.750	0.555	
Adjusted R-squared	0.551		
Probability (F-statistic)	0.000		***

Source: Eviews 9 estimation

*, **, *** significant level of 10%, 5% and 1% respectively

TABLE 4: Random effects model results of the relationship between independent variables and capital structure

<i>Independent Variable</i>	<i>Coefficient</i>	<i>p-value</i>	
SIZE	-1.224	0.843	
RISK	-48.067	0.007	***
GROWTH	0.083	0.216	
PFT	-92.533	0.004	***
LIQ	-0.657	0.769	
TANG	38.899	0.040	**
TAX	-0.319	0.952	
DUMCRISIS	5.227	0.168	
C	45.216	0.104	
Adjusted <i>R</i> -squared	0.057		
Probability (<i>F</i> -statistic)	0.000		

Source: *Eviews 9 estimation*

*, **, *** significant level of 10%, 5% and 1% respectively

The probability of the *F*-statistic of the fixed effects cross-sectional model (TABLE 3) and the random effects model (TABLE 4) is lower than .05. This indicates that both models are suitable. To ascertain whether the fixed effects model was appropriate to determine the significant capital structure determinants, the fixed effects redundancy test was performed (Brooks, 2008:507). The results of the fixed effects diagnostic test are presented in TABLE 5.

TABLE 5: Fixed effects redundancy test

<i>Test cross-section fixed effects</i>	<i>Statistic</i>	<i>p-value</i>
Cross-section <i>F</i>	12.720	0.000
Cross-section Chi-square	347.402	0.000

Source: *Eviews 9 estimation*

TABLE 5 indicates that the redundancy test has a probability-value (*p*-value) lower than .05 and that the fixed effects cross-sectional model is more suitable than the pooled ordinary least square model in 4.1. The fixed effects model is therefore not dismissed. It can be concluded that cross-sectional differences should be included in the model to account for the uniqueness of each company.

To establish whether the random effects model was more appropriate for this study, the Hausman test was applied (Hausman, 1978). This test determines whether errors are correlated; the absence of serial correlations in the error term is critical for the reliability of the estimates (Auret et al., 2013:86; De Vries & Erasmus, 2012:7; Chipeta et al., 2012:1987). The results of the Hausman test indicated a *p*-value greater than .05 at 0.872, which implies that autocorrelation was not

present. The diagnostic analysis therefore indicated that the random effects model was more suitable for this study and should be selected above the fixed effects model (Hidayat & Abduh, 2012).

4.3 Final model

The evaluation of the models presented in this section indicates that the best estimations of the relationship between independent variables and capital structure for the sample of South African companies were obtained from the random effects model (see TABLE 4). The probability of the p -statistic is also below .01, which indicates that the model can be accepted on a 99% confidence level (Shahzad, 2016).

4.4.1 Significant determinants of capital structure

As depicted in TABLE 4, the significant determinants of capital structure in the final model with p -values smaller than .05 are risk (0.007), profitability (0.004) and tangibility (0.04). These results suggest that these variables are significant determinants of capital structure on the 99% and 95% confidence levels respectively.

The signs of the coefficients of the risk and profitability are negative, whereas the coefficient of the tangibility variable indicates a positive relationship with the capital structure (TABLE 4). Support for the findings on the significant risk, profitability and tangibility variables is presented below.

Risk: The negative relationship between the independent risk variable and the dependent capital structure variable supports the trade-off theory and is consistent with the findings of Alzomaia (2014). The negative relationship is due to higher volatility in earnings, resulting in a higher probability of bankruptcy due to difficulty in honouring interest payments (Alzomaia, 2014:61; De Jong et al., 2008:1960).

Profitability: The negative relationship between the independent profitability variable and the dependent capital structure variable supports the pecking order theory followers (Myers & Majluf, 1984). It is also in line with the findings of Mans and Erasmus (2011:29), Ningsih and Djuaeriah (2013:11) in Indonesia, Alzomaia (2014:53) in Saudi Arabia and Tchui goua (2014:11) in 66 other countries.

