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**Equity ownership patterns and corporate financing choices of listed
South African firms**

**A research report submitted in partial fulfilment (50%) of the requirements for the
degree of
Master of Commerce**

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DECLARATION

I declare that this research report is my own original work and that all sources have been accurately reported and acknowledged. It is submitted for the degree of Masters of Commerce to the University of Witwatersrand, Johannesburg. This research has not been submitted for any degree or examination at this or any other university.



Stephen L. Letsoenya



Date

DEDICATION

This thesis is dedicated to my late grandparents Sylvia 'Mathabo Molupe and Philip Khiba Molupe.

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ABSTRACT

Capital structure has been an important subject for academic research since the groundbreaking works of Modigliani and Miller (1958). This paper is a modest attempt to address the relationship of ownership structure of the firm and leverage in the context of South Africa. It investigates whether the ownership type affects the way the firm chooses between internally generated funds or debt in its financing activities.

The 95 non-financial and non-mining firms listed on the Johannesburg Stock Exchange from 2000-2010 were chosen to constitute the sample of the study. The study employs a panel data regression model on longitudinal data testing four leverage measures against three ownership variables that serve as explanatory variables for the study.

The findings indicate the presence of highly concentrated ownership structure in the South African 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. On the other hand, widely held ownership has been found to have a significant positive relationship with leverage levels. Ownership by insiders such as directors, however, was found not to be significantly related to capital structure in the South African market based on the measures employed by the study.

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

CHAPTER 1: INTRODUCTION

1.1. PURPOSE OF THE STUDY

Since Modigliani and Miller's (1958) irrelevance proposition concerning capital structure choice and firm value, finance researchers have invested a lot of time and effort to study cross-sectional and time-series variations in capital structure in an attempt to understand the determinants of the firm's financing behaviour. Modigliani and Miller (1958) contended that in perfect capital markets, capital structure is irrelevant and a firm's financing and investment decisions are independent. The purpose of this study is to assess equity ownership patterns of listed non-financial firms in South Africa between 2000 and 2010 and determine whether there are any implications of such patterns for the firms' financing choices.

1.2. IMPORTANCE OF THE STUDY

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.

Various studies, (Jensen and Meckling (1976), Mahrt-Smith (2005), Al-Fayoumi and Abuzayed, (2009), have respectively explored how the agency relationship between the owners of capital and managers, the firm's ownership structure, managerial behaviour and corporate governance impact on the financing decisions of the firm. It is the intention of this study to explore these and other

studies in seeking to explain the South African context as regards the ownership patterns of firms and the impact of that on leverage choices by firms.

Brailsford, Oliver and Pua (2002) looked at the managerial perspective to provide an explanation for 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 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.

Ownership patterns will be defined using the following parameters: director ownership, individual block-holders ownership and top five shareholders ownership. These will be analysed as to their relationship and effect on leverage using panel data regression analysis. Various definitions of leverage as uncovered in the literature (Rajan and Zingales (1995) and Lemma and Negash (2011)) will be used. These definitions as well as other control variables for leverage are discussed in the methodology chapter. In the main, due to leverage's tendency to being sensitive depending on how it is measured, a substantial number of leverage measures will be used in this study. This is in line with the approach adopted in Lemma and Negash (2011). The broad objective of this study is to understand the relationship of leverage in its widest sense to ownership patterns.

Modigliani and Miller (1958) concluded that firms choose their optimal capital structures by trading off the benefits and costs of debt and equity. According to Mazur (2007), the main benefit of debt is tax deductibility of interest, which is balanced against bankruptcy costs and agency costs. The trade off theory suggests the existence of a target optimal capital structure, which companies try to reach by balancing the amount of debt and equity sources of funds that they need to fund their operations. According to this theory, companies seek to obtain optimum capital structure and weigh up the advantages and disadvantages of an additional monetary unit of debt. The advantages of this approach include interest payments being deductible from company tax

(Modigliani and Miller 1963). Furthermore, the problem of free cash flow is reduced (Jensen 1986; Stulz 1990).

The disadvantages of debt include the potential cost of financial distress (Kraus and Litzenberger 1973; Kim 1978) and agency costs arising between owners and financial creditors (Jensen and Meckling 1976; Myers 1977). If optimal capital structure is reached, the benefits and shortfalls of debt offset each other and equilibrium is achieved. In this sense, Myers (1984) showed that the trade-off approach implied the rate of real company indebtedness reverting to a target or optimum level.

Contrary to the tradeoff theory is the pecking order theory, which assumes that there is no target level of leverage, and companies use debt only when their internal funds are insufficient. It was first observed by Donaldson (1961) as quoted by Myers (1984), that firms, instead of aiming towards a target-specific capital structure, choose a type of capital according to the following preference order: internal finance, debt, equity. Donaldson's observation was further explained by Myers (1984) and Myers and Majluf (1984) by referring to the existence of information asymmetry between managers (insiders) and investors (outsiders). Insiders, knowing more about the value of the firm than outsiders, avoid issuing equity when the shares of the company are undervalued.

1.3. PROBLEM STATEMENT

The main problem for the study is to conceptualise the relationship between capital structure and various combinations of external and managerial ownership of the firm in order to ascertain how these influence the capital structure and financing behaviour of the firm.

1.4. SIGNIFICANCE OF THE STUDY

The financing decisions of a firm are of vital importance for its operating and investing activities. The study will therefore attempt to add to the body of knowledge in this area while also assisting in identifying possible areas for further research.

1.5. DELIMITATIONS OF THE STUDY

The study will be limited to listed non-financial and non-mining entities on the JSE main board between 1999 and 2009. The Johannesburg Stock Exchange (JSE) is South Africa's licensed equities, bonds and derivatives exchange and is the largest exchange on the African continent.

The study will not attempt to calculate the optimal financing mix of the companies being surveyed but will focus on the outstanding characteristics of financing behaviour by the firms and their equity ownership patterns.

The study will be limited to the quantitative determinants of capital structure and will not focus on the qualitative determinants such as need for control, risk propensity, experience, social norms, culture and personal worth.

1.6. LIMITATIONS OF THE RESEARCH

In the first instance, although the study assumes that the historical financial information collected from the McGregor BFA database will be largely free of material misstatements and will provide reliable and valid comparative analysis of the companies in the study sample, this cannot be taken for granted. As such, extreme care has been taken that the researcher does not introduce potential contamination of the data collected. Therefore, it is hoped that the 95 sampled companies will be representative of the experiences of the broader JSE listed non-financial and non-mining entities regarding how their capital structure decisions are influenced by their ownership structures. Besides the financial and mining companies, also removed from the sample were companies that

did not have published financial information for all the years between 2000 and 2010 which form the focus of the study.

The remainder of the paper is organised as follows. Section 2 develops a theoretical framework that highlights the potential interactions among leverage, debt maturity, growth opportunities and investment. Section 3 proposes a system of equations that simultaneously models leverage, debt maturity and investment. Section 4 discusses the data and methods used in the paper. Section 5 presents the empirical results and several robustness tests. Section 6 concludes.

CHAPTER 2: LITERATURE REVIEW

2.1. INTRODUCTION

This section contains a literature review of the key themes pertaining to capital structure theories, more broadly, and in particular to how ownership structures affect corporate financing decisions and firm value. The section also highlights some of the research that has been done in this area in the context of South Africa and selected countries.

2.2. CAPITAL STRUCTURE DEFINITION AND MEASUREMENT

This section of the study will explore various definitions and measures of corporate capital structure focusing on the debt ratios used and the nature of debt be it short-term or long-term. According to Bevan and Danbolt (2002), focusing on long-term debt when analyzing firms which incorporate a larger percentage of short-term debt in their capital structure, will yield limited explanatory power. They argue that inclusion of trade credit has a substantial impact on explanatory variables. Thus in cases where short-term liabilities, mainly trade credits and overdraft facilities, play an important role in corporate financing, application of the broader measure of capital structure is reasonable. Second, there are different approaches as to the use of either book or market values in their capital structure measures. Market values result from capital structure theory, but in practice, there is a problem with obtaining data on the market value of corporate debt. According to Graham and Harvey (2001), application of book values is reasonable because financial managers use mainly book values in decision making. For the purposes of this study, market values of are used as information in published financial statements reflect fair values of debt.

2.3. REVIEW OF LEVERAGE LITERATURE

2.3.1. TRADE-OFF THEORY

As introduced in the first chapter, according to this theory, companies seek to obtain optimum capital structure and weigh up the advantages and disadvantages of an additional monetary unit of debt. The advantages of this approach include interest payments being tax deductible (Modigliani and Miller 1963). Furthermore, the problem of free cash flow is reduced (Jensen 1986; Stulz 1990).

It may be apt at this point to make a distinction between debt and equity in as far as the financing of the firm is concerned. Damodaran (2001:483) defines debt as “any financing vehicle that has a contractual claim on the firm’s cash flows and assets, creates tax deductible payments, has a fixed life, and has priority claims on the cash flows in both operating periods and bankruptcy.”

On the other hand, argues Damodaran (2001:483) “equity is defined as any financing vehicle that has a residual claim on the firm, does not create a tax advantage from its payments, has an infinite life, does not have priority in bankruptcy, and provides management control to the owner.”

On the other hand, the disadvantages of debt include the potential cost of financial distress (Kraus and Litzenberger 1973; Kim 1978) and agency costs arising between owners and financial creditors (Jensen and Meckling 1976; Myers 1977). If optimal capital structure is reached, the benefits and shortfalls of debt offset each other and equilibrium is achieved. In this sense, Myers (1984) showed that the trade-off approach implied that over time the rate of real company indebtedness reverts to a target or optimum level for its specific circumstances shaped by factors such as industry and the risk tolerance of shareholders.

According to Damodaran (2001) examples of equity financing for private firms include owner’s equity and venture capital while on the other hand publicly traded firms can resort to common stock, warrants, contingency value rights, and other equity innovations. When it comes to debt, the main categories are bank debt, bonds and leasing.

2.3.2. PECKING ORDER THEORY

The pecking order theory predicts a hierarchical order in a company's financing policy. This order is led by the financial sources that are least subject to information costs and at the same time involve less risk. Internally generated funds are the preferred source of financing, followed by low-risk short-term debt and then higher risk long-term debt. The last option is new capital, which is the source of financing with the highest information costs. According to Donaldson (1961) as quoted by Myers (1984), managers generally favour internally generated funds as compared with external funding. The only exception would be for special circumstance whereby external funds could be needed for special projects or needs. From the perspective of this approach, changes in the level of debt are not motivated by the need to reach a given debt target, but rather the need for external financing, once internal resources have been exhausted and assuming that opportunities for profitable investment exist. In line with this theory, the key to a firm's financing is the amount of internal resources that are obtained and the existence of profitable investments.

2.3.3. CALCULATION OF THE DEPENDENT VARIABLE – LEVERAGE

For the calculation of the dependent variable, most studies use different forms of debt ratio. According to Mazur (2007), the differences between the measures concern mainly two things. The first one relates to the two broad definitions of the capital structure that are commonly used. These are the ones based on book value and the other based on market value. According to MacKay and Philips (2005) the use of book values can be justified on the grounds that financial managers focus more on book value when designing financial structure.

The second set of differences relate to the nature of the debt included. As pointed out by Bevan and Danbolt (2002), concentrating on long-term debt when analysing firms which include a larger amount of short-term debt into their structure, will yield limited explanatory power.

2.4. REVIEW OF OWNERSHIP STRUCTURE LITERATURE

A large body of capital structure research follows Jensen and Meckling (1976) in using agency theory to argue that managerial insiders deviate from optimal level of capital structure. 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). As debt increases the firm's exposure to the vagaries of the external financing environment and pressures, Friend and Hasbrouck (1988) argue that managerial insiders should be much more sensitive to the bankruptcy risk debt financing induces and may be inclined to minimize this risk by using less than the optimal amount of debt. Donaldson as quoted by Fisher (1962) finds that management strongly favours internally generated funds except when unavoidable peak needs must be met, favours familiar investment areas over new and unfamiliar opportunities, and tends to hold a cost-free concept of retained earnings for the familiar and a rough opportunity cost standard for the unfamiliar investment.

According to Dang (2011), subsequent theoretical research has relaxed the perfect capital market assumption and 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 clearly 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.

2.5. OWNERSHIP STRUCTURE VARIABLES AND HYPOTHESES

2.5.1. THE EXPLANATORY VARIABLES

The explanatory variables for leverage in this study will consist of the variables of ownership by directors, ownership by individual block-holders, and ownership by a few shareholders taken to be the top 5 shareholders. In addition, firm size, approximated by taking a natural log of sales, has been used as a control variable for ownership.

Table 2.1: 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)

According to Joher (2006) modern corporate finance literature focuses on two competing issues governing management behaviour. These are agency problem and theory of corporate control. Agency theory posits that there is an inherent conflict of interest between shareholders and managers because of the existence of separation of ownership and control. Ownership structure becomes an increasingly important phenomena as it has important implication for firm

performance and value by mitigating agency costs of the firm. Therefore this paper will look into, firstly, the impact of corporate ownership on corporate debt policy and, secondly, factors determining the interdependencies of ownership structure and corporate debt policy.

2.5.2. 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. Secondly, 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.

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.

According to Demsetz (1985), diffused ownership structures that allow ownership to be scattered among individual block-holders can allow managers to serve their own needs rather than to tend to the profits of the owners. This could result in loosened control over managers by the owners. The proxy for individual block owners has been the category of “certificated shareholdings” as per the McGregor BFA database.

Demsetz and Lehn (1985) discuss the determinants of ownership structure and refute the thesis of Berle and Means (1932) which brought the alleged consequence of diffuse ownership structures for the separation of ownership and control to the fore. Berle and Means’ interpretation of the issue has remained the focus of debate for more than half a century. Diffuseness in ownership structure, by modifying the link between ownership and control, is seen by them as undermining the role of profit maximization as a guide to resource allocation. Diffuseness of ownership is said to render owners of shares powerless to constrain professional management. Since the interests of management need not, and in general do not, naturally coincide perfectly with those of owners,

this would seem to imply that corporate resources are not used entirely in the pursuit of shareholder profit.

