

FINANCIAL CRISIS AND CAPITAL STRUCTURE: PERSPECTIVES FROM AN EMERGING MARKET ECONOMY

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Abstract

World economies experienced one of the worst recessions in recorded history in 2008. South Africa, as an emerging economy, did not escape the negative effects of the global recession, and, as a result, experienced its first recession in almost two decades. During a recession, firms may need to adjust their capital structure in response to the adverse circumstances. The purpose of this study was to investigate the effect of the South African recession on the capital structure of firms listed on the Johannesburg Securities Exchange (JSE). Panel data methodology was used for this study. The results indicate that the 2008-2009 South African recession did have a significant impact on the capital structure of South African firms and that financial managers actively managed their capital structure to adapt to the new environment and circumstances they were exposed to.

Keywords: Recession, Capital Structure, South Africa, Firm Characteristics, Emerging Economy

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1. Introduction

On 26 November 2008, the President of the United States of America announced: "We are on the precipice of the greatest financial crisis since the great depression of the 1930s" (Payne, 2011:150). What started out as an isolated instability in the sub-prime segment of the United States housing market, escalated into one of the worst global recessions recorded in history. According to the National Bureau of Economic Research, the recession officially started in the United States in December 2007 and ended in June 2009. The well-known saying that the rest of the world sneezes when the US catches a cold seemed to be justified as influential economies in the European Union and Japan collectively lapsed into recession by mid-2008 (Verick and Islam, 2010:3).

Not only were developed economies adversely affected by the US recession, but many developing and emerging economies also felt the injurious effects of the US recession at the end of 2008. The impact of the US recession on the majority of countries in the developing world manifested in terms of growth deceleration, although several developing countries experienced outright recessions as well. These included countries such as Armenia, Mexico, South Africa, Turkey, the Baltic States and the Ukraine (Verick and Islam, 2010:5). Despite the initial state of denial by politicians and business elites in South Africa, the reality finally dawned that the South African economy entered a recession for the first time in almost two decades.

Globally, the recession hit financial firms the hardest, which resulted in hundreds of bank failures. Local banks in South Africa experienced some stress, especially on the earnings front as advances and credit extension fell sharply. However, no bank failures occurred in South Africa most probably because of the banks' strong profitability, low level of non-performing loans, comfortable capital cushions and a lack of direct exposure to problem assets in the US and Europe (OECD, 2010: 13). The effects of the global recession on the South African economy were, however, evident in other sectors. These effects were especially apparent in the manufacturing and export sectors. The impact of the recession was evident in the form of contractions in output, productions and sales, leading to poor economic growth, more unemployment, and the failure of businesses due to a significant decrease in consumer demand. As a result, firms experienced tremendous financial pressure as a consequence of the recession. Lower sales volumes could result in weaker profitability, liquidity, growth and most probably a decline in a firm's cash balance, amongst others. Furthermore, these conditions may result in high levels of financial distress, especially for those firms exposed to a high level of leverage. In such adverse economic situations it may be necessary for firms to reconsider their capital structure and possibly opt for financial restructuring by exchanging debt for equity.

Various local and international studies on the impact of the most recent recession have been conducted, with the focus being predominantly on the

impact on financial institutions. Although various South African studies have also been conducted on the topic of capital structure, a gap in the literature exists that relates to the impact of the recession on the capital structure of firms operating in South Africa.

The purpose of this study was, therefore, to investigate whether the 2008-2009 South African recession had an effect on the capital structure of JSE-listed firms in South Africa, and whether the circumstances necessitated firms to adjust their capital structure over a relative short-term period. The majority of research on capital structure adjustments suggest that firms do not appear to adjust their capital structure quickly (Duggal and Budden, 2011; Lemmon, Roberts and Zender, 2008; Frank and Goyal, 2004). However, the effects of a global and even domestic recession may be so strong that firms may be forced to make changes to their leverage ratios to adapt to the prevailing economic environment.

2. Literature overview

2.1 Impact of the recession on the South African economy and firm performance

According to the National Bureau of Economic Research (2003), a recession can be described as a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in the real Gross Domestic Product (GDP), real income, employment, industrial production, and wholesale-retail sales. All the aforementioned aspects of the definition of a recession, were prevalent in the South African economy at the time. The impact was especially severe in the drop of the country's annualised GDP growth rate. Statistics South Africa reported that South Africa's GDP figure at market prices for the fourth quarter of 2008 has contracted by 1,8% quarter-on-quarter from 0,2% growth in the third quarter. In the first quarter of 2009 the GDP contracted by an annualized 6,4%. By the end of the first quarter of 2009, it was evident that South Africa had fallen into a recession, by experiencing two consecutive quarters of negative growth. The impact of the global recession became a reality and the South African economy entered a recession for the first time since the end of 1992.

In general, the recession hit financial firms particularly hard, globally, which resulted in hundreds of bank failures. Local banks in South Africa also experienced pressure, especially on the earnings front as advances and credit extension fell sharply. Growth in credit extension slowed in September 2009 to the lowest in almost 40 years. Growth in credit to the private sector fell to 2.34% year-on-year in September 2009 - the weakest growth performance since October 1966. Even though the banking sector in South Africa was also exposed to this decline, they were protected

from the full-blown banking crises experienced in the UK, parts of Europe and the US (Padayachee, 2011:10). As mentioned earlier, no bank failures occurred in South Africa and this was possibly attributed to the banks' strong profitability, low level of non-performing loans, comfortable capital cushions and a lack of direct exposure to problem assets in the US and Europe (OECD 2010: 13).