The negative relationship between profitability and capital structure is related to more profitable companies using their retained earnings as the first choice of financing. Debt financing, which impacts the capital structure, is utilised only when retained earnings have reached a level of near exhaustion. Since profitable companies have a larger amount of retained earnings, they take longer to reach the stage where debt financing is needed (Myers, 2001:92).

Tangibility: The positive relationship between tangibility and capital structure is consistent with the trade-off theory followers (Vatavu, 2012:289). The positive relationship is also evident in the studies of Rajan and Zingales (1995), Booth, Aivazian, Demirgüç-Kunt and Maksimovic (2001) and Frank and Goyal (2003).

The positive relationship between capital structure and tangibility is due to the ability of tangible assets to serve as collateral to access debt financing, which influences the capital structure of companies. The debt capacity of a company increases as the tangibility of its assets increases, which results in a lower cost of debt financing. This, in turn, makes debt financing more attractive,

which supports the positive sign of the tangibility coefficient (Titman & Wessels, 1988:3; Vatavu, 2013:181).

4.4.2 Insignificant determinants of capital structure

The size, growth, taxation and liquidity variables are insignificant determinants of the capital structure in the sample of the companies in South Africa that were included in this study. The p -values are greater than .05 at 0.843, 0.216, 0.952 and 0.769 respectively (see TABLE 4).

According to the trade-off theory followers, the benefits of the tax shield serve as a motivation to explain the impact on the capital structure proportions; however, the evidence gathered in this study does not support this prediction (Myers, 2001:82).

The insignificance of the taxation variable has also been proven by Vatavu (2012:289). In his study, the G7 countries, 10 developing countries as well as China, Malaysia and Egypt, were reviewed from 1980 to 2004. Vatavu found the taxation variable to be irrelevant to the capital structure in all cases except for Egypt (Vatavu, 2012:289).

4.4.3 Insignificance of the 2008 financial crisis

The pre-financial crisis period (2002-2007) and the period during and after the 2008 financial crisis period (2008-2013) were considered using the dummy variable (DUMCRISIS). The dummy variable obtained a p -value of .168 (see TABLE 4). This value is above the norm of .05. This indicates that there was no significant change in the capital structures of the sample of companies in the period preceding, during and after the 2008 financial crisis. Since the capital structures of the top 40 companies did not significantly change over this period it was concluded that the 2008 financial crisis was insignificant to the capital structures of the sampled companies.

The evidence of the insignificance of the 2008 financial crisis for the sample of South African companies is in contrast to Piaw and Jais's study (2013:455), which found that Malaysian companies decreased their debt levels after the 1997 Asian financial crisis. However, the insignificance of the 2008 financial crisis corresponds with Vatavu's findings (2013) on the impact of the 2008 financial crisis on a sample of Romanian listed companies (Vatavu, 2013:186).

4.4.4 Importance of the significant capital structure determinants after the 2008 financial crisis

To determine whether the importance of the significant company-specific capital structure determinants (risk, profitability and tangibility as identified in the final model in 4.3) changed during and after the 2008 financial crisis, the interactive dummies for the significant capital structure determinants were included in a second panel regression model (Brooks, 2008:461).

The model can be explained as follows:

$$DE_{it} = \alpha + \beta prof_{it} + \beta tang_{it} + \beta risk_{it} + \beta (prof \times dum)_{it} + \beta (tang \times dum)_{it} + \beta (risk \times dum)_{it} + \mu_{it}$$

The influences of the significant company-specific capital structure determinants risk, profitability and tangibility on capital structure after applying the fixed effects cross-sectional model and the random effects model are presented in TABLES 6 and 7.

