

**MAF006**

**Equity ownership patterns and corporate financing choices:  
Evidence from listed South African firms**

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**Abstract**

In this paper we examine the relationship between equity ownership patterns and leverage in South Africa's listed firms. We investigate whether the ownership type affects the way the firm chooses between internally generated funds and debt in its financing activities. 95 non-financial and non-mining firms listed on the Johannesburg Stock Exchange between 2000-2010 were chosen for the study. We employed a panel data regression model on longitudinal data testing four leverage measures against three ownership variables that serve as explanatory variables. The findings indicate the presence of highly concentrated ownership structures in the South African stock market as measured by the equity ratio that the top five shareholders have. This has an inverse relationship with the debt levels that firms assume meaning lower leverage. On the other hand, widely held ownership has been found to have a significant positive relationship with leverage levels indicating a greater propensity to assume debt finance. Ownership by insiders such as directors, however, was found not to be significantly related to capital structure.

**Keywords** *Ownership structure, leverage, corporate governance, South Africa*

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## 1. INTRODUCTION

Capital structure is one of the central issues of corporate finance. Since Modigliani and Miller's (1958, 1961) and Miller's (1977) irrelevance propositions, finance researchers have invested a lot of time and effort to study cross-sectional and time-series behavior of capital and debt maturity structures. These works can be grouped into those that examined (i) the determinants of capital structure; (ii) the adjustment speeds of firms towards target level leverage; (iii) debt maturity structures; (iv) the adjustment speed of firms towards target debt maturity structures; (v) and whether the observed empirical behavior does support managerial behavior.

Hennessey et al 2006, Mehrotra et al (2005) and most textbook writers (Brealy (2000), Damodaran (2001)), state that the trade off and pecking order theories of capital structure remain dominant theories of capital structure, with Damodaran positing that capital structure might be related to the life cycle theory of the firm. Major determinants of capital structure are firm size, interest, tax shield, asset tangibility, growth rate, profitability and lagged values of leverage. Studies that focused on the adjustment speeds towards target ratios of capital structure and debt maturity reported mixed results, and the conclusions appear to depend on the institutional (laws and organizations) and macroeconomic environments in which a firm is operating.

Previous research has established a list of determinants of capital structure (Court, Radlof, van der Watt, 1999; Negash, 2001,2002; de Wet 2006). In a more recent study Lemma and Negash (2011) show that determinants of capital structure in South Africa depend very much on how leverage is measured. With regard to adjustment speed towards target capital structure, early evidence shows mixed results (Ramjee and Gwatidzo 2012). In another recent study Moyo (2012:331) states that asset tangibility, non-debt tax shields capital expenditure, firm growth rate, financial distress, profitability and changes in working capital are the most important predictors of leverage and changes in debt. One gap from previous South African capital structure studies is the role of equity ownership concentration in the choice of capital structure. In this paper, we attempt to fill this void by examining the equity ownership patterns of 95 listed non-financial firms between 2000 and 2010 to

determine whether ownership patterns have associations with the firms' financing choices.

Datta, Iskandar-Datta and Raman (2005) contend that the importance of leverage and debt maturity structure choice in alleviating manager–shareholder agency conflicts is well recognized in the finance literature. These important decisions are the responsibility of the firm's managers who are expected to make optimal (value-maximizing) financing choices on behalf of the shareholders. A complication, however, is brought about by the separation of ownership and control under which it is assumed that managers will not voluntarily choose the optimal debt maturity structure or leverage and self-impose monitoring unless there is an incentive mechanism to align managerial and shareholder interests. This, according to Datta, Iskandar-Datta and Raman (2005) introduces the agency problem of managerial discretion. In essence Datta et al (op cit) confirm the results of Jensen and Meckling (1976) and Harris and Raviv (1992).

Brailsford, Oliver and Pua (2002) examined the managerial perspective for explaining the variations in capital structure. They argued that under the managerial perspective, the capital structure decision is not only determined by internal and external contextual factors which impact on the basic concerns of risk and controls, but that the values, goals, preferences and desires of managers are also important inputs to the financing decision. They contend that corporate financing decisions are influenced by managers' adverse incentives and the incentive for managers to act opportunistically can be influenced by the structure of equity ownership. Hence, examining equity ownership structures is an area of interest. In this paper ownership patterns will be defined using parameters such as director ownership, individual block-holders ownership and top five shareholders ownership.

We proceeded as follows: Using panel data regression methods we examined the financial statements of 95 companies listed on the JSE across a time period of 11 years, and attempted to relate equity ownership patterns with leverage. The findings indicate the presence of highly concentrated ownership structures in the South African stock market as measured by the proportion of shares owned by the top five shareholders. This has an inverse relationship with the debt levels that firms assume meaning assumption of lower levels of debt. On the other hand, widely held

ownership has been found to have a significant positive relationship with leverage levels meaning higher levels of leverage. Ownership by insiders such as directors, however, was found not to be significantly related to capital structure. The remainder of the paper is organised as follows. Section 2 provides the theoretical framework and develops the research questions and the relevant hypothesis. Section 3 specifies the models for leverage and defines the ownership structure variables. Section 4 discusses the data, presents the empirical results and provides robustness tests. Section 5 concludes and summarises the relevance of the topic choice and indicates the directions for possible future research.

### **2. RELEVANT LITERATURE AND DEVELOPMENT OF HYPOTHESIS**

The literature on the capital structure of North American firms is abundant. The first debate, whether firm financing choice has any relationship with the value of the firm, has been debated since the seminal works of Modigliani and Miller (1958). Modigliani and Miller (1963), Miller, (1977) and Hagerman and Senbet, (1978) are major theoretical works on capital structure. Myers (1984) shows that the capital structure “puzzle” has not been resolved despite the thriving empirical research results. Textbooks and recent empirical works that use both static and dynamic models appear to advance two major theories. The first is optimal/target leverage level (Kraus and Litzenberg 1973; Titman and Wessels 1988; Stulz 1990; Mazur 2007). In this respect, the tradeoff theory posits that companies seek to obtain optimum capital structure and weigh up the advantages and disadvantages of an additional monetary unit of debt. If this is correct, gains from leverage must be traded off against the cost of distress and bankruptcy. The second is the pecking order theory, which states that managers prefer internal financing and if they need outside financing, they prefer debt over equity (Donaldson 1961 as quoted by Myers (1984), Myers, 1984; Myers and Majluf, 1984; Shyam Sunder and Myers, 1999). Most empirical studies show that the two theories are not mutually exclusive.