The effects of the global recession in South Africa were, however, also evident in other sectors of the economy, especially in the manufacturing and export sectors. According to the South African Reserve Bank, the manufacturing output in the first quarter of 2009 declined by 6.8% relative to the previous quarter, while mining production declined by 12.8% over the same period. Similar contractions were apparent in the retail and wholesale trade sales, with motor vehicles (domestic and export) in particular falling sharply (SARB Quarterly Bulletin, 2009).

It is to be expected that contractions in output, productions and sales may have a direct impact on the financial performance of firms. With a decrease in economic growth of a country, firms expect demand to fall due to a reduction in private disposable income. Research by Hofmeyr (2009) found that consumer spending in South Africa decreased by approximately 5% during this period, which was the largest contraction in almost two decades. A fall in demand will result in lower sales volumes, which may consequently result in weaker profitability, liquidity and growth, to mention but a few outcomes. Furthermore, it may result in financial distress, depending on a firm's capital structure. If a firm is highly leveraged, it may struggle to fulfill all its debt obligations when a decline in cash flow is experienced. In such adverse economic situations, firms may opt for financial restructuring by exchanging debt for equity, and in this way reduce the firm's leverage. This financial restructuring was evident in the US where firms had incentives to cut their fixed costs including interest expenses and restructuring their balance sheets by using more equity financing than debt financing (Duggal and Budden, 2011).

2.2 Capital structure adjustments due to a recession

Due to the various effects of the 2008-2009 recession, it could be expected that many firms had to reconsider their capital structure at the time in order to adapt to the new challenges presented by the recession. The question that arises is whether firms did in fact change their capital structure? Several researchers studied the manner in which firms adjusted, or failed to adjust, their capital structure. Capital structure adjustments have received growing interest since it can help distinguish alternative theories of capital structure (Frank and Goyal, 2004:49).

Researchers such as Lemmon et al. (2008:1605) found that firms do not appear to adjust their capital structures quickly. They found that corporate capital structures are stable over long periods of time and that firms that have high (low) leverage tend to remain so for longer than 20 years (Duggal and Budden, 2011:14). Frank and Goyal (2004:55) furthermore report that there is clear evidence of a long-term relationship between debt and equity, and that this evidence is quite compatible with the trade-off theory of capital structure. The majority of evidence reveals that firms do not appear to adjust their capital structures quickly. However, the effects of a global or even a domestic recession may force firms to change their leverage ratios to adapt to the prevailing new economic environment.

Prior research on capital structure have indicated that not all countries will experience the same effects during periods of economic recession and financial turmoil. Research, furthermore, suggest that capital structures differ from industry to industry, and that the debt-equity choice even varies between firms within the same industry. This situation may be attributed to the fact that changes in a country's economy may have a direct impact on the operations and characteristics of firms. The majority of empirical studies support the view that firm-specific factors dominate industry-specific factors with regard to capital structure decisions (Balakrishnan and Fox, 1993). Several determinants have emerged from various theoretical and empirical studies to better explain the financing decisions of firms. The consensus is that a firm's level of leverage increases with fixed assets, non-debt tax shields, investment opportunities and firm size (Harris and Raviv, 1991). Similarly, the level of leverage decreases due to volatility, advertising expenditure, the probability of bankruptcy, profitability, and the uniqueness of a product (Rajan and Zingales, 1995). It is highly likely that a recession will have an effect on the operations and characteristics of firms, which may also result in financial managers considering adjusting their capital structure. It is, therefore, necessary to also consider the effects of the recession on firm characteristics and the impact of these changes on capital structure.

3. Research problem and objectives

The majority of research conducted on the effects of the 2007-2009 global recession examined the impact of the global recession on a country's economy and society. Research, furthermore, predominantly focused on the impact of the recession on financial institutions because they experienced the impact of the recession the most. There are, however, limited studies, especially in South Africa that focused on the effects of the recession on the capital structure of non-financial firms.

The justification for this study was, therefore, to investigate whether the 2008-2009 South African recession had an effect on the capital structure of listed firms in South Africa. Besides this primary objective, the following secondary objectives were also addressed:

- to investigate the effect of firm characteristics on capital structure for each year included in the study; and
- to investigate whether the effect of the South African recession on capital structure differed between the sectors on the JSE.

Based on the primary objective the following hypotheses were formulated:

H₀: The 2008-2009 South African recession did not have a significant impact on the capital structure of South African listed firms

H_A: The 2008-2009 South African recession did have a significant impact on the capital structure of South African listed firms

A finding of no significant change in capital structure will be consistent with the previous findings by Lemmon et al. (2008) and Frank and Goyal (2004) that capital structure remains stable over time and/or adjustments to capital structures do not occur quickly.

4. Identification of variables and measurement instruments used in the study

The dependent variable for the study was capital structure (operationalised in the next section). The independent variables that were selected were five firm characteristics: profitability, asset structure, growth, size and liquidity. To define the dependent variable and the five independent variables, financial ratios were used as measures of these variables. These are illustrated in Table 1.