TABLE 6: Fixed effects cross-sectional model results on the impact of the 2008 financial crisis on the significant company-specific capital structure determinants

<i>Significant Independent Variable</i>	<i>Coefficient</i>	<i>p-value</i>	
RISK	- 55.72625	0.0013	****
PFT	- 60.65880	0.0981	**
TANG	63.82638	0.0336	***
DUMCRISIS	2.739391	0.6309	
Interactive risk	- 133.7898	0.2198	
Interactive profitability	- 27898.12	0.5593	
Interactive tangibility	34.44167	0.0050	****
Probability (<i>F</i> -statistic)	0.00000		

Source: *Eviews 9* estimation

*, **, ***, **** significant level of 15%, 10%, 5% and 1% respectively

TABLE 7: Random effects model results of the impact of the 2008 financial crisis on the significant company-specific capital structure determinants

<i>Significant Independent Variable</i>	<i>Coefficient</i>	<i>p-value</i>	
RISK	-54.77329	0.0011	****
PFT	-70.42902	0.0396	***
TANG	27.19384	0.1404	*
CR	2.891206	0.6115	
Interactive risk	-172.8549	0.1014	**
Interactive profitability	-12.2141	0.7952	
Interactive tangibility	33.45378	0.0061	****
Probability (<i>F</i> -statistic)	0.00000		

Source: *Eviews 9* estimation

*, **, ***, **** significant level of 15%, 10%, 5% and 1% respectively

The *p*-values of the *F*-statistic for both models in TABLES 6 and 7 have a value lower than .05, indicating that both models are suitable. The Hausman test will indicate which model will be more appropriate (Hausman, 1978). The diagnostic analysis with the Hausman test indicated a *p*-value greater than .05 at 0.2732. This implied that autocorrelation was not present. This result indicated that the random effects model in TABLE 7 was more suitable than the fixed effects model in TABLE 6 (Hidayat & Abduh, 2012).

TABLE 7 indicates the impact of the 2008 financial crisis on the significant company-specific capital structure determinants by means of the random effects model. The p -value of the F -statistic is lower than .01. This indicates the overall significance of the model on the 99% confidence level (Shahzad, 2016).

TABLE 7 indicates that risk had a significant negative relationship with capital structure with a coefficient of -54.77329 before the 2008 financial crisis. The negative relationship stays significant and strengthens due to the coefficient of interactive risk increasing by a further -172.8549 in the post-crisis period. The p -value for the risk interactive variable is 0.1014 indicating a 90% confidence level.

Profitability had a significant negative relationship with a coefficient of -70.42902 with capital structure before the 2008 financial crisis. This relationship becomes insignificant during and after the 2008 financial crisis due to the p -value of interactive profitability that is higher than .05 at 0.792, whereas the relationship of tangibility with capital structure becomes more significant during and after the 2008 financial crisis. This is indicated by the p -value changing from 0.1404 before the 2008 financial crisis to 0.0061 in the post-crisis period. Tangibility strengthens its positive relationship with capital structure from a coefficient of 27.19384 before the 2008 financial crisis by a further 33.45378 during and after the 2008 financial crisis. This is on the 99% confidence level and based on a p -value of 0.0061.

Harrison and Widjaja (2014:55) also found that tangibility had a stronger influence on capital structure in the United States after the 2008 financial crisis but that profitability exerted more influence on capital structure before the 2008 financial crisis. Profitability will normally be lower during and after a financial crisis, restricting the internal financing capacity of a company. This explains the insignificance of profitability on capital structure during and after the 2008 financial crisis (Harrison & Widjaja, 2014:72). The importance of tangibility serving as collateral to secure debt financing was reiterated with the stronger influence on capital structure during and after the 2008 financial crisis. Due to the volatility during and after the 2008 financial crisis risk also remained an essential capital structure determinant for the sample companies.

5. CONCLUSION

The capital structure of companies, and particularly the significant internal and external factors, influences a company's sustainability and value (Chowdhury & Chowdhury, 2010:119; Gowd, 2014:10).

The results of this study indicated that the South African top 40 companies regarded profitability, risk and tangibility (significant capital structure determinants) as the major company-specific indicators to establish their ideal capital structure and therefore significant to maximise company value. The insignificant determinants of an ideal capital structure for the South African top 40 were identified as size, growth, liquidity and taxation. This finding is consistent with the studies of Alzomaia (2014) in Saudi Arabia and Vatavu (2013) in Romania.