In addition to the two established theories, market timing (Baker and Wurgler, 2002) and life cycle (Damodaran, 2001) are studies that attempt to explain the time series behavior of debt levels in the firm. Baker and Wurgler (2002) show that managers issue new equities when prices are high relative to their book value and repurchase when stock prices are low. Hence, the observed capital structure (leverage ratio) is

affected by the price at which the equities of the firm are traded. In contrast, Damodaran (2001) shows that debt level is a function of the firm's age or life cycle (start up, growth, maturity and decline).

In addition to price theory, why managers follow one method of financing as opposed to another, and whether the observed empirical evidence can be explained by theories of managerial behaviour (agency, information asymmetry, signalling, wealth distribution among capital providers, see Harris and Raviv 1992 for extensive discussion) or institutional factors such as financial market microstructure, legal and macroeconomic variables has attracted the interests of several researchers (Jensen and Meckling, 1976; Kim 1978; La Porta, de Silanes and Vishney 1998, Rajan and Zingales, 1995; Lemma and Negash, 2012). Graham and Harvey (2001) surveyed the opinions of CFOs to identify whether there is a gulf between theory and practice. They find that the factors that affect the decision to issue debt in the United States are financial flexibility, credit rating, earnings and cash flows volatility, insufficient funds, interest rates and interest tax shields, transaction and bankruptcy costs.

As regards JSE listed firms, the studies revolved around the trade-off theory (Negash, 2001, 2002), pecking order theory (Wu and Negash, 2002); the determinants of capital structure (de Wet 2006; Lemma and Negash, 2011); and adjustment speed towards target capital structure (Ramjee and Gwatidzo, 2012 and Moyo, 2012). Frielinghaus, Mostert and Firer (2005) studied the influence of different capital structure theories. They found that firms in the early and late life stages, which typically have less internal funding than they require, use more debt than cash-rich firms in prime. Their study therefore provides support for Myers' (1977) pecking order and Damodaran's (2001) life stages proposition. Previous capital structure and debt maturity studies in South Africa have not examined the role of equity ownership patterns (concentrations). This paper aims to fill the gap.

Ownership structure and concentration is closely linked to Jensen and Meckling's (1976) agency theory. One stream of research suggests that leverage reduces managerial discretion over corporate resources because higher debt financing increases the commitment and pressure to distribute surplus cash as repayment of debt obligations (Jensen, 1986). In a more recent study Dang (2011) examined how

various market frictions and imperfections give rise to potential interactions between corporate financing and investment. An example of this is Myers (1977) who demonstrates that in high-growth firms with risky debt, managers acting in the interest of shareholders may forgo positive-NPV projects because the payoff of these projects would at least partially accrue to debt-holders, hence leading to an underinvestment or 'debt-overhang' problem.

Dang (2011) contends that an alternative view is advanced by Jensen (1986) and Stulz (1990) who argue that in low-growth firms with large free cash flows, leverage can be used as a disciplining device because it discourages managers from overinvesting in risky projects. These agency models show that the conflicts of interest among managers, shareholders and debt-holders over the exercise of investment will create potential underinvestment and overinvestment incentives, in which corporate financing and investment decisions become interrelated. Hence examining the equity ownership structure in more detail may provide better insight into how debt decisions are made.

To assess the extent of equity ownership concentration in the firm, various proxy variables can be used. Table 1 below shows the list of variables identified by prior research. The direction of relationship (positive or negative) is omitted from the table as the various studies report mixed results. The most notable variables used in previous research to measure ownership concentration are individual block holders, ownership by directors, ownership by a few shareholders, being the top 5 shareholders for the purposes of this study, and ownership by a nominee company or trust.

**Table 1: Ownership variables**

Individual block-holders ownership (INDIV).	Demsetz (1983), Srivastava (2011), Mahrt-Smith (2005), Rajan and Zingales (1995), Demsetz and Lehn (1985)
Director ownership (DIR)	Al-Fayoumi and Abuzayed (2009), Jensen (1986), Lemmon & Lins (2003), Joher (2006), Friend & Hasbrouk (1988) and Friend & Lang (1988)

Top 5 shareholders ownership (TOP5)	Bhaumik, Driffield & Pal (2010), Garcia-Marco & Robles-Fernandez (2008), Hill & Snell (1988), Amihud & Lev (1981), Kasbi (2009), Demsetz & Lehn (1985)
Ownership by a Holding Company, Corporate or a Family Trust (HOLD)	La Porta, Lopez-de-Silanes, and Shleifer (1999), Claessens, Djankov, and Lang (2000), Lins (2003)

## 2.1 Ownership by Individual block-holders

Mahrt-Smith (2005) examines interaction effects of the capital structure and ownership structure in manager-run corporations and concludes that strong, concentrated equity ownership is associated with strong, concentrated debt holdings. In addition, that tough debt covenants may be more prevalent in environments that also favour large equity holders, and thirdly, that if long-term firm-specific investment is important, then the equity should be more dispersed. Furthermore, Rajan and Zingales (1995) in their study of international patterns of capital structure, contend that the effect of ownership concentration on capital structure is far from obvious. They argue that the presence of large shareholders on the board of directors should reduce the extent of agency costs between managers and shareholders and facilitate equity issues. Furthermore, these shareholders may be undiversified, which may increase their aversion to debt.