Table 1. Identified variables and measurement instruments

Identified	Measurement Instrument (Financial Ratio Or Indicator)
Capital structure Debt-equity ratio (DE_{BV} & DE_{MV})	$DE_{BV} = \frac{\text{book value of total debt}}{\text{preference share capital} + \text{book value of ordinary equity} + \text{minority interest}}$ $DE_{MV} = \frac{\text{book value of total debt}}{\text{preference share capital} + \text{market value of ordinary equity} + \text{minority interest}}$
Total debt = long-term and short-term interest-bearing debt Book value of ordinary equity = distributable reserves plus non-distributable reserves + ordinary share capital Market value of ordinary equity = market capitalisation (market price x number of issued ordinary shares)	
Profitability Return on assets (ROA)	$ROA = \frac{EBIT}{\text{total assets}}$
EBIT = earnings before interest and tax Total assets = non-current assets + current assets	
Asset structure Fixed assets-to-total assets (FA/TA)	$FA/TA = \frac{\text{fixed assets}}{\text{total assets}}$
Fixed assets = property, plant and equipment at carrying value	
Liquidity Current ratio (CR)	$CR = \frac{\text{current assets}}{\text{current liabilities}}$
Current assets = total inventory + debtors + short-term loans + cash and bank + other current assets Current liabilities = short-term borrowings + creditors + bank overdraft + provision for taxation + provision for dividends	
Growth Market-to-book ratio (M/B ratio)	$M/B \text{ ratio} = \frac{\text{market value of equity}}{\text{book value of equity}}$
Market value of equity = preference share capital + market capitalisation of ordinary shares + minority interest Book value of equity = ordinary share capital + preference share capital + distributable reserves + non-distributable reserves + minority interest	
Size	$\ln[\text{sales}] = \text{Lognormal of sales}$

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

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

The third aspect (whether the measure of leverage is based on the book value or the market value of equity) was very important in this study. As mentioned, leverage can be expressed relative to book values or market values of equity. Book values are determined by what has already happened in the past, while market values are influenced by future

expectations and developments (Frank and Goyal, 2003:12). Mackay and Phillips (2005) and Thies and Klock (1992) argue that book values better reflect the target leverage of management, since market valuations of equity are beyond the control of management. Modigliani and Miller (1958) and Welch (2004), however, argue that market value measures better reflect the ownership between equity and debt holders. It was, therefore, decided to investigate both the book value and the market value of equity in this study.

In the following section the sample and data used in the study are discussed as well as the data analysis techniques used to analyse the data.

5. Research method

5.1 The sample and data

In this study the following sectors of the JSE were included: the industrial sector, basic materials, consumer goods, consumer services, health care, oil and gas, technology and telecommunications. Firms from the financial and the mining sector (subsector of basic materials) were excluded as their financial characteristics and their use of leverage differ considerably from firms in the afore-mentioned sectors. Furthermore, firms that operate in these two sectors incorporate different types of business activities and their financial statements are different to those of firms in the other sectors. Including these two sectors would make comparisons between firms more difficult. The sample was therefore restricted by excluding the financial sector as well as all firms in the mining industry that form part of the basic materials sector.

Focusing only on those firms that are listed at the end of the selected period may expose the study to a survivorship bias. Survivorship bias is the result of a firm delisting from a stock exchange. This may often be due to financial failures or financial restructuring of firms. Continuing with research which suffers from survivorship bias could result in inconsistent and unreliable results owing to the apparent persistence of the results. In order to reduce survivorship bias, it was important to include those firms that delisted during the period investigated in this study. Consequently, both listed and firms that delisted during the selected period, were included in the study.

Finally, to be included in the sample a firm had to provide sufficient financial data for a year in order to measure the identified variables. This requirement was incorporated in the study since the data set contained cross-sectional and time-series dimensions. A data set that contains both of these two dimensions is classified as panel data (Keller, 2005:650).

To conclude: the sample for this study included both listed firms on the JSE and those firms that delisted from the JSE, over a period of six years, namely 2006 to 2011. By applying the above

requirements, the final sample for this study consisted of a total of 268 firms, 227 listed and 41 of them delisted.

5.2 Data analysis

External databases were used to obtain the data needed for statistical analysis. McGregor BFA (2011) was used to gain access to the income statements, balance sheets, and sundry data items in a standardised format. This database was also used to extract the year-end share prices of all the firms included in the study.

Once the data had been prepared and the accuracy verified, Statistica Version 9 (2009) were used for further analysis. Both descriptive and inferential analyses were conducted in this study to address the research question. The data set was subdivided into three time-periods. The first time-period focused on the pre-recession period, including the years 2006 and 2007. Since the two consecutive quarters of negative GDP growth was in the last quarter of 2008 and the first quarter of 2009, these two years formed the recession time-period. Then, lastly, the years 2010 and 2011 represented the post-recession period.

6. Empirical results and findings

In this section an in-depth discussion of the empirical results are provided. Descriptive statistics were used to introduce the nature of the data set that was used and to decide what type of inferential statistics should be used. The descriptive measures used in this study included the following: mean, median, standard deviation, skewness and kurtosis. Due to the existence of extreme outliers in the data set, the data were trimmed to three standard deviations from the mean. These descriptive measures were applied to the full data set containing both firms that remained listed and those firms that delisted during the study period. Table 2 provides the results from the descriptive statistics, which is followed by a discussion of these results.

Table 2. Descriptive statistics for the period 2006 to 2011

Variables	N	Mean	Median	Variance	Standard Deviation	Skewness	Kurtosis
DE _{BV}	1265	1.25	0.98	0.84	0.91	0.75	-0.49
DE _{MV}	1265	0.89	0.63	0.56	0.75	0.90	-0.45
ROA	1265	16.83	16.30	172.74	13.14	0.06	-0.21
FA/TA	1265	0.32	0.27	0.05	0.23	0.74	-0.35
CR	1265	1.60	1.35	1.01	1.01	2.97	14.69
M/B ratio	1265	1.98	1.63	2.11	1.45	0.73	-0.44
ln (sales)	1265	14.16	14.02	4.49	2.12	-0.01	-0.46

The first variable of importance is the debt-equity ratio, which was used to quantify the dependent variable, namely, capital structure. As

previously mentioned, this study included both book value and market value measures of leverage since

both these measures have their own strengths and weaknesses.