The relationship between the capital structure and the possible determinants vary across countries (Auret, Chipeta & Krishna, 2013:76; Piaw & Jais, 2013:457). The results of this study indicate that the South African top 40 companies depict a negative relationship between their capital structures and the profitability and risk variables. As the profitability and risk variables increase, the top 40 companies will decrease their debt levels; and lowering the debt-equity ratio negatively affects the valuation of the company. Tangibility indicates a significant positive

relationship with the debt-equity ratio, which indicates that the top 40 companies will increase their debt levels as their asset tangibility increases.

When the importance of the significant risk, profitability and tangibility capital structure determinants were investigated after the 2008 financial crisis (coefficients of interactive variables), risk was identified as the leading variable, with tangibility the second strongest indicator of capital structure. Profitability lost its importance as a significant capital structure determinant for the South African top 40 companies.

It was also concluded that the capital structures of the sample of JSE Ltd listed companies did not significantly change after the 2008 financial crisis. South African companies have a conservative view on the usage of debt, which can explain why the 2008 financial crisis did not have a significance influence on the capital structure of the sample of companies in this study (Fosu, 2013). This is similar to Korea, which was more conservative with its ideal capital structure after the 1997 Asian crisis, and therefore Korean companies dealt much better with the 2008 financial crisis (Brealey et al., 2011: 493).

To obtain an ideal capital structure and maximise company value, policy makers and company decision makers will be well advised to pay attention to company-specific determinants of capital structure. If risk, tangibility and, to a lesser extent, profitability change in companies, this can indicate a possible change in capital structure. This change in the capital structure of a company influences its value and the perceptions investors have about it.

5.1 Practical implications

Investors continually aim to buy shares from undervalued companies and attempt to sell those of overvalued companies. The methodology and findings of this study can be applied to determine whether a company's capital structure is changing and to identify the company-related determinants of that change.

This study also provides a framework of principles to establish an ideal environment-adjusted capital structure. It was found that the major determinants of the capital structure of the top 40 South African companies are risk, tangibility and to a lesser extent profitability. It is recommended that managers and investors monitor these variables to identify possible changes in the capital structure and value of a company.

In closing, decisions regarding capital structure affect the valuation of a company and influence investors' decisions (Chowdhury & Chowdhury, 2010: 112; Gowd, 2014:10). Due to the constantly evolving nature of capital structures, this will remain a contentious but extremely important consideration (Milken, 2009).

LIST OF REFERENCES

- Alzomaia, T.S.F. (2014). Capital structure determinants of publicly listed companies in Saudi Arabia. *International Journal of Business and Finance Research*, 8(2), pp. 53-67.
- Auret, C., Chipeta, C. & Krishna, S. (2013). Financial constraints and capital structure dynamics across the business cycle: Some evidence from the JSE. *Journal for Studies in Economics and Econometrics*, 37(1), pp. 75-103.

