CAPITAL STRUCTURE AND REGULATION IMPLICATIONS FOR SOUTH AFRICAN BANKS

*JHvH de Wet**

Abstract

Past research on capital structure was spearheaded by the ground-breaking models of Nobel Prize laureates Modigliani and Miller. However, little research has been done on the application of their and other theories to banking institutions located in Southern Africa. This study analyses the determinants of the capital structure of banks in South Africa based on secondary financial data and by performing this analysis attempts to establish trends in capital structure policy and regulatory compliance. The study also identifies best practices that contribute to the overall value and performance of the banking institution. Conclusions drawn from the results and literature create greater understanding of the dynamics of capital structure and its implications for South African Banks.

Keywords: Banks Act, Basel Committee, Capital Structure, Modigliani and Miller Propositions, Pecking Order Theory, Signalling Theory, Trade-Off Theory

* *University of Pretoria, Lynnwood road, Pretoria, South Africa*
Fax: 27 12 420 3916
Tel.: 27 12 420 3731
E-mail: Johannes.dewet@up.ac.za

1. Introduction

What determines how a banking institution funds its activities? To the management of most banking institutions the decision regarding the choice of alternative funding sources and the resultant mix of debt to equity is a matter of utmost importance. Management is constantly in search of an optimal mix of debt to equity, or capital structure that maximises the value of the firm and decreases its risk profile.

The value of the bank and its risk profile are the two drivers to the capital structure decision that reflects the different interests of those who, on the one hand, are primarily interested in the banking institution as a business, and those who, on the other hand, are primarily interested in the banking institution. Bank operations in turn, affect the money supply, which influences the total level of economic activity (Alhadeff & Alhadeff, 1957:24).

At the genesis of capital structure theory is the work by Modigliani and Miller, (Modigliani & Miller, 1958:261-297). Modigliani and Miller's work sought to identify conditions under which capital structure decisions were irrelevant to a firm. They proposed that a firm's chosen capital structure was irrelevant to the value of the firm albeit in a perfect capital market (Modigliani & Miller, 1958:269). Most scholars and academics argue that our markets are imperfect and Modigliani and Miller's work has been the catalyst to numerous academic works thereafter to attempt to solve the puzzle of capital structure.

Banking regulation has also been of special interest as the activities of banks influence an economy's money supply (Alhadeff & Alhadeff, 1957:24). The recent global financial crisis, which began in the US subprime market, has ensured that the topic of banking regulation receives special focus and banks come under scrutiny (Drumond, 2009:799). The Capital Accord proposed by the Basel Committee on Banking Supervision in 1988 was initially intended for the bank of G-10 countries. The Basel Accord has since become the standard for national regulators worldwide and led to countries introducing minimum capital requirements on most banking institutions (Chiuri, Ferri & Majnoni, 2001:400).

Capital structure theory thus far has been derived from prior work and the capital structure of industrial firms. However, banks and their assets and functions are materially different to other industries (Diamond & Rajan, 2000:2431). Little research has been done on the application of this theory to banking institutions and even less with regard to banking institutions located in South Africa. This adds increased complexity to the determining of a bank's capital structure policy by management. The difficulty is further exacerbated by the increased application of regulatory control.

2. Aim of study

For over five decades there has been a vigorous debate regarding the capital structure of firms and the determination of an optimal capital structure. Banking

institutions in particular have received much criticism recently, especially as a result of the global credit crisis, with regards to capital inadequacy and the need for increased regulation. However, very little research and guidance is available on the application of capital structure theory in the banking sector which would assist bank management in appropriate decision-making. The aim of this paper is therefore to analyse the determinants of the capital structure of banks in South Africa. By performing this analysis the study shall attempt to establish trends in capital structure policy and regulatory compliance. Furthermore the study will attempt to identify best practice that contributes to the overall value and performance of the banking institution.

3. Research objectives

The study will aim to achieve the following specific research objectives:

- To assess whether past capital structure theories developed with firms in developed countries in mind is applicable to South African Banks.
- To analyse the regulatory requirements imposed on South African banks by domestic regulatory bodies and international requirements.
- To compare current capital structures of South African banks with capital structure theory and regulatory requirements.
- To ascertain whether capital structure decisions and regulation have had an impact on the performance and value of South African banks.

4. Importance and benefits of the study

Capital structure theory has been covered by numerous academics albeit from a one-sided perspective. Furthermore, the application of this theory to banks has been limited and its application to banks within South Africa has been almost non-existent. A thorough search of information platforms has revealed no comprehensive research on capital structure theory and regulation and its application to South African banks.

Lately the focus being placed on bank practices and risk profiles has intensified. This is due to the recent global financial crisis which has led to the collapse of some of the largest banking institutions in the world (Drumond, 2009:799). This critical focus on banks is being applied in an attempt to identify risk factors that contributed to the global financial crisis and to implement regulatory controls that will mitigate those risks. The capital structure of banks in particular is an area which can be readily scrutinised and controlled by regulation.

From a practical perspective, the findings of the study should be of assistance to management of South African banks in their decision-making process and their attempts to maximise their firms' value and performance. Additionally, correct application of capital structure theory and compliance with regulations will decrease a bank's risk profile and in turn result in a more stable monetary system and economy.