Furthermore, in contrast to the Berle Means (1932) image of corporations, Demsetz (1985) shows that diffused ownership structures that allow ownership to be scattered among individual block-holders can allow managers to serve their own needs rather than to the benefits of the owners. This could result in loosened control over managers by the owners. Therefore we hypothesize as follows:

*Hypothesis 1: Leverage is positively related to the ownership by Individual block-holders.*

## 2.2 Ownership by Directors

Al-Fayoumi and Abuzayed (2009) analyzed panel data for a sample of Jordanian industrial firms during the period 2001 to 2005. The study provided empirical evidence indicating that the debt ratio is negatively related to managerial ownership

and inconclusively related to individual shareholders' ownership. Moreover, the study finds no significant relationship between debt ratio and institutional ownership. These results are consistent with the entrenchment behaviour of managers and passive monitoring by institutions. Al-Fayoumi and Abuzayed (2009) also observe that managers do not always adopt capital structures that maximize shareholder wealth. This is particularly true when managers are not under the pressure of a disciplining force. In addition, they noted that large stockholders can also affect the conflict between the manager and the shareholder, because they have strong incentives to monitor managers. Jensen (1986) also noted that professional managers of a firm who are not the owners derive personal benefits from expanding beyond the optimal size of the firm by their desire to have, among others, power and status. The latter may increase leverage and lower firm efficiency.

Lemmon and Lins (2003) state that insiders who control corporate assets can potentially expropriate outside investors by diverting resources for their personal use or by committing funds to unprofitable projects that provide private benefits. By diverting resources for private benefit, controlling managers have the opportunity to increase their current wealth or perquisite consumption without bearing the full cost of their actions. Alternatively, by investing resources within the firm in positive NPV projects, managers have the opportunity to increase their future wealth in proportion to their claims on the firm's future cash flows. In general, the incentives of controlling insiders to divert resources away from profitable investment projects decrease in proportion to their level cash flow ownership and the rate of return available on investment projects. Joher (2006) also identifies increased managerial ownership as having the potential to align interests of managers with the interest of outside shareholders and reduces the debt. The role of debt here is as an agency-conflict-mitigating device. Friend and Hasbrouk (1988) and Friend and Lang (1988) suggest that corporate insiders have a much greater vested interest in ensuring the continued viability of the firm because of the greater non-diversifiable risk of debt to management than to public investors. Therefore, the larger the stocks owned by insiders in the firm, the greater the desire of insiders to minimize capital structure risks. Accordingly, a negative coefficient for director ownership is expected.

*Hypothesis 2: Leverage is negatively related to the ownership by Insiders.*



### **2.3 Ownership by a Few number of Shareholders**

Bhaumik, Driffield and Pal (2010) confirm that the literature suggests that, on average, firms with concentrated ownership are risk averse. In another recent study, Garcia-Marco and Robles-Fernandez (2008) have found evidence of the negative impact of ownership concentration on risk taking. Their findings are consistent with evidence that suggests that an increase in the concentration of ownership of shares leads to a reduction in product diversification (Hill and Snell, 1988), and that the likelihood of conglomerate merger is lower for firms with concentrated ownership (Amihud & Lev, 1981). Kasbi (2009) also states that ownership concentration is widespread and has been shown by a large number of papers from the corporate governance literature and the microstructure literature to be responsible for adverse selection problems due to information asymmetry or the extraction of private benefits of control. Kasbi (2009) goes on to indicate that large block-holders are also likely to avoid financing decisions that threaten their control over the firm. The presence of a second large shareholder beyond the first one has also been shown as being a potential means of enhancing price informativeness and reducing wealth diversion and thereby reducing the costs of external finance.

With regard to concentrated ownership in emerging markets, Bhaumik, Driffield and Pal (2010) state that concentrated ownership of shares is another characteristic of emerging-market firms. They observe that while ownership concentration is common among family-controlled firms, it is observed in other organisational forms as well, and as a result family control and ownership concentration cannot be treated as being synonymous. Similarly, in contrast to diffused ownership, Demsetz and Lehn (1985) argue that ownership by a few number of shareholders, measured as the top 5 shareholders, reduces the possible misalignment between managers and owners by acting as a source of influence and oversight. The study therefore hypothesizes as follows:

*Hypothesis 3: Leverage is negatively related to ownership by a few number of shareholders.*

### **2.4 Ownership by a Holding Company, a Dominant Corporate or a Family Trust**

In assessing pyramidal ownership structures, Almeida and Wolfenzon (2006) argue that in several countries, single individuals or families control a large number of firms. In such an organization, typically referred to as a family business group, the top family often organizes the ownership of the group member firms in a pyramidal structure. The family directly controls a firm, which in turn controls another firm, which might itself control another firm, and so forth. Relative to the United States and many other well-developed economies, La Porta, Lopez-de-Silanes, and Shleifer (1999), Claessens, Djankov, and Lang (2000) and Lins (2003) show that the widespread use of pyramidal ownership structures and cross-holdings in East Asia allows insiders to exercise effective control over a company, despite owning relatively few of its cash flow rights.

Therefore we hypothesize as follows:-

*Hypothesis 4: Leverage is positively related to a pyramidal control structure through a holding company, a large corporate or family trust.*

### **3. DATA, METHODOLOGY AND MODEL SPECIFICATION**

#### **3.1. Sources of data and sample description**

In order to test the four hypotheses we examined 95 non-financial and non-mining listed companies listed on the JSE. As at January 2012, there were 310 non-financial firms listed on the main board of the JSE, according to information on the JSE website. The firm level panel data for the study was primarily obtained from the McGregor BFA database. The data used in the analysis consists of all industrial, consumer goods, consumer services, healthcare, oil & gas, technology and telecommunications firms listed on the JSE for which historical shareholding pattern for the period of study as well as Statements of Financial Position (Balance Sheet) and the Statements of Comprehensive Income (Income Statement) for all the years between 2000 and 2010 could be obtained. Mining firms and firms within financial services are not included in the analysis because their borrowing capacity, capital adequacy requirements and the valuation of their asset bases such as mineral deposits and the rights to those deposits are imposed by regulators. As such these companies are restricted by way of how much debt and equity they can have on their balance sheets.

