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LIST OF ABBREVIATIONS

Abbreviation	Meaning
CEO	chief executive officer
EVA	economic value added
GDP	gross domestic product
JSE	Johannesburg Stock Exchange
MENA	Middle East and North Africa
MVA	market value added
OC3	three largest shareholders
ROA	return on assets
ROE	return on equity
SIC	Standard Industrial Classification
UK	United Kingdom

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

A paramount question for corporate finance theory and practice is whether ownership matters. The issue of the importance of the type of shareholder in a firm and the level of shareholding owned by the shareholder has to be examined in different institutional settings and at different times. Berle and Means' (1932:47) seminal work was premised on companies owned by many small shareholders and run by professional managers. On the other hand, corporations which are held tightly by large shareholders also operate successfully in certain jurisdictions. The types of shareholders of companies vary widely and the effects of these shareholders on corporations remain unresolved. Specifically, an understanding of the effects of ownership on two areas, which remain pivotal in finance literature, namely capital structure decisions and corporate performance, is crucial to the economic well-being of the shareholders, the management, the firm and the economy as a whole.

This thesis investigates the effects of ownership on capital structure and corporate performance in South African firms. The current chapter presents the introduction to the thesis, the motivation for the research, research questions and contributions of the research.

1.2 RATIONALE FOR THE STUDY

The motivation for this research was the lack of empirical evidence showing the effects of ownership on capital structure and the effects of ownership on firm performance in emerging economies such as South Africa.

Little is known about how firms in emergng markets raise capital or why firm performance in general is not as good as that of its counterparts in developed nations. Emerging economies such as South Africa have been experiencing low growth, averaging about one per cent, even when compared to other emerging markets. Firms remain small despite the presence of a competitive banking sector, a vibrant stock exchange and a functioning bond market.

In addition, even large and international firms such as Steinhoff experienced at least an 80% drop in share price and at least US$12.7 billion loss in market value due to irregularities, which have led to investigations in both South Africa and Germany (The Economist, 2017). Steinhoff was originally a German company which moved to and listed its shares in South Africa. One of South Africa's wealthiest businessmen was the company's largest shareholder and board Chairman.The company expanded by buying businesses in Europe and the United States of America, using debt. One of the biggest losers in the Steinhoff saga and the second largest shareholder is the Government Employees Pension Fund which is managed by the Public Investment Corporation (PIC). The Public Investment Corporation had a 10% shareholding which was equal to one percent of the Public Investment Corporation's US$157 billion worth of assets under its management. This research discusses the role of this peculiar organisation.

In further developments, the largest shareholder, who has since resigned as chairman of the board, is suing Steinhoff for £3.4 billion (or South African Rand 59 billion) for cash injections which he made in the company in 2015 and 2016 (Boland, 2018). Questions regarding the roles of management, majority and minority shareholders remain unanswered. The current research seeks to contribute to this literature.

Disparities in wealth between the rich and poor people are high in South Africa. The World Bank confirmed in its economic outlook in April 2018 that South Africa is the most unequal country in the world and that the inequality undermined policy certainty and constrained investment (World Bank, 2018:24). South Africa had a Gini-coeffient of 0.63 for 2015 (0.65 for 2014), which was the highest in the world and worse than that for 1994, the year in which the country became a democracy. The Gini-coeffiiceint has a range of zero for a perfectly equal society and one for a perfectly unequal society. South Africa's low-growth path was reflected not only in historical growth rates of 1.3% in 2017

but also in forecast rates of 1.8% to 1.9% for 2018 and 2019 respectively, while other emerging and developing economies have forecast growth rates of 4.5% and 4.7% for 2018 and 2019.

The democractic South African government identified the apartheid system which denied black people access to resources as one of the causes of the uneven distribution of wealth. The government adopted a black empowerment policy, which included prescibed ownership levels of firms for black people under certain conditions as a means of addressing the economic imbalances of the pre-1994 era. Although the imbalances spread beyond racial lines, it was acknowledged, in the main, that the black population remained the poorest. Apart from re-distributing wealth, the policy was intended to catalyse economic growth by fostering economic inclusion and harnessing the majority of the population, which is black, into mainstream wealth creation. The current study also sought to shed more light into the extent of such efforts and their effects on capital structure and performance of listed firms.

The types of ownwership and ownership concentration are at the heart of the skewed distribution of wealth. Individuals who do not have ownership cannot expect to share in the profitability of the firms that they do not own. Incentive schemes may exist for employees but the owners decide how such schemes are structured. The level of ownership determines the extent to which an owner can meaningfully change corporate policies. The absence of ownership and historical lack of equity held by the black population, for example, make it difficult for such a population group to access debt for its businesses. In adition, the lack of meaningful exposure to ownership of businesses may make it difficult for such a shareholder type to run large firms which perform well. The results of the study should be beneficial to policy makers, ownership groups studied such as institutional investors, families, management, the Public Investment Corporation, government, black people and foreign investors as well as financial instituions such as banks and other development finance institutions.

Ownership concentration and capital structure

Studies on ownership predominantly assumed that ownership of firms was dispersed (Berle & Means, 1932:47; Jensen & Meckling, 1976:306). Empirical evidence from the USA (Demsetz, 1983:388; Morck, Shleifer & Vishny, 1988:308; Shleifer & Vishny,

1986:462) and from emerging and other developed markets (La Porta, Lopez-de-Silanes, Shleifer & Vishny, 1998:1146-1148; La Porta, Lopez-de Silanes & Shleifer, 1999:511) showed that there was ownership concentration. High ownership concentration was associated with low investor protection in certain jurisdictions and was seen as a substitute for legal protection. The large shareholdings were therefore recognised as providing monitoring services of the firm's management, which was considered beneficial to the firm. However, the large shareholders also needed monitoring if they were prone to expropriating benefits to themselves to the detriment of small shareholders (Lins, 2003:160). Due to the empirical results they obtained in the study of East Asian countries, Claessens, Djankov and Lang (2000:82) postulated that concentration of ownership was negatively related to a country's level of economic development. A finding by the same study that differences in ownership concentration between countries were also due to variations in company law across those countries further motivated the current study.

Large ownerships were also expected where there was a possibility of expropriation by the state (or the state agency problem) (Stulz, 2005:1597). Rather than professional managers, such controlling shareholders were associated with lower incentives to use resources for their private benefit and were also considered to be more motivated to reduce state expropriation. Hence the state agency problem forced corporate insiders to allow other outside shareholders to inject more funds, leading to a concentration of ownership, which could limit a firm's ability to take advantage of international financial globalisation. Large shareholders would prefer to have more debt in firms if they believed that leverage could be used to monitor management (Kim, 2006:213). Diffuse ownership has been associated with the free-rider problem where management may not be monitored because everyone else believes this is being done by the next shareholder.

Positive relationships were observed between ownership concentration and leverage (Brendea 2014b:7; Cespedes, Gonzalez & Molina 2010:248; Rossi & Cebula, 2016:891), which were interpreted to mean that there was complementarity between large shareholdings and leverage in reducing agency costs. Another interpretation was that depending on the country's framework for protection of minority investors, the major investors used the debt for financing their own needs in order to protect their control of

the firms and to extract private benefits for themselves, at the expense of the small shareholders. Major shareholders could use the debt for their own benefit in order to avoid issuing equity (Paligorova & Xu, 2012:701) and to avoid scrutiny from creditors (Lee & Kuo, 2014:411).

On the other hand, Shahar, Adzis and Baderi (2016:36) found negative relationships between ownership concentration and leverage. The results were taken to mean that debt was not likely to be an effective monitoring tool for firms with concentrated ownership. Negative relationships were also attributed to information asymmetries associated with ownership concentration, leading to limited abilities by firms to raise debt (Farooq, 2015:99). An alternative explanation was that controlling shareholders found it expedient to reduce debt as a way of mitigating risk in the event of bankruptcy, thereby supporting the trade-off theory of capital structure (Shahar *et al.*, 2016:36).

Ownership concentration was also considered at macro or country level by considering the average number of firms controlled by certain families in a country, the level of market capitalisation controlled by the families and the percentage of gross domestic product contributed by firms owned by those families (Claessens *et al*., 2000:108; Demsetz & Lehn, 1985:1170; Faccio & Lang, 2002:367). Higher concentration was associated with lower levels of economic development of the countries studied. The effects of ownership concentration therefore remain unresolved due to the mixed results, creating a necessity for further studies, such as the current one, to contribute to the literature on the issue.

A review of the main theories of capital structure, namely Modigliani and Miller's irrelevancy theory, trade-off theory, asymmetric information theories, product/input market interactions theory, momentum profitability theory and agency theory provides different conclusions on the capital structures of firms. Due to the different results in the theory, the empirical research is an attempt to understand the actual relationships that exist in practice.

The types of ownerships have also been shown to affect capital structure. Major classifications of ownership types are institutional investors, management, families, foreigners, government, companies and other shareholders. An additional category

used in the current South African study is black ownership, which was similar to local ownership (Ezeoha & Okafor, 2010:251), but only included historically disadvantaged individuals. In addition, the government pension fund manager and investor of other government funds, the Public Investment Corporation, was considered a different type of owner because of it being part of the government but also acting as one of the largest institutional investors in South Africa.

Institutional ownership and capital structure

Davis (2008:11) observed a trend to reconcentrate ownership by mutual funds and reported that these funds did not easily participate in corporate governance, leading to the concept of *new finance capitalism*. Ownership by mutual funds was also found to be transient, or holding shareholdings for five years or shorter periods (Davis, 2008:11). Such institutional investors were passive and one reason for this behaviour was that it was perceived to be easier to walk away than to be activists, with the results of such activism being shared by free-riding shareholders. In addition, pension funds in the UK were more interested in the performance of investments rather than being active as shareholders or attending to corporate governance issues (Tilba & McNulty, 2013:165). The trend was assumed to be short-lived rather than being the norm (Davis, 2008:12). Rossi and Cebula (2016:883), on the other hand, refer to institutional investors as patient investors in their Italian study, which has been the widely held view of institutional investors. Hence the role of institutional investors in determining corporate policy in other jurisdictions remains largely unknown.

Where the relationship between institutional investors and capital structure was negative (Bathala, Moon & Rao, 1994:38; Michaely, Popadak & Vincent, 2015:1; Rossi & Cebula, 2016:884; Tong & Ning, 2004:63), such results were interpreted to mean that financial leverage and institutional investors were substitutes in monitoring management.

Foreign ownership and capital structure

The association of foreign ownership with better access to capital, better governance and modern management, was found to lead to lower leverage in foreign-owned firms (Li, Yue & Zhao, 2009:472). Access to diverse sources of finance can lead foreign-owned firms to choose the type of finance they deem best, leading to lower debt. If there

are different tax rates between locally owned and foreign-owned firms, with the foreign-owned firms having lower tax rates, the tax advantage for the foreign-owned group may be lost. Hence foreign-owned firms may prefer to use less debt. If debt is viewed as a monitoring tool, and foreign investors are mainly institutional investors, then the foreign institutional investors may be viewed as substitutes for debt. Monitoring includes controlling management and the foreign-owned companies may therefore have lower debt (Huang, Lin & Huang, 2011:209).

A possible reason for the positive relationship between foreign ownership and capital structure was information asymmetry in emerging markets. The foreign investors therefore perceived the lenders to be performing a monitoring role and preferred to invest alongside them (Mishra & Ratti, 2011:182; Zou & Xiao, 2006:246). The results of these studies were not statistically significant. Using the information asymmetries argument, Phung and Le (2013:45) expected a positive relationship between foreign ownership and capital structure but found a negative relationship. Foreign investors were said to avoid information asymmetries by investing in large companies with low leverage and Vo (2011:12) also found a negative relationship.

Gurunlu and Gursoy (2010:21) also associated better access by foreign investors to different sources of finance, including local lenders, with a positive relationship between foreign ownership and debt. However, Phung and Le (2013:50) observed a weak positive relationship using the fixed effects approach. Given these mixed results, the aim of the current study is to add more insight into the role of foreign ownership in capital structure.