Demsetz and Lehn (1985) find no significant relationship is found between ownership concentration and accounting profit rates for this set of firms and conclude that the variables that are empirically significant in explaining the variation in ownership structure for 511 U.S. corporations are firm size, instability of profit rate, whether or not the firm is a regulated utility or financial institution, and whether or not the firm is in the mass media or sports industry.

It is therefore hypothesized as follows:

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

2.5.3. 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) notes 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. In this study, ownership by directors as a classification in the ownership database of McGregor BFA, has been used to approximate ownership by insiders.

According to Lemmon and Lins (2003) the 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 are decreasing in the level of the insider's proportional cash flow ownership and in the rate of return available on investment projects.

Joher (2006) 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 own by insiders in the firm, the greater the desire of insiders to minimize capital structure risks. Accordingly, a negative coefficient for director is expected.

Hypothesis 2: Leverage is positively related to the ownership by Insiders

2.5.4. OWNERSHIP BY A FEW NUMBER OF SHAREHOLDERS

According to Bhaumik, Driffield and Pal (2010), the literature suggests that, on average, firms with concentrated ownership are risk averse. In a 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).

Concentrated ownership will be measured by looking at the proportion of shares owned by the Top 5 shareholders. According to Kasbi (2009), 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. 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.

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. 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

2.5.5. 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. This pattern of

ownership is also observed in South Africa with family trusts, corporates and families having dominant ownership of some listed companies on the JSE.

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 elective control over a company, despite owning relatively few of its cash flow rights.

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

2.5.6. CONTROL VARIABLE FOR OWNERSHIP STRUCTURE

As in Driffield, Mahambare & Pal (2006), the following firm specific control variable for ownership structure will be used.

(a) Firm size:

Firm size is measured by log of total sales. Firm size may be positively (Friend and Lang, 1988) or negatively (Rajan and Zingales, 1995) related to leverage. According to Driffield, Mahambare & Pal (2006: 16), “large firms may exercise economies of scale, have better knowledge of markets and are able to employ better managers. Large size may enable greater specialisation. It may also measure a firm's market power or the level of concentration in the industry.”

According to Joher (2006), previous studies have argued that managerial ownership is much greater in smaller firms than in larger firms. As the firm gets larger, a relatively smaller proportion of shares is owned by the directors and managers owing to their limited personal wealth, constraints on personal borrowing, and the diversification problem. Therefore, a negative coefficient for firm size is hypothesized.

2.6. OWNERSHIP STRUCTURE AND LEGAL SYSTEMS

Klapper and Love (2002) point out that previous research studying the link between law and finance has concentrated on corporate governance around the world, focusing on differences in legal systems across countries and legal families. This rapidly developing body of literature began with the finding that the laws that protect investors differ significantly across countries, in part because of differences in legal origins (La Porta, Lopez-de-Silanes, Shleifer and Vishny, 1998). They also find that cross-country differences in laws and their enforcement affect ownership structure, dividend payout, availability and cost of external finance and market valuations

In a study of global governance systems, Pichhadze (2009) suggest that firms in countries with poor investor protection can use provisions in their charters to improve their corporate governance, which may improve their performance and valuation. Furthermore, the results of the study indicate that firms can independently improve their investor protection and minority shareholder rights, to a certain degree, but that this adjustment mechanism is a second best solution and does not fully substitute for the absence of a good legal infrastructure.

In a study of corporate governance practices in South Africa, Malherbe and Segal (2001) argue that modest debt-equity ratios and conservative banking practices enabled South African firms to avoid liquidity and solvency problems during the emerging markets crisis. A number of historic factors lie behind these sound balance sheets. But in future, proper disclosure, governance and market oversight will be the most important check on corporate gearing and bank lending. They further point out that, by reducing investor risk, sound governance should increase the use of equity and bond markets as capital-raising alternatives to the highly leveraged balance sheets of banks. The future resilience of South African corporations and banks to macroeconomic shocks is to some extent a governance issue.

In South Africa, the key legislative framework for corporate governance is the New Companies Act, 2008 (the Act) which, among other things, provides for stricter accountability and transparency requirements for state owned companies and public companies.

Following the enactment of the Act, the third report on corporate governance in South Africa, authored by the King Committee, was published as the King Report on Governance for South

Africa 2009 and the King Code of Governance Principles, commonly referred to as King III. King III replaces the previous King Reports (King I and King II) and intends to place South Africa at the forefront of governance internationally. The introduction to King III states that a new report on corporate governance became necessary because of the new Companies Act, 2008, and also because of changes in international governance trends. The Code deals with a number of governance elements, each of which is broken down into different principles which must be applied.

2.7. SOME EVIDENCE FROM AROUND THE WORLD

2.7.1. EUROPEAN EXPERIENCE

Based upon a large data set of public and private firms in the United Kingdom, Brav (2009) found that compared to their public counterparts, private firms rely almost exclusively on debt financing, have higher leverage ratios, and tend to avoid external capital markets, leading to a greater sensitivity of their capital structures to fluctuations in performance. These differences are due to private equity being more costly than public equity. This, according to Brav (2009), suggests that in countries in which the stock market does not provide enough liquidity, underwriters do not provide certification, and minority rights are not protected, value of control and information asymmetry will be larger and as a result, the financial policy of public firms will be similar to the financial policy of private firms. Specifically, relative to public companies in developed stock markets such as those in the US and the UK public firms in underdeveloped stock markets will rely less on equity capital, will have higher debt ratios, and will visit the capital markets less frequently. In addition, their leverage will be more sensitive to operational performance and exhibit greater persistence.

Also in the UK, and focusing more on listed entities, Panno (2003) investigated the empirical determinants of capital structure choice by analysing security issues made by companies in the UK and Italy between 1992 and 1996, and examined how companies actually select between financing instruments at a given point in time and in different financial contexts. The results provide evidence of interesting differences between the two financial markets, and there are generally supported the idea of the UK market being more testable and in principle more

consistent with the main prescriptions of the more recent developments of capital structure theory. The study also suggested that firms in well-developed financial systems such as the UK might have long-term target leverage ratios, while in less efficient markets such as Italy an optimal debt level does not seem to be a major concern. Finally, for both markets, the results were consistent with the notion that the tax advantage of debt financing plays a relevant role in capital structure decisions.

Consistent with the pecking order theory, in a study by Mazur (2007) examining the determinants of financing decisions for 238 Polish nonfinancial companies that were quoted on the Warsaw Stock Exchange for the 5-year period of 2000–2004, the data suggested that Polish companies have been more willing to use external financing at the beginning of the 21st century, than in the first years of economic transition. Yet, they mainly rely on trade credits, keeping their long-term debt ratios below the 8% level. In addition, firms that are more profitable, and these having high liquidity ratios, prefer to finance their operations with internal funds.

Kasbi (2009) investigated the capital structure dynamics of a panel of 766 firms from five Western Europe countries: France, Italy, UK, Germany and Switzerland over the period 1996–2007 and concluded that if firms adjust their capital structure towards an optimal level with adjustment costs affecting this optimization behaviour, then firms with a concentrated ownership structure should adjust their leverage at a slower rate.

Furthermore, it was found that European firms have a target leverage to which they revert at different rates. The speed of adjustment is the lowest for firms with a single large blockholder. These results extend previous literature by introducing the transaction costs and the agency costs inherent to ownership concentration as significant determinants of capital structure dynamics.

2.7.2. UNITED STATES EXPERIENCE

Norton (1990) considers this to be in line with Modigliani and Miller (1958) in that larger firms are willing to use debt as a tool to help lower costs. Small firms are not, due perhaps in part to the desire of many of the small firms to use no debt at all due to management preference. Larger firms

are willing to play the yield curve to lower debt financing costs; smaller firms, again possibly due to an aversion to debt, are generally unwilling to play the yield curve.

Motivated by agency theory, Jiraporn and Gleason (2007) took advantage of the recently developed Governance Index (Gompers, Ishii, and Metrick 2003) to explore agency costs as a determinant of financial leverage. The Governance Index is interpreted as a measure of the strength of shareholder rights and has been used to examine situations where agency costs are relevant. The empirical results revealed an inverse relation between capital structure and the strength of shareholder rights. Debt seems to help mitigate agency costs in firms where shareholder rights are restricted. In these firms, the debt ratio is positively related to the degree of restrictiveness of corporate governance: the more suppressive the governance, the weaker the shareholder rights and the higher the debt ratio. Jiraporn and Gleason (2007) further conclude that regulation substitutes for shareholder rights to reduce agency costs and there appears to be no relation between leverage and shareholder rights in regulated firms. Thus, regulation and debt seem to substitute for each other in controlling agency costs.

Agrawal and Nagarajan (1990) investigated evidence of factors influencing the capital structure decision of 100 listed US firms by comparing their financial, managerial, and ownership characteristics with those of a control sample of levered firms. It was found that all-equity firms exhibit greater equity ownership by top managers and more extensive family involvement in corporate operations than levered firms do. Managerial ownership in all-equity firms is positively related to the extent of family involvement. All-equity firms are also characterized by greater liquidity positions than levered firms. Overall, the evidence suggests that managerial choice of an all-equity capital structure may be aimed at reducing the risk associated with large undiversifiable investments of personal wealth and family human capital in these firms.

2.7.3. ASIAN EXPERIENCE

Driffield, Mahambare and Pal (2007) concluded that corporations in four East Asian countries that were worst affected by the crisis in the late 1990s, namely, Indonesia, Korea, Malaysia and Thailand had become over-reliant on debt, this being due in part to the prevailing ownership structures. This, they conclude, highlighted the importance of differentiating the effects of ownership not only from control but also from management. A further finding was that separation

of control from cash-flow rights has limited effects on leverage and valuation among non-family firms without a single big shareholder, a cronyman, while these seem to matter significantly for the family firms with a cronyman. Driffield, Mahambare and Pal (2007) define the case of a cronyman as the one where the CEO, Board Chairman or Vice Chairman is also a controlling owner. This they reckon comes closest to the owner-managed firms elsewhere in the literature.

In a study of 375 non-financial firms on the Kuala Lumpur Stock Exchange during 1995-1999, Suto (2003) concluded that foreign ownership contributes the disciplining of local firms through the deepening of corporate governance practices.

In India, Kumar (2003) examined the effect of ownership structure on the firm performance for an unbalanced panel of 2478 Indian corporate firms from 1994 to 2000 and concludes that the shareholding by institutional investors and managers affect firm performance non-linearly, after controlling for observed firm characteristics and unobserved firm heterogeneity. Furthermore, equity ownership by foreign and corporate shareholders did not seem to influence firm performance.

2.7.4. LATIN AMERICAN EXPERIENCE

Céspedes, Gonzales and Mollina (2009) studied the capital structure determinants of Latin American firms using a comprehensive sample covering seven countries. The findings were that firms in the region have debt levels similar to those of U.S. firms, which is puzzling, given their low tax benefits and their higher bankruptcy costs. They argued that ownership-concentrated firms avoid issuing equity because they do not want to share control rights. Céspedes, Gonzales and Mollina (2009) also found that Latin American firms have high ownership concentration, which creates an ideal setting to study how ownership concentration explains firms' capital structure. Consistent with the control argument, there was a positive relation between leverage and ownership concentration, when losing control becomes an issue. In addition, other determinants that do not proxy for control rights are consistent with previous finding, that is, firms that are larger, have more tangible assets, and are less profitable are also more leveraged.

Lefort and Walker (2000), studying corporate ownership structures in Chile, discovered that economic groups are the predominant form of corporate structure in Chile, and that the most

common way of separating control from cash-flow rights is through pyramid schemes. These schemes have proven to be successful in raising external funding. Controllers of Chilean conglomerates rely on a relatively small number of people in order to conduct business, and these people participate exclusively as board members of corporations affiliated to their group. However, controllers of Chilean conglomerates hold more equity than strictly needed for control, suggesting that cash-flow benefits associated to subsidiaries are relatively large.

2.7.5. AUSTRALIAN EXPERIENCE

Fishman, Gannon and Vinning (2005) analysed the relationship between ownership structure and corporate performance for fifty firms listed on the Australian Stock Exchange during 2002-2003 and concluded that managerial ownership impacts negatively on firm performance that is consistent with the management entrenchment hypothesis.

2.7.6. AFRICAN AND MIDDLE EASTERN EXPERIENCE

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.

2.8. OBSERVATIONS FROM INTERNATIONAL STUDIES OF CAPITAL STRUCTURE AND OWNERSHIP

The running theme seems to be the level of capital market development as well as the concentration of ownership in terms of how much appetite firms have for debt financing. In more

established and efficient markets, firms tend to take a longer term perspective on financing their operations (Brav, 2009; Panno, 2003) while in emerging economies, firms tend to have closed ownership and generally are averse to taking on too much debt financing (Agrawal and Nagarajan, 1990; Céspedes, Gonzalez and Molina, (2009). Although this study is not looking capital structure differentiation by size of an entity, it would be enlightening to observe what pattern of behaviour South African firms exhibit given the relatively developed capital markets which exist, however, in the context of an emerging economy.

2.9. REVIEW OF LEVERAGE AND OWNERSHIP STRUCTURE LITERATURE IN SOUTH AFRICA

There is relative paucity of studies focusing on the relationship between ownership patterns and financing options for listed corporates in South Africa. In recent years, however, there have been some major strides in research contributions in this area. Lemma and Negash (2011), examined the antecedents of capital structure of firms on the JSE and found evidence that supports the existence of significant information asymmetries and transaction costs. This result suggested that external financing is costly and therefore avoided by firms. It also suggested that the firms might be avoiding potential dilution of ownership control. Lemma and Negash (2011) also suggested, for future research, the study of the association between capital structure, ownership structure, and corporate governance in the context of an emerging economy as this has now become a widely debated subject and of important policy implications.