5. Literature review

Following the seminal work of Modigliani and Miller in 1958 (Modigliani & Miller, 1958:261-297), capital structure has been the topic of rigorous debate in corporate finance theory. Myers (2001:81) expressed it most eloquently when he stated that there is no universal theory of capital structure or a 'one-size-fits-all' approach, but rather guidelines from established theory that are available to the financial manager to interpret. These guidelines should then enable a financial manager to make an optimal decision for the firm under their stewardship, given its circumstances.

The term capital structure refers to the long term financing of a company and one of the key reasons for attracting such focus is the possible relationship it may have with a company's value. Essentially, the choices of financing that a company has available to it are either from an internal source, external source or a combination of the two. Internal sources of finance primarily refer to the retained earnings of a company and its working capital. External finance consists of debt and equity in very broad terms. There are a myriad sources or instruments of debt and equity, examples of which are depicted in Figure 1 below.

Valuation theory tells us that the value of an asset is calculated by the sum of all future cash flows that will be derived from that asset, discounted at an appropriate discount rate (Moyer, McGuigan & Rao, 2005:37). Capital structure theory attempts to answer the question of whether a company's level of debt in relation to its equity does have any impact on company value.

The decision that management is then faced with is what capital structure will yield the best result for the company. What follows is a review of the current theories of capital structure and legislation that would impact the financing decision-making process for a bank's management.

Capital structure theory

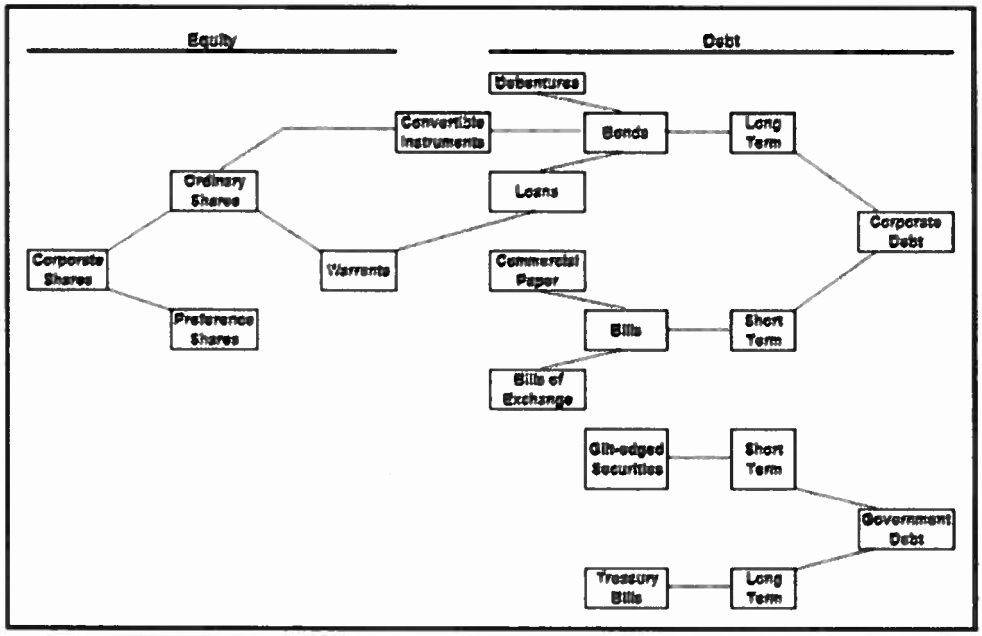
An understanding of capital structure theory will aid management in their endeavours to make the best decision on the financing of the firm. There are numerous theories on the subject and although the theory does not provide all of the answers, it does provide useful insights which will aid management in their decision-making process. The following is a brief review of the existing theories of capital structure in their chronological order of development.

Traditional Theory of Capital Structure

In the traditionalist view the cost of debt capital is cheaper than the cost of equity finance due to the tax benefits of debt (Atrill, 2009:342). These benefits, which make the real cost of debt lower than equity,

result in a firm reducing its overall cost of capital if it were to increase its levels of borrowing. At fairly low levels of debt financing the overall cost of capital of the firm is reduced. At high levels of debt financing as financial risk increases, the cost of debt and equity financing starts to increase causing the overall cost of capital to increase as well. The logic put fairly simply is that there exists a mix of debt and equity for a firm that will result in the overall cost of capital of the firm being at a minimum. Firms should strive to achieve this optimum mix as it is at this level that the value of the firm is maximised.

Figure 1. Sources of external finance



Source: (Davies, Boczko & Chen, 2008:231)

The Modigliani and Miller Propositions

At the forefront of modern capital structure theory are the propositions put forth by Modigliani and Miller (Modigliani & Miller, 1958:261-297; Modigliani & Miller, 1963:433-443; Miller, 1988:99-120) who, using economic theory established the well-known Modigliani and Miller propositions I and II (hereafter referred to as MM I and MM II, respectively). According to the MM I (Modigliani & Miller, 1958:269), changes in a firm's capital structure have no long term effects on a firm's market value; hence the market value of a firm is argued to be independent of its capital structure. This means that the choice of debt or equity sources of funding is irrelevant and can be considered to be perfect substitutes.