The analysis is also restricted to firms that have no missing data and that have not undergone significant restructurings and mergers. This was done by going through the Stock Exchange News Service (SENS) to search for merger announcements in the years under study. The final dataset for the study included, in total, 95 companies belonging to seven industries as depicted in Table 2 below:

**Table 2: Summary of sample companies by industry**

Industry	No. of companies	Percentage
Consumer goods	24	25.3%
Consumer services	23	24.2%
Healthcare	3	3.1%
Industrials	32	33.7%
Oil & Gas	1	1.1%
Technology	9	9.5%
Telecommunications	3	3.1%
Total	95	100.0%

### 3.2 Model Specification

This study uses panel data methodology. According to Schmidheiney (2012), panel data is most useful when the outcome variable depends on explanatory variables which are not observable but correlated with the observed explanatory variables. If such omitted variables are constant over time, panel data estimators allow for the consistent estimating of the effect of the observed explanatory variables. In this paper, the use of firm-level fixed-effects panel data methodology as in De la Bruslerie and Latrous (2007), is primarily used because it allows for the control of

both year-variant but firm invariant omitted variable as well as firm variant but time-invariant variables.

This leads to the estimation of the following equation:

$$\text{LEV}(\mathbf{k})_{it} = \alpha + \beta_1*(\text{TOP\_5}) + \beta_2*(\text{INDIV}) + \beta_3*(\text{INSID}) + \beta_4*(\text{HOLDING}) + \beta_5*(\text{ASS-STR}) + \beta_6*(\text{FIN\_SIT1}) + \beta_7*(\text{FIN\_SIT2}) + \beta_8*(\text{GRO\_OPS}) + \beta_9*(\text{SIZ\_FRM}) + \beta_{10}*(\text{PROD\_UNQ}) + \beta_{11}*(\text{TAX\_SHLD}) + \beta_{13}*(\text{Sector dummy variables}_{S_{it}}) + \varepsilon_{it}$$

where

- $i$  denotes the cross-sections and  $t$  denotes the time period with  $i = 1...95$  and  $t = 1...11$ . The yearly observations are from 2000 to 2010.
- $\text{LEV}(\mathbf{k})$  represents different leverage measures (Total Debt/Net Assets, Total Liabilities/Total Assets, Total Debt / Capital, Profit Before Interest and Tax / Interest Expense) with  $k = 1, 2, 3$  and  $4$ .
- Finally,  $\varepsilon_{it}$  is the normal error term. Sector dummy variables range from 1 to 7 representing the sample industry classification.
- $\alpha$  is the constant

The following are the ownership variables:

- Insider Ownership (INSID)
- Individual block-holders ownership (INDIV)
- Top 5 shareholders ownership (TOP5)
- Ownership by a holding company, a dominant corporate or a family trust (HOLDING).

And the following are the control variables:

- Asset Structure (ASS\_STR)
- Financial Situation (FIN\_SIT1)
- Financial Situation 2 (FIN\_SIT2)
- Growth Opportunities (GROW\_OPS)
- Size of the Firm (SIZE\_FRM)
- Product Uniqueness (PROD\_UNQ)
- Tax Shields (TAX\_SHLD)

## 4. FINDINGS AND DISCUSSION

### 4.1 Data analysis procedure

This section of the study reports on the descriptive statistics of both the dependent and independent variables for the sample over the period under consideration. Secondly, the section highlights the results of panel data regression analysis that was used to identify any potential effects of ownership measures on leverage in the context of South Africa. This study tested for multicollinearity by using a coefficients table housing collinearity statistics to investigate for standard errors. A correlation matrix suggested no evidence of multicollinearity

It is anticipated that during this process, large values of standard errors among the coefficients will be detected. Large standard errors reduce the precision with which the regression coefficient associated with a particular variable can be estimated, a term otherwise referred to as the variance inflation factor: VIF1 (Glantz and Slinker, (2001). With regard to heteroskedasticity, Defusco, McLeavey, Pinto and Runkle (2004) state that heteroskedasticity occurs when the calculated error variance correlates with values of the independent variables, thereby affecting statistical inference. This study attempts to correct for this effect by accurately calculating the study variables and by using a reasonable sample size of 95 firms.

Variables that are potentially responsible for determining capital structure decisions in companies have been found in the literature. Some of the theoretical determinants of capital structure used for this study are the same as those used by Mazur (2007). These explanatory variables include the ownership variables such ownership by a few shareholders (TOP5), ownership by insiders/directors (INSID) and ownership by individual block-holders (INDIV). In addition, the following control factors are employed by the study: assets structure, profitability, growth opportunities, company size, product uniqueness and non-debt tax shields.

Following Rajan and Zingales (1995) and Lemma and Negash (2011) leverage is measured using four variables. They are total liabilities over total assets (TL/TA), total debt over net assets (TD/NA), total debt over capital (TD/CAP), and profit before interest and taxes over interest expense (PBIT/IE). Each of the leverage variables were defined as follows:-

- Total Debt to Total Assets is the value of short term plus long term debt divided by total assets.
- Total Debt to Net Assets is the ratio of book value of debt divided by net assets where net assets are assets minus accounts payable and other current liabilities.
- Total Debt to Capital is the book value of debt divided by the sum of the book value of debt and equity.
- PBIT is Profit before interest and taxes.

In the remaining section, we present and discuss the descriptive statistics for the primary variables, as well as the panel data regression analysis to determine whether the hypotheses are accepted or rejected. The study uses the panel data model with fixed and random effects. The fixed effects model controls for all time-invariant differences between the individuals, so the estimated coefficients of the fixed-effects models cannot be biased because of omitted time-invariant characteristics. On the other hand, the random effects model, also called a variance components model, assumes that the dataset being analysed consists of a hierarchy of different populations whose differences relate to that hierarchy. Random effects models are used in the analysis of hierarchical or panel data when one assumes no fixed effects (i.e. no individual effects).