Wu and Negash (2002) studied which of the pecking order theory and target adjustment theories best explains the policy followed by South African managers. The corporate debt behaviour and policies adopted by South African managers were examined using the analytical tools provided by Shyam-Sunder and Myers (1999). They found that corporate managers in South Africa tend to adopt target adjustment behaviour in the long-term but had to react using pecking order behaviours when faced with short-term earnings and cash-flow shocks. Wu and Negash (2002) postulated that this pecking order behaviour may be a result of the under-developed corporate debt market in South Africa and the high costs and delays associated with equity financing. Furthermore, they also found that debt and financing behaviours of corporate managers change with the size of the firm and variations in time. The evidence from their study for the size effect

shows that the pecking order hypothesis is dominant for small firms. Additionally they observed that managers are changing their debt behaviour over time.

Also looking at the South African context, 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 theory, and extends it by showing how the pecking order is affected by the different life stages through which firms progress.

It is against this background that this paper will seek to understand the relationship between capital structure and ownership structure in listed non-financial South African companies traded on the JSE. This will be done by examining the relationship between external and managerial ownership of a company to its capital structure.

CHAPTER 3: RESEARCH METHODOLOGY

This section outlines the methodology that is used to conduct this research. Firstly, the relevant literature around quantitative research is discussed, followed by the review of research design and the population and sample used. Lastly, issues of validity and reliability as well as multicollinearity and heteroskedasticity are discussed.

3.1 RESEARCH METHODOLOGY

The principal objective of the study is to examine the influence of ownership patterns on firms' financing choices. Thus a quantitative research design is used to obtain relationships between various forms of leverage and ownership variables.

A concise and yet comprehensive definition of quantitative research is the one by Burns and Grove (2005:23) who describe quantitative research as “a formal, objective, systematic process in which numerical data are used to obtain information about the world. This research method is used to describe variables; examine relationships among variables and to determine cause-and-effect interactions between variables.” The contrast to quantitative research is qualitative research which according to Shields and Twycross (2003) is used when the meaning of something needs to be found.

The study will use a panel data regression methodology in order to gather and analyze appropriate data to answer the research questions. According to Bruderl (2005), panel data are repeated measures of one or more variables on one or more persons (repeated cross-sectional time-series). Torres-Reyna (2011) describes panel data, also known as longitudinal or cross-sectional time-series data, as a dataset in which the behaviour of entities are observed across time. These entities could be states, companies, individuals, countries, etc. Panel data methodology is most appropriate for this study since the information on the dependent and independent variables, as discussed in the previous chapter, will be across a number of firms over a time period of eleven

years from 2000-2010. According to Bruderl (2005) the benefits of panel data include the fact that data is more informative due to it having more variability, less collinearity and more degrees of freedom thereby enabling the efficient development of decision making estimates.

3.2 SOURCES OF DATA AND SAMPLE DESCRIPTION

The population of relevance is all non-financial and non-mining listed companies listed on the JSE. As at January 2012, there were 310 non-financial firms listed on the JSE according to information on the JSE website. The firm level panel data for the study is 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 and capital adequacy requirements imposed by regulators and the valuation of their asset bases such as mineral deposits and the rights to those deposits. 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 3.1 below:

Table 3.1: 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%

The full list of all companies that made it into the final dataset is provided in Appendix A.

[Refer to Appendix A](#)

3.3 VARIABLES DESCRIPTION

The variables are described in this section. 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 to be used for this study will be the same as those used by Mazur (2007) in a similar study to analyze the capital structure of Polish firms. 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.

Appendix B summarises these variables together with theoretical predictions as to the direction of their influence on the dependent variable, leverage.

Rajan and Zingales (1995), Lemma and Negash (2011) use the following four variables as measures of leverage:

Table 3.2: Leverage variables and definitions

Total Liabilities over Total Assets	TL/TA
Total Debt over Net Assets	TD/NA
Total Debt over capital	TD/CAP
Profit Before Interest and Taxes over Interest Expense (PBIT/IE)	PBIT/IE

3.4 DEFINITIONS OF VARIABLES

Leverage measures are calculated for all non-financial and non-mining companies reporting consolidated balance sheets and income statements between 2000 and 2010 and are defined as follows for the study:

- 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 ration 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.

3.5 CONTROL VARIABLES FOR LEVERAGE

3.5.1 ASSETS STRUCTURE

Assets structure is measured with the ratio of fixed assets over total assets. Assets structure is commonly suggested as a variable since fixed assets can serve as collateral.

3.5.2 FINANCIAL SITUATION

According to the pecking order hypothesis, firms prefer internal finance to external finance. Availability of internal funds is captured by the variables: profitability and liquidity.

3.5.3 GROWTH OPPORTUNITIES

According to Mazur (2007), Jensen and Meckling (1976), Myers (1977), and Stulz (1990), leverage is inversely related to growth opportunities since growing firms have more opportunities to invest in risky projects at the expense of creditors (the cost of debt increases). Growth opportunities are measured by using long-term investment to total assets as a proxy.

3.5.4 SIZE OF THE FIRM

Another important potential determinant for leverage can be the size of the firm. In this study, firm size is measured with two variables: net revenues and total assets.

3.5.5 PRODUCT UNIQUENESS

According to Titman and Wessels (1988), firms with relatively unique products are expected to advertise more and, in general, spend more on promoting and selling their products. Therefore,

the measure used here is: selling expenses over sales. According to Mazur (2007), Gajdka (2002), used the same measure in an earlier study in Poland.

3.5.6 TAX SHIELDS

According to Modigliani and Miller (1963), companies should aim towards entire debt financing due to tax deductions associated with interest payments on debt. Therefore, in line with the static trade-off theory, a positive relationship between effective tax rate and leverage should be expected. The effective tax rate is measured as the ratio of total tax to total taxable income of a firm.

3.6 TOOLS FOR DATA ANALYSIS

This study uses panel data methodology to analyse the data. According to Yaffee (2003) panel data analysis endows regression analysis with both a spatial and temporal dimension. The spatial dimension pertains to a set of cross-sectional units of observation. These could be countries, states, counties, firms, commodities, groups of people, or even individuals. The temporal dimension pertains to periodic observations of a set of variables characterizing these cross-sectional units over a particular time span.

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) primarily because, this model allows the control for 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:

$$\text{LEV(k)}_{it} = \alpha + \beta_1 * (\text{TOP_5}) + \beta_2 * (\text{INDIV}) + \beta_3 * (\text{INSID}) + \beta_4 * (\text{HOLDING}) + \beta_5 * (\text{ASS_STR}) + \beta_6 * (\text{FIN_SIT1}) + \beta_7 * (\text{FIN_SIT2}) + \beta_8 * (\text{GRO_OPS}) + \beta_9 * (\text{SIZ_FRM}) + \beta_{10} * (\text{PROD_UNQ}) + \beta_{11} * (\text{TAX_SHLD}) + \beta_{12} * (\text{FRM_SIZ}) + \beta_{13} * (\text{Sector dummy variables}_{it}) + \varepsilon_{it}$$

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.
- LEV(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, ε_{it} is the normal error term. Sector dummy variables range from 1 to 7 representing the sample industry classification.
- α 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)
- Firm Size (FRM_SIZ) – control variable for ownership

3.7 DATA ANALYSIS PROCEDURE

This study reports on the descriptive statistics of both the dependent and independent variables for the sample over the period under consideration, using measures of tendency such as mean,

maximum values, minimum values and standard deviation in order to describe the general characteristic of the variables under study. Secondly, panel data regression will be used to identify any potential effects of ownership measures on leverage in the context of South Africa. Ownership variables were discussed in section 2.5 and leverage variables under section 3.3 of this chapter.

3.8 VALIDITY AND RELIABILITY

3.8.1 INTERNAL VALIDITY

According to Kalof, Dan and Dietz (2008), internal validity refers to the study's ability to draw appropriate conclusions from the data at hand. In this case, the study will be drawing on previous research in terms of variables for capital structure, ownership structure and corporate governance as well as using established data analysis methodologies and thereby ensuring that appropriate conclusions are observable from the data analysis.

3.8.2 EXTERNAL VALIDITY

Kalof, Dan and Dietz (2008) refer to external validity as the ability to generalise from a study to a larger population. The study sample will be all non-financial companies listed on the JSE between 2000 and 2010 that have comprehensive information. As such the sample will be very close in approximating the whole population of such companies on the JSE and thus ensuring that the results are representative and can be extended to the population.

3.8.3 RELIABILITY

According to Kalof, Dan and Dietz (2008), reliability is all about consistency of research findings if the research is repeated time after time under similar conditions. Using a clear process and techniques that have been tested in previous research and drawing the sample from reputable data

sources will ensure that the study can be repeated under similar circumstances in the future and thus pass the reliability test.

3.9 MULTICOLLINEARITY AND HETEROSKEDASTICITY

3.9.1. MULTICOLLINEARITY

Step-wise and multiple regressions are complicated by the presence of multicollinearity. This condition arises when high inter-correlations exist among the predictors or explanatory variables affecting the estimation of partial regression coefficients and increasing the amount of standard errors (DeFusco et al., 2004: 473; Cooper & Schindler, 1998: 564 and Maholtra, 1998: 577).

According to Glantz and Slinker (2001) and Malhotra (1998), multicollinearity affects multiple regressions in at least three ways:

- a. Multicollinearity reduces the size of the multiple correlations,
- b. the confounding resulting from the high inter-correlations among the independent variables makes interpretation problematic, and
- c. multicollinearity increases the regression coefficient variance resulting in a more unstable regression equation.

This study tested for multicollinearity by using a coefficients table housing collinearity statistics to investigate for standard errors. A correlation matrix was run between the variables, as depicted in Appendix D Table 13, with the result was that there was no evidence of multicollinearity.

Refer to Appendix D Table 13

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).

3.9.2. HETEROSKEDASTICITY

According to Defusco, McLeavey, Pinto and Runkle (2004), heteroskedasticity occurs when the calculated error variance correlates with values of the independent variables, thereby affecting statistical inference. This study will correct for this effect by accurately calculating the study variables and by using a large sample.

CHAPTER 4: ANALYSIS AND INTERPRETATION OF RESEARCH RESULTS

4.1 INTRODUCTION

The objective of this chapter is to analyse and interpret the results of the statistical analysis performed on the data. The analysis discusses the descriptive statistics for the primary variables, and the panel data regression analysis performed and determines whether the hypotheses are accepted or rejected. Regression equations were tested at a 5% confidence level. The study uses the panel data model with fixed-effects. The reason for choosing the fixed effects model over the random effects model is that the former 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 such as culture, religion, gender, geographical location, race, and so on.

However, as Kohler and Kreuter (2009) point out, one side effect of the features of fixed-effects models is that they cannot be used to investigate time-invariant causes of the dependent variables. This is not a problem in our study because, technically, time-invariant characteristics of the firm should be perfectly collinear with the firm or dummies and the explicit objective of the study is to study financing behaviour of firms that can be explain by a time-variant dependent variable of leverage as measured by the four ratios employed by the study. Kohler and Kreuter (2009) point out those fixed-effect models are designed to study the causes of changes within a person [or entity]. A time-invariant characteristic cannot cause such a change, because it is constant for each person.

On the other hand, according to Torres-Reyna (2011), the rationale behind random effects model is that, unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model. Based on the hypotheses for the study and previous literature on the subject, it is posited that some of the independent variables of leverage have some explanatory influence on leverage and it is the objective of the study to uncover whether this is indeed so in the context of listed non-financial firms in South Africa. Another possible angle for the study could be to assess how differences across entities have some influence on the dependent variable. This could be a subject of future

research and in that case, it should be advisable to use random effects. According to Torres-Reyna (2011), an advantage of random effects is that one can include time invariant variables such as location. In the fixed effects model these variables are absorbed by the intercept.

4.2 DESCRIPTIVE STATISTICS

Appendix C summarizes descriptive statistics for the dataset that is comprised of 98 companies.

Refer to Appendix C Table 1

Refer to Appendix C Table 2

Refer to Appendix C Table 3

Refer to Appendix C Table 4

As summarized in Table 3, 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.

Looking at the Box and Line Plots in Appendix C, it is visually apparent that there is a pronounced shift in the mean values of certain leverage measures in particular Total Debt over Net Assets and Total Liabilities. According to the South African Institute of Chartered Accountants' website, listed South African companies were required to adopt International Financial Reporting Standards (IFRS) for reporting periods beginning on or after 1 January 2005 perhaps explaining the change in trends for some leverage ratios from 2006 onwards.

Refer to Appendix C Table 6

4.3 ANALYSIS OF RESULTS

4.3.1 CORRELATION MATRIX

Correlation quantifies the extent to which two quantitative variables, X and Y move together. When high values of X are associated with high values of Y , a positive correlation exists. When high values of X are associated with low values of Y , a negative correlation exists. The closer r is to $+1$, the stronger the positive correlation. The closer r is to -1 , the stronger the negative correlation. In other words, the sign of the correlation coefficient determines whether the correlation is positive or negative. The magnitude of the correlation coefficient determines the strength of the correlation.

A series of correlation matrices were run between the leverage variables, between the explanatory variables as well as between the ownership variables in order to detect multicollinearity. With regard to the leverage variables, testing at a 95 percent confidence interval, a positive linear relationship with a correlation of 0.0626 was found between Total Debt divided by Capital and between Total Liabilities divided by Total Assets. This could be ascribed to the fact that by implication there are cross sharing of numerator and denominator values with Total Liabilities for instance being part of the definition of Total Debt and Capital being part of Total Assets. As a result, if one component goes up, it influences the other measures positively in this case.

Refer to Appendix C Table 5

Among the control variables, a Pearson's correlation matrix was run among all explanatory, control and dummy variables. This is summarized in Table 13. Overall, no variables were found to be highly correlated to each other eliminating the problem of heteroskedasticity.

With regard to ownership variables, a strong positive correlation of 0.76193 is identified between ownership by the top 5 shareholders and whether a company is owned by a holding company, a corporate or a family trust again reflecting definitional problems whereby in this case the latter could be the definition of the former. 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.