State ownership and capital structure

Shleifer (1998:147) argues that private ownership should generally be preferred to state ownership and that where social goals are to be met, they should be dealt with through government contracting rather than ownership. However, market failure has been one of the arguments for state ownership. Megginson and Netter (2001:331) studied privatisation around the world and noted that the democratic political leadership of South Africa disposed of many state shareholdings. The current study examines the extent of such state shareholdings and their effects on the capital structures of investee firms.

Government guarantees are sometimes offered to state-owned firms, making the cost of borrowing cheaper than that of privately held firms (Deesomsak, Paudyal & Pascetto, 2004:392; Dewenter & Malatesta, 2001:320). Finance may also be obtained from state-controlled banks (Faccio, 2006:369). On the other hand, the government may not issue shares to the public in order to raise money, as privately owned firms do (Ezeoha & Okafor, 2010:252). Stringent procedures apply, leaving firms with options to borrow, use retained earnings or receive an equity injection from the state.

State ownership and capital structure were found to have positive and statistically significant relationships (Firth, Lin & Wong, 2008:642; Li *et al.*, 2009:471; Megginson & Netter, 2001:331). In some jurisdictions covered by the studies, the banks were owned by the state, whereas South Africa, the focus of the current study, has a banking sector that is generally privately owned, with the exception of a small number of state-owned lending and investment financial institutions such as the Development Bank of Southern Africa, the National Empowerment Fund and the Industrial Development Corporation.

Ownership concentration and corporate performance

Concentration of insider ownership leads to better corporate performance due to alignment between shareholders and management, leading to a reduction of agency costs (Jensen & Meckling, 1976:334). Non-management shareholder concentration increases corporate performance due to control and monitoring of management (Shleifer & Vishny, 1986:461) whereas concentration of ownership by families leads to better corporate performance due to superior knowledge and long-term investment horizons.

Multiple measures of ownership concentration ranging from the top one to the top 10 shareholders or a combination were employed in previous studies (Chang, 2003:250; Gonenc, 2006:199; Hautz, Mayer & Stadler, 2013:108; Jadoon & Bajuri, 2015:200; Onder, 2003:189; Yasser & Mamun, 2015:169). The use of multiple measures of corporate performance was encouraged by Daily and Johnson (1997:107) and was applied to the current research.

Nguyen, Locke and Reddy (2015:148) found positive relationships between ownership concentration and firm performance in Vietnam (a developing country) and Singapore

(a developed economy). The results were ascribed to strong corporate governance by large shareholders in the developing country, which had weak national governance. Other positive relationships were observed in the studies by Jadoon and Bajuri (2015:202), Singal and Singal (2011:380) and Wellalage and Locke (2012:62).

The relationship between the level of insider ownership and firm performance is an inverse U-shape, showing that performance increases with ownership up to a certain level, after which the entrenchment effect takes over and performance decreases. Alternatively, expropriation by large shareholders commences at this level at the expense of the smaller outside shareholders (expropriation hypothesis) (Wellalage & Locke, 2012:62). Isik and Soykan (2013:34) suggest that future research should consider using other measures of performance such as economic value added and market value added. The current study includes these performance variables.

Some studies found that ownership concentration had no effect on firm performance (Al-Saidi, 2013:813; Demsetz & Lehn, 1985:1155; Demsetz & Villalonga, 2001:209; Najjar, 2012:13; Yasser & Mamun, 2015:162). Part of the argument for such a result was efficient markets, which were assumed to force firms to assume optimal capital structures. Shleifer (2000:1) examined the question whether financial markets were efficient and concluded that, in some instances, markets were not efficient, leading to behavioural finance. Yasser and Mamun (2015:173) attributed their results to quality of data, heterogeneity of sample firms and the methods used for estimating the relationships. A South African study by Cameron (2012:1) found no relationship between ownership concentration and firm performance, indicating that the level of ownership of firms did not have an effect on the performance of firms. Cameron (2012:1) suggests that future research should be conducted to confirm the results. The current study uses the sample firms from the same stock exchange.

Negative relationships between ownership and firm performance were attributed to the prevention of take-overs and managerial entrenchment (Barclay & Holderness, 1989:384; Stulz, 1988:26), controlling shareholders consuming benefits, paying themselves high salaries, pursuing sub-optimal corporate policies and employing less qualified family members (Anderson & Reeb, 2003a:1306; Morck *et al.*, 1988:293; Morck, Wolfenzon & Yeung, 2005:676; Ongore, 2011:2122).

Ongore (2011:2120) studied the effects of concentrated and diffuse ownership on firm performance and found negative and positive results respectively. However, the sample was relatively small, at 42 companies and the sectoral mix was not disclosed, making it difficult to compare this study with other studies. However, the contribution to the ownership concentration and performance literature in Africa is acknowledged.

A meta-analysis of 42 studies on the relationship between ownership concentration and firm performance was conducted by Wang and Shailer (2015:202) in 18 emerging markets. South Africa was not one of the countries covered in the study. Differences in the origin of populations from which sample firms were chosen, the types of samples (whether they included or excluded financial firms) and the models used, including the endogeneity problem, were identified and provided for. A negative relationship was found across all countries. Accounting and market measures of firm performance were reviewed, but notably, economic and market value added were not included in the studies, but are incorporated in the current study.

Other studies found mixed results, for example, a positive relationship between ownership concentration and return on equity but a negative relationship between ownership concentration and return on assets (Alipour, 2013:1137). Such results implied that the relationship depended on the corporate performance measure used. Berrone, Surroca and Tribo (2007:828) observed a positive relationship for market performance measures but a negative relationship was found with the accounting measures. Similar results were obtained by Ting, Kweh, Lean and Ng (2016:1) in Malaysia, who used the generalised method of moments approach in their Malaysian study. Ownership concentration was associated with higher corporate performance when market measures were used but a negative relationship was observed when accounting measures were used.

Managerial ownership and corporate performance

Literature on types of shareholders and their effects on firm performance was also reviewed. In their theoretical study, Jensen and Meckling (1976:327) argued that firms in the USA were generally widely owned and that management controlled such firms, which often performed poorly. Theoretically, managerial ownership led to alignment

between managerial and other shareholdings, reducing agency costs and leading to better corporate performance. A positive relationship between managerial ownership and firm performance was implied by this line of reasoning.

Positive relationships were found between managerial ownership and firm performance, in line with the theoretical proposition that managerial ownership reduced agency problems (Moscu, Grigorescu & Prodan, 2015:194). Insider ownership had a positive relationship with corporate performance in a Sri Lankan study by Wellalage and Locke (2012:58), while a similar relationship was observed between board ownership and corporate performance in a study of Nigerian financial firms by Uwuigbe and Olusanmi (2012:212). Corporate performance was observed to increase with management ownership in Chinese firms (Gao & Song, 2008:382), and with chief executive officers' shareholdings (McConnell & Servaes, 1990:604; Mehran, 1995:175).

Increased managerial shareholding may lead to fewer non-executive directors on the board, resulting in management making decisions which reduce firm value by expropriating wealth from outside shareholders (Jensen, 1993:863). Communication and co-ordination problems increase and board monitoring becomes more difficult (Faccio & Lasfer, 2000:71), leading to lower firm performance. The implication is that managerial ownership is good for firm performance up to a point, beyond which the relationship becomes negative.

Non-linear relationships including the N-shape where there was a positive relationship up to a certain managerial ownership level followed by a negative relationship, and then followed by a positive relationship, were observed in some studies (Cho, 1998:104; McConnell & Servaes, 1990:595; Morck *et al.* 1988:301; Ruan, Tian & Ma, 2011:78). The positive ranges were attributed to the alignment effects whereas the portions with negative relationships were attributed to the entrenchment effects on the part of management.

Family ownership and corporate performance

Families were associated with special reasons for owning and managing firms such as guarding the reputations of their families. Hence their ownership of firms was proposed as mitigation for agency costs (Anderson, Mansi & Reeb, 2003:264). Family firms

outperformed non-family firms in studies by King and Santor (2008:2423), Villalonga and Amit (2006:412), Maury (2006:321) and Anderson and Reeb (2003a:1303); and family ownership was considered beneficial to minority shareholders (Maury, 2006:322), which is the opposite of the expropriation hypothesis. Coles, Lemmon and Meschke (2012:161) argue that corporate performance and managerial ownership are endogenous. In this case, it means that the relationship is two-sided. In addition, different performance measures produce different results. A positive relationship was observed by Ting *et al.* (2016:1), who calculated the measure of family ownership from the top 30 shareholders. The reasons provided for the relationship were greater interest in the business by family members and their better understanding of the business. Additional studies with positive relationships were conducted by Martinez, Stohr and Quiroga (2007:83) and Lee (2004:49). Higher levels of trust and greater family commitment, longer investment horizons and better monitoring were used to explain better performance.

Family ownership was also found to have an inverse U-shaped relationship with firm performance when ownership was slightly concentrated (15% family ownership or more) (Lozano, Martinez & Pindado, 2016:1333). Che and Langli (2015:1216) also found a U-shaped relationship between family ownership and firm performance. The role of the second-largest shareholders was examined by these studies and in their sample of private family firms, the latter study found that corporate performance was positive when the second shareholder was not a family member. A similar relationship was observed when ownership of companies was much more dispersed (Anderson & Reeb, 2003a:1323). In these instances, corporate performance was positive at lower levels of ownership and then became negative at higher levels of ownership. Increased private individual and family ownership had a negative relationship with corporate performance in the Abdallah and Ismail (2017:110) study.

Given the different types of relationships regarding the effects of managerial and family ownership on corporate performance obtained in the studies, it was imperative that the current study be conducted to test these relationships in a South African context. Insights gained from such a study will provide more light on how these groups of shareholders affect corporate performance.

State ownership and corporate performance

The effect of state ownership on corporate performance was also discussed in the literature. Wortzel and Wortzel (1989:633) argue that firms which are owned by the state may lack explicit goals and objectives and may not have proper systems or appropriate organisational cultures. The authors state that ownership is not the issue but how such firms are managed. However, because governance structures are determined by the owners, ownership remains important. The performance of privatised firms was compared with that of private firms in Europe and no significant difference was found (Arcas & Bachiller, 2008:107). In the UK, Martin and Parker (1995:225) found no unequivocal evidence that privately owned firms performed better than state-owned firms. In a study of bank performance, government ownership was found to have no impact (Arouri, Hossain & Badrul, 2014:117).

Privately owned firms performed better than state-owned firms, whether or not the state was a major shareholder, according to Bai, Lu and Tao (2009:453). The performance of privatised firms in China, Central and Eastern Europe depended on whether the new owners were foreign, in which case there was better performance, or local, in which case performance was mixed (Estrin, Hanousek, Kocenda & Svejnar, 2009:699). Their results also differed from region to region, pointing to the necessity for studies in different countries, including South Africa, to be embarked on.

State ownership was positively related to corporate performance in Gulf Co-operation Council countries (Zeitun, 2014:74), Malaysia (Ting *et al.*, 2016:1) and Turkey (Gursoy & Aydogan, 2002:6). However state-owned firms were not less efficient (Arcas & Bachiller, 2008:107) or state ownership had no effect on firm performance (Arouri *et al.*, 2014:117). Privately owned firms were found to perform better than state-owned firms and the contrast in performance was even more marked when state ownership was reduced below majority shareholding status (Bai *et al.*, 2009:453). A negative relationship was observed between state ownership and firm performance (Liu *et al.*, 2009:471; Pervan, Pervan & Todoric, 2012:81; Zeitun, 2009:96). Reductions in state ownership were recommended in order to improve corporate performance. Non-linear relationships were also found between state ownership and firm performance (Tian & Estrin, 2008:75; Wei, 2007:519; Yu, 2013:75). Therefore, the effect of state ownership on firm performance remains an open question and the current study also examines it.