#### 4.1. Descriptive Statistics

Tables 3 to 5 contain the descriptive statistics for the dataset that is comprised of 95 companies. Outliers in the data which were more than three standard deviations from the mean were removed and their values replaced with zero so as not to contaminate the data and affect the results.

**TABLE 3: SUMMARY STATISTICS: LEVERAGE MEASURES**

Variable	Mean	Std Dev	Min	Max	N	Lower 95% CL for Mean	Upper 95% CL for Mean	t Value	Pr >  t
L_TL_TA	0.3576	0.2939	0	1.930	1067	0.3400	0.3753	39.74	<.0001
L_TD_NA	1.1611	1.4686	-3.929	17.423	1067	1.0729	1.2493	25.83	<.0001
L_TD_CP	0.7374	0.6927	0	6.457	1067	0.6957	0.7790	34.77	<.0001
L_PBIT_I E	41.3448	225.6818	-2063.32	3742	1066	27.7817	54.9079	5.98	<.0001

**TABLE 4: SUMMARY STATISTICS: SCALED AND TRANSFORMED EXPLANATORY VARIABLES**

Variable	Mean	Std Dev	Min	Max	N	Lower 95% CL for Mean	Upper 95% CL for Mean	t Value	Pr >  t
ASS_STR	0.2812	0.2218	0	0.9475	1067	0.2679	0.2946	41.42	<.0001
FIN_SIT1	0.1805	0.1642	-0.3886	2.4661	1067	0.1706	0.1903	35.91	<.0001
FIN_SIT2	1.7462	1.0596	0	8.9446	1067	1.6825	1.8098	53.83	<.0001
GROW_OPS	0.0352	0.0701	-0.0037	0.6203	1067	0.0310	0.0394	16.38	<.0001
SIZE_FRM	0.2627	0.1643	-0.0903	1.5603	1067	0.2528	0.2725	52.22	<.0001

PROD_UNQ	0.5448	0.3049	0	1.0360	1066	0.5264	0.5631	58.33	<.0001
TAX_SHLD	5.5580	6.9225	- 16.7967	95.1722	1067	5.1421	5.9738	26.23	<.0001
TOP_5	41.5248	21.5822	0	96.82	1067	40.2284	42.8213	62.85	<.0001
INDIV	11.0108	17.6916	0	69.664	1067	9.9480	12.0735	20.33	<.0001
HOLDING	0.2165	0.4120	0	1	1067	0.1917	0.2412	17.16	<.0001
DIRECTOR	16.9588	21.3789	0	100	1067	15.6746	18.2430	25.91	<.0001
D_CON GOODS	0.2062	0.4048	0	1	1067	0.1819	0.2305	16.64	<.0001
D_CON SERVICES	0.2371	0.4255	0	1	1067	0.2116	0.2627	18.2	<.0001
D_HEALTHCARE	0.0309	0.1732	0	1	1067	0.0205	0.0413	5.83	<.0001
D_INDUSTRIALS	0.3608	0.4805	0	1	1067	0.3320	0.3897	24.53	<.0001
D_OIL&GAS	0.0103	0.1011	0	1	1067	0.0042	0.0164	3.33	0.0009
D_TECHNOLOGY	0.0928	0.2903	0	1	1067	0.0753	0.1102	10.44	<.0001
D_TELECOMMS	0.0309	0.1732	0	1	1067	0.0205	0.0413	5.83	<.0001

**TABLE 5: SUMMARY OF OWNERSHIP TYPES**

OWNERSHIP TYPE	MEAN PERCENTAGE
DIRECTORS	17.02 %
INDIVIDUAL SHAREHOLDERS	12.45%
TOP 5 SHAREHOLDERS	40.73 %
PYRAMIDS (HOLDING COMPANIES, DOMINANT CORPORATE AND FAMILY TRUSTS)	20.00 %

As summarized in Table 5, there is a predominance of pyramidal and concentrated ownership structures in South Africa in line with research from Asia and Latin America (La Porta, Lopez-de-Silanes, and Shleifer 1999; Claessens, Djankov, and Lang 2000; and Lins 2003). This could perhaps be due to the country's history of international isolation in the years prior to the onset of democratic rule in 1994. However, the predominance of pyramid structures in South Africa is also believed to be tempered, in recent years, by increased globalization of the economy following 1994 as well as a growing number of cross-listings. We do not see marked changes in the South African economy that show changes in the level of debt absorbed in the economy or in the corporate sector. Our explanation of this is that this may be attributed to the debt and equity classification simply because of changes in financial reporting standards when RSA adopted IFRS in 2005.

#### 4.2. Analysis of Results

A series of correlation matrices were run between the leverage variables (Table 6), and between the explanatory variables in order to detect multicollinearity (Table 7). With regard to the leverage variables, testing at a 95 percent confidence interval, a positive linear relationship with a correlation of 0.6257 was found between Total Debt divided by Net Assets and between Total Liabilities divided by Total Assets. This could be ascribed to the fact that by implication there is a cross sharing of numerator and denominator values with Total Liabilities for instance being part of the definition of Total Debt and Net Assets being part of Total Assets.

**TABLE 6: PEARSON CORRELATION PEARSON CORRELATION COEFFICIENTS (LEVERAGE MEASURES)**

	<b>TL_TA</b>	<b>TD_NA</b>	<b>L_TD_CP</b>	<b>L_PBIT_IE</b>
<b>TL_TA</b>	1	0.6257	0.1145	-0.0598
<b>TD_NA</b>	0.6257	1	0.3727	-0.0608
<b>TD_CP</b>	0.11455	0.3727	1	-0.0803
<b>PBIT_IE</b>	-0.0598	-0.0608	-0.0803	1

Among the control and ownership variables, a Pearson’s correlation matrix was run among all explanatory, control and dummy variables. This is summarized in Table 7. Overall, no variables were found to be highly correlated to each other, hence eliminating the problem of multicollinearity. The exception is that a strong positive correlation of 0.77465 is identified between ownership by the top 5 shareholders and when a company is owned by a holding company, a corporate or a family trust again reflecting definitional problems. The latter was dropped from the model as in fixed effects model, time invariant variables (i.e. within a panel) get dropped as it only assessing time varying variables designed to study the causes of changes within an entity (or company in this case). Overall, the panel regression variable, company, was found to be strongly balanced.