Refer to Appendix C Table 13

4.3.2 RESULTS OF THE PANEL DATA REGRESSION

The model summaries in Appendices D indicate that equations 1 to 4 are significant in explaining the relationship between leverage measures and various explanatory variables because of $p > F$ values under 0.0005. If this number is < 0.05 then your model is acceptable. This is a test (F) to see whether all the coefficients in the model are different than zero. Table 11 and 12 summarises results of the panel regression models for the four leverage measures, the results of which are discussed in the following paragraphs.

Refer to Appendix D Table 7 to Table 12

Interpreting the model output

Interpreting the beta coefficients

According to Brandom (2008), in the case of time-series cross-sectional data the interpretation of the beta coefficients would be “...for a given country, as X varies *across time* by one unit, Y increases or decreases by β units”

Interpreting the t-values and two-tail p-values

T-values test the hypothesis that each coefficient is different from 0. To reject this, the t-value has to be higher than 1.96 (for a 95% confidence). If this is the case then we can say that the variable has a significant influence on the dependent variable (y). The higher the t-value, the higher the relevance of the variable.

In terms of the t-values, if the t-stat is more than 2 (the coefficient is at least twice as large as the standard error), meaning that one could conclude that the variable in question has a significant impact on the dependent variable. High t-statistics (over 2) mean the variable is significant. The t-Test is regarded as a powerful statistical test in terms of rejecting a null hypothesis that is false.

Two-tail p-values test the hypothesis that each coefficient is different from 0. To reject this, the p-value has to be lower than 0.05 (95%, if one chooses an alpha of 0.10), if this is the case then you can say that the variable has a significant influence on your dependent variable (y).

Interpreting the R-square

The analysis will also refer to the R-square statistic. R-square shows the amount of variance of Y explained by X. In other words, this statistic measures how successful the fit is in explaining the variation of the data. It is the square of the correlation between the response values and the predicted response values. It is also called the square of the multiple correlation coefficient and the coefficient of multiple determination. R-square can take on any value between 0 and 1, with a value closer to 1 indicating that a greater proportion of variance is accounted for by the model. For example, an R-square value of 0.8234 means that the fit explains 82.34% of the total variation in the data about the average. In this study, the R-square measure equates to 69.5%, 44.69%, 11.56% and 25.09% for the equations 1 to 4, respectively. This highlights that generally, except in one case, the variation of the data is not explained by the fit of the regression line.

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: deflation, logging, seasonal adjustment, differencing. All of these transformations will change the variance and may also change the units in which variance is measured. Deflation and logging may dramatically change the units of measurement, while seasonal adjustment and differencing generally reduce the variance significantly when properly applied. Therefore, if the dependent variable in the regression model has already been transformed in some way, it is possible that much of the variance has already been "explained" merely by the choice of an appropriate transformation. As to whether the measures of the dependent variables in these equations have in some way been transformed, this is beyond the scope of this research.

4.3.3 TOTAL LIABILITIES OVER TOTAL ASSETS

Equation 1:

$$(\text{Total Liabilities} / \text{Total Assets})_{it} = \alpha + \beta_1 * (\text{TOP_5}) + \beta_2 * (\text{INDIV}) + \beta_3 * (\text{INSID}) + \beta_4 * (\text{HOLDING}) + \beta_5 * (\text{ASS-STR}) + \beta_6 * (\text{FIN_SIT1}) + \beta_7 * (\text{FIN_SIT2}) + \beta_8 * (\text{GRO_OPS}) + \beta_9 * (\text{SIZ_FRM}) + \beta_{10} * (\text{PROD_UNQ}) + \beta_{11} * (\text{TAX_SHLD}) + \beta_{12} * (\text{FRM_SIZ}) + \beta_{13} * (\text{Sector dummy variables}_{it}) + \varepsilon_{it}$$

Refer to Appendix D Table 7

The results of leverage as measured by a ratio of total liabilities to total assets are presented in Table 7. Using equation 1, under the fixed two way estimates, the panel data regression yielded positive relations for the coefficient of the explanatory variables of TOP5, INDIV and INSID and for the control variables of asset structure, financial situation 1, product uniqueness, tax shields and firm size. The model fit as measured by the R-square displays a model fit for the data at around 70% under the fixed two-way estimate. The model therefore has strong predictive ability and results in a stable and adequate base for testing the hypothesis.

The Pesaran's test of cross sectional independence is 6.369, Pr = 0.0000, evidence of cross sectional dependence. This is usually a problem in macro panels with long series (20+ years).

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 = 3.37 under fixed effects and 1.2 under random effects model) associated with this leverage outcome following multivariable adjustment and was the largest coefficient of the three ownership variables
- (3) Top 5 shareholders ownership (TOP5) is significantly (t-value = 3.3 under both models) associated with this leverage outcome following multivariable adjustment.

Therefore, using this measure of leverage, we can accept Hypothesis 1 that says 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.

According to the descriptive statistics on the explanatory variables of ownership displayed in Table 4, these two ownership structures accounted for 12.5% and 40.7% of ownership patterns, respectively.

Refer to Appendix D Table 4

4.3.4 TOTAL DEBT OVER NET ASSETS

Equation 2:

$$(\text{Total Debt} / \text{Net Assets})_{it} = \alpha + \beta_1*(\text{TOP_5}) + \beta_2*(\text{INDIV}) + \beta_3*(\text{INSID}) + \beta_4*(\text{HOLDING}) + \beta_5*(\text{ASS-STR}) + \beta_6*(\text{FIN_SIT1}) + \beta_7*(\text{FIN_SIT2}) + \beta_8*(\text{GRO_OPS}) + \beta_9*(\text{SIZ_FRM}) + \beta_{10}*(\text{PROD_UNQ}) + \beta_{11}*(\text{TAX_SHLD}) + \beta_{12}*(\text{FRM_SIZ}) + \beta_{13}*(\text{Sector dummy variables}_{it}) + \varepsilon_{it}$$

Refer to Appendix D Table 8

Table 8 presents the results of leverage as measured by a ratio of total debt to capital. Using equation 2, under the fixed two way estimates, the panel data regression yielded positive relations for the coefficient of the explanatory variables of TOP5, INDIV and INSID and for the control variables of financial situation 1, size of the firm and tax shields. The model fit as measured by the R-square displays a model fit for the data at around 44.7% under the fixed two-way estimate and 3.86% under random two-way effects. The model therefore has strong predictive ability and results in a stable and adequate base for testing the hypothesis. The t-statistic measures are all insignificant being below the threshold of 2 in all cases for the explanatory variables.

The model diagnostics returned $\text{Prob} > F = 0.0001$ and is highly significant. As such, we failed to reject the null that year coefficients are jointly equal; therefore, no time effects are needed.

- (1) Director ownership (INSID) is not significantly associated with this leverage outcome following multivariable adjustment (t-value = 0.88);
- (2) Individual block-holders ownership (INDIV) is not significantly associated with this leverage outcome following multivariable adjustment (t-value = 1.59); and
- (3) Top 5 shareholders ownership (TOP5) is not significantly associated with this leverage outcome following multivariable adjustment (t-value = .69).

Therefore, leverage as measured through Total Debt divided by Net Assets seems not to be influenced in any way, positive or negative by any of the predictor variables.

4.3.5 TOTAL DEBT OVER CAPITAL

Equation 3:

$$(\text{Total Debt / Net Assets})_{it} = \alpha + \beta_1*(\text{TOP_5}) + \beta_2*(\text{INDIV}) + \beta_3*(\text{INSID}) + \beta_4*(\text{HOLDING}) + \beta_5*(\text{ASS-STR}) + \beta_6*(\text{FIN_SIT1}) + \beta_7*(\text{FIN_SIT2}) + \beta_8*(\text{GRO_OPS}) + \beta_9*(\text{SIZ_FRM}) + \beta_{10}*(\text{PROD_UNQ}) + \beta_{11}*(\text{TAX_SHLD}) + \beta_{12}*(\text{FRM_SIZ}) + \beta_{13}*(\text{Sector dummy variables}_{it}) + \varepsilon_{it}$$

Refer to Appendix D Table 9

The results of leverage as measured by a ratio of total debt to net assets are presented in Table 9. Using equation 3, under the fixed two-way estimates, the panel data regression yielded positive relations for the coefficient of the explanatory variables of TOP5, INDIV and INSID and for the control variables of asset structure, financial situation 1, financial situation 2, growth opportunities, size of the firm, product uniqueness, tax shields and firm size. The model fit as measured by the R-square displays a model fit for the data at around 11.5% under the fixed two-way estimate. The model cannot be relied upon in terms of its predictive ability and reliability for testing the hypothesis having a $Pr > F$ of 0.6077. The t-statistic has values of less than 2 in all of the control variables and the explanatory variables of ownership.

The model results lead to the conclusions that:

- (1) Director ownership (INSID) is not significantly associated with this leverage outcome following multivariable adjustment (t-value = 0.22);
- (2) INDIV is not significantly associated with this leverage outcome following multivariable adjustment and largest coefficient of the three ownership variables (t-value = 0.16);
- (3) Top 5 shareholders ownership (TOP5) is not significantly (t-value = 0.23) associated with this leverage outcome following multivariable adjustment and largest coefficient of the three ownership variables.

We can therefore reject 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) referred to above.

4.3.6 PROFIT BEFORE INTEREST AND TAXES OVER INTEREST EXPENSE

Equation 4:

$$(\text{PBIT} / \text{Interest Expense})_{it} = \alpha + \beta_1 * (\text{TOP_5}) + \beta_2 * (\text{INDIV}) + \beta_3 * (\text{INSID}) + \beta_4 * (\text{HOLDING}) + \beta_5 * (\text{ASS-STR}) + \beta_6 * (\text{FIN_SIT1}) + \beta_7 * (\text{FIN_SIT2}) + \beta_8 * (\text{GRO_OPS}) + \beta_9 * (\text{SIZ_FRM}) + \beta_{10} * (\text{PROD_UNQ}) + \beta_{11} * (\text{TAX_SHLD}) + \beta_{12} * (\text{FRM_SIZ}) + \beta_{13} * (\text{Sector dummy variables}_{it}) + \epsilon_{it}$$

Refer to Appendix D Table 10

Regression results testing the significance of leverage as measured by the ratio of profit before interest and tax to interest expense are presented in Table 10. Using the fixed two-way estimates, Prob > F = 0.001 indicating that the model is significant in its predictive ability. However, R-square came out at only 1.36% indicating a very poor model fit. The t-values all came out below the threshold of 2 except for the case of individual block-holders ownership (INDIV) (t-value = 2.69).

The conclusions that can be drawn from this are that:

- (1) Director ownership (INSID) is not significantly associated with this leverage outcome following multivariable adjustment (t-value = 0.16);
- (2) Individual block-holders ownership (INDIV) is significantly associated with this leverage outcome following multivariable adjustment (t-value = 2.69; and
- (3) Top 5 shareholders ownership (TOP5) is not significantly (t-value = 0.23) and inversely associated with this leverage outcome following multivariable adjustment.

Results for all key regression results are summarized in Appendix D Tables 11: Wansbeek and Kapteyn Variance Components and Appendix D Table 12: Summary of Fixed Two Way Estimates.

Refer to Appendix D Table 11

Refer to Appendix D Table 12

4.4 SUMMARY OF RESULTS

4.4.1 TOP 5 SHAREHOLDERS OWNERSHIP (TOP5)

The results here indicate that concentration of ownership tends to have significant positive association 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. In other three instances, there is no significant association.

4.4.2 DIRECTOR OWNERSHIP (INSID)

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.

4.4.3 INDIVIDUAL BLOCK-HOLDERS OWNERSHIP (INDIV)

When we look at ownership by a widespread ownership base in the form of individual shareholders 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 t-value of 3.7 leads to the accepting of the hypothesis 1 which predicted a positive relationship between leverage and individual block-holders. This confirms the thrust behind 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 endeavours including excessive borrowing.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS FOR FUTURE RESEARCH

5.1 INTRODUCTION

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 the context of investigating the impact of unobservable factors on the financing behaviour of JSE listed firms.

5.2 SUMMARY OF RESULTS

The findings indicate the presence of highly concentrated ownership structure in the South African market as measured by the ratio of the top five . This has an inverse relationship with the debt levels that firms assume while widely held ownership has a significant positive relationship with leverage levels. On the other hand, ownership by insiders by way of directors of the company, was found not to be significant 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. The study on the other hand points to close shareholders and owner-managers seeking to leverage external funds more and more in their pursuit of investment opportunities rather than looking at internal sources of funding.

5.3 CONTRIBUTION TO THE LITERATURE

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.

5.4 LIMITATIONS OF THE RESEARCH STUDY AND RECOMMENDATIONS FOR FUTURE RESEARCH

A significant limitation of the study has been in the employment of a very limited number of ownership variables due to time and financial constraints. It would have broadened the dimension of the study to include more ownership variables such as ownership by institutional shareholders as well as previous CEOs currently on the board. Future research can include more control variables for ownership such as the age of the firm and diversification as measured by the firm operating in more than three market segments, each accounting for more than 10% of the total revenue of the firm. 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 as it assumed time invariant values of 1 if it was present and 0 otherwise instead of using percentage ownership. This could be a future improvement area for similar studies. Future research can also focus on the nature of external financing that is preferred by firms whether it is short-term debt or long-term debt and the risks associated with each type of external financing. This could perhaps be classified by industry. 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, in particular, and the emerging market economies in general.