- Bhayani, S.J. (2009). Impact of financial leverage on cost of capital and valuation of firm: A study of Indian cement industry. *Paradigm*, 13(2), pp. 43-49.
- Bloomberg L.P. (2014): Financial data for top 40 companies. 12/31/2002 to 12/31/2013. Accessed: October 14, 2014 from Bloomberg terminal.
- Booth, L., Aivazian, V., Demirgüç-Kunt, A. & Maksimovic, V. (2001). Capital structure in developing countries. *Journal of Finance*, 56, pp. 87-130.
- Brealey, A., Myers, S.C. & Allen, F. (2011). *Principles of Corporate Finance*, 10th edition. McGraw-Hill: New York.
- Brooks, C. (2008). *Introductory Econometrics for Finance*, 2nd edition. New York: Cambridge University Press.
- Chipeta, C., Wolmarans, H. & Vermaak, F. (2012). Impact of financial liberalisation on capital structure: Evidence from the Johannesburg Securities Exchange. *African Journal of Business Management*, 6(5), pp. 1984-1998.
- Chowdhury, A. & Chowdhury, S.P. (2010). Impact of capital structure on firm's value: Evidence from Bangladesh. *Business and Economic Horizons*, 3(2), pp. 111-122.
- Dang, V.A., Kim, M. & Shin, Y. (2014). Asymmetric adjustment toward optimal capital structure: Evidence from a crisis. *International Review of Financial Analysis*, 33, pp. 226-242.
- De Jong, A., Kabir, R. & Nguyen, T.T. (2008). Capital structure around the world: The roles of firm- and country-specific determinants. *Journal of Banking & Finance*, 32(9), pp.1954-1969.
- De Vries, A. & Erasmus, P.D. (2012). The influence of firm characteristics and economic factors on capital structure: A comparison between book value and market value leverage. *Management Dynamics*, 21(3), pp. 2-16.
- De Wet, J.H. & Dhanraj, K. (2007). Unlocking shareholder value by moving closer to the optimal capital structure. *Accounting SA*, pp. 28-32.
- Dedu, V. & Nitescu, D.C. (2012). Basel III – Between Global Thinking and Local Acting. *Theoretical and Applied Economics*, 6(571), pp. 5-12.
- Fama, E.F & French, K.R. (2002). Testing Trade-Off and Pecking Order Predictions about Dividends and Debt. *The Review of Financial Studies*, 15(1), pp. 1-33.
- Frank, M.Z. & Goyal, V.K. (2003). Testing the pecking order theory of capital structure. *Journal of Financial Economics*, 67, pp. 217-248.
- Fosu, S. (2013). Capital structure, product market competition and firm performance: Evidence from South Africa, *The Quarterly Review of Economics and Finance*, 53, pp. 140-151.
- Ganguli, S.K. (2013). Capital structure – does ownership structure matter? Theory and Indian evidence. *Studies in Economics and Finance*, 30(1), pp. 56-72.
- Gergelyné Kása, M. (2016). Lessons learned from the effect of tight monetary conditions and crises on corporate capital structure, *Studies and Articles*, 47(5), pp. 27-38.
- Glen, J. & Pinto, B. (1994). Debt or equity? How firms in developing countries choose. Discussion Paper. International Financial Corporation, Washington D.C.
- Gowd, T.N. (2014). Impact of leverage, capital structure and dividend policy practices on shareholders' wealth in Larsen and Toubro limited, India. *International Journal of Advanced Research in Computer Science and Management Studies*, 2(6), pp. 8-17.