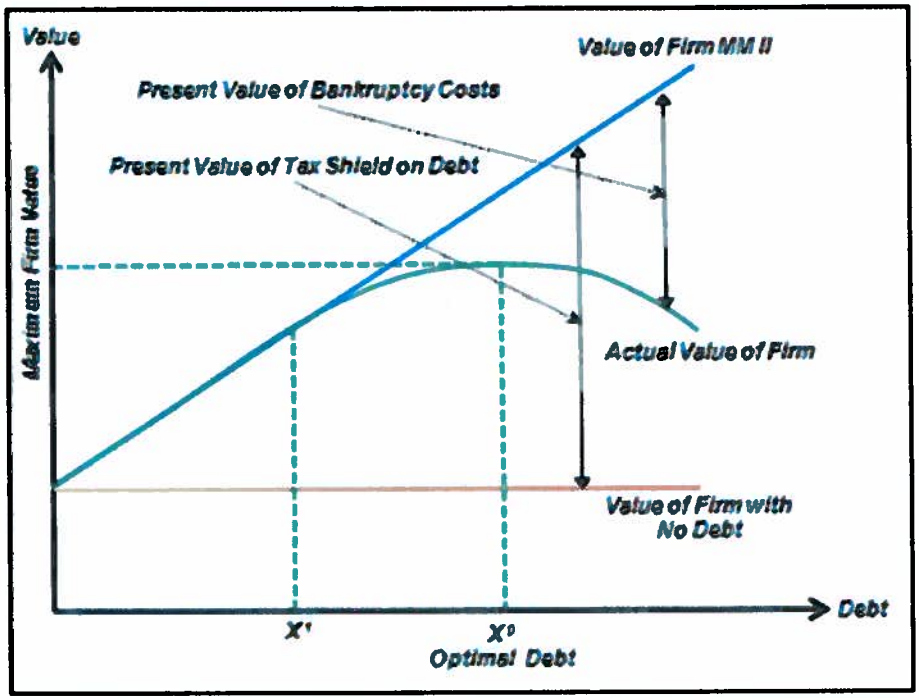
After much criticism to their proposition I, Modigliani and Miller revised their thinking and put forth their second proposition in 1963. The second proposition (MM II) (Modigliani & Miller, 1963:433-443) relaxes the assumption of no taxes and also considers that interest payable on debt is tax deductible. MM II postulated that as debt financing increases, the overall cost of capital decreases. Almost 15 years later, Miller (1977:261-275) revised MM II to take into account the effects of personal taxes as well as corporate taxes. In essence Miller stated that due to returns on stocks being taxed at relatively lower rates to returns on bonds/debt, an investor would be willing to accept a lower pre-return from stocks relative to the pre-tax return on bonds/debt. Miller went on to prove that although the presence of personal taxes lowers the cost of equity financing, it does not completely offset the savings from the lower cost of debt financing (Brigham & Ehrhardt, 2005:559).

Trade-off Theory

The publications by Modigliani and Miller led to a surge in research where the primary focus was either to prove or disprove the Modigliani and Miller propositions. As MM I is based on a very restrictive set of assumptions, it is only logical that further tests would be conducted to determine if MM I would still hold if these assumptions were to change. The trade-off theory arose due to the relaxation of such assumptions. Kjellman and Hansén (1995:92) stated that "the static trade-off model states that value maximising firms chooses the target debt/equity ratio that maximises firm value by minimising the costs of prevailing market imperfections, such as taxes, bankruptcy costs, and agency costs".

According to the trade-off theory, a firm must decide on a target debt ratio which maximises its value and then slowly move towards that target debt ratio. The optimal capital structure is found when the marginal benefit of each incremental unit of debt (i.e. interest tax shields) is equal to marginal cost of each incremental unit of debt (i.e. financial distress costs) (Gwatidzo, 2008:76). This phenomenon is displayed in Figure 2 below:

Figure 2. Trade of theory's value of the firm



Source: (Ross, Westerfield, Jaffe & Jordan, 2008:465)

The trade-off theory recognises that firms may have different capital structures and does not promote a one-size-fits-all approach. It does suggest that firms with fairly high profit income levels and safe fixed assets may have high target debt/equity ratios as they have larger profits to service interest payments without incurring adverse financial distress costs, whereas firms that are experiencing losses or a slump in earnings and risky assets may choose to rely more heavily on equity funding (Myers, 2001:91).

Pecking Order Theory

The theories discussed thus far assume that all investors have access to relevant information regarding a firm's future earnings prospect. In reality, this assumption may not be valid. It can be argued that managers and employees of a company, i.e. insiders, have access to information about a firm's earnings prospects and future cash flow that the ordinary investor does not. This situation is referred to as asymmetric information.

The important fact here is that managers will only issue shares when they are overvalued in order to protect the interests of existing shareholders. Issuing under-priced shares would actually result in the transfer of wealth from old to new shareholders. Since the market is aware of this, an issue of shares by a firm will thus be construed as a signal that the shares are overvalued, or as bad information about an issuing firms' quality. The result is that the price of shares tends to fall after a share issue. This can be so severe as to force the managers to pass-up positive NPV projects (Gwatidzo, 2008:80).

Internal funds or debt involve little or no undervaluation or information costs and therefore will be preferred to equity by firms in this situation. In other words, management prefer internal funds to external funds and if there is any need for external funds they will go for debt rather than equity. Myers and Majluf (1984:576) refer to this behaviour as the "pecking order" theory of financing. A firm will generally choose to finance an investment with internal funds such as retained earnings first, followed by new debt and finally with new equity.