Ownership by institutional investors and corporate performance

Pound (1988:237) explains the role of institutional investors with three hypotheses, namely conflict of interest, strategic alignment and efficient monitoring. Institutional investors were shown to have capacity to monitor and discipline managers (Shleifer & Vishny, 1986:465). A positive relationship was found between institutional ownership and one performance measure (Tobin's Q), while all other measures had insignificant relationships, reflecting the inconclusiveness of some results (Arora & Sharma, 2016:420). Other positive associations were observed in studies by McConnell and Servaes (1990:595), Dahlquist and Robertsson (2001:432), Arouri *et al.* (2014:117) and Uwuigbe and Olusanmi (2012:208), although the last two studies used financial institutions in their samples as opposed to non-financial firms, which are analysed in the current study.

Institutional ownership had no impact on firm performance in Gulf Co-operation Council countries (Zeitun, 2009:96; Zeitun, 2014:75), while negative relationships were found between institutional ownership and corporate performance (Wellalage & Locke, 2012:58). The current study explores this relationship for South African non-financial firms.

Foreign ownership and corporate performance

Using foreign board membership to represent foreign ownership, foreign ownership had a positive relationship with firm performance (Oxelheim & Randoy, 2003:2382). Agency and institutional investor theories were used to explain the relationship. Higher productivity was associated with foreign ownership (Yudaeva, Kozlov, Melentieva & Ponomareva, 2003:407) in Russia, while better corporate governance systems were the reason for the positive relationship between foreign ownership and corporate performance. Better performance by foreign companies was also explained by the long-term perspectives of foreign investors (Gurbuz & Aybars, 2010:358; Huang & Shiu, 2009:567). Foreign ownership was positively related to corporate performance (Abdallah & Ismail, 2017:96; Uwuigbe & Olusanmi, 2012:208).

An inverted U-shaped relationship was observed between foreign ownership and performance, meaning a positive relationship at the lower levels of foreign ownership

and a negative relationship at the higher levels of ownership (Choi, Sul & Min, 2012:207; Phung & Mishra, 2016:64). Better skills brought by foreign investors, among other advantages, explained the positive relationship and entrenchment by foreign investors as a possible cause for the negative aspect. Phung and Le (2013:45) found a negative relationship between foreign ownership and corporate performance, although the relationship was insignificant, using ordinary least squares regression analysis. Foreign ownership had no effect on corporate performance in Zeitun's (2014:76) study. Taking a cue from studies such as that of Agyemang, Fantini and Ansong (2016:227) and the fact that there was a significant level of foreign ownership in South Africa and given the mixed results from prior studies, the current study examines the effects of foreign ownership on corporate performance.

Black ownership and corporate performance

To widen the ownership pool, the South African government introduced regulations which required companies to have certain levels of ownership by previously disadvantaged groups. Companies which tendered for government contracts were expected to comply with the regulations. Compliance in that case could at worst leave the company's revenue streams unchanged whereas non-compliance for companies which relied on such contracts was expected to lead to lower revenue streams, and consequently, lower profitability. Companies which did not rely on government contracts were not expected to experience a direct impact regarding compliance or non-compliance with black ownership regulations. Adoption of black shareholdings would be for good corporate citizenship, among other reasons. The current study therefore seeks to understand the effects of black ownership on corporate performance. This category is similar but not equivalent to local or indigenous ownership.

Public Investment Corporation ownership and corporate performance

The study identifies the Public Investment Corporation, a government entity which manages the South African Government Employees Pension Fund and other government funds, as a unique institution due to its ownership and its role as an institutional investor. As a government institution, it could be expected to fulfil other government mandates such as employment creation and preservation, even at the expense of optimal corporate performance. The relationship between ownership and performance may not necessarily be positive. On the other hand, as a fund manager,

the Public Investment Corporation would be expected to have the capacity to monitor management, leading to a positive relationship between ownership and corporate performance.

The effect of company ownership on corporate performance also remains unresolved. Large companies with their extensive resources can monitor the investee companies effectively, leading to a positive relationship. Abdallah and Ismail (2017:109) and Ongore (2011:2120) found positive relationships between company ownership and performance of investee companies. Smaller companies may not have the capacity to provide the resources and monitoring required or large companies may be entrenched, leading to a negative relationship. The current study aims to examine this relationship using South African data.

Other shareholders constitute the balance of shareholders in the ownership groups in the current study. Therefore, the nature of such shareholders and type of relationship they should have with corporate performance can only be established empirically.

1.3 RESEARCH QUESTIONS

The current research provides additional evidence and extends the literature by seeking to answer the following questions:

a) Does ownership (concentration and type of ownership such as institutional, family, managerial, foreign, state, black, Public Investment Corporation, company and other) affect capital structure in South African-listed firms?

b) Does ownership (concentration and type of ownership such as institutional, family, managerial, foreign, state, black, Public Investment Corporation, company and other) affect corporate performance in South African-listed firms?

1.4 RESEARCH CONTRIBUTION

The current research will contribute to theory, methodology and practice. Firstly, studies often examine the relationship between ownership concentration and/or ownership type and capital structure or firm performance. This study extends the literature by studying

different levels of ownership concentration and various types of ownerships to explain capital structure or corporate performance simultaneously. In particular, categories of ownership in the study, namely institutional, family, managerial, foreign, state, black, Public Investment Corporation, company and other, cover a wider range than those employed in other studies, enhancing theoretical knowledge by providing a more elaborate picture of the effects of ownership.

Secondly, the study uses two types of ownerships not found in the extant literature, namely black ownership and ownership by Public Investment Corporation. Although the former type of ownership is closely linked to local ownership, it is different in that it does not include all local ownership but certain sections. The latter concept of ownership is considered too significant and unique to be merged with other types of ownerships. The use of these classifications enables a deeper understanding of ownership.

Thirdly, the current study investigates the effect of ownership on capital structure and corporate performance, which has not been studied using South African data. This study will contribute to the theory by providing further understanding of the relationships between ownership and capital structure and firm performance in a developing country. Additionally, the study shows the testability of theories in finance in an emerging market.

Furthermore, the study provides different measures of the dependent variables, namely capital structure and corporate performance, and independent variables (ownership), thereby contributing to research. Capital structure is measured by the book values and market values as well as short-term, long-term and total debt. The leverage factor, which has not been employed in similar studies, is also used as a measure of capital structure. Firm performance is measured using return on assets and return on equity, which are accounting measures, Tobin's Q, which is a market measure and economic value-added and market value-added, which are economic measures. The last two economic measures have hardly been used in analyses of the effects of ownership on capital structure and corporate performance. Ownership concentration is measured using the Herfindahl index, calculated based on the percentage shareholdings of the top one, two, three, five and 10 shareholders, thereby covering different levels of ownership concentration and obtaining a perspective on how the relationships changed with the changes in the shareholding levels. By collecting annual data on non-financial firms

listed on the Johannesburg Stock Exchange (JSE) Securities Exchange from 2004 to 2014, the study creates an elaborate database on ownership, capital structure and firm performance in South Africa over this period.

Furthermore, a number of methods are used to analyse the data. These methods are suited for the type of data and will overcome the problems usually encountered in regression analysis such as endogeneity, heteroscedasticity and unobserved heterogeneity. Two versions of the generalised method of moments approach are used to examine the relationships of ownership structure and firm performance. This is the first study using these methods and examining these relationships on South African data.

As a final contribution, the study is expected to assist with insights into how capital structure and firm performance are influenced by ownership, among other factors. Such knowledge may be beneficial to the firms' managers and directors, shareholders and banks in their decision-making processes, and assist in providing direction to policy-makers.

A main result from the South African study was that ownership affects capital structure. Family ownership had a positive effect on capital structure. The practical implication is that family ownership should be promoted in order for the economy to increase the use of corporate debt, leading to an increase in economic activity in the banking sector and in the family firms. Financial institutions have to stand ready to provide finance to the family firms. Given the small number of banks in South Africa, policy makers may need to consider the licensing of more and smaller banks to make the oligopolistic market more competitive, leading to lower costs of debt.

Given the negative relationship between black ownership and capital structure, policy makers should consider innovative ways of funding to encourage the use of debt by the majority of the population to spur economic development. More emphasis should also be placed on creating new productive capacity by black owners instead of the selling of small shareholdings in existing businesses.

The positive relationships between ownership by institutional investors, foreign investors and companies and capital structure ensure that there is a good equity base from which debt can be raised in the economy, leading to a robust financial system.

Foreign ownership had a positive effect on corporate preformance. A practical implication is that the skills, experience and resources from such shareholders enable them to perform well in different environments. Policy makers need to create an environment which is friendly to these investors so that more foreign investment may be attracted into the economy. On the other hand, among other results, black ownership had a negative effect on corporate performance. Training, exposure and opportunities should also be afforded to the black population by firms, shareholders and directors to ensure that the skills base of the country is increased, leading to a more skilled workforce and an entrepreneurial population.

1.5 STRUCTURE OF THE RESEARCH

The thesis consists of nine chapters. A summary of each chapter is provided below:

Chapter 1: Introduction
The current chapter presents a general overview of the thesis, the motivation for the research, research questions and contributions of the research.

Chapter 2: Literature review of the relationship between ownership and capital structure
A review of the literature on ownership and capital structure is provided in this chapter. The chapter starts with an overview of the literature between ownership concentration and capital structure and proceeds to review the relationship between ownership types and capital structure. The chapter identifies some gaps in the existing literature and develops hypotheses in response to issues raised in previous studies in relation to the effects of ownership on capital structure.

Chapter 3: Literature review of the relationship between ownership and corporate performance

This chapter reviews the literature on ownership and corporate performance. It begins with the relationship between ownership concentration and firm performance and then reviews the relationship between types of ownership and corporate performance. The chapter identifies some gaps in the existing literature and develops hypotheses in response to issues raised in previous studies, taking the South African context into account, in relation to the effects of ownership on firm performance.

Chapter 4: Research methodology

This chapter discusses the process of data collection and the statistical models used in the investigation of the relationships between ownership and capital structure and ownership and corporate performance.

Chapter 5: Descriptive statistics and correlation analysis of the relationship between ownership and capital structure

This chapter presents the results of the empirical analysis of the relationship between ownership and capital structure. In particular, descriptive statistics and correlation analyses are examined in this chapter.

Chapter 6: Descriptive statistics and correlation analysis of the relationship between ownership and corporate performance

This chapter presents the results of the empirical analysis of the relationship between ownership and corporate performance. In particular, descriptive statistics and correlation analyses are examined in this chapter.

Chapter 7: The effects of ownership on capital structure - results

This chapter examines the balance of the empirical results between ownership and capital structure. The effects of ownership concentration and ownership type such as institutional investors, families, directors, foreigners, the state, companies, Public Investment Corporation, blacks and other shareholders on capital structure are investigated.

Chapter 8: The effects of ownership on corporate performance - results

This chapter examines the balance of the empirical results of ownership and corporate performance. The effects of ownership concentration and ownership type such as institutional investors, families, directors, foreigners, the state, companies, Public Investment Corporation, blacks and other shareholders on firm performance are investigated.

Chapter 9: Conclusion

This chapter presents the salient findings of the study and compares them with the findings from previous studies. The results of the study are also discussed. The chapter concludes by indicating implications for South African firms and for policy-makers in addition to pointing out the limitations of the study and recommends further areas for research.

CHAPTER 2

LITERATURE REVIEW OF THE RELATIONSHIP BETWEEN OWNERSHIP AND CAPITAL STRUCTURE

2.1 INTRODUCTION

Chapter 1 explained the main objectives of the study, namely to investigate whether ownership affects capital structure and firm performance. This chapter explores the relevant literature on the relationship between ownership structure and capital structure, in line with the first objective of the study. The analysis of the literature is meant to assist in the establishment of the key objectives of the study, enable a refinement of the research problem, provide a basis for research design and assist in identification of theories, which will be used to interpret the research findings and support the conclusions of the of the study. The study reviews prior studies on ownership, including ownership concentration and its effects on capital structure. The next chapter reviews previous literature on the effects of ownership on firm performance. The study focuses on the role of debt in resolving problems of agency between shareholders and lenders and between management and shareholders. Such a review is intended to highlight some of the issues faced in this area of research and how they are resolved.