- Gwatidzo, T., Ntuli, M. & Mlilo, M. (2016). Capital structure determinants in South Africa: a quantile regression approach. *Journal of Economic and Financial Sciences*, 9(1), pp. 275-290.
- Harrison, B. & Widjaja, T.W. (2014). The determinants of capital structure: Comparison between before and after the financial crisis, *Economic Issues*, 19(2), pp. 55-82.
- Hausman, J.A. (1978). Specification Tests in Econometrics. *Journal of Econometric Society*, 46(6), pp. 1251-1271.
- Hidayat, S. & Abduh, M. (2012). Does Financial Crisis Give Impacts on Bahrain Islamic Banking Performance? A Panel Regression Analysis. *International Journal of Economics and Finance*, 4(2), pp. 79-87.
- Ju, N., Parrino, R., Potoshman, A.M. & Weisbach, M.S. (2005). Horses and rabbits? Trade-off theory and optimal capital structure. *Journal of Financial and Quantitative Analysis*, 40(2), pp. 1-24.
- Junevicius, A. & Justinaviciene, K. (2010). EU taxation policy during financial crisis. *European Integrated Studies*, 4, pp. 97-102.
- Kara, E. & Erdur, D.A. (2015). Determinants of capital structure: a research on sectors that contribute to exports in Turkey, *Istanbul University Journal of the School of Business*, 44(2), pp. 27-38.
- Kraus A. & Litzenberger, R.H. (1973). A state-preference model of optimal financial leverage. *Journal of Finance*, 28(4), pp. 911-922.
- Kyereboah-Coleman, A. (2007). The impact of capital structure on the performance of microfinance institutions. *Journal of Risk Finance*, 8(1), pp. 56-71.
- Mans, N. & Erasmus, P.D. (2011). The combined effect of changes in the South African business environment on capital structure. *Management Dynamics*, 20(1), pp. 19-31.
- Marx, B. (2008). *An analysis of the development, status and functioning of audit committees at large listed companies in South Africa*. Unpublished PhD thesis. Johannesburg: University of Johannesburg.
- Milken, M. (2009). *Why Capital Structure Matters: Companies that repurchased stock two years ago are in a world of hurt*. Available from: <http://tinyurl.com/cd9c96>. (Accessed 22 July 2014).
- Modigliani, F. & Miller, M.H. (1958). The cost of capital, corporate finance and the theory of investment. *American Economic Review*, 48, pp. 261-297.
- Modigliani, F. & Miller, M.H. (1963). Corporate income taxes and the cost of capital: A correction. *American Economic Review*, 53(3), pp. 433-443.
- Moyo, V., Wolmarans, H. & Brummer, L. (2013). Dynamic capital structure determinants: Some evidence from South African firms. *Journal of Economics and Financial Sciences*, 6(3), pp. 661-682.
- Myers, S. (1984). The capital structure puzzle. *Journal of Finance*, 39, pp. 573-592.
- Myers, S.C. (2001). Capital structure. *Journal of Economic Perspectives*, 15(2), pp. 81-102.
- Myers, S.C. & Majluf, N.S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13, pp. 187-221.
- Negash, M. (2002). Corporate tax and capital structure: Some evidence and implications. *Investment Analysts Journal*, 56, pp. 17-27.
- Ningsih, W. & Djuaeriah, N. (2013). *The capital structure and firm's financial leverage in Indonesian publicly listed cement industry*. Proceedings of World Business and Social Science Research Conference, 24-25 October 2013, Bangkok, Thailand.

- Niu, X. (2008). Theoretical and Practical Review of Capital Structure Determinants. *International Journal of Business Management*, 3, pp. 133-139.
- Ngugi, R.W. (2008). Capital financing behaviour: Evidence from firms listed on the Nairobi Stock Exchange. *The European Journal of Finance*, 14(7), pp. 609-624.
- Piaw, L.L. & Jais, M. (2013). *The Capital Structure of Malaysian Firms in the Aftermath of the Asian Financial Crisis 1997*. Conference proceedings of the 2nd International Conference on Management, Economics and Finance, Malaysia. Available from: www.internationalconference.com.my. (Accessed 24 November 2014).
- Rajan, R.G. & Zingales, L. (1995). What Do We Know About Capital Structure? Some Evidence from International Data. *Journal of Finance*, 50(5), pp. 1421-1460.
- Shahzad, A. (2016). Detecting Earning Management and Earning Manipulation in BRIC Countries; a Panel Data Analysis for Post Global Financial Crisis Period. *International Journal of Account Research*, 4(1), pp. 1-10.
- Tchuigoua, T.H. (2014). Capital Structure of Microfinance Institutions. *Journal of Financial Services Research*, pp. 1-13.
- Titman, S. & Wessels, R. (1988). The Determinants of Capital Structure Choice. *Journal of Finance*, 43(1), pp. 1-19.
- Vatavu, S. (2012). Trade-off versus pecking order theory in listed companies around the world. *Annals of the University of Petrosani, Economics*, 12(2), pp. 285-292.
- Vatavu, S. (2013). Current challenges in capital structure decisions : Evidence from Romanian companies operating in different sectors. *Managerial Challenges of the Contemporary Society*, (5), pp. 181-186.
- Wiwattanakantang, Y. (1999). An empirical study on the determinants of the capital structure of Thai firms. *Pacific-Basin Finance Journal*, 7, pp. 371-403.