Signalling Theory

Another theory born out of the concept of asymmetric information is "signalling theory". This theory was made popular by Ross (1977a; 1977b). Investors view the actions of management as a signal regarding the status of the firm and a transfer of information. Ross argued that the value of a firm will increase with the

addition of leverage as the increased leverage causes the market's perception of the firm's value to improve (1977b:38). Ross (1977b:38) also stated that the increasing of leverage can be a costly signal for a firm. A good firm would adopt a higher debt ratio than a poor firm as the manager of a good firm would be confident of the future prospects of the good firm due to insider information of the good firm's future prospects and its ability to safely service higher debt payments.

Tsai (2008:243) made an important criticism of Ross's model by stating that the main reason for the undervaluation arises as the market's valuation of future prospects is lower than the true value rather than the signalling of the equity issue as argued by Ross. Also, there is an incentive for managers of large corporates to convey signals in such a way that the value of the firm would increase, but may not always convey the correct message to the market regarding the firm's prospects. This growth via the signal would enable them to cash up their shares at a higher value (Gwatidzo, 2008:80).

6. Capital regulation review

Although banks are profit-making institutions and managed with the aim of generating wealth for their shareholders, they play a crucial role in a country's economy. They are deposit-taking institutions and act as the custodians of the public's money. They provide loan finance to clients and trade in various types of assets. They are the transmission mechanism for monetary policy and providers of other specialised functions, such as trading in foreign currencies. Bank regulators, concerned with the stability of the economy, face agency conflicts regarding the firms that they supervise. As mentioned earlier, agency problems occur when there are different goals and objectives, asymmetric information or dishonesty.

The Banks Act

The Banks Act (94/1990) is an act of legislature promulgated by parliament that regulates all companies within the borders of South Africa that continue the business of accepting deposits from the public. The primary function of the Banks Act is to outline the rules and procedures for regulating banking entities and to enable their on-going supervision. Pursuant to this purpose it provides for the South African Reserve Bank (SARB) to elect an official who shall be the Registrar of Banks and have special powers of office.

The Basel accords

The Basel Committee on Banking Supervision issued the second Basel Accord in 2004, which outlined the minimum capital requirements to be followed by the most significant banks worldwide and therefore has important financial stability implications. The original Accord was introduced to the G10 in 1988 and has to date been adopted by over 100 countries (Jackson & Emblow, 2001:118).The original Basel Accord was based on broad credit risk requirements and has over the years been amended to introduce trading book requirements as well. The original Basel Accord put forward a requirement of a total risk-weighted capital ratio of 8% that each bank should adhere to (Basel Committee on Banking Supervision, 1988:28). This ratio was calculated as the ratio of a bank's capital to that bank's total risk-weighted assets.

Failure to adhere to this minimum would result in the shareholders being able to recapitalise the bank in question. Regulatory authorities could thereafter step in and proceed with the liquidation of the bank if the shareholders failed to act. Banks could achieve this regulatory minimum in various ways; either by issuing new equity, decrease the amount of their assets, or they could merely change the portfolio mix of their assets by switching to lower risk assets while keeping their overall asset level constant (Cumming & Nel, 2005:641).

The original Basel Accord succeeded in raising international capital levels but came under considerable criticism. Due to this criticism the second accord was drafted which sought to improve on the imperfections of the first.

The second version of the Accord as illustrated in Figure 3 below has three pillars.

Pillar 1 relates to the minimum capital requirements and prescribes the appropriate minimum capital requirements to cater for market risk, operational risk and credit risk (Basel Committee on Banking Supervision, 2005:12).

Pillar 2 relates to the supervisory review process and defines the roles of banking supervisors and describes the powers conferred unto them (Basel Committee on Banking Supervision, 2005:204). Pillar 2 also details how a bank's management should go about in its management of the risks as defined in Pillar 1. Basel II was an improvement on Basel I as it created the framework for supervisors to have greater involvement in the review and regulation of banks.

Pillar 3 relates to market discipline and sets out the policies of best practice that a bank should follow to adequately disclose information to the public regarding their risk exposures, risk profile and risk mitigation practises (Basel Committee on Banking Supervision, 2005:226).