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APPENDICES

APPENDIX A: LIST OF COMPANIES IN THE FINAL DATASET

	Company	Sector
1	Afgeti	Consumer Goods
2	Amalgamated Appliance Holdings	Consumer Goods
3	AVI Limited	Consumer Goods
4	Capevin	Consumer Goods
5	Cashbuild	Consumer Goods
6	Comp Fin Richemont	Consumer Goods
7	Distell	Consumer Goods
8	Dorbyl	Consumer Goods
9	Illovo Sugar	Consumer Goods
10	Intertrading	Consumer Goods
11	Metair Investments Ltd	Consumer Goods
12	Nu-World	Consumer Goods
13	Oceana	Consumer Goods
14	Rainbow Chicken	Consumer Goods
15	SAB Miller	Consumer Goods
16	Sappi	Consumer Goods
17	Seardel	Consumer Goods
18	Sovereign Food	Consumer Goods
19	Steinhoff	Consumer Goods
20	Tiger Brands	Consumer Goods
21	Tongaat Hulett	Consumer Goods
22	Advtech Ltd	Consumer Services
23	African & Overseas Enterprises Ltd	Consumer Services
24	Caxton CTP	Consumer Services
25	Clicks Group Ltd	Consumer Services
26	Combined Motor Holdings Ltd	Consumer Services
27	Cullinan Holdings Ltd	Consumer Services
28	Famous Brands Ltd	Consumer Services
29	JD Group Ltd	Consumer Services
30	Kagiso Media Ltd	Consumer Services
31	Massmart Holdings Ltd	Consumer Services
32	Naspers Ltd	Consumer Services
33	Nictus Beperk	Consumer Services

34	Pickn Pay Holdings	Consumer Services
35	Pickn Pay Stores	Consumer Services
36	Rex Trueform Clothing Co Ltd	Consumer Services
37	Shoprite Holdings Ltd	Consumer Services
38	Spur Corporation Ltd	Consumer Services
39	Sun International Ltd	Consumer Services
40	The Don Group Ltd	Consumer Services
41	The Foschini Group Ltd	Consumer Services
42	Truworths Ltd	Consumer Services
43	Verimark Holdings Ltd	Consumer Services
44	Woolworths Holdings Ltd	Consumer Services
45	Aspen Pharmacare	Healthcare
46	Mediclinic	Healthcare
47	Netcare	Healthcare
48	Allied Electronics	Industrials
49	Astrapark	Industrials
50	Aveng	Industrials
51	Barloworld	Industrials
52	Basil Read	Industrials
53	Bell Equipment	Industrials
54	Cargo Carriers	Industrials
55	Ceramic Industries	Industrials
56	Control Instruments	Industrials
57	Digicore	Industrials
58	Distribution and Warehousing	Industrials
59	ELE Group	Industrials
60	Excellerate	Industrials
61	Grindrod Ltd	Industrials
62	Group Five Ltd	Industrials
63	Howden Africa Holdings Ltd	Industrials
64	Hudaco Industries Ltd	Industrials
65	Illiad	Industrials
66	Imperial Holdings	Industrials
67	Jasco Electronics	Industrials
68	Masonite Africa	Industrials
69	Metrofile	Industrials
70	Micromega	Industrials
71	Mobile Industries Ltd	Industrials
72	Murray & Roberts	Industrials
73	Nampak	Industrials
74	PPC	Industrials
75	Reunert Ltd	Industrials
76	Super Group	Industrials
77	The Bidvest Group	Industrials

78	Transpaco	Industrials
79	Treacor	Industrials
80	Sasol	Oil & Gas
81	Adaptit	Technology
82	Compu-Clearing	Technology
83	Convergent Holdings	Technology
84	Datacentrix	Technology
85	EOH Holdings	Technology
86	Gijima	Technology
87	Mustek	Technology
88	Pinnacle Holdings	Technology
89	Securedata	Technology
90	Allied Technologies	Telecommunications
91	MTN Group	Telecommunications
92	Telkom	Telecommunications
93	City Lodge Holdings	Consumer Services
94	Evrax Highveld	Industrials
95	Mr Price Holdings	Consumer Services

**APPENDIX B: CONTROL VARIABLES AND THEIR RELATIONSHIP TO DEBT RATIO
(MAZUR, 2007)**

THEORY	VARIABLE	DEFINITION	DEFINITION	PREDICTED RELATIONSHIP
STAKE- TRADE- OFF	ASSET STRUCTURE	ASST	FIXED ASSETS/TOTAL ASSETS	-
	PROFITABILITY	PROF	OPERATING PROFIT/ NET REVENUES FROM SALES	+
	GROWTH	GR_1		-
	OPPORTUNITIES	GR_2		-
		GR_3		-
	SIZE	SIZ_1		+
		SIZ_2		+
	UNIQUENESS	UNIQ		-
	BUSINESS RISK	RISK		-
	NON-DEBT SHIELDS	TAX NDTS		-
PECKING ORDER	ASSETS STRUCTURE	ASST		-
	PROFITABILITY	PROF		-
	GROWTH	GR_1		+
	OPPORTUNITIES	GR_2		+
		GR_3		+
	SIZE	SIZ_1		+/-
		SIZ_2		+/-
	DIVIDEND POLICY	DIV		+

APPENDIX C: TABLES – DESCRIPTIVE STATISTICS

TABLE 1: SUMMARY STATISTICS: EXPLANATORY VARIABLES

Variable	Mean	Std Dev	Minimum	Maximum	N
ASS_SIR	0.2871503	0.220304	0	0.9473326	1045
FIN_SIT1	0.1860294	0.1931331	-1.3327797	2.4660593	1045
FIN_SIT2	1.7761077	1.1881562	0	10.7830609	1045
GROW_OPS	0.040028	0.0972071	-0.004099	0.9992194	1045
SIZE_FRM	0.2641399	0.2423725	-2.6758824	2.4882537	1045
PROD_UNQ	0.5634625	0.3178887	0	3	1044
TAX_SHLD	9.6021485	118.609922	-426.661932	3449.33	1045
TOP_5	40.734163	20.9296253	5.64	96.82	1045
INDIV	12.457665	20.2443593	0	78.909	1045
HOLDING	0.2	0.4001915	0	1	1045
DIRECTOR	17.028804	21.5059092	0	100	1045
FRMSZ_OW	6.2752976	1.0097213	0	8.1393627	1044
D_CONSUMER GOODS	0.2	0.4001915	0	1	1045
D_CONSUMER SERVICES	0.2421053	0.4285628	0	1	1045
D_HEALTHCARE	0.0315789	0.17496	0	1	1045
D_INDUSTRIALS	0.3578947	0.4796105	0	1	1045
D_OIL&GAS	0.0105263	0.1021053	0	1	1045
D_TECHNOLOGY	0.0947368	0.2929913	0	1	1045
D_TELECOMMS	0.0315789	0.17496	0	1	1045

TABLE 2: SUMMARY STATISTICS: DEPENDENT VARIABLES

Variable	Mean	Std Dev	Minimum	Maximum	N
L_TL_IA	0.3698674	0.308245	0.000920069	2.1527711	1045
L_TD_NA	1.8332705	16.4300185	-149.1835378	483.3146603	1045
L_ID_CP	0.7498761	1.0070286	-21.4380699	6.4572492	1045
L_PBIT_IE	139.3050595	1795.98	-27810	35438	1041

TABLE 3: LEVERAGE

Leverage measure	Mean Percentage
Total Liabilities / Total Assets	36.98
Total debt / Net Assets	183.32
Total Debt / Capital	74.98
Profit Before Tax and Tax / Interest Expense	13930.30

TABLE 4: 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 %

TABLE 5: CORRELATION MATRICES

Correlation Analysis						
Simple Statistics						
Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
L_TL_TA	1045	0.36987	0.30824	386.51146	0.0000201	2.15277
L_TD_NA	1045	1.83327	16.43002	1916	-149.18354	483.31466
L_TD_CP	1045	0.74988	1.00703	783.62055	-21.43807	6.45725
L_PBIT_IE	1041	139.30506	1796	145017	-27810	35438
Pearson Correlation Coefficients						
Prob > r under H0: Rho=0						
Number of Observations						
	L_TL_TA	L_TD_NA	L_TD_CP	L_PBIT_IE		
L_TL_TA	1	0.12446	0.0626	-0.00616		
		<.0001	0.0431	0.8427		
	1045	1045	1045	1041		
L_TD_NA	0.12446	1	0.02633	-0.0049		
	<.0001		0.3951	0.8746		
	1045	1045	1045	1041		
L_TD_CP	0.0626	0.02633	1	-0.01343		
	0.0431	0.3951		0.6652		
	1045	1045	1045	1041		
L_PBIT_IE	-0.00616	-0.0049	-0.01343	1		
	0.8427	0.8746	0.6652			
	1041	1041	1041	1041		

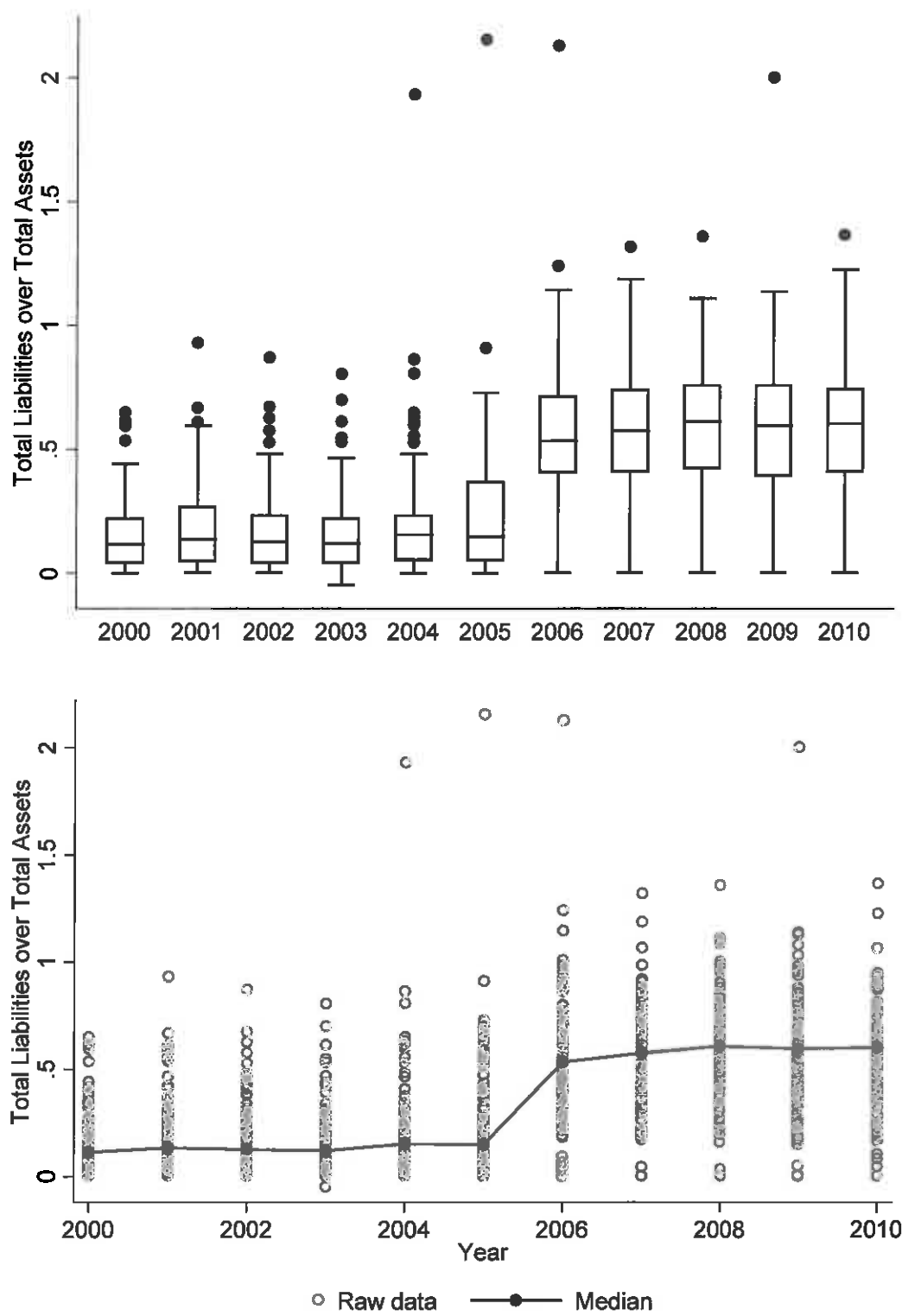
4 Variables TOP_5 INDIV
HOLDING DIRECTOR