Due to the existence of outliers in the data set (substantiated by statistics for skewness and kurtosis) the median rather than the mean values were analysed for this study. The median value for DE_{MV} is lower than for DE_{BV} . These results reflect the difference between the book value of equity (according to the financial statements of the firm) and the value the market attributes to the equity of a firm. Since the market value of shares is usually higher than the value in the balance sheet (book value), it could have been expected that the median DE_{MV} would be lower than the median DE_{BV} . The median value for DE_{MV} ratio is 0.63, indicating that the assets are primarily financed by means of equity (R0.63 of debt for every R1 of shareholders' funds). With a median value of 0.98 for DE_{BV} ratio, it appears that firms use more or less equal amounts of debt and equity to finance assets or investment opportunities (more or less R1 debt for every R1 of shareholders' funds) when book values are considered.

Return on assets (ROA) was used to estimate profitability and was defined as the earnings before interest and tax (EBIT) divided by total assets. The mean ROA of all the firms included in the full data set is 16.83%, with a median value of 16.30%. This value implies that firms generated a return (EBIT) of 16.30% on their utilised assets. The median profitability of 16.30% is at par with various developed and developing economies. Compared to the results from a study conducted by De Jong, Kabir and Nguyen (2008), this ROA of 16.30% is one of the highest ROA ratios among both developed and developing countries. The results by De Jong et al. (2008) reveal that the average ROA ratio for developed countries ranges from a low of 3.3% in Hong Kong to a high of 13.7% in New Zealand, and that the developing economies' average ROA values range from 6.5% in the Philippines to a high of 23.2% in Turkey.

To measure the asset structure of the firms, the amount of fixed assets in the balance sheet was divided by total assets (FA/TA). Considering the median as the measure for central tendency, it conveys that the full data set has a median FA/TA of 26.7%. This figure means that, on average, the total assets of a firm consists of 26.7% fixed assets, which is generally considered as potential collateral to obtain debt financing. The median percentage of fixed assets to total assets for the group of all firms is relatively low compared to the other countries included in the study of De Jong et al. (2008).

The current ratio (CR) was used as a measure of liquidity. This ratio indicates the ability of a firm to fulfil its short-term obligations. The median value of the CR for the full data set is 1.35. This value indicates that for every R1 of current liabilities, firms have R1.35 of current assets to cover their short-term obligations. It is reassuring to observe that the sample

firms included in this study have sufficient current assets to fulfil their short-term obligations. The median of 1.35 for this South African study is also, more or less, on par with other countries.

The independent variable, growth, was measured by the market-to-book ratio (M/B ratio). The median M/B ratio for the firms included in this particular study is 1.63. This figure indicates that investors are willing to pay, on average, R0.63 more for a firm's share than what the actual book value of that particular share is. This median value is relatively high compared to other developing countries such as Mexico (1.11), Pakistan (1.00) and Turkey (1.33) (De Jong et al., 2008). Based on this argument, it can be concluded that the firms included in this study have considerable growth opportunities at their disposal. This, however, may not necessarily indicate that South Africa have higher growth opportunities compared to other countries. The differences in the M/B ratios of countries also indicate that this ratio could be more country-specific than firm-specific. The reason why the M/B ratio for the South African firms is relatively high compared to other countries may be because investors are willing to accept higher risk and, therefore, are prepared to pay more for the shares. If this is the reason for the higher M/B ratios, it does not necessarily portray signs of growth, but rather of the risk-adverseness of investors.

Lastly, size was measured by the natural logarithm of sales (\ln [sales]). The median value of 14.02, representing sales of approximately R1.2 million, is considered as the measure for central tendency of size for the firms. Despite the extreme outliers, the standard deviation of 2.12, however, indicates that the values are not spread out too much from the mean. It has to be taken into consideration, however, that the natural logarithm was used in order to reduce variability of the sales amounts.

Referring to Table 2, it is evident that the data set for this particular study is not normally distributed, since none of the variables have a skewness of zero. The dependent variable (as measured by both DE_{BV} and DE_{MV}) and four independent variables are skewed to the right, i.e., the distributions are positively skewed. \ln (sales) is the only variable that is negatively skewed. This distribution implies that the tails are longer to the left and that it contains results below the mean that are more extreme. In terms of the kurtosis values, CR is the only variable which returned a value of greater than 0. Kurtosis values greater than 0 indicate distributions that are leptokurtic, meaning that the distributions are more peaked than, and have flatter tails than, a normal distribution. In other words, the distribution of this variable has more data points clustered around the mean and more data points with large deviations from the mean (referring to the fatter tails). All the other variables returned kurtosis values of less than 0. This result indicates that the distribution of these variables is platykurtic.

The important conclusion from the results of the descriptive statistics, and the skewness and kurtosis results in particular, is that the data set contained non-parametric data. This conclusion is important, since the methods used for further analyses depend on the nature of the raw data. After the results for the descriptive statistics were obtained and analysed, inferential statistics were conducted. The results of the inferential analyses are discussed by referring to each objective that was identified for the study.