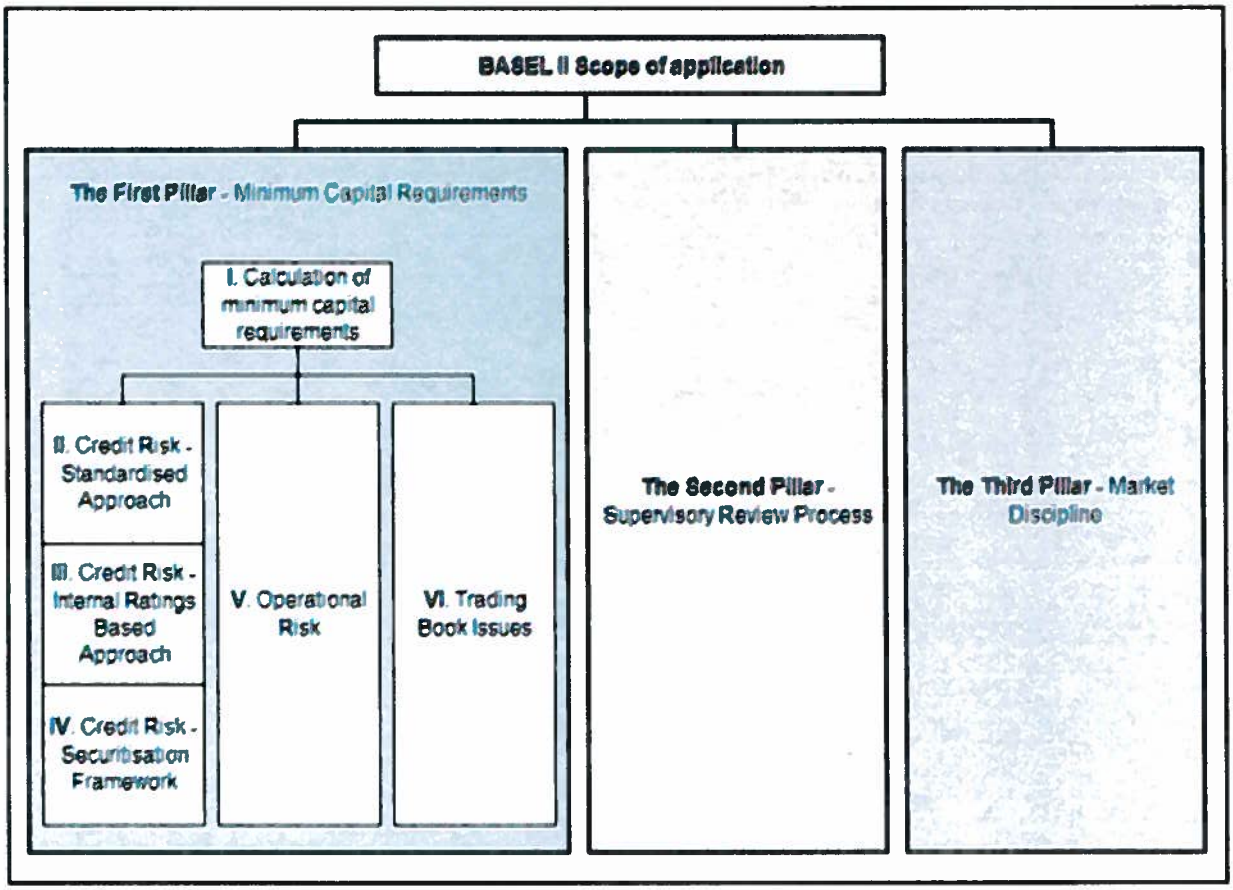
Basel III Enhancements

The enhancements put forward by the Basel committee as part of Basel III (Basel Committee on Banking Supervision, 2010:2) relate mainly to the capital requirements of banks and the liquidity risk management processes adopted by banks.

Under Basel III, a bank's common-equity Tier 1 capital must be a minimum of 4.5% of its risk

weighted assets (RWA) at all times (Basel Committee on Banking Supervision, 2011:12). The committee also requires banks to build up excess capital during periods when there is no stress as a 'capital conservation buffer'. This capital conservation buffer, which comprises solely of Tier 1 capital, is 2.5% of RWA (Basel Committee on Banking Supervision, 2011:55). Banks who meet the minimum capital adequacy requirements but have no capital conservation buffer would have restrictions placed on their capital distributions until such time that they were able to meet the required buffer level.

Figure 3. Structure of the Basel II accord



Source: (Basel Committee on Banking Supervision, 2005:6)

Basel III aims to strengthen the practices of liquidity risk management and puts forward the standards of best practice as devised by the Basel committee. The new standards of liquidity funding have been designed to ensure that a bank has sufficient funding to meet its obligations during periods of stress in both the short and long-term.

In summary the capital requirements as specified by the Basel Committee post Basel II is depicted in Table 1 as follows:

Table 1. Basel capital requirements

Capital Requirements			
	Common Equity Tier 1	**Tier 1 Capital**	**Total capital**
Minimum	4.5%	6.0%	8.0%
Conservation Buffer	2.5%	2.5%	2.5%
Minimum plus conservation buffer	7.0%	8.5%	10.5%
Countercyclical Buffer range	0% - 2.5%		

Source: (Basel Committee on Banking Supervision, 2011:64)

The practice of banking regulation is purely to promote the soundness and stability of banking systems. Whether current regulations achieve this aim is debatable, however, it has been shown by the Basel Committee that improving the safety and soundness of the global financial system by increasing the minimum capital and liquidity requirements from their current levels, results in clear net long-term economic benefits (South African Reserve Bank, 2010:14). These benefits are mainly achieved via the lower probability of financial crises and the losses stemming from them.

7. Research hypotheses and methodology

The scope of the literature and regulatory review was developed to create a theoretical foundation of knowledge about the factors that influence the capital structure decision in a bank. The purpose of this study is to assess the implications of that decision on South African banks.

Research hypotheses

To investigate and understand the implications of capital structure theory and regulation for South African banks, the following propositions are made:

Hypothesis 1: Increases in leverage increases a bank's profitability

The more debt that a bank uses, the less it needs equity to finance its activities. The additional debt financing will allow the bank greater opportunity to generate profits and has tax advantages as well. The firm leverage is measured by the Debt / Equity (D/E) ratio as dependent variable and the profitability by the Return on Assets (ROA), Return on Equity (ROE) and Earnings per Share (EPS) as independent variables.

Hypothesis 2: An increase in leverage increases a bank's market value

Both MM II and the trade-off theory referred to above states that a firm can increase its value by increasing its usage of debt finance. MM II states that the firm will continue to increase its value by increasing its usage of debt as debt is cheaper to tax advantages and will lower the firms WACC and in turn raise its value. The trade-off theory supports the use of debt to increase a firm's value but only in instances where the marginal benefits of tax deductible debt outweigh the marginal increases in bankruptcy costs. Firm value will be measured by EPS, Price Earnings Ratio (P/E), Price to Book Value (Price/Book) and the Market to Book ratio.