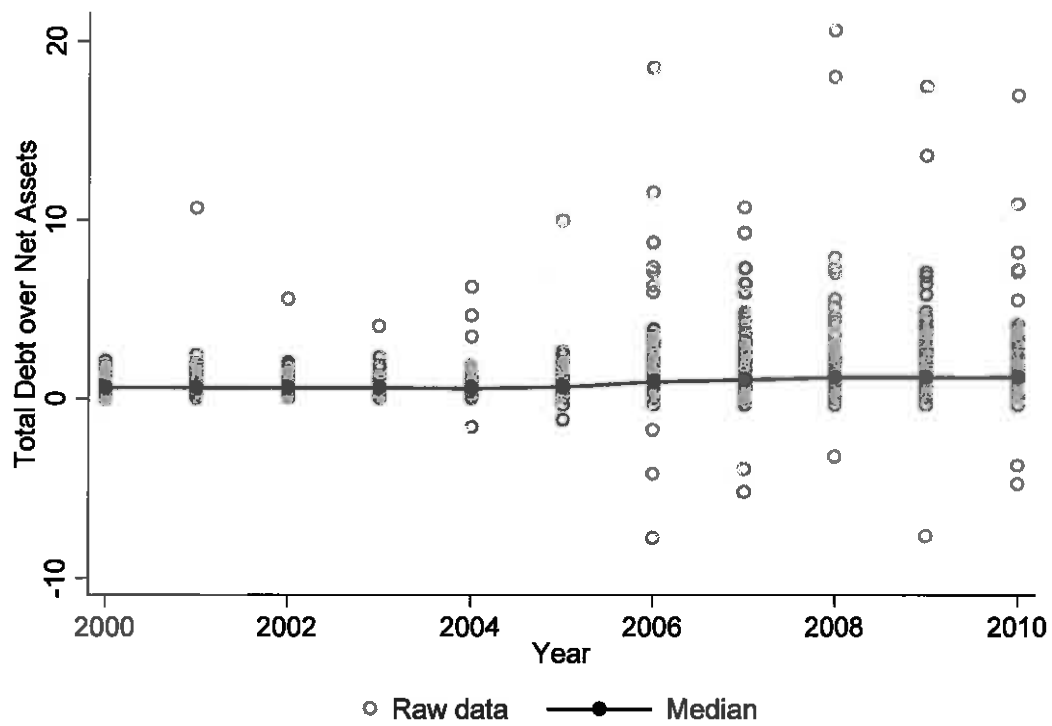
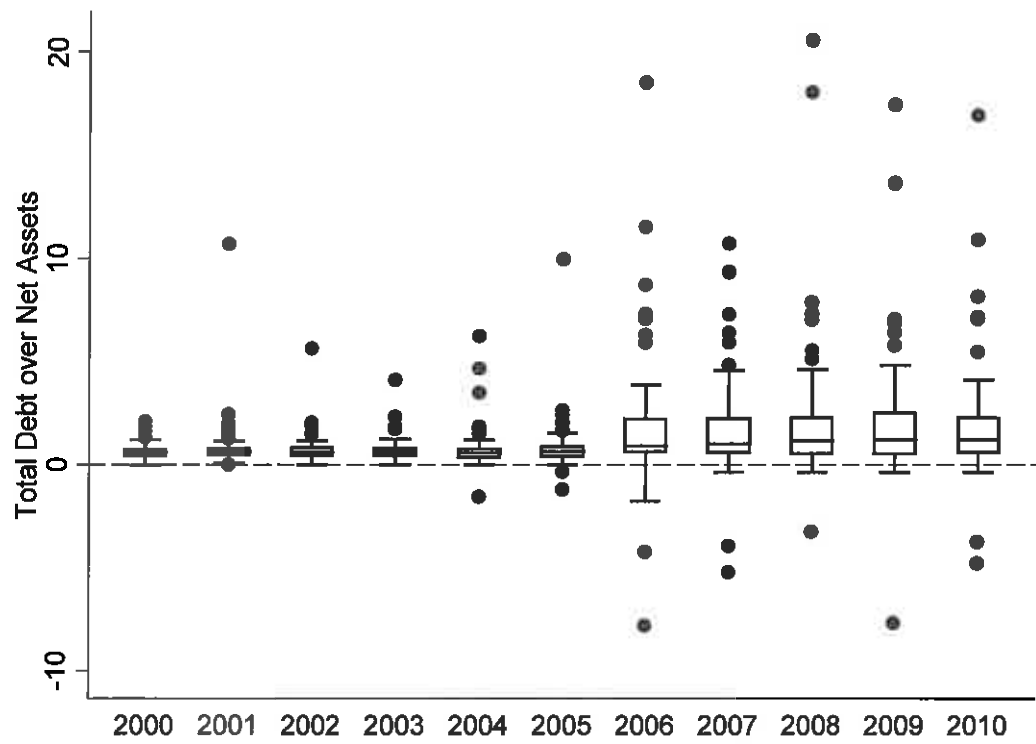
Simple Statistics						
Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
TOP_5	1045.0000	40.7342	20.9296	42567.0000	5.6400	96.8200
INDIV	1045.0000	12.4577	20.2444	13018.0000	0.0000	78.9090
HOLDING	1045.0000	0.2000	0.4002	209.0000	0.0000	1.0000
DIRECTOR	1045.0000	17.0288	21.5059	17795.0000	0.0000	100.0000

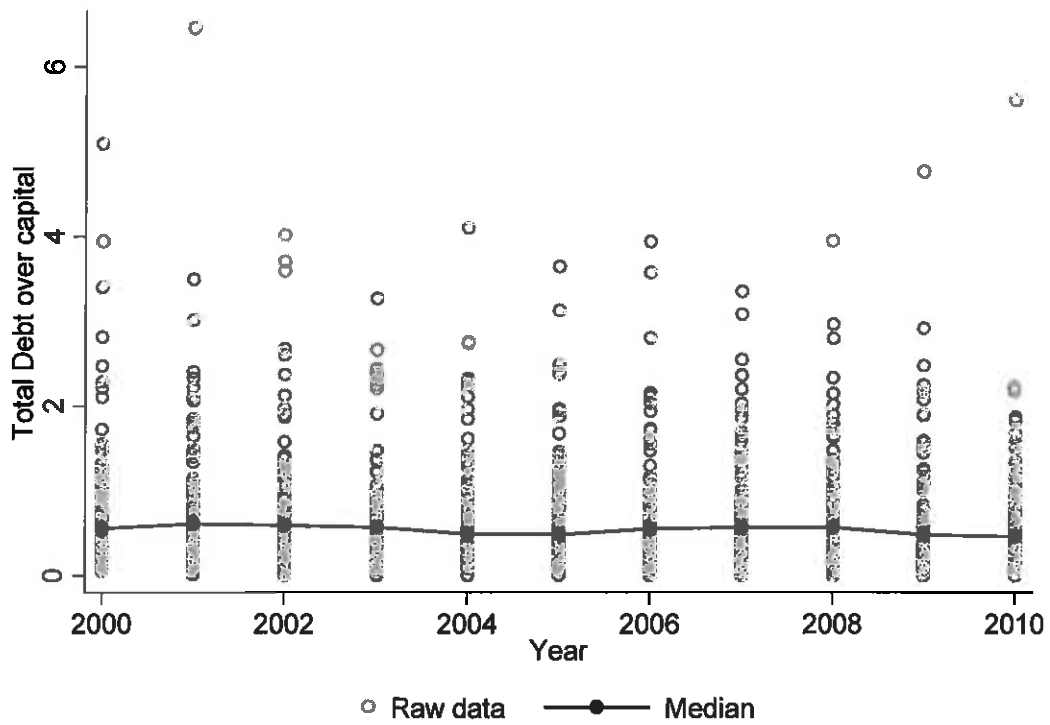
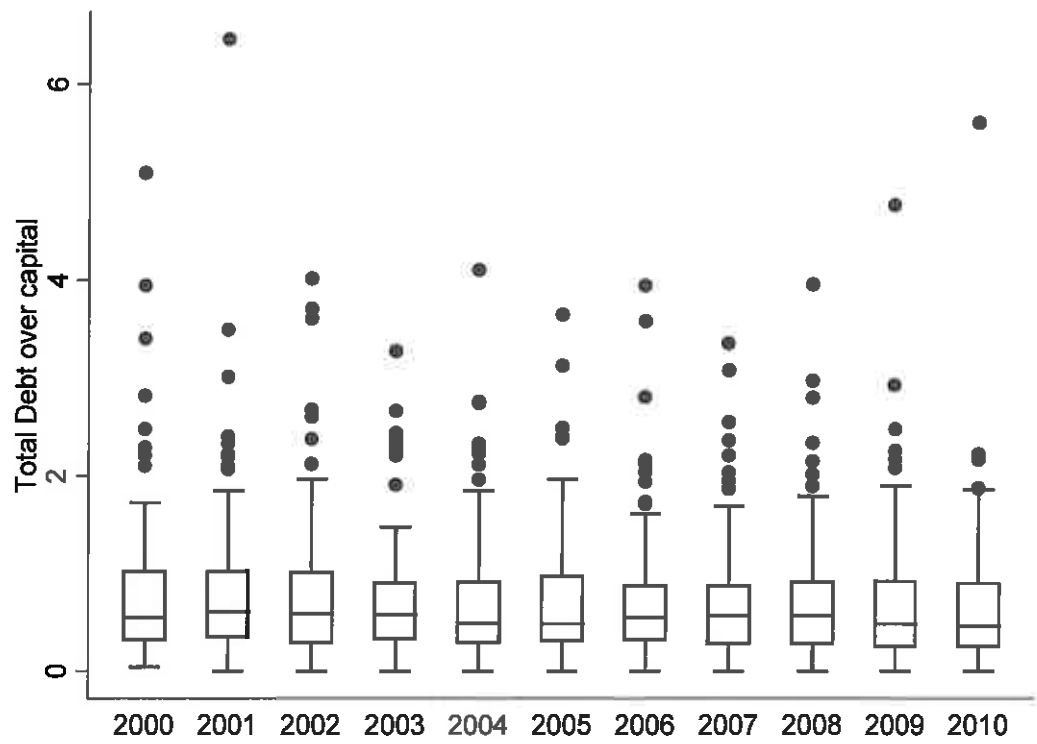
Pearson Correlation
Coefficients, N = 1045
Prob > |r| under H0:
Rho=0

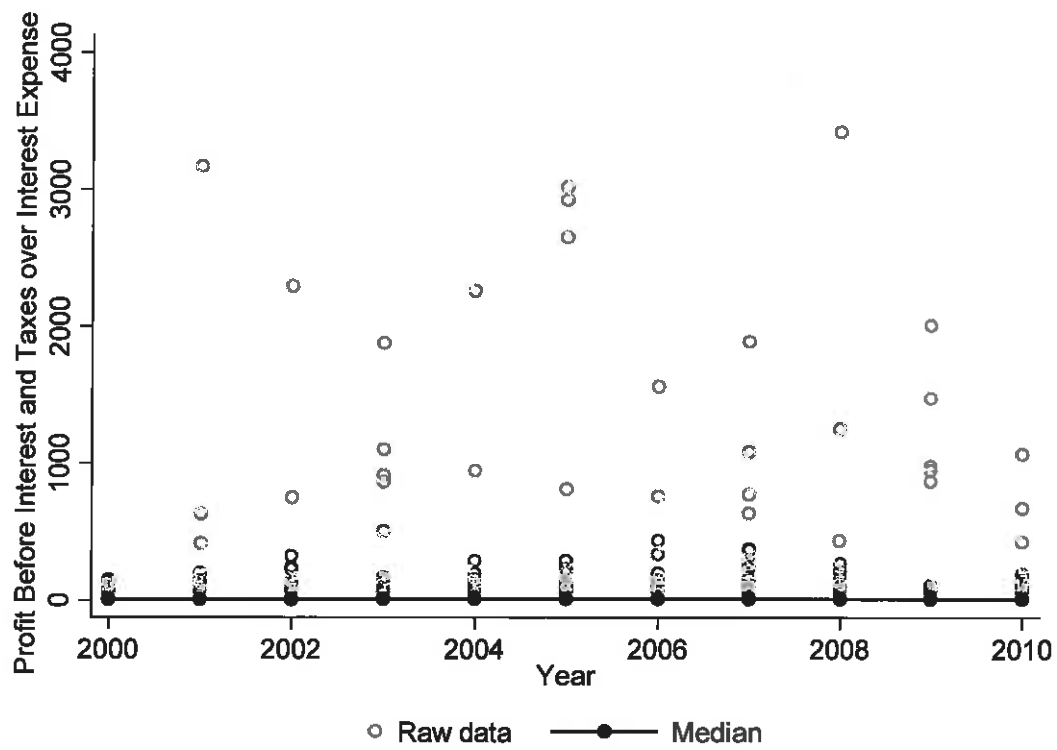
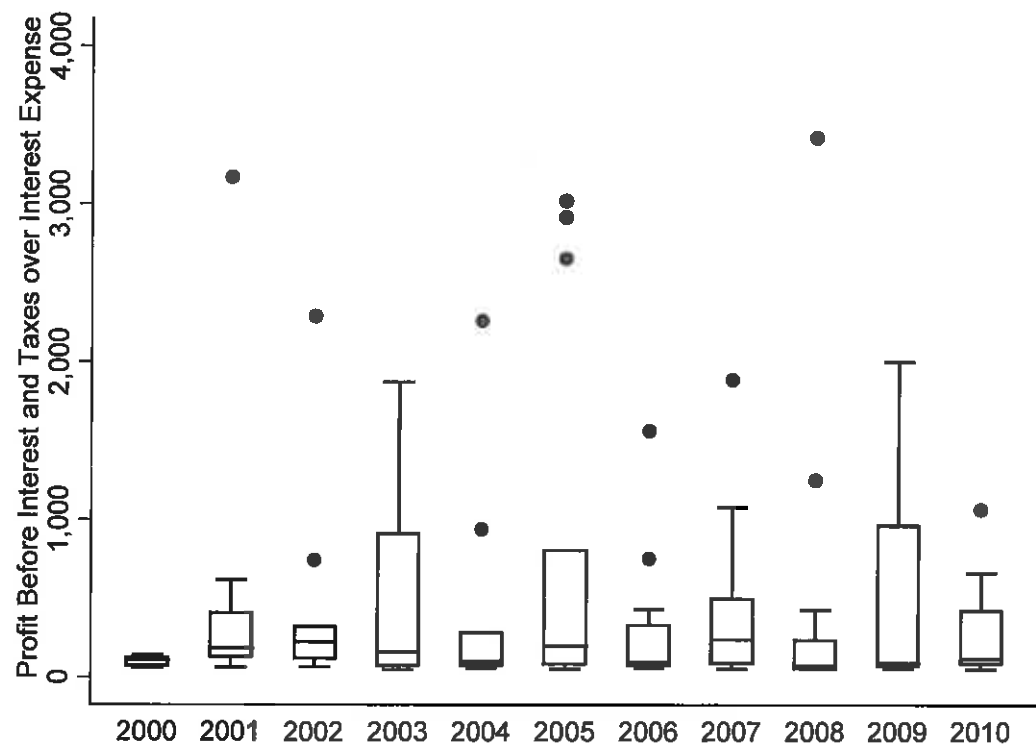
	TOP_5	INDIV	HOLDING	DIRECTOR
TOP_5	1.0000	-0.4277	0.7619	0.2137
		<.0001	<.0001	<.0001
INDIV	-0.4277	1.0000	-0.2288	0.0670
	<.0001		<.0001	0.0303
HOLDING	0.7619	-0.2288	1.0000	0.1803
	<.0001	<.0001		<.0001
DIRECTOR	0.2137	0.0670	0.1803	1.0000
	<.0001	0.0303	<.0001	