6.1 The effect of the 2008-2009 South African recession on the capital structure of listed firms in South Africa

Table 3. Summary of the mixed model repeated measures ANOVA test of DE_{BV} for the pre-recession (2006-2007), recession (2008-2009) and post-recession (2010-2011) period

	2006-2007	2008-2009	2010-2011
2006-2007 (1.224)	1.000		
2008-2009 (1.217)	0.876	1.000	
2010-2011 (1.112)	0.018***	0.019***	1.000
p-value: 0.0252			

Notes: The values in parentheses are the DE_{BV} mean values for the respective time periods
 *** Significant at the 1% level ** Significant at the 5% level

Table 4. Summary of the mixed model repeated measures ANOVA test of DE_{MV} for the pre-recession (2006-2007), recession (2008-2009) and post-recession (2010-2011) period

	2006-2007	2008-2009	2010-2011
2006-2007 (0.592)	1.000		
2008-2009 (0.904)	0.000***	1.000	
2010-2011 (0.937)	0.000***	0.480	1.000
p-value: 0.000			

Note: The values in parentheses are the DE_{MV} mean values for the respective time periods
 *** Significant at the 1% level ** Significant at the 5% level

Based on the results in the above two tables, it is, firstly, evident that different results are observed between book value and market value leverage. Secondly, the p -values indicate that the recession did have a statistically significant impact on the debt-equity ratio of firms. The results for DE_{BV} indicate that the debt-equity ratio in the post-recession period is significantly different from the pre-recession and the recession period respectively. These differences are statistically significant at the 5% level. The results show that firms were able to maintain DE_{BV} from 2006 up to 2009, but this ratio declined significantly after the recession period.

Considering the debt-equity ratio at book value, it is clear that the recession changed the financing mix of firms. The average DE_{BV} ratio indicates that firms went from issuing R1.22 of debt for every Rand of equity in 2006-2007 to R1.11 in 2010-2011. The recession thus had an effect on global equity and debt issuance. According to the data on global debt and equity offerings from 2007 to 2010, provided by the Wall Street Journal, global equity issuance declined from \$876 billion in 2007 to \$471 billion in 2008 (a

The primary objective of this study was to determine whether the recession that was experienced in South Africa during 2008-2009 affected the capital structure of firms. In an attempt to answer this research question, a mixed model repeated measures ANOVA was conducted to determine whether significant differences in the debt-equity ratios existed between the three sample periods. This mixed model repeated measures ANOVA was conducted for both book value and market value leverage, and it indicates statistical significant differences at a 95% confidence interval. Table 3 reports the results for DE_{BV} and Table 4 reports the results for DE_{MV} .

46.2% decline), while debt issuance declined from \$6 634 billion in 2007 to \$4 244 billion in 2008 (a 36% decline) (Fosberg, 2012:3). The results for DE_{BV} indicate that firms only started to adjust their use of debt and equity to a significant extent after the major effects of the recession was experienced in South Africa. The decline in the DE_{BV} indicates that firms reduced their use of debt capital to a great extent. One of the reasons for a decline in the use of debt capital may be explained by the way that banks alter lending requirements over economic troughs. During times of economic difficulty such as a recession, banks have to re-examine unprofitable business units such as mortgages and have to reconsider their distribution costs in such areas. In an economic downturn, it becomes more difficult for banks to assess the creditworthiness of corporate borrowers. Since adverse economic conditions have a negative impact on the cash flows of borrowers, banks may suffer losses because some of their outstanding loans default (Akinboade and Makina, 2009:479). Defaults usually result in banks reducing the availability of capital and making it more difficult for firms to attract new debt

capital. Since book value leverage is affected by the accounting value of equity, it is expected that the book value of equity will remain more or less constant. This is so because the book value of equity is not affected by changes in the market prices. It can, therefore, be assumed that the significant decline in DE_{BV} is due to a decline in debt capital.

Market value leverage paints a different picture compared to book value leverage. The results from the mixed model repeated measures ANOVA demonstrate that the difference in DE_{MV} before (2006-2007) and after the recession period (2010-2011) is statistically significant at the 1% level. The DE_{MV} ratio indicates that firms went from issuing R0.59 of debt for every Rand of equity in 2006-2007 to R0.94 in 2010-2011, again illustrating that the recession changed the financing mix of firms.

The result reported for DE_{MV} is different from DE_{BV} in the sense that an increase (opposed to a decrease in DE_{BV}) in leverage is observed from the pre-recession period to the post-recession period. A significant contraction in stock prices in the 2008-2009 period may be the reason for this significant increase in market value leverage, because market value leverage is influenced by the firm's stock price. Stock market investors were the first to feel the impact of the recession when the JSE all-share index fell from a high of 32 542 on 23 May 2008 to a low of 18 066 on 21 November 2008, and new listings remained subdued throughout 2009. Prices of stock fell due to the global recession and this decline can help explain a reduced performance of the stock market during the time of the recession (Muchaonyerwa, 2011:33). Those investors that entered the South African stock market in mid to late 2008 witnessed a 46.64% drawdown of the JSE in seven months and only broke even again three years later in January 2012 (Van Vuuren, 2012). The recession, therefore, resulted in a significant decline in the market value of listed firms' stock.

According to the p -values (DE_{BV} : 0.0252; DE_{MV} : 0.000) reported by the mixed model repeated measures ANOVA test, it is evident that there are significant differences between the capital structures

in the pre-recession and post-recession period. Therefore, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_A) accepted. Therefore, it is apparent that the 2008-2009 South African recession did have a significant impact on the capital structure of South African firms.