Hypothesis 3: An increase in leverage increases a bank's financial distress and probability of failure

Increased debt levels translate into increased costs to service that debt. This places additional stress on the bank's cash flow and as such raises the level of financial distress. The trade-off theory states that the increased costs of financial distress would raise the cost of capital and therefore cause the bank's value to decline. Financial distress will be measured by the Interest Cover (Interest/EBIT and Interest/Cash Flow) and probability of failure will be measured by the McGregor Bureau of Financial Analysis (BFA) financial distress model.

8. Research design

The proposed empirical research for the study will take the form of an exploratory, quantitative, cross-sectional research utilising secondary data. The information utilised relating to the capital structure of banks and their financial performance was sourced from the McGregor BFA online database. The data was confined to banks listed on the Johannesburg Stock Exchange (JSE) for the period under review.

Sampling

Saunders, Lewis and Thornhill (2009:206), state that sampling can be used when it is impractical for a researcher to survey an entire population due to various constraints. A sample can be taken and the inferences made from the analysis thereof can be extrapolated to the entire population. It would be quite onerous to attempt to analyse all banks in South Africa and it was found that the required information was not available for all banks for the period under review, thus a sample approach was best suited to this study.

The representative sample taken incorporates the recognised big four banks in South Africa, ABSA, FirstRand, SBSA and Nedbank, as information derived from them should be most indicative of conditions within the South African banking sector as a whole. The representative sample has been listed on the JSE and has information available which spans a twenty year period.

Data collection

The published financial results of the banks are obtained from McGregor BFA. McGregor is a leading supplier of financial data and news and the data is uniform and includes history since 1990. In addition, certain basic and uniform analysis has been performed on this data by McGregor BFA and is easily available. All standardisation of the data is carried out by the Bureau for Financial Analysis and therefore the information is comprehensive, reliable and accurate.

The regulatory returns of all banks are made available via the South African Reserve Bank. The returns in particular are the DI400 Capital Adequacy series of returns and have provided us with the necessary information to assess bank's capital structure from a regulatory compliance perspective.

Also, the published annual financial statements available from each specific bank, as well as via

McGregor BFA, have been procured to assist in the analysis.

9. Data analysis

The collected data was recorded, transformed to the correct form where necessary and stored in an Excel spread sheet file. All sources of data are in electronic format and written to a compact disc for back-up purposes and ease of retrieval.

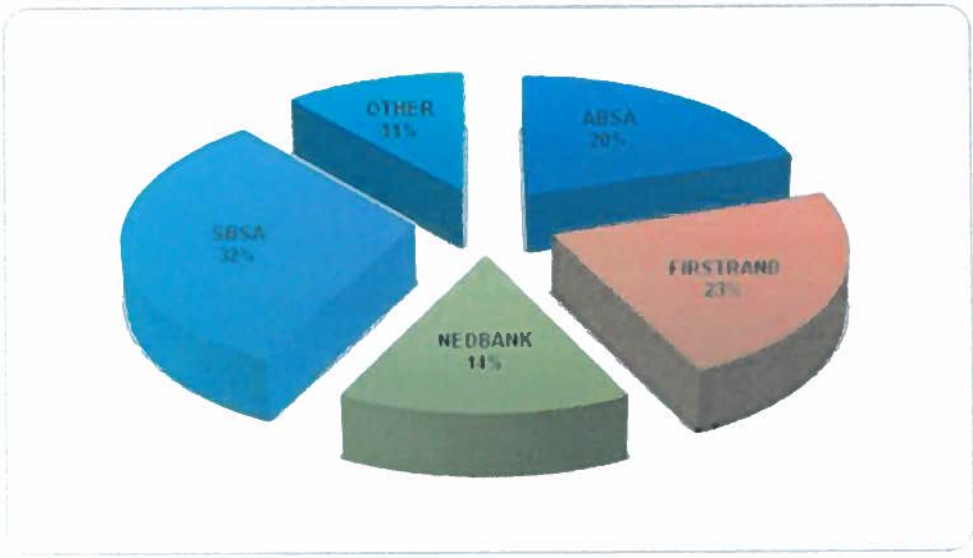
Exploratory data analysis was performed on an aggregate level to identify trends relating to the capital structure of South African Banks. The primary analysis tools utilised are an evaluation of key financial ratios and general statistical tests.

Presentation of results

The presentation of results begins with a description of the sample selected for the study and well as descriptive statistics based on the independent variable of capital structure. This is followed by the results of the correlation analysis.

A sample of the banks listed on the JSE was taken which comprised of ABSA, FIRSTRAND, NEDBANK and SBSA. As per data extracted from McGregor BFA, these four banks are the majority players in the banking sector of South Africa and together account for 88.8% of the market share based on the market closing share prices on 14 October 2011. Figure 4 depicts the relative market share of each of these four banks and their respective shares of the market.

Figure 4. Composition of banking sector



Complete data available for these banks for the purposes of testing capital structure spanned a period of seventeen years from 1994 to 2010. Capital structure is represented by the D/E ratio. The capital structure levels as observed over the test period for each of the test banks are shown in Figure 5.