### **4.3. Results of the panel data regression**

The model summaries of panel data regression output in Tables 8-11 indicate significant relationship between certain leverage measures and various explanatory variables because of  $p > F$  values under 0.0005. The tables summarize results of the panel regression models for the four leverage measures, the results of which are discussed in the following paragraphs.

Using Fixed Effects model in Panel data regressions, the R-squares are 70.9%, 48.3%, 74.5% and 40.4% when leverage is measured by Total Liabilities / Total Assets, Total Debt / Net Assets, Total Debt / Capital and Profit Before Interest and Tax / Interest Expense, respectively. The respective percentages using the Random Effects model are 7.7%, 5.0%, 16.6% and 2.6%. This highlights that generally, the fitness of the model is dependent on the type of model used. One of the possible explanations for low R-square values is when measures of the dependent variable have been transformed somehow. According to Nau (1981), there are many transformations that may be applied to a variable before it is used as a dependent variable in a regression model. These include deflation, logging, seasonal adjustment and differencing. All of these transformations will change the variance and may also change the units in which variance is measured. In this paper we focused on the significance level of the variable under study rather than on the model's overall fitness as measured by adjusted R square.

#### **4.3.1. Total Liabilities over Total Assets**

The results of leverage as measured by a ratio of total liabilities to total assets are presented in Table 8 and 9 attached as Appendix 2. Under the fixed two way estimates, the panel data regression yielded significant positive relationships for the coefficient of the explanatory variables of TOP5 and INDIV, but an insignificant coefficient for INSID. The control variables of asset structure, product uniqueness and tax shields had significant relationships. Financial situation1 and Financial Situation 2 provided mixed results. The R-square was about 70% under the fixed two-way estimate.

More specifically the following conclusions can be drawn from the analysis:

- (1) Director ownership (INSID) was found not to be significantly associated with this leverage outcome following multivariable adjustment;
- (2) Individual block-holders ownership (INDIV) is significantly (t-value = 3.05 under fixed effects and 0.0315 under random effects model) associated with this leverage outcome following multivariable adjustment;
- (3) Top 5 shareholders ownership (TOP5) is significantly (t-value = 3.58 under the fixed effects model) associated with this leverage outcome following multivariable adjustment.

Therefore, using this measure of leverage, we can accept Hypothesis 1 that leverage is positively related to the ownership by individual blockholders (INDIV) and Hypothesis 3 that leverage is negatively related to ownership by a few number of shareholders (TOP5). These findings are in line with those of Rajan and Zingales (1995) who argued that the presence of large shareholders on the board of directors as could be deduced from a concentrated ownership structure reduces the extent of agency costs between managers and shareholders. Demsetz (1985), argued that a diffused ownership structure can allow managers to serve their own interests as against those of the shareholders.

#### **4.3.2. Total Debt over Net Assets**

Tables 8 and 9 also present the results of leverage as measured by a ratio of total debt to capital. Again under the fixed two way estimates, the panel data regression yielded positive and significant coefficients for TOP5 and INDIV and for the control variable of asset structure. The R-square was about 48.3% under the fixed two-way estimate and 5% under random two-way effects. The signs for measures of financial situations appear to send mixed results and might suggest scaling and model mis-specification problems. Notwithstanding this, we can conclude as follows:-

- (1) Director ownership (INSID) is not significantly associated with this leverage outcome following multivariable adjustment;
- (2) Individual block-holders ownership (INDIV) is significantly associated with this leverage outcome following multivariable adjustment (t-value = 3.1); and
- (3) Top 5 shareholders ownership (TOP5) is significantly associated with this leverage outcome following multivariable adjustment (t-value = 2.62).

Therefore, leverage as measured through Total Debt divided by Net Assets seems to be influenced positively by dispersed ownership structures (INDIV) and concentrated ownership (TOP5).

#### **4.3.3. Total Debt over Capital**

The results of leverage as measured by a ratio of total debt to capital are also presented in Tables 8 and 9. Under the fixed two-way estimates, the panel data regression yielded positive relations for the coefficient of the explanatory variables of INDIV and for the control variables of size of the firm, product uniqueness. The model fit as measured by the R-square displays a strong positive model fit for the data at around 74.5% under the fixed two-way estimate. The t-statistic for INDIV is significant at 2.58.

The model results lead to the conclusions that:

- (1) Director ownership (INSID) is not significantly associated with this leverage outcome following multivariable adjustment.
- (2) INDIV is significantly associated with this leverage outcome following multivariable adjustment and largest coefficient of the three ownership variables of 0.642 (t-value = 2.58);
- (3) Top 5 shareholders ownership (TOP5) is not significantly associated with this leverage outcome following multivariable adjustment and largest coefficient of the three ownership variables.

We can therefore accept Hypothesis 1 to the effect that leverage is positively related to the firm ownership by individual block-holders as seen in studies by Rajan and Zingales (1995) and Demsetz and Lehn (1985).

#### **4.3.4. Profit before Interest and Taxes over Interest Expense**

Regression results testing the significance of leverage as measured by the ratio of profit before interest and tax to interest expense are presented in Tables 8 and 9. Again the results indicate scaling and model misspecification issues though the R squares suggest some robustness. Notwithstanding these the following the conclusions can be drawn.

- (1) Director ownership (INSID) is not significantly associated with this leverage outcome following multivariable adjustment.

(2) Individual block-holders ownership (INDIV) is not significantly associated with this leverage outcome following multivariable adjustment.

(3) Top 5 shareholders ownership (TOP5) is not significantly associated with this leverage outcome following multivariable adjustment.