6.2 The effect of firm characteristics on capital structure for each year included in the study

Various prior studies have indicated that certain firm characteristics influence the amount of debt and equity being employed in a firm's capital structure. Any recession would be expected to lead to changes in some of the operations and characteristics of firms. As previously mentioned, the recession caused a significant contraction in consumer demand and export volumes plummeted. It can be expected that characteristics such as profitability and available cash flow will be negatively affected because of these developments. Therefore, a secondary objective for the study was to investigate whether possible changes in capital structure could be associated with firm-specific attributes. Based on previous studies and empirical investigations, five firm characteristics were identified for this study (Harris and Raviv, 1991; Hutchinson and Hunter, 1995; Wald, 1999; Baral, 2004; Hall, Hutchinson, and Michaelas, 2004). These characteristics were profitability, asset structure, liquidity, growth and size. Based on the existing literature, these characteristics are deemed to be important factors in both developed and developing countries.

A multiple regression analysis was conducted separately for each year included in the study period to determine whether the impact of these variables on capital structure was relatively consistent before, during and after the recession. Table 5 and Table 6 provide the multiple regression analyses results for DE_{BV} and DE_{MV} respectively. The values provided in the tables represent the regression coefficients as well as the p -values (in parentheses) for each variable.

Table 5. Summary of the multiple regression analysis results for DE_{BV} for each year included in the study

Independent variables	DE_{BV}					
	2006	2007	2008	2009	2010	2011
ROA	-0.551 (0.000***)	-0.373 (0.000***)	-0.363 (0.000***)	-0.344 (0.000***)	-0.350 (0.000***)	-0.360 (0.000***)
FA/TA	-0.256 (0.000***)	-0.335 (0.000***)	-0.252 (0.000***)	-0.221 (0.000***)	-0.240 (0.000***)	-0.231 (0.000***)
CR	-0.446 (0.000***)	-0.450 (0.000***)	-0.362 (0.000***)	-0.478 (0.000***)	-0.457 (0.000***)	-0.452 (0.000***)
M/B ratio	0.371 (0.000***)	0.275 (0.000***)	0.287 (0.000***)	0.245 (0.000***)	0.307 (0.000***)	0.362 (0.000***)
ln (sales)	0.198 (0.002**)	0.201 (0.000***)	0.201 (0.000***)	0.121 (0.030**)	0.078 (0.203)	0.145 (0.016**)
R^2	0.595	0.465	0.425	0.408	0.385	0.442

Table 6. Summary of the multiple regression analysis results for DE_{MV} for each year included in the study

Independent variables	DE_{MV}					
	2006	2007	2008	2009	2010	2011
ROA	0.270 (0.000***)	-0.177 (0.004**)	-0.347 (0.000***)	-0.250 (0.000***)	-0.224 (0.000***)	-0.226 (0.000***)
FA/TA	-0.190 (0.004**)	-0.256 (0.000***)	-0.207 (0.000***)	-0.194 (0.000***)	-0.156 (0.003**)	-0.168 (0.001***)
CR	-0.365 (0.000***)	-0.339 (0.000***)	-0.246 (0.000***)	-0.437 (0.000***)	-0.414 (0.000***)	-0.491 (0.000***)
M/B ratio	-0.493 (0.000***)	-0.597 (0.000***)	-0.480 (0.000***)	-0.530 (0.000***)	-0.546 (0.000***)	-0.540 (0.000***)
ln (sales)	0.002 (0.971)	0.072 (0.199)	0.152 (0.004**)	0.034 (0.441)	0.012 (0.826)	-0.002 (0.964)
R^2	0.426	0.469	0.471	0.510	0.532	0.600

Notes: The following regression equation was conducted: $DE_Y = b_0 + b_1ROA + b_2FA/TA + b_3CR + b_4M/B \text{ ratio} + b_5\ln(\text{sales})$; where DE_Y is DE_{BV} and DE_{MV} respectively.

*** Significant at the 1% level

** Significant at the 5% level

The R^2 values provided in Table 5 and 6 indicate that the variation in DE_{MV} is slightly better explained by the independent variables than for DE_{BV} . From the R^2 values it is evident that the identified firm characteristics played a significant role in the determination of the capital structure of firms. For DE_{BV} and DE_{MV} , respectively, the variation in the independent variables can explain as much as 60% of the variation in leverage. An interesting observation is that a R^2 value of 60% for DE_{BV} and DE_{MV} was returned in different years (2006 and 2011 respectively). The R^2 values for DE_{BV} declined during the period from 2006 up to 2010, where after it started to slightly increase again. For DE_{MV} , the opposite is observed. In terms of DE_{MV} , the R^2 value continuously increased from 42.6% in 2006 to 60% in 2011. The reason for the decrease in the R^2 values for DE_{BV} may be due to the fact that book values consider the past as book values are determined by what has already happened. Market values, on the other hand, are determined by looking into the future (Frank and Goyal, 2003:12). Therefore, the increase in the R^2 values for DE_{MV} may be due to the effects of the recession, since firms then had to seriously consider factors that could have an impact on the future value of their stocks and the overall value of the firms. Investors are interested in the current performance as well as the potential future performance of firms since it provides an indication of their expected stock returns. Investors make their investment decisions predominantly on expectations of future risk and returns. This information is thus better reflected in market values than book values.

When emphasis is placed on each of the firm characteristics, it is apparent that four of the five firm characteristics are statistically significant at either the 5% or 1% level of significance for all six years. Ln (sales) is the only variable that returned inconsistent results in terms of significance. The effects of the recession on South African firms were vividly

illustrated by the increase in firm failure rates due to significant decreases in export volumes and customer demands. Firm failure rates increased regardless of the size of the firms, which may explain why the size-variable does not seem to play as an important role as the rest of the firm characteristics.