TABLE 6: BOX AND LINE PLOTS - LEVERAGE









APPENDIX D: OUTPUT OF REGRESSION ANALYSIS

TABLE 7: LEVERAGE = TOTAL LIABILITIES OVER TOTAL ASSETS

$$(\text{Total Liabilities} / \text{Total Assets})_{it} = \alpha + \beta_1 * (\text{TOP_5}) + \beta_2 * (\text{INDIV}) + \beta_3 * (\text{DIRECTOR}) + \beta_4 * (\text{HOLDING}) + \beta_5 * (\text{ASS-STR}) + \beta_6 * (\text{FIN_SIT1}) + \beta_7 * (\text{FIN_SIT2}) + \beta_8 * (\text{GRO_OPS}) + \beta_9 * (\text{SIZ_FRM}) + \beta_{10} * (\text{PROD_UNQ}) + \beta_{11} * (\text{TAX_SHLD}) + \beta_{12} * (\text{FRM_SIZ}) + \beta_{13} * (\text{Sector dummy variables}_{it}) + \varepsilon_{it}$$

Fixed Two Way Estimates

Model Description

Estimation Method	FixTwo
Number of Cross Sections	95
Time Series Length	11

Fit Statistics

SSE	30.1899	DFE	927
MSE	0.0326	Root MSE	0.1805
R-Square	0.695		

F Test for No Fixed Effects

Num DF	Den DF	F Value	Pr > F
104	927	16.72	<.0001

Parameter Estimates

Variable	DF	Estimate	Standard Error	t Value	Pr > t	Label
Intercept	1	-0.02079	0.1603	-0.13	0.8968	Intercept
ASS_STR	1	0.185876	0.093	2	0.046	
FIN_SIT1	1	0.015818	0.0452	0.35	0.7263	
FIN_SIT2	1	-0.03727	0.00976	-3.82	0.0001	
GROW_OPS	1	-0.07901	0.0899	-0.88	0.3799	
SIZE_FRM	1	-0.0382	0.0314	-1.22	0.2246	
PROD_UNQ	1	0.026305	0.0285	0.92	0.3568	
TAX_SHLD	1	7.09E-06	0.00005	0.14	0.8874	
TOP_5	1	0.013926	0.00423	3.3	0.001	
INDIV	1	0.410547	0.1219	3.37	0.0008	
HOLDING	0	0	.	.	.	
DIRECTOR	1	0.000063	0.000585	0.11	0.9117	
FRMSZ_OW	1	0.025109	0.0103	2.45	0.0146	
D_CONSUMER GOODS	0	0	.	.	.	
D_CONSUMER SERVICES	0	0	.	.	.	
D_HEALTHCARE	0	0	.	.	.	
D_INDUSTRIALS	0	0	.	.	.	
D_OIL&GAS	0	0	.	.	.	
D_TECHNOLOGY	0	0	.	.	.	
D_TELECOMMS	0	0	.	.	.	

Wansbeek and Kapteyn Variance Components (RanTwo)					
Model Description					
Estimation Method	RanTwo				
Number of Cross Sections	95				
Time Series Length	11				
Fit Statistics					
SSE	946.8526	DFE	1023		
MSE	0.9256	Root MSE	0.9621		
R-Square	0.0498				
Variance Component Estimates					
Variance Component for Cross Sections	61.97923				
Variance Component for Time Series	0.042775				
Variance Component for Error	0.032567				
Hausman Test for Random Effects					
DF	m Value	Pr > m			
0					
Parameter Estimates					
Variable	DF	Estimate	Standard Error	t Value	Pr > t
Intercept	1	-1.14414	3.5904	-0.32	0.75
ASS_STR	1	0.180935	0.0894	2.02	0.0433
FIN_SIT1	1	0.008688	0.0434	0.2	0.8413
FIN_SIT2	1	-0.03634	0.00938	-3.87	0.0001
GROW_OPS	1	-0.08276	0.0865	-0.96	0.3389
SIZE_FRM	1	-0.02048	0.0297	-0.69	0.4911
PROD_UNO	1	0.029465	0.0274	1.07	0.2831
TAX_SHLD	1	7.49E-06	0.000048	0.16	0.8764
TOP_3	1	0.013384	0.00405	3.3	0.001
INDIV	1	0.045462	0.0378	1.2	0.2293
HOLDING	1	-0.02493	2.0533	-0.01	0.9903
DIRECTOR	1	-0.00008	0.000562	-0.13	0.8938
FRMSZ_OW	1	0.026878	0.00986	2.73	0.0065
D_CONSUMER GOODS	1	0.194649	3.9361	0.05	0.9606
D_CONSUMER SERVICES	1	0.425987	3.8844	0.11	0.9127
D_HEALTHCARE	1	0.479581	5.6357	0.09	0.9322
D_INDUSTRIALS	1	0.194187	3.6836	0.05	0.958
D_OIL&GAS	1	0.843369	8.3797	0.1	0.9199
D_TECHNOLOGY	1	0.04273	4.3287	0.01	0.9921
D_TELECOMMS	1	0.119958	5.0107	0.02	0.9809

TABLE 8: LEVERAGE = TOTAL DEBT OVER CAPITAL

$$(\text{Total Debt} / \text{Net Assets})_{it} = \alpha + \beta_1 * (\text{TOP_5}) + \beta_2 * (\text{INDIV}) + \beta_3 * (\text{DIRECTOR}) + \beta_4 * (\text{HOLDING}) + \beta_5 * (\text{ASS_STR}) + \beta_6 * (\text{FIN_SIT1}) + \beta_7 * (\text{FIN_SIT2}) + \beta_8 * (\text{GRO_OPS}) + \beta_9 * (\text{SIZ_FRM}) + \beta_{10} * (\text{PROD_UNQ}) + \beta_{11} * (\text{TAX_SHLD}) + \beta_{12} * (\text{FRM_SIZ}) + \beta_{13} * (\text{Sector dummy variables}_{it}) + \varepsilon_{it}$$

Fixed Two Way Estimates**Model Description**

Estimation Method	FixTwo
-------------------	--------

Number of Cross Sections	95
--------------------------	----

Time Series Length	11
--------------------	----

Fit Statistics

SSE	584.1795	DFE	927
MSE	0.6302	Root MSE	0.7938

R-Square	0.4469
----------	--------

F Test for No Fixed Effects

Num DF	Den DF	F Value	Pr > F
104	927	3.71	<.0001

Parameter Estimates

Variable	DF	Estimate	Standard Error	t Value	Pr > t
Intercept	1	0.488978	0.7053	0.69	0.4883
ASS_STR	1	-0.24309	0.4091	-0.59	0.5525
FIN_SIT1	1	0.152611	0.1987	0.77	0.4426
FIN_SIT2	1	-0.18906	0.0429	-4.41	<.0001
GRO_OPS	1	-1.39178	0.3956	-3.52	0.0005
SIZE_FRM	1	0.107193	0.1383	0.78	0.4384
PROD_UNQ	1	-0.09044	0.1255	-0.72	0.4714
TAX_SHLD	1	0.000039	0.00022	0.18	0.8583
TOP_5	1	0.012761	0.0186	0.69	0.4926
INDIV	1	0.855448	0.5364	1.59	0.1111
HOLDING	0	0	.	.	.
DIRECTOR	1	0.002261	0.00257	0.88	0.3802
FRMSZ_OW	1	0.002745	0.0451	0.06	0.9515
D_CONSUMER GOODS	0	0	.	.	.
D_CONSUMER SERVICES	0	0	.	.	.
D_HEALTHCARE	0	0	.	.	.
D_INDUSTRIALS	0	0	.	.	.
D_OIL&GAS	0	0	.	.	.
D_TECHNOLOGY	0	0	.	.	.
D_TELECOMMS	0	0	.	.	.

Wansbeek and Kapteyn Variance Components (RanTwo)					
Model Description					
Estimation Method	RanTwo				
Number of Cross Sections	95				
Time Series Length	11				
Fit Statistics					
SSE	591.2708	DFE	1023		
MSE	0.578	Root MSE	0.7602		
R-Square	0.0386				
Variance Component Estimates					
Variance Component for Cross Sections	180.9388				
Variance Component for Time Series	0				
Variance Component for Error	0.630183				
Hausman Test for Random Effects					
DF	m Value	Pr > m			
0					
Parameter Estimates					
Variable	DF	Estimate	Standard Error	t Value	Pr > t
Intercept	1	0.164193	6.1554	0.03	0.9787
ASS_SIT	1	-0.22349	0.3872	-0.58	0.564
FIN_SIT1	1	0.136832	0.1873	0.73	0.4653
FIN_SIT2	1	-0.18917	0.0408	-4.64	<.0001
GROW_OPS	1	-1.37829	0.3762	-3.66	0.0003
SIZE_FRM	1	0.131454	0.129	1.02	0.3083
PROD_UNQ	1	-0.08286	0.1198	-0.69	0.4891
TAX_SHLD	1	0.000035	0.000209	0.17	0.866
TOP_5	1	0.011892	0.0174	0.68	0.4945
INDIV	1	0.017253	0.0675	0.26	0.7982
HOLDING	1	-0.38847	3.5493	-0.11	0.9129
DIRECTOR	1	0.002618	0.0024	1.09	0.2755
FRMSZ_OW	1	0.001759	0.041	0.04	0.9658
D_CONSUMER GOODS	1	0.24818	6.6962	0.04	0.9704
D_CONSUMER SERVICES	1	0.560135	6.6097	0.08	0.9325
D_HEALTHCARE	1	0.094313	9.5879	0.01	0.9922
D_INDUSTRIALS	1	0.375099	6.2666	0.06	0.9523
D_OIL&GAS	1	0.184807	14.2599	0.01	0.9897
D_TECHNOLOGY	1	0.334577	7.365	0.05	0.9638
D_TELECOMMS	1	-0.17413	8.5244	-0.02	0.9837

TABLE 9: LEVERAGE = TOTAL DEBT OVER NET ASSETS

$$(\text{Total Debt} / \text{Capital})_{it} = \alpha + \beta_1 * (\text{TOP_5}) + \beta_2 * (\text{INDIV}) + \beta_3 * (\text{DIRECTOR}) + \beta_4 * (\text{HOLDING}) + \beta_5 * (\text{ASS_STR}) + \beta_6 * (\text{FIN_SIT1}) + \beta_7 * (\text{FIN_SIT2}) + \beta_8 * (\text{GRO_OPS}) + \beta_9 * (\text{SIZ_FRM}) + \beta_{10} * (\text{PROD_UNQ}) + \beta_{11} * (\text{TAX_SHLD}) + \beta_{12} * (\text{FRM_SIZ}) + \beta_{13} * (\text{Sector dummy variables}_{it}) + \varepsilon_{it}$$

Fixed Two Way Estimates					
Model Description					
Estimation Method	FixTwo				
Number of Cross Sections	95				
Time Series Length	11				
Fit Statistics					
SSE	249233.2	DFE	927		
MSE	268.8599	Root MSE	16.3969		
R-Square	0.1156				
F Test for No Fixed Effects					
Num DF	Den DF	F Value	Pr > F		
104	927	0.96	0.6077		
Parameter Estimates					
Intercept	1	-10.1041	14.5676	-0.69	0.4881
ASS_STR	1	10.86071	8.4506	1.29	0.199
FIN_SIT1	1	1.055153	4.1041	0.26	0.7972
FIN_SIT2	1	0.368727	0.8864	0.42	0.6775
GROW_OPS	1	-12.1251	8.1709	-1.48	0.1382
SIZE_FRM	1	1.10754	2.8563	0.39	0.6983
PROD_UNQ	1	0.8975	2.5927	0.35	0.7293
TAX_SHLD	1	0.000588	0.00455	0.13	0.8972
TOP_5	1	0.087225	0.3839	0.23	0.8203
INDIV	1	1.756631	11.0795	0.16	0.8741
HOLDING	0	0	.	.	.
DIRECTOR	1	0.011691	0.0532	0.22	0.826
FRMSZ_OW	1	0.593579	0.9324	0.64	0.5245
D_CONSUMER GOODS	0	0	.	.	.
D_CONSUMER SERVICES	0	0	.	.	.
D_HEALTHCARE	0	0	.	.	.
D_INDUSTRIALS	0	0	.	.	.
D_OIL&GAS	0	0	.	.	.
D_TECHNOLOGY	0	0	.	.	.
D_TELECOMMS	0	0	.	.	.

Wansbeek and Kapteyn Variance Components (RanTwo)					
Model Description					
Estimation Method	RanTwo				
Number of Cross Sections	95				
Time Series Length	11				
Fit Statistics					
SSE	274355.3	DFE	1023		
MSE	268.187	Root MSE	16.3764		
R-Square	0.0209				
Variance Component Estimates					
Variance Component for Cross Sections	0				
Variance Component for Time Series	1.848728				
Variance Component for Error	268.8599				
Hausman Test for Random Effects					
DF	m Value	Pr > m			
0					
Parameter Estimates					
Variable	DF	Estimate	Standard Error	t Value	Pr > t
Intercept	1	-1.54355	5.7144	-0.27	0.7871
ASS_STR	1	-0.29519	2.9168	-0.1	0.9194
FIN_SIT1	1	-1.54235	3.3715	-0.46	0.6474
FIN_SIT2	1	-0.79233	0.4827	-1.64	0.101
GROW_OPS	1	-7.08178	5.7472	-1.23	0.2181
SIZE_FRM	1	4.375359	2.4172	1.81	0.0706
PRGD_UNQ	1	0.48901	1.9735	0.25	0.8044
TAX_SHLD	1	0.000494	0.00431	0.11	0.9087
TOP_3	1	-0.0054	0.0454	-0.12	0.9054
INDIV	1	-0.01728	0.0299	-0.58	0.5631
HOLDING	1	0.67357	2.1438	0.31	0.7534
DIRECTOR	1	0.045392	0.0285	1.59	0.1113
PRMSZ_OW	1	0.439989	0.636	0.69	0.4892
D_CONSUMER GOODS	1	0.308038	2.6456	0.12	0.9073
D_CONSUMER SERVICES	1	3.361317	2.6111	1.29	0.1983
D_HEALTHCARE	1	-0.20076	3.7063	-0.05	0.9568
D_INDUSTRIALS	1	-0.27565	2.4779	-0.11	0.9114
D_OIL&GAS	1	-0.62836	5.5496	-0.11	0.9099
D_TECHNOLOGY	1	0.013069	3.0578	0	0.9966
D_TELECOMMS	1	0.224962	3.4565	0.07	0.9481