The review of the literature on the effects of ownership on capital structure begins with Section 2.2 which reviews the effects of concentrated ownership on firm capital structure, with a view to establish the different views and whether there is agreement on how such ownership affects capital structure. Section 2.3 discusses the different theories of capital structure. Section 2.4 examines ownership identity, or types of ownerships, such as management, institutional investors, foreign ownership and government ownership and their relationship with capital structure. The section also reviews whether different types or identities of ownerships have an effect on how firms are financed. Control variables and measures of capital structure are discussed in Section 2.5. Emerging hypotheses which emanate from a review of the literature are

discussed in Section 2.6. Section 2.7 provides a summary of the chapter and relates it to Chapters 3 and 4.

Iannotta, Nocera and Sironi (2007:2128), in their investigation of ownership structure, risk and performance in the European banking industry, state that a firm's ownership structure consists of two dimensions, namely the degree of concentration of ownership and the nature or types of owners. They argue that the first dimension refers to the extent to which a firm's ownership is more or less dispersed. In terms of the second dimension, they postulate that even if two firms have the same degree of concentration, they will differ if one has government, for example, as a majority shareholder. The identity of the owners, namely who the shareholders are, and concentration of ownership, or the proportion of shares owned by the shareholders are identified as two important issues emanating from the ownership structure discussion (Fazlzadeh,Hendi & Mahboubi, 2011:251).

The analysis in this study will use these two components of ownership structure because they provide a deeper insight into the way firms are owned. In addition, previous studies adopt the same distinction, although some studies tend to examine ownership concentration only or type of ownership only, without examining both elements at the same time.

It is important to consider the question of type of ownership before discussing its effects. Ownership is classified into several categories including individuals or families, ownership by management and/or board of directors (usually called insider ownership), ownership by corporate firms, financial institutions and special groups such as black economic empowerment, in the case of South Africa.

2.2 INTRODUCTION TO CONCENTRATION OF OWNERSHIP

Apart from the types of owners, the concentration of ownership is also important. In this case, the discussion involves whether the ownership of the firm is diffused or concentrated. Diffused ownership refers to the case where there are many small shareholders owning a company and in the case of concentrated ownership, there are a few shareholders holding large stakes. Research by Berle and Means (1932:47) and Jensen and Meckling (1976:306) is based on the notion that firm ownership is widely dispersed. Evidence of concentration of ownership in USA firms was provided by Demsetz (1983:388), Shleifer and Vishny (1986:462) and Morck *et al.* (1988:308).

Similar findings were made in emerging and other developed markets (La Porta *et al.*, 1998:1146-1148; La Porta *et al.*, 1999:511). La Porta *et al.* (1998:1115) empirically examined the effect of the enforcement of investor protection laws on corporate ownership patterns in 49 countries around the world (21 with French civil law, six with Germanic civil code, four with Nordic civil code and 18 using common law). The sample consisted of publicly listed non-financial companies with no government ownership. South Africa was included in the sample and was classified under the countries with laws which have an English origin. The study traced commercial law to two legal traditions, namely common law, which has an English origin and civil law (with French, German and Scandinavian variants), which is based on Roman law. Through various mechanisms including conquests, these laws spread across the world. Countries with civil laws were found to have the weakest protection of investors and creditors. Large shareholdings, hence ownership concentration, were partly recognised as providing monitoring services on the firm's management, a phenomenon which was considered advantageous to the firm. The authors argued that high ownership concentration was to be a substitute for legal protection in a jurisdiction where there was poor investor protection. High ownership concentration was associated with poor protection of investors. Ownership concentration was measured by the combined ownership of the three largest shareholders. Civil law countries were found to have the poorest investor protection and had highly concentrated firm ownership.

La Porta *et al.*'s (1998:1113) study highlights the importance of country or jurisdiction in which a firm operates as one of the determinants of such a firm's corporate governance systems, including the pattern of ownership, and ownership concentration. The sample size, 10 for each country, can be considered to be very small. However, given the large number of countries covered by the study (49), the small sample size per country could be justified if a cursory view across the countries was the objective. Larger samples are required for studies endeavouring to give a more representative reflection of the characteristics of the underlying population. The 10 largest (by market capitalisation) non-financial, domestic, totally private firms were selected for each country. In countries where these criteria could not be met, a minimum of five firms was selected. It would be necessary to conduct an in-depth analysis to understand the issues in any single country. Concentration of ownership of the top three shareholders is pragmatic and a similar measure will be used, among others, for the study of South African firms.

Concentration of ownership leads to the concept of block-holding. Block-holders are shareholders who own a certain minimum prescribed but usually material stake in a company. Holderness (2009:1381) uses a minimum threshold of 5% to define block-holders, in line with other studies (Claessens *et al.*, 2000:85; Dlugosz, Fahlenbrach, Gompers & Metrick, 2006:599; Faccio & Lang, 2002:360; Villalonga & Amit, 2006:389). Part of the justification for the use of 5% is that Mikkelson and Ruback (1985:526) and Holderness and Sheehan (1985:573) showed that shares in the 5-10% range did have a significant effect on firm value. Tobin's Q, a measure of firm performance or value, was found to vary with managerial ownership in this range (Morck *et al.,* 1988:298). Studies also used lower cut-off thresholds for the largest shareholder.

In his theoretical study of the limits of financial globalisation, Stulz (2005:1597) argues that concentration of ownership hampers economic growth and financial development and stifles countries from taking advantage of the globalisation of finance. He states that country attributes are crucial to financial decision-making due to what he calls the "twin agency problems" caused by leaders of sovereign states and corporate insiders who act in their own interests at the expense of outside shareholders. Where these problems exist, the author argues that diffuse ownership is not the best option but rather concentrated ownership to combat these problems.

Stulz (2005:1596) considers firms to face the risk of internal expropriation by management or major shareholders (or “the agency problem of corporate insider discretion”) and external expropriation by the state. Problems caused by corporate insider discretion are similar to the problems of separation of ownership and management under agency theory, which were discussed by Jensen and Meckling (1976:306). Examples of such issues are lavish expenditure used to purchase company planes and even outright fraud. Stulz (2005:1596) argues that when the risk of possible expropriation, whether by management or the state is high, ownership should be concentrated, which, in turn, constrains economic growth, the development of financial markets and financial globalisation, which is specifically defined in the study as the increase in trade in financial assets. Due to the corporate insiders’ and other controlling shareholders’ limited resources and aversion to co-investment with other parties, Stulz (2005:1597) argues that these two elements act as impediments to retard the extent to which firms can take advantage of, for example, low cost of capital, which can be beneficial to the firm. Controlling shareholders and management may not want to face the threat of dilution of their shareholdings and/or loss of control, although the injection of more funding can be beneficial to the company. In the context of a firm’s capital structure, this means that due to such restrictions, firms may be unable to take advantage of cheaper sources of capital in order to be optimally financed. Firm value may also be compromised due to firms incurring costs which are in excess of what is available in the market simply because the management or controlling shareholders are unwilling to take advantage of market conditions.

Stulz (2005:1597) adopts the term *the agency problem of the state ruler discretion* to describe possible expropriation by the state. This concept refers to the manner in which the state can use its power to increase the benefits it derives while reducing the returns to firms under its jurisdiction. According to North and Weingast (1989:803), there are two ways of viewing the way the state functions. One way is through the contracting model, which describes the extent to which the state makes it easier for firms to enter into contracts which increase the returns of its investments such as securing property rights and wealth protection. A second view is the predatory theory of the state in which it can implement policies, including expropriation, which they argue should be avoided because it severely prejudices the returns to the assets of firms. North (1981:20) mentions that the state is needed for economic growth but that the same state could

also be the cause of economic decline. The introduction of the effects of the role of the state in a study of private firm ownership provides a different and wider approach to the subject. Stulz (2005:1598) argues that if the agency problem of the state is significant and a firm is run by professional managers and has a dispersed shareholding, those managers will take steps to ensure that monitoring of their actions becomes more difficult. As a result, management entrenchment is enhanced. Controlling shareholders who also manage the company, rather than professional managers, are associated with lower incentives to use resources for their private benefit, but would be more motivated to reduce state expropriation. Hence ownership concentration is expected if there is a potential for higher state expropriation or the state agency problem. This argument is taken further to state that the increased state agency problem increases ownership concentration, forcing corporate insiders to allow other outside investors to put in money. However, the way that corporate insiders react to the state agency problem may be considered to define the limit to which a firm is able to take advantage of international financial globalisation.

By adding the state agency problem and controlling shareholders, Stulz (2005:1597) extends the ambit of agency theory, which was traditionally viewed as a problem between ownership and control (Jensen & Meckling, 1976:306). Further insights into ownership concentration are found in that paper. The South African study will not examine the state agency issue but examine normal ownership as well as ownership concentration by various groups of shareholders including the state, where applicable. The potential effects of financial globalisation are indirectly alluded to in the South African study only to the extent that there is foreign ownership of a South African firm.

Studies on ownership generally concentrate on insider ownership, namely management control. An empirical study by Gilson (1990:355) examines large shareholders in the case of bankruptcy. He found that ordinary share ownership became more concentrated with large block-holders than with insiders. Holderness (2009:1377) examined the hitherto established notion that firms in the USA were more diffusely held than those from other countries. He found that ownership of firms in the USA showed evidence of concentration and that there were many block-holders. Data used was collected from USA-based firms and firms from 22 European countries and East Asia. The 375 USA firms were listed on the New York Stock Exchange, American Stock Exchange and

National Association of Securities Dealers Automated Quotations (NASDAQ) and the data was collected from 1995. He split ownership into several categories such as ownership by block-holders, directors and officers together, block-holders only, directors and officers only and largest shareholders. The largest shareholders collectively were found to own 39% of the shares and directors and officers 24%, while outside block-holders (shareholders who had no representation on the board) owned 11% of the shares on average.

2.2.1 Concentration of ownership and capital structure

This section reviews studies on concentration of ownership and its effects on capital structure. The review highlights the measures used in analysing concentration of ownership and other related variables, and methodologies adopted in some of those studies to provide an understanding of the issues involved and the extent of the first part of the research problem, namely how ownership concentration affects capital structure. This review will lead to the formulation of the relevant hypotheses at the end of the chapter.

Holderness (2009:1402) and Demsetz and Lehn (1985:1167) found an inverse relationship between concentration of ownership and the size of a firm. An inverse relationship was found between the ownership concentration of a firm and its age in the USA (Helwege, Pirinsky & Stulz, 2007:1016; Holderness, Kroszner & Sheehan, 1999:442) and in the UK (Franks, Mayer & Rossi, 2009:4043). The same studies showed that concentration of ownership reduced over a firm's life cycle. The decline in concentration happens because of founders selling their stakes over time for the purposes of diversification as well as the firms issuing shares, thereby forcing a dilution of the existing shareholders unless they subscribe for more shares. This means that large firms have low ownership concentration and that older firms have low concentration of ownership. However, old firms do have block-holders. The negative relationship between ownership concentration and firm size is due to the fact that as firms become bigger, constraints to individuals' wealth make it difficult for them to continue to invest more. Another reason given by Holderness (2003:51) is that as firms become bigger, block-holders are unable to accomplish their goals.

Concentration of ownership may have an effect on the capital structure of a firm, among other decisions. Ezeoha and Okafor (2010:252) argue that dispersed ownership gives room within the ownership structure for local shareholders to hold shares in firms. They assume that the firm in question is foreign based and is expanding its operations into a different country. A locally owned and domiciled firm with concentrated ownership may not face similar issues. Financial institutions have been identified as major shareholders in some firms. In bank-based environments such as Japan, where banks are also allowed to own shares in firms, the banks may be majority shareholders. Prowse (1992:1123) found that these financial institutions in Japan had 20.5% shareholdings in firms compared with 0.2% shareholdings by financial institutions in the USA.