6.3 Sector differences concerning the effects of the recession on capital structure

The final secondary objective was to determine whether the effects of the recession were different for the various sectors on the JSE. The JSE consists of nine sectors namely, basic materials, consumer services, consumer goods, financials, industrials, technology, health care, oil and gas, and telecommunications. As was mentioned earlier, firms included in the mining sector (subsector of basic materials) and the financial sectors were excluded because their financial characteristics and their use of leverage differ considerably from firms in the other sectors. Furthermore, due to the small size of the health care, oil and gas, telecommunication sectors, mixed model repeated measures ANOVA tests were only conducted on the basic materials, consumer goods and services, industrials and technology sectors. The results from the analysis of both DE_{BV} and DE_{MV} were not significant, implying that the trend of the debt-equity ratios for all the sectors was more or less the same (a downward trend for DE_{BV} and an upward trend for DE_{MV}).

4. Conclusion and managerial implications

The primary objective of this study was to investigate whether the 2008-2009 South African recession had an effect on the capital structure of listed firms in South Africa. The sample included a total of 268

firms and covered a study period of six years, from 2006 to 2011. The data set was sub-divided into three time-periods. The first time-period focused on the pre-recession period, including the years 2006 and 2007. Since the two consecutive quarters of negative GDP growth was in the last quarter of 2008 and the first quarter of 2009, these two years formed the recession time-period. Then, lastly, the years 2010 and 2011 represented the post-recession period.

Both descriptive and inferential statistics were conducted in order to address the research question. Based on the results reported by the mixed model repeated measures ANOVA, the 2008-2009 recession that was experienced in South Africa did have a significant impact on the capital structure of firms (in terms of book value and market value leverage). The average DE_{BV} ratio indicate that firms went from issuing R1.22 of debt for every Rand of equity in 2006-2007 to R1.11 in 2010-2011. Since the book value of equity is expected to remain more or less constant, it can be assumed that firms decreased their use of debt capital after the recession which resulted in the decline in DE_{BV} . The decline in debt capital may be due to banks making it more difficult for firms to attract new debt capital during time of economic troughs. The results reported for DE_{MV} indicate an increase in leverage from the pre-recession period to the post-recession period. This significant increase in DE_{MV} since the recession period may be due to the negative effect the recession had on stock prices. The JSE all-share index fell from 32 542 on 23 May 2008 to a low of 18 066 on 21 November 2008, which resulted in a significant decline in the market value of firms' stock.

Based on the results from the mixed model repeated measures ANOVA, the null hypothesis was rejected and the alternative hypothesis accepted. Therefore, the 2008-2009 South African recession did have a significant impact on the capital structure of South African firms. This evidence shows that financial managers actively managed their capital structure in an attempt to adapt to the adverse environment and circumstances they had to deal with.

Two secondary objectives were also addressed. The first was to investigate the effect of firm characteristics on capital structure for the three selected time periods. Five firm characteristics (profitability, asset structure, liquidity, growth and size) were selected for the study based on prior research. A multiple regression analysis was conducted for each year included in the study. From the resultant R^2 values it is evident that the identified firm characteristics played a significant role in the determination of the capital structure of firms, explaining as much as 60% of the variation in leverage (DE_{BV} and DE_{MV}).

Four of the five firm characteristics proved to be statistically significant at either the 5% or 1% level. Size was the only independent variable that was inconsistent in terms of its impact on leverage. This

may be because many firms failed as a result of the recession, irrespective of its size.

Lastly, a distinction was drawn between the ten different sectors on the JSE. A mixed model repeated measures ANOVA was again conducted to highlight significant differences between the different sectors. The results from the tests for both DE_{BV} and DE_{MV} were not significant, suggesting that the trend of the debt-equity ratios for all the sectors was more or less the same.

According to the results reported, it is clear that the recession did have a significant effect on the capital structure of firms listed on the JSE. The results for this South African study do, however, differ from the results reported by the Wall Street Journal on global debt and equity issuance as well as for similar studies conducted for US firms. Although these studies also report that the recession had an impact on the capital structure of firms, it was found that the effect of the recession on firm capital structure was almost completely reversed by the end of 2010. The results for South African firms clearly reveal that firms adjusted their capital structure, however, they did not restore it to the pre-recession level of book value or market value leverage once the worst part of the recession was over. These results may support the view of Welch (2004) who has challenged the implications of the trade-off theory of capital structure. Welch (2004) argued that the stock price effect are considerably more important in explaining debt-equity ratios than any of the previously identified theories and that stock returns are the primary known component of capital structure and capital structure changes. According to Welch (2004), shocks to the stock market affect capital structure. However, since firms do not take steps to reestablish a leverage target, the levels of debt and equity do not influence subsequent leverage adjustments.

5. Limitations of the study

A number of limitations were encountered and should be taken into account when considering the results of this study. Firstly, financial data of firms not listed on the JSE are very difficult, if not impossible, to obtain. This situation limited the study to the inclusion of only publicly-listed firms. A further shortcoming was the inclusion of only a limited number of variables in the study. A variety of other variables may influence the capital structure decisions made by financial managers. For practical reasons it is difficult, if not impossible, to identify all these variables and include them all in a single study. This problem limited the study to the inclusion of only the stated variables to address the research question. It is evident that almost all of the identified firm characteristics in the study had an effect on capital structure changes. It may, therefore, indicate that other firm characteristics could also exert an influence on capital structure adjustments during periods of a recession. For future

research it may thus be considered to include more firm-specific attributes such as business risk, volatility and investment opportunities.