TABLE 10: LEVERAGE = PROFIT BEFORE INTEREST AND TAX OVER INTEREST EXPENSE

$$(\text{PBIT} / \text{Interest Expense})_{it} = \alpha + \beta_1 * (\text{TOP_5}) + \beta_2 * (\text{INDIV}) + \beta_3 * (\text{DIRECTOR}) + \beta_4 * (\text{HOLDING}) + \beta_5 * (\text{ASS_STR}) + \beta_6 * (\text{FIN_SIT1}) + \beta_7 * (\text{FIN_SIT2}) + \beta_8 * (\text{GRO_OPS}) + \beta_9 * (\text{SIZ_FRM}) + \beta_{10} * (\text{PROD_UNQ}) + \beta_{11} * (\text{TAX_SHLD}) + \beta_{12} * (\text{FRM_SIZ}) + \beta_{13} * (\text{Sector dummy variables}_{it}) + \varepsilon_{it}$$

Fixed Two Way Estimates

Model Description

Estimation Method FixTwo**Number of Cross Sections** 95**Time Series Length** 11

Fit Statistics

SSE 2.513E+09 **DFE** 923**MSE** 2722613.9 **Root MSE** 1650.0345**R-Square** 0.2509

F Test for No Fixed Effects

Num DF	Den DF	F Value	Pr > F
104	923	2.14	<.0001

Parameter Estimates

Variable	DF	Estimate	Standard Error	t Value	Pr > t
Intercept	1	1861.744	1467	1.27	0.2047
ASS_STR	1	-482.452	857.9	-0.56	0.574
FIN_SIT1	1	-128.908	413.6	-0.31	0.7554
FIN_SIT2	1	170.8931	90.0845	1.9	0.0581
GROW_OPS	1	-338.524	823	-0.41	0.6809
SIZE_FRM	1	47.95514	287.7	0.17	0.8677
PROD_UNQ	1	-284.505	261.3	-1.09	0.2765
TAX_SHLD	1	0.024702	0.4578	0.05	0.957
TOP_5	1	-60.5717	38.6369	-1.57	0.1173
INDIV	1	3004.896	1115	2.69	0.0072
HOLDING	0	0	.	.	.
DIRECTOR	1	-3.60102	5.3625	-0.67	0.5021
FRMSZ_OW	1	-71.7572	93.9538	-0.76	0.4452
D_CONSUMER GOODS	0	0	.	.	.
D_CONSUMER SERVICES	0	0	.	.	.
D_HEALTHCARE	0	0	.	.	.
D_INDUSTRIALS	0	0	.	.	.
D_OIL&GAS	0	0	.	.	.
D_TECHNOLOGY	0	0	.	.	.
D_TELECOMMS	0	0	.	.	.

Wansbeek and Kapteyn Variance Components (RanTwo)

Model Description

Estimation Method	RanTwo
Number of Cross Sections	95
Time Series Length	11

Fit Statistics

SSE	2.561E+09	DFE	1019
MSE	2513159.4	Root MSE	1585.2947
R-Square	0.0136		

Variance Component Estimates

Variance Component for Cross Sections	3.27E+09
Variance Component for Time Series	0
Variance Component for Error	2722614

Hausman Test for Random Effects

DF	m Value	Pr > m
0	.	.

Parameter Estimates

Variable	DF	Estimate	Standard Error	t Value	Pr > t
Intercept	1	-1311.21	26086.1	-0.05	0.9599
ASS_STR	1	-732.809	815.5	-0.9	0.3691
FIN_SIT1	1	-214.61	391.4	-0.55	0.5836
FIN_SIT2	1	178.6669	85.845	2.08	0.0377
GROW_OPS	1	-529.954	785.2	-0.67	0.4999
SIZE_FRM	1	246.8789	269.4	0.92	0.3597
PROD_UNQ	1	-266.203	250.1	-1.06	0.2875
TAX_SHLD	1	-0.00996	0.4351	-0.02	0.9817
TOP_5	1	-60.7042	36.6438	-1.66	0.0979
INDIV	1	182.0909	279.7	0.65	0.5152
HOLDING	1	4301.409	14932.2	0.29	0.7734
DIRECTOR	1	-5.78166	5.0111	-1.15	0.2489
FRMSZ_OW	1	-75.6428	85.7066	-0.88	0.3777
D_CONSUMER GOODS	1	1312.39	28562.4	0.05	0.9634
D_CONSUMER SERVICES	1	2124.596	28189.9	0.08	0.9399
D_HEALTHCARE	1	1955.329	40896	0.05	0.9619
D_INDUSTRIALS	1	999.4704	26730.1	0.04	0.9702
D_OIL&GAS	1	3951.865	60814.5	0.06	0.9482
D_TECHNOLOGY	1	1852.948	31411.2	0.06	0.953
D_TELECOMMS	1	29.03341	36359.5	0	0.9994

TABLE 11: WANSBEEK AND KAPTEYN VARIANCE COMPONENTS
(RANTWO)

	Intercept	ASS STR	FIN SIT1	FIN SIT2	GROW OPS	SIZE FRM	PROD_UNQ	TAX_SHLD	TOP 5
Model 1	-1.1441	0.1809	0.0087	-0.0563	-0.0624	-0.0205	0.0295	0.0000	0.0119
Model 2	0.1642	-0.2235	0.1368	-0.1892	-1.3783	0.1315	-0.0829	0.0000	0.0119
Model 3	-1.5436	-0.2952	-1.5424	-0.7923	-7.0819	4.3754	0.4890	0.0005	-0.0054
Model 4	-1311.2100	-732.8090	-214.6100	178.6669	-529.9540	246.8789	-266.2030	-0.0100	-
									60.7042

INDIV	DIRECTOR	FRMSZ_OW	Variance Component	R-square	t Value	Pr > t
Model 1	0.0455	-0.0001	0.0326	0.0498	-0.3200	0.7500
Model 2	0.0173	0.0026	0.6302	0.0386	0.0304	0.9787
Model 3	-0.0173	0.0454	268.8599	0.0209	-0.2700	0.7871
Model 4	182.0909	4301.090	2722614	0.0136	-0.0500	0.9599

TABLE 12: SUMMARY OF FIXED TWO WAY ESTIMATES

	Intercept	ASS_STR	FIN_SIT1	FIN_SIT2	GROW_OPS	SIZE_FRM	PROD_UNQ	TAX_SHLD	TOP_5
Model 1	-0.0208	0.1859	0.0154	-0.0373	-0.0790	-0.0182	0.0263	0.0000	0.0135
Model 2	0.4890	-0.2431	0.1526	-0.1891	-1.3918	0.1072	-0.0904	0.0000	0.0128
Model 3	-10.1041	0.8607	1.0552	0.3687	-12.1251	1.1075	0.0075	0.0006	0.0872
Model 4	1861.7440	-482.4520	-128.9080	170.8931	-338.5240	47.9551	-284.5050	0.0247	-
									60.5717

	INDIV	DIRECTOR	FRMSZ_OW	F-value	Pr > t	R-square	t-value	Pr > t
Model 1	0.4105	0.0001	0.0251	16.7200	0.0001	0.1805	-0.1300	0.8968
Model 2	0.8354	0.0023	0.0027	3.7100	0.0001	0.4469	0.6900	0.4883
Model 3	1.7566	0.0117	0.5936	0.9600	0.6077	0.1156	-0.6900	0.7871
Model 4	3004.8960	-3.6010	-71.7572	2.1400	0.0001	0.3509	1.2700	0.2047

Appendix D Table 13
Pearson Correlation Coefficients

	ASS_STR	FIN_SIT1	FIN_SIT2	GROW_OPS	SIZE_FIRM	PROD_UNQ	TAX_SHLD	TOP_5	INDIV	HOLDINGS	DIRECTOR	FRMSZ_OW	D_CONS_GOODS	D_CONS_SERV	D_HEALTHCARE	D_IND	D_OIL&GAS	D_TECH	D_TEL
ASS_STR	1	-0.2527 <0.001 1045	-0.24327 <0.001 1045	-0.13496 <0.001 1045	-0.0632 0.0351 1045	-0.24163 <0.001 1044	0.00922 0.766 1045	-0.21619 <0.001 1045	0.01507 <0.001 1045	0.01159 0.7082 1045	-0.06359 0.0399 1043	0.14451 <0.001 1044	0.03197 0.3018 1045	0.03057 0.00211 1045	0.18795 <0.001 1045	0.01576 0.6103 1045	0.1297 <0.001 1045	-0.25112 <0.001 1045	0.157 <0.001 1045
FIN_SIT1		1	0.00856 0.0013 1045	0.00843 0.7855 1045	0.8846 <0.001 1045	0.36748 <0.001 1044	-0.02992 0.334 1045	-0.15553 <0.001 1045	0.06119 0.048 1045	-0.02478 0.0221 1045	-0.03248 0.09 1045	-0.07311 0.182 1044	-0.107 0.0005 1045	0.02209 0.4756 1045	0.06161 0.0465 1045	0.05774 0.8116 1045	0.00738 0.0621 1045	0.00738 0.8116 1045	0.12203 <0.001 1045
FIN_SIT2			1	-0.08815 0.0043 1045	0.00949 0.0546 1045	-0.02136 0.6899 1044	-0.01163 0.7072 1045	-0.17772 <0.001 1045	0.06363 0.0003 1045	0.11209 0.0003 1045	0.11856 0.0001 1045	-0.23115 <0.001 1044	0.02635 0.3949 1045	0.11277 0.0003 1045	-0.07383 0.017 1045	0.17155 0.6228 1045	-0.01523 0.0001 1045	-0.08978 <0.001 1045	0.0037 0.0001 1045
GROW_OPS				1	0.1574 0.7855 1045	-0.12627 <0.001 1044	0.00964 0.7555 1045	0.00508 0.8697 1045	0.0189 0.5416 1045	0.08895 0.004 1045	-0.05131 0.0974 1045	-0.18182 <0.001 1044	0.0695 0.0246 1045	0.05671 0.6669 1045	-0.03072 0.3211 1045	-0.01767 0.5683 1045	-0.02405 0.3651 1045	-0.09991 0.0032 1045	-0.0387 0.2113 1045
SIZE_FIRM					1	-0.17545 <0.001 1044	-0.0521 0.0923 1045	-0.05705 0.0653 1045	0.1872 0.172 1045	-0.00486 0.8754 1045	0.04531 0.1483 1043	-0.14738 <0.001 1044	-0.15458 <0.001 1045	0.1186 0.0001 1045	-0.01158 0.7086 1045	-0.00717 0.0134 1045	-0.00017 0.3564 1045	-0.00127 0.0031 1045	0.09128 0.1822 1045
PROD_UNQ						1	0.03731 0.2284 1044	0.19216 0.19216 1044	-0.20024 <0.001 1044	0.04467 0.1493 1044	0.0483 0.1188 1044	0.17315 0.1044 1043	0.1758 0.11376 1044	0.00002 0.7844 1044	0.01047 0.7844 1044	0.01285 0.0007 1044	0.01285 0.0007 1044	-0.06473 0.0365 1045	-0.2706 <0.001 1045
TAX_SHLD							1	0.0091 0.7689 1045	-0.01427 0.6449 1045	0.00156 0.9598 1045	-0.03147 0.3094 1045	0.04252 0.1698 1044	-0.01698 0.5835 1045	-0.02113 0.4951 1045	-0.00686 0.8248 1045	0.03245 0.2946 1045	-0.00486 0.8753 1045	-0.02269 0.4637 1045	-0.00858 0.7793 1045
TOP_5								1	-0.42772 0.76193 1045	-0.001 0.76193 1045	-0.13051 0.21365 1045	-0.11051 0.1044 1044	0.05555 0.16738 1045	-0.0726 0.0001 1045	-0.13182 0.02488 1045	0.045 0.1045 1045	-0.05761 0.0677 1045	-0.0538 0.0822 1045	-0.01946 0.5248 1045
INDIV									1	-0.2288 0.0001 1045	0.06701 0.0303 1045	-0.008564 0.1044 1044	-0.02037 0.5106 1045	-0.12942 0.0001 1045	-0.03975 0.1992 1045	0.07169 0.0205 1045	-0.06271 0.0427 1045	0.09719 0.0017 1045	0.00182 0.5568 1045
HOLDINGS										1	-0.1803 0.1383 1045	-0.05878 0.1044 1044	0.07895 0.14744 1045	0.0107 0.0001 1045	-0.06019 0.06517 1045	-0.09881 0.0004 1045	-0.05157 0.0957 1045	-0.16175 0.0517 1045	0.06019 0.0517 1045
DIRECTOR											1	-0.41565 0.1044 1045	-0.13883 0.13883 1045	-0.0409 0.00758 1045	-0.08136 0.0085 1045	-0.0758 0.0085 1045	-0.07645 0.0085 1045	-0.07645 0.0085 1045	-0.07645 0.0085 1045
FRMSZ_OW												1	0.11311 0.0003 1044	-0.10568 0.0006 1044	0.07926 0.0104 1044	0.04064 0.1895 1045	-0.15065 0.0001 1045	-0.25236 0.0001 1045	-0.1974 0.0001 1045
D_CONSUMER_GOOD													1	-0.2826 0.0001 1045	-0.09029 0.0001 1045	-0.37929 0.0001 1045	-0.05157 0.0001 1045	-0.16175 0.0001 1045	-0.09029 0.0001 1045
D_CONSUMER_SERV														1	-0.10206 0.0001 1045	-0.42196 0.0001 1045	-0.05983 0.0596 1045	-0.18284 0.0001 1045	-0.10206 0.0001 1045
D_HEALTHCARE															1	-0.13482 0.0001 1045	-0.01863 0.5476 1045	-0.05842 0.0591 1045	-0.03261 0.2933 1045
D_INDUSTRIALS																1	-0.077 0.0128 1045	-0.24152 0.0001 1045	-0.08925 0.7651 1045
D_OIL&GAS																	1	-0.03937 0.2812 1045	-0.01863 0.5476 1045
D_TECHNOLOGY																		1	-0.05842 0.0591 1045
D_TELECOMMS																			1
D_TEL																			1