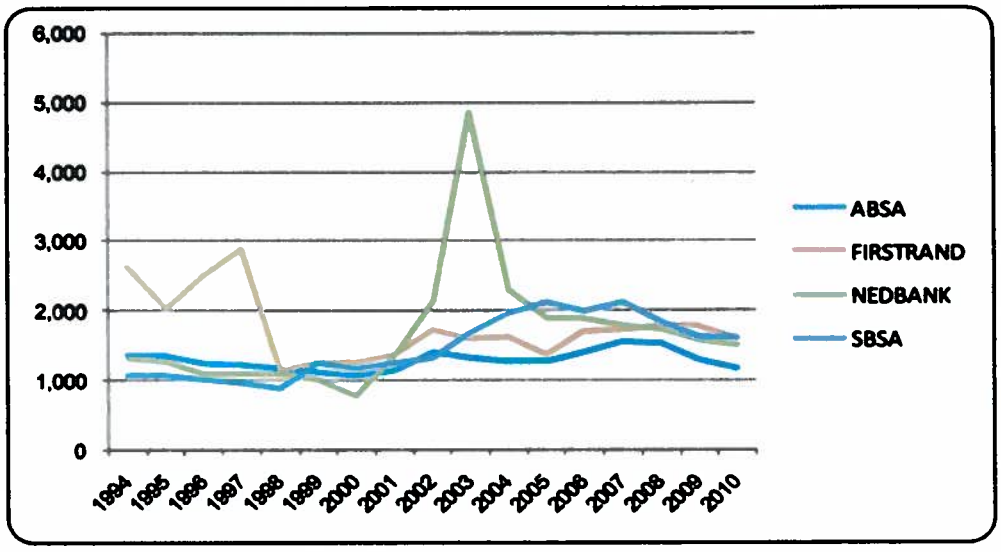
Similar tests were done for each bank individually (not shown) and from these and Table 3 above it can be inferred that ABSA, FirstRand and Nedbank showed a correlation only between capital structure and EVA. SBSA showed a correlation between capital structure, P/E, EVA and Market to Book. Overall, no correlation could be established at an industry level. The findings suggest that an in certain cases an increase in the usage of debt by a bank has some effect of increasing the market value of that bank but is not conclusive. Hypothesis 2 can therefore not be accepted conclusively, meaning that it cannot be determined if capital structure is responsible for an increase or decrease in the market value of a bank.

Hypothesis 3: An increase in leverage increases a bank's financial distress and probability of failure

The metrics used to measure financial distress of the banks were the K-Score, and the Interest Cover ratio. The K-score was developed by Prof. JH de la Rey for South African companies and is available from the McGregor BFA database (Correia, Flynn, Uliana and Wormald, 2007:5-23).

The relationship between capital structure as the dependant variable and Interest Cover and K-Score as the independent variables was conducted by first establishing the type of distribution followed by each of the variables. The distribution type then determined the most appropriate type of correlation test; Pearson product moment correlation for normally distributed variables and the Spearman rank order correlation for variables that are not normally distributed.

Figure 5. Capital structure of individual banks



From the figure above it is clear that ABSA and SBSA have managed their capital structures with a degree of discipline over the last seventeen years and settled at 1168% and 1586% respectively in 2010. FirstRand has made huge progress in bringing down its debt usage from 2890% in 1997 to 1600% in 2010. Nedbank, after having a huge spike to 4838% in 2003 have brought down their debt levels to 1495% in 2010.

Hypothesis 1: Increases in leverage increases a bank's profitability

Statistical tests to determine the relationship between capital structure and the independent variables were first conducted on the market sample of banks and thereafter on each of the four banks; ABSA, FirstRand, Nedbank and SBSA.

The results of the tests (shown only for the market, comprising all four banks together) were as reflected in Table 2:

Table 2. Statistical tests of capital structure – Hypothesis 1 Market

Descriptive Statistics	Minimum	Maximum	Mean	Variance	Standard deviation	Variation coefficient	Skewness	Kurtosis
D/E	1,061.28	2,383.14	1,546.45	100,258	316.64	0.199	0.563	0.922
ROA	3.83	9.30	6.91	2.54	1.59	0.224	-0.499	-0.475
ROE	11.17	25.36	18.79	17.56	4.19	0.216	-0.042	-0.915
EPS	277	1,031	582	53,867	232	0.387	0.632	-0.634

Normality Tests	Shapiro-Wilk test			Anderson-Darling test			Accept / Reject Normality
	W	p-value	alpha	A^2	p-value	alpha	
D/E	0.920	0.254	0.05	0.437	0.250	0.05	Normal
ROA	0.961	0.769	0.05	0.261	0.645	0.05	Normal
ROE	0.917	0.228	0.05	0.470	0.204	0.05	Normal
EPS	0.936	0.405	0.05	0.316	0.503	0.05	Normal

Correlation Statistics	Pearson			Spearman		
	r(x,y)	p	R^2	rho	p	R^2
ROA	(0.356)	0.161	0.127	(0.534)	0.029	0.285
ROE	(0.065)	0.804	0.004	0.096	0.712	0.009
EPS	0.160	0.540	0.026	0.301	0.237	0.091

Similar tests were done for each bank individually (not shown) and from these and Table 2 above it can be deduced that the test results were rather varied. Three out of the four sample banks showed significant correlation between capital structure and ROA whereas only one bank showed significant correlation with EPS. Overall, however, no correlation could be established at an industry level.