In summary, when ownership is represented by the top 5 shareholders (TOP5), the results indicate that concentration of ownership tends to have significant positive associations with leverage levels but only when leverage is measured by a ratio of Total Liabilities over Total Assets. In other words, such firms tend to finance their operations mainly through debt finance. Using the other measures of leverage are used, there is no significant association.

Using director ownership (INSID) as a measure of ownership, the results in this case indicate that ownership by insiders in the form of directors does not have any significant association with the firm's leverage choices as measured through the four measures adopted. This goes against some of the findings by previous research which led to the study's hypothesis 2 that there is a positive relationship between leverage and ownership. This hypothesis is therefore rejected.

Finally, when individual block holders ownership (INDIV), which is common in very mature widely held firms, there seems to be on the whole, a significantly positive association between leverage and ownership as measured through this metric. The high t-values of 2.58, 3.1 and 3.05 for leverage as measured through Total Debt / Capital, Total Debt / Net Assets and Total Debt / Total Assets, respectively, lead to the acceptance of hypothesis 1 which predicted a positive relationship between leverage and individual block-holders. This supports the argument by Berle and Means (1932) contention that diffuseness in ownership structure prevalent in widely-held firms undermines the ability of shareholders in reining in professional managers who may not have the best interests of the firm by engaging in risky, short-term profit maximization endeavors including excessive borrowing.

## **5. SUMMARY, CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH**

This study investigates the relationship between the firm's financial choices and ownership patterns in South Africa. It applies a panel data regression model on various measures of leverage and to identify any influence of ownership patterns measured using three ownership variables as explanatory variables and other

control variables as covariates. The use of multiple variables (proxies) was in line with the approach adopted by Lemma and Negash (2011) in investigating the impact of unobservable factors on the financing behaviour of JSE listed firms.

The findings indicate the presence of highly concentrated ownership structure in the South African market as measured by the ratio of the Top 5 shareholders. This should have an inverse relationship with the debt levels that firms assume while widely held ownership should have a significant positive relationship with leverage levels. Ownership by insiders by way of directors of the company, was found not to be significantly related to capital structure in the South African market. The latter point is in contrast to Donaldson (1961) as quoted by Myers (1984:581) who pointed out that “management strongly favours internal generation as a source of new funds even to the exclusion of external funds except for occasional unavoidable 'bulges' in the need for funds. Regarding ownership as measured by a proportion of individual stock-holders, a significantly positive association between leverage and ownership was found in three out of the four leverage measures indicating that widely held firms tend to seek debt as a source of finance for their operations.

The study is one more step in trying to explore the dynamics of ownership structures and leverage among listed non-financial and non-resource firms in South Africa. However, its findings are not entirely conclusive thereby making a case for a more in-depth look at this area of knowledge by looking at other measures of leverage and explanatory variables that could not be used due to data and time constraints under the present study. As a result, the value of the study's contribution to the literature can be seen in unearthing some questions and issues which could be valuable in triggering further work in this area.

A significant limitation of the study has been in the employment of a very limited number of ownership variables. Future research can broaden the dimension of the study to include more ownership variables such as ownership by institutional shareholders and nominee companies, as well as previous CEOs currently on the board. The fourth measure of ownership in the form of shareholding by holding companies, family trusts and corporate which was meant to assess pyramidal ownership structures in South Africa was dropped by the regression model because

of the use of dummy. Future research can improve on this. The influence of corporate governance variables can also be incorporated in future studies to further explain the important dynamics of firm financing choices in the context of South Africa.

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**APPENDIX 1: TABLE 7: PEARSON CORRELATION COEFFICIENTS (EXPLANATORY VARIABLES)**

	ASS_STR	FIN_SIT1	FIN_SIT2	GROW_OPS	SIZE_FRM	PROD_UNQ	TAX_SHLD	TOP_5	INDIV	HOLDING	DIRECTOR
ASS_STR	1	0.30827	-0.2602	-0.09388	-0.07062	-0.18232	-0.13599	-0.2504	0.13872	-0.03985	-0.05807
FIN_SIT1	0.3087	1	0.10232	0.03094	0.35937	-0.38571	-0.12222	-0.1833	0.0147	-0.10017	-0.05094
FIN_SIT2	-0.2603	0.10232	1	-0.03558	0.07413	0.0221	-0.04324	0.2295	-0.0636	0.12614	0.11323
GROW_OPS	-0.0938	0.03094	-0.0355	1	-0.0814	-0.05139	0.05769	-0.0362	-0.0539	-0.01612	-0.17546
SIZE_FRM	-0.0706	0.35937	0.07413	-0.0814	1	-0.1962	-0.3187	-0.0346	-0.1306	-0.02845	0.0969
PROD_UNQ	-0.1823	-0.3857	0.0221	-0.05139	-0.1962	1	0.00092	0.1402	-0.1172	-0.02506	0.06047
TAX_SHLD	-0.1359	-0.1222	-0.0432	0.05769	-0.3187	0.00092	1	0.14214	-0.0755	0.08283	0.04212
TOP_5	-0.2504	-0.1833	0.2295	-0.03626	-0.03467	0.1402	0.14214	1	-0.3822	0.77465	0.20792
INDIV	0.1387	0.0147	-0.0636	-0.05391	-0.1306	-0.11728	-0.07559	-0.3822	1	-0.23928	0.05384
HOLDING	-0.0398	-0.1001	0.12614	-0.01612	-0.02845	-0.02506	0.08283	0.77465	-0.2392	1	0.16628
DIRECTOR	-0.0580	-0.0509	0.11323	-0.17546	0.0969	0.06047	0.04212	0.20792	0.05384	0.16628	1

**APPENDIX 2: REGRESSION ANALYSIS OF PANEL DATA**

**TABLES 8: SUMMARY OF REGRESSION ANALYSIS OF PANEL DATA: FIXED TWO WAY ESTIMATES**

<b>Model description</b>		
Estimation method	FixTwo	FixTwo
Number of Cross Sections	97	
Time Series Length	11	
	TL/TA	TD/NA
<b>Fit Statistics</b>		
SSE	26.7805	1187.6
MSE	0.0282	1.25
R-Square	0.7092	0.48
DFE	949	9
Root MSE	0.168	1.11
<b>F Test for No fixed effects</b>		
Num DF	106	1
Den DF	949	9
F Value	18.26	5.
Pr > F	<.0001	<.0001