Another future research opportunity may be to place emphasis on the specific financing sources used by firms. This focus may offer a more detailed indication of which financing source (debt capital, external equity such as the issuing of shares or internal equity such as retained earnings) was predominantly affected by the recession. Such an analysis may also give a clearer indication of the capital structure theory predominantly followed by South African firms.

References

- Akindboade, O.A. and Makina, D. (2009), "Bank lending and business cycle: South African evidence", *African Development Review*, Vol. 21 No. 3, pp. 476–498.
- Balakrishnan, S. and Fox, I. (1993), "Asset specificity, firm heterogeneity and capital structure", *Strategic Management Journal*, Vol. 14 No. 1, pp. 1–16.
- Baral, K.J. (2004), "Determinants of capital structure: A case study of listed companies in Nepal", *The Journal of Nepalese Business Studies*, Vol. 1 No. 1, pp. 1–13.
- De Jong, A., Kabir, R. and Nguyen, T.T. (2008), "Capital structure around the world: The roles of firm- and country-specific determinants", *Journal of Banking and Finance*, Vol. 32 No. 9, pp. 1957–1969.
- Duggal, R. and Budden, M.C. (2011), "Capital structure shifts and recession: An empirical investigation", *Journal of Business and Economics Research*, Vol. 9 No. 12, pp. 13–17.
- Fosberg, R.H. (2012), "Capital Structure and the financial crises", *Journal of Finance and Accountancy*, Vol. 11, pp. 1–11.
- Frank, M.Z. and Goyal, V.K. (2003), "Testing the pecking order theory of capital structure", *Journal of Financial Economics*, Vol. 67 No. 2, pp. 217–248.
- Frank, M.Z. and Goyal, V.K. (2004), "The effect of market conditions on capital structure adjustments", *Finance Research Letters*, Vol. 1 No. 1, pp. 47–55.
- Hall, G.C., Hutchinson, P.J. and Michaelas, N. (2004), "Determinants of the capital structures of European SMEs", *Journal of Business Finance and Accounting*, Vol. 31 No. 5/6, pp. 711–728.
- Harris, M. and Raviv, A. (1991), "The theory of capital structure", *Journal of Finance*, Vol. 46 No. 1, pp. 297–355.
- Hofmeyr, J. (2009), "Recession and recovery". [Online]. Available: http://ijr.org.za/publications/pdfs/IJR_TA_Prelims.pdf [24 April 2012].
- Hutchinson, R.W. and Hunter, R.L. (1995), "Determinants of capital structure in the retailing sector in the UK", *The International Review of Retail, Distribution and Consumer Research*, Vol. 5 No. 1, pp. 63–78.
- Keller, G. (2005), *Statistics for management and economics 7th edition*, Thomson Higher Education, Belmont, CA.
- Lemmon, M., Roberts, M. and Zender, J. (2008), "Back to the Beginning: Persistence and the Cross-section of the Corporate Capital Structure", *Journal of Finance*, Vol. 48 No. 4, pp. 575–1609.
- Mackay, P. and Phillips, G.M. (2005), "How does industry affect firm financial structure?", *Review of Financial Studies*, Vol. 18 No. 4, pp. 1433–1466.
- McGregor BFA (Pty) Ltd. 2011. Research domain. Software and database. Johannesburg.
- Modigliani, F. and Miller, M.H. (1958), "The cost of capital, corporation finance and the theory of investment", *The American Economic Review*, Vol. 48 No. 3, pp. 261–297.
- Muchaonyerwa, F. (2011), "Business cycles and stock market performance in South Africa", Master thesis, University of Fort Hare, Alice.
- National Bureau of Economic Research. (2008), "It's official. The U.S. is in a Recession," Associated Press, December 1, 2008.
- National Bureau of Economic Research. (2003), "The NBER's recession dating procedure", [Online]. Available: http://www.nber.org/cycles/jan08bcdc_memo.html [24 April 2012].
- OECD, (2010), OECD Economic Surveys South Africa. [Online]. Available: www.treasury.gov.za/comm_media/press/2010/2010071901.pdf. [26 April 2012].
- Padayachee, V. (2011), "Global economic recession: effects and implications for South Africa at a time of political challenges", [Online]. Available: <http://www2.lse.ac.uk/internationalDevelopment/20thAnniversaryConference/ImpactoftheGlobalFC.pdf> [26 April 2012].
- Payne, B.C. (2011), "On the financial characteristics of firms that initiated new dividends during a period of economic recession and financial market turmoil", *Journal of Economics and Finance*, Vol. 35 No. 2, pp. 149–163.
- Rajan, R.G. and Zingales, L. (1995), "What do we know about capital structure?", *Journal of Finance*, Vol. 50 No. 5, pp. 1421–1460.
- South Africa Reserve Bank, Quarterly Bulletin, March 2009, Pretoria, SARB
- Thies, C.F. and Klock, M.S. (1992), "Determinants of capital structure", *Review of Financial Economics*, Vol. 1 No. 2, pp. 40–53.
- Van Vuuren, D. (2012), "SA on the brink of recession?", [Online]. Available: http://www.sharenet.co.za/marketviews/mv_view_article.php?id=1758 [6 July 2012].
- Verick, S and Islam, I. (2010), "The Great Recession of 2008–2009: Causes, Consequences and Policy Responses". Working paper, Institute of for the Study of Labour, Bonn.
- Wald, J. (1999), "How firm characteristics affect capital structure: An international comparison", *Journal of Financial Research*, Vol. 22 No. 2, pp. 161–187.
- Welch, I. (2004), "Capital structure and stock returns", *Journal of Political Economy*, Vol. 112 No. 1, pp. 106–131.