The findings suggest that an increase in the usage of debt by a bank has some effect of increasing the profitability of that bank but is not the sole determinant of an increase in profitability. This finding is significant as it supports the MM II where a firm can increase its value by increasing its use of cheaper debt finance. The usage of the cheaper debt finance has a leveraging effect on the returns of the bank which in turn enhances the ROA, ROE and EPS. The findings therefore lend some support to Hypothesis 1, but the evidence is not conclusive.

Hypothesis 2: An increase in leverage increases a bank's market value

The ratios used to measure market value of the banks were Price Earnings Ratio (P/E), Market to Book Value (Market/Book), Economic Value Added (EVA) and share price. The relationship between capital structure as the dependant variable and P/E, Market to Book and EVA as the independent variables was conducted by first establishing the type of distribution followed by each of the variables. The distribution type then determined the most appropriate type of correlation test; Pearson product moment correlation for normally distributed variables and the Spearman rank order correlation for variables that are not normally distributed.

The statistical tests (shown only for the market, comprising of all four banks together) produced the following results as shown in Table 3:

Table 3. Statistical Tests of capital structure – Hypothesis 2: Market

Descriptive Statistics	Minimum	Maximum	Mean	Variance	Standard deviation	Variation coefficient	Skewness	Kurtosis
D/E	1,061.28	2,363.14	1,546.45	100,258	316.64	0.199	0.563	0.922
P/E	0.74	6.55	2.20	2.22	1.49	0.656	1.757	2.491
MARKET TO BOOK	0.76	3.52	2.04	0.43	0.65	0.311	-0.029	0.633
EVA	2.66	7.56	5.84	1.87	1.37	0.227	-0.680	-0.301

Normality Tests	Shapiro-Wilk test			Anderson-Darling test			Accept / Reject Normality
	W	p-value	alpha	A^2	p-value	alpha	
D/E	0.920	0.254	0.05	0.437	0.250	0.05	Normal
P/E	0.837	0.019	0.05	0.706	0.049	0.05	Not Normal
MARKET TO BOOK	0.923	0.278	0.05	0.496	0.174	0.05	Normal
EVA	0.942	0.487	0.05	0.337	0.446	0.05	Normal

Correlation Statistics	Pearson			Spearman		
	r(x,y)	p	R^2	rho	p	R^2
P/E	(0.224)	0.388	0.050	(0.208)	0.421	0.043
MARKET TO BOOK	0.009	0.973	0.000	0.066	0.798	0.004
EVA	(0.404)	0.107	0.163	(0.586)	0.015	0.343

The statistical tests (again shown only for the market, comprising all four banks together) yielded the following results as indicated in Table 4:

Table 4. Statistical tests of capital structure – Hypothesis 3: Market

Descriptive Statistics	Minimum	Maximum	Mean	Variance	Standard deviation	Variation coefficient	Skewness	Kurtosis
D/E	1,061.28	2,363.14	1,546.45	100,258	316.64	0.199	0.563	0.922
INTEREST COVER	0.91	6.50	2.07	3.02	1.74	0.815	1.897	1.955
FINANCIAL DISTRESS	(1.23)	(1.00)	(1.15)	0.00	0.07	-0.055	0.606	-0.327

Normality Tests	Shapiro-Wilk test			Anderson-Darling test			Accept / Reject Normality
	W	p-value	alpha	A^2	p-value	alpha	
D/E	0.920	0.254	0.05	0.437	0.250	0.05	Normal
INTEREST COVER	0.914	0.208	0.05	0.417	0.281	0.05	Normal
FINANCIAL DISTRESS	0.864	0.043	0.05	0.603	0.092	0.05	Not Normal

Correlation Statistics	Pearson			Spearman		
	r(x,y)	p	R^2	rho	p	R^2
INTEREST COVER	(0.040)	0.879	0.002	0.051	0.843	0.003
FINANCIAL DISTRESS	(0.212)	0.413	0.045	(0.277)	0.281	0.077

Similar tests were done for each bank individually (not shown). The statistical tests showed no significant correlation between capital structure and financial distress, which is contrary to expectations. This can be attributed to the K-Score being an unsuitable metric for the purpose of the correlation tests. The K-Score incorporates many operational as well as financing measures and the number of operation measures used is higher than the financing measures used. The K-Score then gives a holistic interpretation of financial distress rather than an interpretation related to purely capital structure. Consequently Hypothesis 3 can also not be accepted, leading one to the conclusion that higher debt levels in banks cannot be proven to lead to greater financial distress and to a higher probability of financial failure.

10. Conclusions and suggestions for further research

Overall, the results did not conclusively align with a particular theory of capital structure. Elements of the various theories such as the Modigliani and Miller propositions, Trade-off Theory and Signalling Theory, were applicable in the findings, but no one theory specifically. Capital structure does influence the profitability and market value positively. Capital structure does not necessarily impact a bank's financial distress.

Considerable work remains before a framework can be developed for the determination of an optimal capital structure of a bank can be developed. More detailed statistical analysis is required with a focus on multivariate analysis to identify combinations of factors that influence capital structure. A larger sample size over a lengthier period is required to identify trends for the financial services sector rather than just a few banks.

A questionnaire approach could be used to determine the behaviours of financial managers and their decision-making preferences with regards to theory and practice. More focused analysis is required to identify the impacts of specific theories such as Pecking Order, Signalling and Agency Costs on the capital structure decision. Nevertheless, even with the limitations of the study as pointed out and the suggestions for future research above, useful insights were gained into the implications of capital structure and regulation for South African banks.

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