If it is believed that leverage can be a tool for monitoring management, large shareholders may prefer to have more debt in their firms (Kim, 2006:213). In this case, concentration of ownership would be positively related to leverage. The controlling shareholders may, in turn, need monitoring if they are prone to expropriating benefits to themselves to the detriment of minority shareholders (Claessens, Djankov, Fan & Lang, 2002:2770; Lins, 2003:160).

The involvement of block-holders in the affairs of a firm through board representation was investigated by Lins (2003:175), who studied the phenomenon in 17 emerging market economies, including South Africa. The results showed that ownership concentration in USA firms was similar to that of other countries studied. A similar result was obtained from an examination of the largest shareholder of a firm. Studies also categorised largest shareholders as follows: family (including individuals), corporate (private or public), government, financial institutions and others. The distribution of ownership between these categories was similar for USA and non-USA firms (Claessens *et al.* 2000:106; Faccio & Lang, 2002:373; Holderness, 2009:1405). The type of largest shareholder in the USA is similar to that of other economies, namely block-holders with board representation. Theoretical papers on large shareholders include those by Shleifer and Vishny (1986:461), Grossman and Hart (1980:42) and Burkart, Gromb and Panunzi (1997:693; 1998:172).

Diffuse ownership leads to the issue that a joint owner will have different incentives from those of a sole owner or a manager. The problem becomes greater with more diffuse ownership. Holderness (2009:1379) argues that more diffuse ownership increases the free-rider problem, which means that some shareholders do not make an effort to monitor the management, knowing that other shareholders are dealing with the issue. In this process, the group that appears indifferent to the problem knows that the efforts of the active shareholders will benefit it, by default. Concentration of ownership may be important because it could lead to an increase in political power for those who own the majority of the shares. On the other hand, ownership concentration may not occur because individuals fail to garner enough financial resources due to limitations in personal wealth.

Holderness (2009:1381) also uses 5% as a minimum threshold for block-holders. His data pertains mainly to registered shareholders whose names appear on the list of shareholders. The problem of beneficial owners, who are shareholders using banks, asset managers and other organisations as registered title holders on their behalf, creates a complication in the identification of the types of owners. Block ownership calculation may be understated under these circumstances. In the South African case, this class of shareholders appears under the classification of nominees. If the details of the nominee shareholding are not provided, the classification of types of shareholders is likely to be approximate. To the extent possible, the study using South African data will take steps to identify the relevant shareholders.

Ownership of firms is stable over short periods of time, according to La Porta *et al.* (1999:475). La Porta *et al.* (1999:493) use 10% of the votes as a cut-off for control of companies. This figure is justified by its materiality and availability of data. This cut-off assumes very concentrated shareholdings (in excess of 10%) when the reality could be that if the companies are extremely large and have substantial market capitalisations, block-holders may be unable to raise such capital. Control of these corporations may therefore lie in the hands of smaller shareholdings among many small shareholdings. Classifications of shareholders in the La Porta *et al.* (1999:476) study were family or individual, the state, a widely held financial institution such as a bank or an insurance company, a widely held corporation and any other type of shareholder. Data limitations hampered the separation of the family and individual categories in that study.

Management, individuals or family ownership may have to be separated if the aim is to investigate the effects of different types of family ownerships in a firm. This delineation is especially important given the strands of the literature which show the effects of each category of ownership on the capital structure of a firm. Family members were classified to be in the management team if the family member was a chief executive officer (CEO), the chairman, the honorary chairman or the vice chairman of the board of directors of the firm that a family controlled. Family names of controlling families were used to detect the presence of a family member in management, as a result, family members with different surnames would not pass this test. Galve-Gorriz and Hernandez-Trasobares (2015:412) define *family ownership* as the sum of the shareholdings by two or more related members as the largest shareholder group. Categories of ownerships for the study of South African firms are therefore defined with data constraints in mind.

Families and the state were found to be the dominant types of shareholders in the La Porta *et al.* (1999:491) study, rather than financial institutions such as banks and insurance companies. Financial institutions had meaningful stakes but not controlling shareholdings. This could be due to the diverse cross-section of 27 countries used in the sample, including some European and Asian companies. Families were found to be the dominant controlling shareholder for the large companies as well as the medium-sized companies. The question of who monitored the controlling families was investigated and it was found that in most cases, no other shareholders monitored the controlling family shareholders. Expropriation of minority shareholders by controlling shareholders would be expected to be rife in such corporations. Strong legal systems to protect the minority shareholders are an option. La Porta *et al.* (1999:471) concluded that whereas Berle and Means (1932:84), in their thesis about the management controlling widely held firms, reflected the position for large USA firms, this was not the case with large corporations in the rest of the world. In the case of South African firms, the level of ownership by financial institutions will be explored. In addition, it is not expected that the state will have a major shareholding directly except through its investment arm such as the government pension fund. The position of the South African firms regarding who controls them will be explored in the current study.

Faccio and Lang (2002:365) and Claessens *et al.* (2000:100) examined the proportion of firms having block-holders and the average aggregate block ownership in a sample of firms from different countries. The UK had the lowest proportion of firms with block-holders and a low average aggregate block ownership. Japan had the lowest block ownership percentage and a low proportion of firms with block-holders. The results for firms based in the USA were similar to those of the other countries and part of the explanation could be the size effect, which means that due to their relatively large sizes, such firms would have lower ownership concentration.

Claessens *et al*. (2000:84) examined the separation of ownership and control in nine East Asian countries. They found that through the existence of cross-holdings and pyramid schemes, the voting rights were usually greater than cash flow rights. Not only were individual firms dominated by shareholders ("micro ownership concentration") but the same shareholders also controlled large numbers of firms (up to two-thirds of firms) within their countries ("macro ownership concentration"). Claessens *et al*. (2000:108) sought to investigate the issue of separation and control across East Asian nations, observe any ownership and control differences within countries, analyse the effect of size and age on ownership and control and whether ownership was concentrated within certain countries. They studied 2 980 listed financial and non-financial firms in nine East Asian nations, namely Hong Kong, Indonesia, Japan, Malaysia, the Philippines, Singapore, South Korea, Taiwan and Thailand. A minimum shareholding of 5% was used from ownership structure data available at the end of the 1996 fiscal year or the closest date available. The Worldscope database from which the information was extracted was believed to be up to two years out of date. Ownership data was collected for only one point in time. Data on nominee shareholders could not be analysed further. The study excluded any firms which had sizeable nominee shareholders. To the extent that the nominees had substantial shareholdings, the result of the study could be affected by the lack of further analysis of such shareholdings. The study undertook an approximation of the effect of nominee shareholders to minimise the effect of the lack of this information.

Claessens *et al*. (2000:82) identify cash flow rights and voting rights as very important in finance theory. Jensen and Meckling (1976:315) postulate that any incentives to expropriate a firm's resources will vary with cash flow rights. They also state that the

concentration of control rights in a controlling shareholder's hands and concentration of cash flow rights are similar concepts. The study was conducted along similar lines to that of Claessens, Djankov, Fan and Lang (1999:30) by analysing four types of controlling shareholders at the 20% voting rights level. They found that the difference between cash flow and control rights was largest for small firms, irrespective of ownership type. They postulated that concentration of ownership was negatively related to a country's level of development, due to the results of their analysis, which showed Japan to have the lowest ownership concentration whereas Thailand had the highest. Differences in ownership concentration between countries were also attributed to variations in company law across different countries.

In their analysis of the correlation between firm age and owners' control stakes, Claessens *et al*. (2000:105) found a positive relationship between firm age and concentrated corporate control for Indonesian, Malaysian and Taiwanese firms, except for Japan. The results for these East Asian countries would be contrary to the life cycle ownership proposition. The Japanese exception, which showed a negative relationship, confirmed it. The positive relationship resonated with the view of Holderness *et al.* (1999:442), who found managerial firm ownership to be higher than earlier in the century.

In terms of size and firm ownership concentration, Claessens *et al*. (2000:105) found family firm ownership to be higher for smaller firms in most of the countries included in their sample. The larger firms tended to be widely held. In order to make their analysis comparable with earlier studies such as that of La Porta *et al*. (1999:472), Claessens *et al*. (2000:106) divided firms into four groups, namely all firms, the largest 20 firms, the middle 50 firms and the smallest 50 firms. When comparing the results of the analysis of the top 20 largest firms in East Asian countries, Claessens *et al*. (2000:107) found similar results to those of Claessens *et al*. (1999:1).

In order to investigate the presence of crony capitalism (powerful people lobbying government for preferential treatment in terms of state procurement contracts, financing, trade or other means), Claessens *et al*. (2000:108) calculated the number of firms in the sample which was controlled by a single family. The highest concentration was Indonesia with four firms and Japan had the lowest with one firm. Another statistic

calculated for a similar purpose was the total value of assets controlled by the dominant family groups in each country. Five families controlled 42.8% of total market capitalisation in the Philippines. One family owned 16.6% of market capitalisation in Indonesia. The top 10 families in each country owned 32.1% (Hong Kong) and 57.2% (Indonesia). Japan had the lowest concentration at 2.8%.

A third measure of concentration of ownership was calculated using the value of corporate assets controlled by the top 15 families as a percentage of gross domestic product (GDP). In 1996, Hong Kong had the highest ratio at 84.2% and Japan had the lowest ratio at 2.1% (Classens *et al*., 2000:108). The study concluded that countries with more developed capital markets appeared to have higher concentration ratios, in general, when compared with countries with less developed capital markets. The argument they used was that the higher figure, gross domestic product, used in the denominator, was more than compensated for by the increase in the capital market development, which was used in the numerator. Using data from Forbes magazine for 11 October 1998, Claessens *et al*. (2000:109) calculated the same ratio for the top 15 American families as for the East Asian countries and obtained a ratio of 2.9% of gross domestic product in 1998. This was comparable with Japan's statistic of 2.1%.

Claessens *et al*. (2000:109) argue that the concentration of corporate ownership leads to and is a means of crony capitalism. They also argue that a corporate sector that is concentrated as a whole could lead to suppression of the rights of minority shareholders and retard institutional development of the regulatory and legal channels that should uphold these rights. They further argue that the participation of government officials in the control of the corporate sector leads to conflict of interest between the state and the private individuals. The presence of such relationships would lead to increased dependence between business people and politicians, resulting in a lack of independence in decision-making. The authors argue that such a practice is prejudicial to the interests of the government and of the general populace. Issues of corporate governance become important and the way economic activity is conducted in the face of wealth concentration also becomes questionable.

Following Claessens *et al*. (2000:81), Faccio and Lang (2002:365) analysed the ultimate ownership and control of 5 232 financial and non-financial firms in 13 Western European

countries as well as the means used by the controlling shareholders to obtain control rights that exceeded ownership rights. They found 36.93% of the firms to be widely held and 44.29% of firms to be family controlled. Widely held firms were dominant in the UK and Ireland, whereas continental European firms were predominantly family controlled. Widely held firms tended to be in the financial sector or big in size. Families controlled firms mainly from the non-financial sector and/or small firms. Widely held firms had a low propensity to control other firms.

There were fewer state-controlled firms in the Faccio and Lang (2002:367) study than in the studies by La Porta *et al.* (1998:1147) and La Porta *et al.* (1999:491). La Porta *et al*. (1998:1147) investigated the shareholding structures of the 10 largest non-financial firms cross 49 countries, including some East Asian nations. They found evidence of high concentration of ownership, which was similar to that found in countries with the same institutional set-up and stage of economic development.

La Porta *et al*. (1999:472) conducted a similar study to the one undertaken a year earlier. The earlier study was dominated by East Asian countries. Nine out of the 10 countries were emerging economies. The latter study shifted emphasis and concentrated on firms in developed nations and only four East Asian countries. They studied 20 listed companies in each of the 27 richest countries, based on the 1993 per capita income. They focused on the richest countries because they conjectured that such countries were more likely to have a degree of dispersed ownership. Where a firm was owned by another company, the study would go one step up until it could find the ultimate shareholder. One of the aims of the study was to find the extent to which significant shareholders owned firms and the identities of these shareholders, such as families, financial institutions and government.