Fixed Two Way Estimates									
Parameter Estimates									
Total Liabilities / Total Assets									
Variable	Intercept	ASS_STR	FIN_SIT1	FIN_SIT2	GROW_OPS	SIZE_FRM	PROD_UNQ	TAX_SHLD	T
DF	1	1	1	1	1	1	1	1	1
Estimate	0.062669	0.330711	0.125878	-0.02462	0.128362	0.007241	0.077515	0.003799	0
Standard Error	0.1218	0.0841	0.0559	0.00999	0.1048	0.0525	0.0336	0.00103	0
t Value	0.51	3.93	2.25	-2.47	1.22	0.14	2.3	3.7	3
Pr >  t	0.6069	<.0001	0.0245	0.0139	0.221	0.8903	0.0214	0.0002	0
Total Debt / Net Assets									
DF	1	1	1	1	1	1	1	1	1
Estimate	-0.16305	1.041207	0.557636	-0.29935	0.766682	-0.38819	0.047919	0.018459	0
Standard Error	0.811	0.5604	0.3721	0.0665	0.698	0.3494	0.224	0.00684	0
t Value	-0.2	1.86	1.5	-4.5	1.1	-1.11	0.21	2.7	2
Pr >  t	0.8407	0.0635	0.1343	<.0001	0.2723	0.2669	0.8306	0.0071	0
Total Debt / Capital									
DF	1	1	1	1	1	1	1	1	1
Estimate	0.849147	-0.67172	-0.04329	-0.27004	-1.15393	0.203664	0.185149	0.0021	0
Standard Error	0.2682	0.1853	0.1231	0.022	0.2309	0.1156	0.0741	0.00226	0
t Value	3.17	-3.62	-0.35	-12.28	-5	1.76	2.5	0.93	0
Pr >  t	0.0016	0.0003	0.7251	<.0001	<.0001	0.0784	0.0126	0.3538	0
Profit before Interest and Tax / Interest Income									
DF	1	1	1	1	1	1	1	1	1
Estimate	177.4827	11.03644	-72.7118	34.28778	-33.9912	165.546	59.12956	0.36147	-9
Standard Error	133.9	92.5226	61.4335	10.9804	115.2	57.691	36.977	1.1299	4
t Value	1.33	0.12	-1.18	3.12	-0.29	2.87	1.6	0.32	-2
Pr >  t	0.1853	0.9051	0.2369	0.0018	0.7681	0.0042	0.1101	0.7491	0

**TABLE 9: SUMMARY OF REGRESSION ANALYSIS OF PANEL DATA: RANDOM TWO WAY ESTIMATES**

Model description	TL/TA	TD/NA	TD/CAP	PBIT/IE
Estimation method	RanTwo	RanTwo	RanTwo	RanTwo
Number of Cross Sections	97	97	97	
Time Series Length	11	11	11	
<b>Fit Statistics</b>				

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SSE	967.3496	967.382	132.2487
MSE	0.9239	0.924	0.1263
R-Square	0.0765	0.0498	0.1658
DFE	1047	1047	1047
Root MSE	0.9612	0.9612	0.3554
<b>Variance Component Estimates</b>			
Variance Component for Cross Sections	32.54817	1501.645	109.8333
Variance Component for Time Series	0.041341	0.286037	0
Variance Component for Error	0.02822	1.251512	0.136912

<b>Wansbeek and Kapteyn Variance Components (RanTwo)</b>							
<b>Parameter Estimates</b>							
<b>Total Liabilities / Total Assets</b>							
<b>Variable</b>	<b>Intercept</b>	<b>ASS_STR</b>	<b>FIN_SIT1</b>	<b>FIN_SIT2</b>	<b>GROW_OPS</b>	<b>SIZE_FRM</b>	<b>PROD</b>
DF	1	1	1	1	1	1	1
Estimate	-0.93512	0.350589	0.110797	-0.02187	0.140244	0.06103	0.0907
Standard Error	2.6138	0.0806	0.0535	0.00956	0.1007	0.0472	0.032
t Value	-0.36	4.35	2.07	-2.29	1.39	1.29	2.83
Pr >  t	0.7206	<.0001	0.0385	0.0223	0.1639	0.1966	0.0047
<b>Total Debt / Net Assets</b>							
DF	1	1	1	1	1	1	1
Estimate	-5.91121	1.194118	0.452847	-0.28006	0.852227	-0.01993	0.1406
Standard Error	17.7483	0.5367	0.356	0.0636	0.6703	0.3145	0.2134
t Value	-0.33	2.22	1.27	-4.4	1.27	-0.06	0.66
Pr >  t	0.7392	0.0263	0.2037	<.0001	0.2039	0.9495	0.5099
<b>Total Debt / Capital</b>							
DF	1	1	1	1	1	1	1
Estimate	0.066876	-0.64074	-0.06725	-0.27044	-1.09987	0.26888	0.2044
Standard Error	4.8025	0.1756	0.117	0.0209	0.2208	0.1026	0.07
t Value	0.01	-3.65	-0.57	-12.95	-4.98	2.62	2.92

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Pr >  t	0.9889	0.0003	0.5655	<.0001	<.0001	0.0089	0.0036
<b>Profit before Interest and Tax / Interest Income</b>							
DF	1	1	1	1	1	1	1
Estimate	538.1394	-2.32892	-65.5052	31.72163	-55.4137	140.934	57.363
Standard Error	1995.5	87.7922	58.4955	10.4396	110.4	51.2372	35.02
t Value	0.27	-0.03	-1.12	3.04	-0.5	2.75	1.64
Pr >  t	0.7875	0.9788	0.263	0.0024	0.6158	0.0061	0.1017