Two samples were collected for each country. The first sample consisted of the top 20 companies measured by market capitalisation in 1995 (large firms) and the second sample consisted of the smallest 10 firms by market capitalisation of equity in 1995, provided that the capitalisation was no less than $500 million (medium-sized firms). Due to differences in stock market sizes, the largest firms in sample countries would not be the same. In addition, and as observed in the study, a minimum capitalisation of $500 million excluded many companies which were more typical of those found in developing

economies. In the context of the richest countries, this categorisation could have some merit. However, the results of such a study would not be easily generalisable to firms which were much smaller than the ones included in the sample in the countries where the samples were taken, not to mention smaller firms in other countries. They further studied control mechanisms used by firms and found that pyramids, management appointments and cross-holdings were employed to control firms, and documented the prevalence of pyramids, cross-holdings and deviations from the one share, one vote principle to enhance control.

Faccio and Lang (2002:373) classified ultimate owners into six groups, namely family, widely held financial institution, the state (at national and local government agency levels), widely held corporations, cross-holding and miscellaneous or other shareholders categories. This classification was wider than that of Claessens *et al*. (2000:103) by the addition of the last two categories, because the latter study only had four groups of shareholders. Although this broadened the shareholder groups, it still did not separate family ownership from management ownership, a fairly common distinction made in the literature.

Where the ultimate owner of a listed firm was an unlisted firm and its ultimate owners could not be traced, Faccio and Lang (2002:373) assumed that such an owner would be treated as family ownership. For the 500 unlisted German firms, the average family shareholding was 89.44%, with the largest owner being the sole owner in 68% of the firms and 90% of these firms were owned by families.

Rossi and Cebula (2016:883) studied the relationship between debt and ownership structure in Italian firms. A balanced panel of 369 firm-year observations from 41 firms covering the period 2005 to 2013 was analysed. The level of concentration of ownership was high, with the first shareholding having 46.42% of the voting rights. Due to the preponderance of family-owned businesses, it was hypothesised that the presence of block-holders would increase risk aversion, leading to the entrenchment effect (of large shareholders) as opposed to the alignment of interests between majority and minority shareholders. Alternatively, it was also plausible that in order to retain control, large shareholders could prefer to increase debt, so that they did not have to dilute their shareholdings by issuing shares as a means of raising finance for their firms.

Rossi and Cebula (2016:883) argue that if the relationship between debt and ownership structure is negative, it means that the two variables are substitutive, namely that ownership structure can play some of the roles played by debt, such as ownership concentration monitoring opportunistic behaviour by management. In the case of a positive relationship between debt and ownership structure, the relationship would be considered complementary, with the two variables acting in concert, for instance, to reduce agency costs. Active monitoring by large shareholders when complemented with debt was predicted to facilitate alignment and convergence of interests between the providers of finance. However, if there were ownership concentration and entrenchment of the large shareholder, additional debt could be used to expropriate private benefits to the large shareholder through "tunnelling'" (Johnson, La Porta, Lopez-de-Silanes & Shleifer, 2000:22). The term was originally used to describe the expropriation of minority by majority shareholders in the Czech Republic, but was generally used to describe the transfer of resources out of company to the major shareholder, who was also part of the management.

Rossi and Cebula (2016:889) used two measures of capital structure, namely *leverage*, which they defined as the ratio of total debt to total assets, and *debt-equity ratio* or *gearing*, which was the ratio of total debt to total equity. These ratios were used in earlier studies. Ownership structure was measured by different indicators. The percentage of shares held by the three largest shareholders (OC3) was the first measure. Alternative measures were the percentage of shares held by the first shareholder (1SH), the second largest shareholder (2SH) and the third largest shareholder (3SH). This second set of variables was separately considered as an alternative to the percentage held by the top three shareholders. Although this study called these variables ownership structure variables, they actually represented one aspect of ownership structure, which was ownership concentration. Hence the second variable used to measure ownership structure (concentration) was a dummy 50, a binary dummy variable, which assumed the value of one if at least one shareholder held 50% of the shares and zero otherwise.

The study used the total shareholdings of the three shareholders and individual holdings of the three shareholders as alternative measures of the same variable. The study introduced the concept of either the sum or the individual parts being used to measure

the same variable, which was a different approach from other studies which used one type of approach only, namely either the sum or the individual variable. Using both approaches is beneficial in that it creates an additional model which is useful for comparative purposes. In other studies, individual shareholdings have been considered up to the second shareholder, at most, but even then this has been done mostly in the case of adding the shareholdings of the top two variables. The extension to use the third shareholder's percentage, which is not part of a sum of individual variables, is also unique. Individual third shareholders are rarely considered in their own right but rather as part of the sum of, for example, the top three shareholders.

Although shareholdings up to the third largest shareholder were analysed by Rossi and Cebula (2016:889), other categories such as the top two, four, five or other number of shareholders can therefore also be chosen for the purposes of similar analysis. The current South African study will determine the use of individual or total shareholdings or both and the different numbers of top shareholders to be used in the analysis to the extent applicable.

Measurement of ownership concentration with the dummy variable for concentration of ownership at 50% cut-off was unique. Studies generally use the percentage shareholding without prescribing a minimum level. The 50% appears to be quite aggressive as a measure of ownership concentration because it means that shareholdings which are as high and significant as 40%, for example, would not pass this threshold. A justification for this approach could be prior knowledge that Italian firm ownership was highly concentrated, as opposed to firm ownership in other countries such as the USA, where ownership was less concentrated. A 5% cut-off was used to calculate ownership concentration. The level used to determine the concentration therefore appears to be determined by pragmatism, bearing in mind the prevailing share ownership patterns in the country under study. The current study will, to the extent required, determine a cut-off level which is relevant to South Africa, bearing in mind practices from prior research.

Rossi & Cebula (2016:889) also used the Herfindahl index as an ownership structure (concentration) variable. It was calculated as the sum of squares of the top three shareholders. Given the concentration of ownership observed in Italy, the top three

shareholders would hold significant percentages of shares. Studies sometimes calculate the index for ownership percentages in excess of a certain figure, such as 5%, which would probably be easily met from the current sample. The study created two other ownership concentration dummy variables for excess control, consisting of the value of ownership concentration for the top three shareholders less the average and median of the sample respectively.

Rossi and Cebula (2016:889) divided the period under study into pre/beginning of the financial crisis period (2005 to 2008) and the crisis/post financial crisis period (2009 to 2013). They followed Kirkpatrick (2009:2) and Levine, Lin and Xie (2016:81), who found the effect of financial crises to be more severe for countries with low shareholder protection regimes. They also found that the stock markets in such cases could not be used as a 'spare tyre' for obtaining finance, with debt markets being the primary source. Since the debt markets in countries with low shareholder protection are not deep, stock markets are a compulsory alternative and with low shareholder protection, these markets do not function properly when there is a financial crisis. Hence the firms get affected much worse by a financial crisis than firms in countries with higher levels of shareholder protection. Alternative sources of capital were said to cease during a financial crisis. Given that Italy's financial architecture is that of a bank-based economy, it was hypothesised that the presence or absence of a financial crisis would make a difference to the results. A crisis variable which took the value of one for the crisis period and zero otherwise was added as a control variable. This variable was relatively unused in the literature. Hence its application to the study of the effect of ownership structure on capital structure was unique. The split of the periods is also of interest because the period covered by the current study on South African companies (2004 to 2014) is the same as the period covered by Rossi and Cebula (2016:893), namely, 2004 to 2014. The current study will take account of variables employed in prior studies but will not explicitly take into account the effects of the financial crisis.

An additional feature of the Rossi and Cebula (2016:890) study is that it considered the interaction of some variables. The interaction variables were the results of multiplication of variables for the top three shareholders by the percentage of shares held by the institutional investor variable, the multiplication of the Herfindahl index by the institutional investor variable and the multiplication of the 50% dummy variable by the

institutional investor variable. Interaction variables were used to test whether the original variables changed their signs when they interacted with the institutional investor variable. A similar analysis was conducted between the top three shareholders variable and the financial crisis variable. Prior studies tended not to examine the interaction effects of variables.

The average top, second and third shareholders held 46.42%, 6.56% and 3.33% of the shares respectively. On average, the top three shareholders held 56.32% of all the shares. These figures confirm the concentration of ownership in the study on Italy where the average Herfindahl index was 0.29. These results showed high levels of ownership concentration, especially for the top one shareholder.

Using the random effects model, Rossi & Cebula (2016:893) found a positive and statistically significant relationship between leverage and the total percentage of shares held by the top three shareholders. They also found a positive and statistically significant relationship between leverage and the Herfindahl index and between leverage and the 50% dummy variable. The study concluded that concentration of ownership and debt played complementary roles in monitoring agency costs.

When individual ownership concentration variables (top shareholder, second shareholder and third shareholders) were analysed, the relationship with leverage was positive for the top two shareholders, and negative for the third-largest shareholder, with results which were statistically significant in both the generalised method of moments and random effects models (Rossi & Cebula, 2016:893). From these results, the authors concluded that at low levels of ownership concentration, as indicated by the percentage of ownership of the third-largest shareholder, which was the smallest percentage (average 3.33%), the relationship with leverage was negative. The relationship then changed to positive at higher levels of ownership concentration (averages of 46.42% for the top shareholders and 6.56% for the second-largest shareholders). The relationship between leverage and the three ownership concentration indicators (top shareholder, second-largest shareholder and third-largest shareholder) exhibited a non-linear trend and appeared to take an inverse U-shape for the generalised method of moments and random effects models.

In their study of Taiwanese publicly listed firms over the period 1999 to 2014, Lo, Ting, Kweh and Yang (2016:113) report a reversed U-shaped relationship between concentration of ownership and leverage. This means that when the concentration of control rights is high, leverage is also high. After reaching an optimal point, the leverage decreases. Leverage falls when the concentration of control rights rises. They attribute this phenomenon to potentially higher risk of bankruptcy, which exceeds the advantages of having debt in the capital structure. Lo *et al.* (2016:115) investigated the relationship between ownership concentration and financial leverage in cases where family ownership was prevalent. They eliminated firms with total assets below a certain threshold in order to control for small-size effects. It could be argued that the resulting sample consisted of sizeable firms and the results obtained from the study might not be easily generalisable to small firms. Their empirical model had leverage (total debt to total assets) as the dependent variable, ultimate owners' and the square of ultimate owners' control as independent variables, as well as control, year and industry variables. The measure for leverage was used in order to avoid the outlier problem when compared with the debt-equity ratio. In line with this observation, the current study will use leverage and other ratios to minimise outlier problems as much as possible.

Lo *et al.* (2016:116) used ultimate owners' control as a measure of the shareholding and to determine the type of shareholder. Such a measure presents the best picture in terms of owners' identity as well as ownership concentration, if any. Where the ultimate owners cannot be identified, perhaps due to data or other limitations, the immediate owner, as identified from the available data, may be used instead. The squared ultimate owners' control percentage was employed to accommodate possible non-linearity in the relationship between leverage and ownership control. Family control was included through a dummy variable, which was multiplied by the ultimate owners' control and the square of the ultimate owners' control variables. Family control was defined in terms of the percentage owned by family members and board memberships or positions held by top management. Consideration was given to the family control being defined in terms of the involvement and essence approaches (Prencipe, Bar-Yosef & Dekker, 2014:368). The former approach emphasises family involvement in top management and/or the board of directors. The essence approach describes the uniqueness characteristic of a family in its exercising control. Managerial and family ownerships were therefore not totally separated.

Leverage was found to be higher in firms owned by families than in those owned by non-families (Lo *et al.*, 2016:118). Results from pooled regression analysis showed a significantly negative relationship between leverage and ultimate control. When the moderating effect of family ownership was taken into account, the family control had a positive influence on financial leverage. The desire of families to control firms by issuing debt rather than equity was used to explain the increased leverage in family firms when compared with non-family firms.

The relationship between financial leverage and ultimate owners' control was assumed to be non-linear by Lo *et al*. (2016:119) and they found a positive relationship between the two variables and a negative association between financial leverage and the square of ultimate owners' control. This result was taken to corroborate the assertion that higher concentration of control rights would be associated with higher leverage as well as the quadratic relationship between the variables. Beyond a certain break point, the relationship between leverage and ownership concentration becomes negative due to interest and repayment obligations, and possible default, which may lead to bankruptcy. Controlling shareholders would want to avoid such eventualities, hence the negative relationship after the optimal point. This relationship held prior to the introduction of the moderating effect of family ownership into the analysis.

When the moderating effect of family ownership was introduced into the relationship between leverage and ultimate owners' control, Lo *et al*. (2016:120) found a significant negative relationship between leverage and ultimate owners' control and a significant positive relationship between leverage and the square of ultimate owners' control. This result was interpreted to mean that for family firms, the relationship between ownership and leverage was less pronounced. They further reported that this was evidence that family firms issued more debt than non-family firms in order to finance their activities.

The Lo *et al*. (2016:113) study is relevant in relation to the current study because of, among other things, its treatment of non-linearity of ownership concentration by the use of the squared version of that variable as well as the linear version of the same variable. The study also introduced the moderating effect of family control by using a dummy variable, which was multiplied by the appropriate ownership control variables. Different

empirical model formulations used in the study will be borne in mind when various models are constructed in the current study.

Paligorova and Xu (2012:701) argue that major shareholders may employ debt for their own benefit by avoiding the issuing of equity. The study documented that pyramidal firms used more debt in their capital structures than non-pyramidal firms in a sample of listed firms from Canada, France, Germany, Italy, Japan, the United Kingdom and the United States of America (G7 countries).

Family control has been proposed as a means of reducing agency costs of debt (Wiwattanakantang, 1999:401-402). In order to maintain control of corporations, families, as major shareholders, may prefer higher leverage. Lo *et al*. (2016:114) argue that in order to avoid external monitoring, family-owned companies may prefer debt as a source of finance. In their study, controlling shareholders preferred the use of debt as a source of funding. In the same vein, Lee and Kuo (2014:411) argue that controlling shareholders with high shareholdings prefer to use debt finance in order to avoid scrutiny from creditors. Such controlling shareholding has been associated with assisting in alleviating managerial entrenchment (Lee & Kuo, 2014:424).

Shahar *et al.* (2016:36) studied the relationship between ownership structure and capital structure in middle-capital public listed firms in Malaysia. They were particularly interested in the relationship between ownership concentration (and dispersion) and capital structure in the Malaysian context. They analysed data from 38 middle-capital firms for the period 2008 to 2012. Firms were identified from an index composed of 70 companies from which financial firms were excluded. All-equity firms were also excluded from the sample. An alternative treatment of such firms is to include them as having zero debt. The latter approach will be adopted in the current South African study, in line with other studies.

Debt levels of firms with high levels of ownership concentration were significantly different from those with low levels of ownership concentration. *Ownership concentration* was defined as the fraction of shares held by the top five largest shareholders (Shahar *et al.*, 2016:37).

A negative relationship was found between ownership concentration and leverage. Companies with high levels of ownership concentration had low levels of leverage and those with low levels of ownership concentration had higher leverage. The results were interpreted to mean that debt was unlikely to be a monitoring tool for companies with high ownership concentration ratios. The lower levels of debt in such cases were associated with lower agency costs of debt. However, the researchers predicted that the lower debt could lead to increased opportunistic behaviour by management.

Shahar *et al*.'s (2016:36) study differed from other studies in that it was conducted in a developing country whereas other studies were conducted in developed countries. Another unique feature of this study was that it focused on a specific size of firms, namely medium-sized firms. Studies usually analyse data across different sizes of firms, from small to large ones. Data constraints may be a possible reason why studies do not choose specific types of firms, especially middle-sized firms. In the current study, the firms to be analysed will cover the whole range of non-financial listed financial firms on the JSE Securities Exchange in order for a South African perspective to be obtained from small to large organisations.

Given the studies which had positive and negative relationships between ownership concentration and leverage, Shahar *et al*. (2016:38) tested the hypothesis that ownership concentration had an impact on leverage and that ownership dispersion also had an effect on leverage, among other hypotheses. Firm-specific characteristics investigated in the study included profitability, size, asset tangibility, growth opportunities and liquidity. These variables were used as control variables in other studies and will be treated as such in the current study on South African-listed firms. Of interest to the current study was the model specification used in the study by Shahar *et al.* (2016:39), which was specified as follows:

$$LEVERAGE_{it} = \beta_0 + \beta_1 PROFIT_{it} + \beta_2 SIZE_{it} + \beta_3 TANGIBILITY_{it} + \beta_4 LIQUIDITY_{it} + \beta_5 GROWTH_{it} + \beta_6 TOP_{it} + \beta_7 DISPERSE_{it} + \varepsilon$$

Where:
LEVERAGE is measured by the ratio of total book value of debt (short- and long-term debt) to total equity;

PROFIT is represented by ratio of operating income to total assets;
SIZE is measured by the logarithm of total sales;
TANGIBILITY is measured by the ratio of fixed assets to total assets;
LIQUIDITY is computed as the ratio of current assets to current liabilities;
GROWTH is measured by the market to book value ratio;
TOP is the variable representing ownership concentration and is the percentage owned by the top five shareholders; and
DISPERSE is the ownership dispersion variable, which is measured by the natural logarithm of the total number of shareholders of the firm.

All variables were measured for firm i at time t. Proxies for ownership concentration used in the study were Herfindahl index, calculated based on the top five shareholdings and ownership dispersion. The latter measure was considered to be the inverse of ownership concentration and was measured by the natural logarithm of the total number of shareholders. The use of natural logarithm was justified in order to neutralise the disparities in shareholder numbers across firms. A high number of shareholders indicated dispersed ownership or low level of shareholder concentration whereas a low number of shareholders signified a high concentration of ownership (Moh'd, Perry & Rimbey, 1998:85; Rozeff, 1982:249). Rozeff (1982:255) positively associated a high level of shareholder dispersion, as measured by the number of shareholders, with the dividend payout ratio. Moh'd *et al.* (1998:87) analysed the impact of ownership structure on the level of corporate debt. Dispersion of shareholders, a measure of ownership structure, was represented by the logarithm of the number of shareholders. Dispersed ownership was found to have no effect on capital structure.

Whereas Shahar *et al*. (2016:41) used the Herfindahl index calculated from the top five shareholdings, the sum of the top five shareholdings is also a possible measure of ownership concentration. No indication was given in the study about the use of a cut-off percentage for the percentages used in the calculation and it could therefore be assumed that all the shareholdings were used in the analysis. The current study will, in line with other studies, use a cut-off of shareholdings in calculating the Herfindahl index.

Shahar *et al.* (2016:40) conducted univariate and multivariate analyses. Under univariate analysis, the sample was subdivided into firms with low ownership

concentration and those with high ownership concentration. The median level of ownership concentration was used to divide the two subgroups. Independent t-tests were conducted to determine whether the two subsamples were different. Results showed that equal variance between the two subsamples could not be assumed. It was then concluded that the leverage of firms with low levels of ownership concentration was different from that of firms with high ownership concentration.

A similar analysis of testing for leverage at different levels of ownership dispersion was also undertaken. The results showed that the subsample with low ownership dispersion was different from the one with high ownership dispersion, leading to the conclusion that the levels of capital structure differed between the two subsamples.

Farooq (2015:99) investigated the effect of ownership on capital structure in the Middle East and North Africa (MENA) region. Data from firms in eight countries, namely Morocco, Egypt, Saudi Arabia, the United Arab Emirates, Jordan, Kuwait and Bahrain, was studied for the period 2005 and 2009. The study was based on earlier research in the Middle East and North Africa region (Farooq & El Kacemi, 2011:1) and other studies which covered several emerging markets, such as East Asia (Claessens *et al*., 2000:81), which revealed high levels of concentration of ownership in emerging markets. Ownership concentration was shown to be negatively related to capital structure. This relationship was attributed to information asymmetries associated with high ownership concentration, leading to limited ability by firms to raise debt. Information asymmetries imply that the disclosure of information is limited and controlling shareholders can increase opportunistic behaviour. With such limited information disclosure, raising capital can be problematic. Hence firms may be raising less debt than what is optimal.

Another argument leading to the same result is that controlling shareholders find it expedient to reduce debt as a risk mitigation measure in the event of bankruptcy. Additionally, for a given level of ownership concentration, the level of debt was found to increase as information asymmetries decreased. Results from the Farooq (2015:99) study also showed that for any given level of ownership concentration, growth firms which had low information asymmetries had higher proportions of debt.

Ownership concentration was defined in Farooq (2015:104) as the percentage of shares owned by insiders. These were, in turn, defined as corporate officers, directors and their family members, individual shareholders who held more than 5%, firm's own pension funds and trusts. Ownership concentration was the independent variable while capital structure was the dependent variable. In addition, control variables such as size, tangibility and complexity (ratio of the sum of stock and debtors to total assets), together with industry and year dummies, were employed in the study. The study on South African firms will consider adopting some of the variables used by Farooq (2015:103) to the extent that they are appropriate.

Farooq (2015:107) estimated capital structure dependent variables using three variables, namely total debt to total equity ratio, total debt to total assets ratio and total debt to total value ratio. The equation below was estimated for each of the three variables:

$$CS = \alpha + \beta_1 (OWNERSHIP) + \beta_2 (LEGAL) + \beta_3 (GROWTH) + \beta_4 (SIZE) + \beta_5 (EPS) + \beta_6 (TANGIBILITY) + \beta_7 (PoR) + \beta_8 (COMPLEXITY) + \sum_{Ind} \beta^{Ind}(IDUM) + \sum_{Yr} \beta^{Yr}(YDUM) + \varepsilon$$

Where:
CS is the capital structure variable;
OWNERSHIP is the independent variable;
LEGAL, GROWTH, SIZE, EPS, TANGIBILITY, PoR, and COMPLEXITY are control variables; and,
IDUM and YDUM are industrial and year dummies.

Farooq (2015:99) provided insight into the effects of ownership concentration in developing countries, using data from the Middle East and North Africa region. Studies usually analyse data from firms in one country only. This study analysed eight countries at the same time. The author did not provide details of the numbers of firms in each country or the percentage of firms that samples from each country represented. Such information could lead to a better understanding of the pervasiveness of these firms in their individual economies. Differences in institutional settings in the different countries could compromise the results of such a study. A South African study could provide insight into the efficacy of the results obtained in the Middle East and North Africa study.

The Farooq (2015:100) study was based on the assumption, derived from earlier studies, that there was a high concentration of ownership in the Middle East and North Africa region and in emerging markets in particular. Whereas this could be made a basis for the Middle East and North Africa study, this cannot be assumed for South Africa. Hence it is essential to establish whether or not there is concentration of ownership in the South African firms. The current study will therefore, in part, explore the extent of ownership concentration in South African firms and if there is, the extent to which such concentration affects capital structure.

Brendea (2014b:1) investigated the relationship between ownership structure and capital structure and firm performance in Romanian firms. Ownership concentration was found to have a positive effect on capital structure, when the firms were adjusting towards target capital structure. The results were contrary to those predicted by agency theory but were similar to those found in other development countries such as by Cespedes *et al.* (2010:248). Their starting point was that in order to resolve agency problems associated with management's inappropriate behaviour, a firm should have more debt in its capital structure, which would limit the cash flow available for management (Jensen,1986:324) and would limit management to act in the interest of shareholders (Berger & Di Patti, 2006:1096). The study argues that lower agency costs imply less debt which, in turn, leads to higher ownership concentration. This implies a negative relationship between ownership concentration and corporate leverage.

Empirical studies also indicated a positive relationship between ownership concentration and capital structure (Brendea, 2014b:7; Cespedes *et al*., 2010:248). Brendea (2014b:3) collected data from 69 non-financial firms listed on the Romanian stock exchange for the period 2007 to 2011. Following Brendea (2014a:324), ownership concentration was measured using the Herfindahl index. The Herfindahl index was calculated as the sum of the squares of the proportion of shareholdings in excess of 5%. A higher Herfindahl index implies a higher level of ownership concentration, while a lower Herfindahl index indicates low concentration of ownership. Cespedes *et al*. (2010: 250) provide the example that if there are two shareholders who own 50% each in Firm A, then the Herfindahl index is 0.5 (or 50% x 50% plus 50% x 50%). Furthermore, if five shareholders own 20% each in Firm B, the Herfindahl index is 0.2 (or 20% x 20%

x 5). Firm A has a higher concentration of ownership than Firm B. Brendea (2014b:3) found a mean Herfindahl index for Romanian-listed firms for the period 2007 to 2011 of 0.38, which was considered to be an indication of high concentration of ownership. The study also found the Herfindahl index showed very small changes for the period under review.

One of the regression models defined in the study used the debt ratio as a measure of leverage. The regression equation for analysing the effect of ownership on leverage used in Brendea (2014b:4) was as follows:

$$DR_{it} = a + c_i + \mu_t + b_0 HI_{it} + b_1 ROA_{it} + b_2 SIZE_{it} + b_3 TANG_{it} + \varepsilon_{it}$$

Where:
DR_{it} is the debt ratio;
c_i represents the firm-specific effects such as firm age;
μ_t represents time effects (such as economic growth and inflation), which affect dependent variables;
HI_{it} is the Herfindahl index;
ROA_{it} is return on assets;
$SIZE_{it}$ represents firm size;
$TANG_{it;}$ stands for asset tangibility;
i is the individual firm;
t is the time period; and,
a and *b* are coefficients.

The Brendea (2014b:3) study is relevant because of the way that it calculated the ownership concentration ratio, namely the Herfindahl index. The index is conceptually simple to calculate and provides a good indicator of ownership concentration. A 5% cut-off level of shareholding was applied to the study of Romanian firms. The choice of the cut-off level is a practical and pragmatic matter. In cases where the shareholdings are generally smaller than 5%, a lower cut-off figure may be chosen. On the other hand, the cut-off figure should not be too small because this leads to many computations of insignificant shareholdings, which will not provide better insight into ownership

concentration. The use of this index will be considered in the current study, depending on its relevance and availability of data to compute it. The study also included variables for effects such as economic growth and inflation, which will not be taken into account in the current South African study. Cespedes *et al*. (2010:249) investigated the determinants of capital structure using a sample from seven countries in Latin America. They found that debt levels in these firms were similar to those found in the USA even though the Latin American firms had lower tax benefits and the costs of bankruptcy were higher than those in the USA.

Cespedes *et al*. (2010:248) found that there was a weak protection of minority shareholders in Latin American companies because the basis of their legal system was French civil law, which La Porta, Lopez-di-Silanes, Shleifer & Vishny (1997:1132); La Porta *et al.* (1998:1151) and La Porta, Lopez-di-Silanes, Shleifer & Vishny (2000:8) found to provide less investor protection than common law. As a consequence, firms preferred the use of debt instead of equity because shareholders did not want to lose control. A positive relationship was found between ownership concentration and capital structure. In particular, the study found a U-shaped relationship between ownership concentration and capital structure. This means that at low levels of ownership, ownership concentration is negatively related to capital structure and at high levels of ownership concentration, there is a positive relationship between ownership concentration and leverage. This result was due to the need by large shareholders to control the firm once a certain level was reached, such as 45% in this study. Cespedes *et al.* (2010:248) propound that at the higher levels of ownership concentration, shareholders would rather use debt than equity to finance their firms because the use of debt did not dilute their control. The authors also argued that this result was obtained because there were larger information asymmetries in Latin American firms, which made it more difficult to issue equity. Latin American financial markets were less developed, leading to high equity issuance costs.

In Cespedes *et al*. (2010:252), *ownership concentration* was defined using the Herfindahl index, which was ued by Brendea (2014b:3), and was described earlier. The index was calculated as the sum of the squares of the percentage shareholding held by each individual shareholder. The study highlighted that the index tended to be underestimated because some shareholders could be related as family members. The

study also grouped shareholders who had the same surname together and this process did not change the main results. Grouping names with the same surname may be considered in the South African study, where applicable.

Ownership concentration was measured using the fraction of shares owned by the top 10 shareholders in the study by Cespedes et al. (2010:250). This approach may be considered as biasing the Herfindahl index downwards. Shareholders beyond the top 10 were not considered in the calculation. Their inclusion would lead to a higher index. This issue is alleviated by the fact that the study included more than 70% of ownership for more two-thirds of the firms included in the sample. The rest of the shareholders would therefore own 30% of the outstanding shares.

Related to the names of the shareholders is the issue of the same shareholder using different investment vehicles in the same company. If an individual shareholder such as a director has shares in a company registered in his or her name, and in the name of a trust which does not bear his or her name, or a private company which is not obviously linked to his or her name, there is the likelihood of understating the degree of concentration. Extending the analysis beyond the top 10 shareholders does not resolve this issue. However, the increased potential costs of administration of shareholdings on the part of the shareholders concerned should reduce such cases to a minimum.

Cespedes *et al.* (2010:252) collected data on ownership concentration for one year (2005) and used it to calculate the Herfindahl index. The rest of the variables were calculated using data from 1996 to 2005, which was a much longer period. Due to the short period over which ownership concentration was collected and analysed, the results might have been different if data analysis was done over a longer period. The current study will estimate ownership concentration on an annual basis over a longer period. Indirectly, the study may shed some light on whether ownership structures are stationary or dynamic over time. The Herfindahl index registered small changes over a five-year period using Romanian data (Brendea, 2014b:3).

Cespedes *et al*. (2010:248) studied firms in countries which used French civil law. The current study will analyse the effects of ownership structure in South Africa, whose legal system is a hybrid of common law from Britain, civil law from Holland and customary

law from indigenous Africans. South Africa is expected to have better protection for investors than Latin American countries. Hence it is essential to test whether the same result will be obtained in a different institutional environment or the opposite result, which will be a confirmation of La Porta *et al.* (1997:1131, 1998:1113, 2000:3). Table 2.1 provides a summary of some of the studies on the effects of ownership concentration on capital structure.

Table 2.1: Summary of some studies on the effects of ownership concentration on capital structure

Study	Data source	Sample firms	Large shareholder measure	Capital structure measure	Relationship
Farooq (2015)	Stock exchange in Morocco, Egypt, Jordan, Saudi Arabia, Kuwait, UAE, Qatar & Bahrain	All listed non–financial: 2005-2009	>5% shareholdings by insiders (corporate officers, directors and family members)	Total debt to total assets; total debt to total equity; total debt to total value	a) +ve for ROA and sales-asset ratio b) –ve management holds 25-50% on same ratios
Brendea (2014b)	Bucharest Stock Exchange: Romania	69 listed non-financial firms: 2007-2011	Herfindahl index	Total debt to total assets using book values	+ve relationship
Cespedes *et al*. (2010)	Stock exchanges in Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela	806 listed non-financial companies: 1996-2005; ownership information for 2005 and 2006	% held by 10 largest shareholders: Herfindahl index	a) Leverage 1_bv[1] b) leverage 2_bv[2] c) leverage 3_mv[3]	+ve relationship (U-shaped)

Source: Compiled by author

[1] Ratio of total debt financing (short-term and long-term) to total debt financing plus book value of equity

[2] Ratio of total financial debt plus total negotiable obligations to total financial debt and negotiable obligations plus the book value of equity

[3] Ratio of total financial debt plus total negotiable obligations to total financial debt and negotiable obligations plus the market value of equity.

Muazeib, Chairiri and Ghozali (2015:23) investigated the effect of corporate governance, including institutional ownership and concentration of ownership, on capital structure in firms listed on the Johannesburg Stock Exchange. The sample consisted of 71 companies listed on the Johannesburg Stock Exchange in 2010. Data was collected from the annual reports obtained from the websites of the Johannesburg Stock

Exchange and the companies in the sample. The data was collected for year 2010. Institutional ownership and ownership concentration had negative and statistically significant relationships with capital structure. Companies with high institutional ownership and ownership concentration had lower leverage. A contribution of this study, according to the authors, is that it is the first one to study the association of corporate governance characteristics and capital structure using data from the Johannesburg Stock Exchange.

Given that the current study examines the effects of ownership on capital structure and firm performance using Johannesburg Stock Exchange data, the study by Muazeib *et al. (*2015:23) is directly relevant to the study. Muazeib *et al. (*2015:24) chose South Africa because the country was seen as one of the important emerging countries in Africa and because of the diverse nature of firms listed on the Johannesburg Stock Exchange. The current study seeks to investigate the variables in question over a longer period than the one year, 2010, that was analysed in the study. The period covered by the study was short and because it covered only one year, no trends could be established from such an analysis. In addition, the sample that was used appears small in relation to the total number of listed firms on the JSE Securities Exchange. These additional features should enable a deeper insight into the relationship between ownership and capital structure to be gained.

Leelakasemsant (2015:11) explored the combined effect of ownership concentration and equity illiquidity on the capital structure of firms in Thailand. Thai firms were said to be characterised by ownership concentration and illiquidity. The combined effect of ownership concentration and illiquidity of shares was found to have a negative impact on leverage.

Leelakasemsant (2015:17) posits that the ownership structure of a firm represents a firm's ability to monitor and control its management and has an effect on the level of information asymmetry between people inside and outside the firm. Illiquidity of a firm's shares was said to have an effect on the capital structure of a firm through its effect on equity issuance (Amihud, 2002:31). The illiquidity of shares affects the cost of equity. The author also argues that firms with a high concentration of ownership have a low incentive to use debt because concentrated ownership takes the role of monitoring

management. Furthermore, firms with high equity liquidity have low equity issuance costs. This increases the likelihood that such firms would use equity if they need to raise finance (Rubin, 2007:223). High ownership concentration and high liquidity imply that the firm will have low leverage. The current study will not deal with the illiquidity issue but will concentrate on the relationship between ownership and capital structure. However, the illiquidity caused by ownership concentration may have an effect on the operation of the capital markets and overall economic efficiency.

Galve-Gorriz and Hernandez-Trasobares (2015:410) investigated the relationship between the institutional framework in which a firm operates, concentration of ownership and family firms. Data for the study was collected from eight Latin American countries, namely Argentina, Brazil, Chile, Colombia, Costa Rica, Honduras, Mexico and Peru, as well as from Spain. The study contrasted firms from emerging markets (Latin America) with those from a more advanced country, namely Spain. Two data sets were analysed. The first data set consisted of the 20 largest companies from Latin America and a similar number of companies from Spain. The second data set consisted of the 20 largest family firms in Latin America and the 20 largest family firms in Spain.

Galve-Gorriz and Hernandez-Trasobares (2015:410) compared ownership concentration in different countries and used institutional framework as one of the explanatory variables. The current study of South African firms will analyse data from one country. Hence the institutional framework is not a variable. However, the study provides results that can be compared with those obtained from the current study.

The level of ownership concentration in South Africa has to be established first. Furthermore, the level of development of the South African institutions needs to be established, especially in relation to the countries studied in Galve-Gorriz and Hernandez-Trasobares (2015:412), if any inferences are to be made about the effect of its institutional framework for ownership concentration. The current study explores the level of ownership concentration and ownership structure in South African non-financial firms and their own capital structure and firm performance. A comparison between the level of institutional development in South Africa and that of other countries is beyond the scope of the current study.

Galve-Gorriz and Hernandez-Trasobares (2015:423) found that firms in countries with more developed institutional settings had lower ownership concentration than those in countries with less developed institutions. The maximum number of firms from any single Latin American country was 20 companies and the minimum, other than zero, was seven. Sample sizes for each country were small. Treating firms from Latin America as if they were from one jurisdiction, for example, the top 20 companies in Latin America, might create an aggregation problem whereby, implicitly, results obtained from a few companies in the different countries might be treated as if they fairly represented the underlying population. The question of representativeness of the sample could be an issue in this study.

Galve-Gorriz and Hernandez-Trasobares (2015:412) analysed ownership concentration data for one year, namely 2011. Extensions of the study over a longer period could provide better insight into the role of countries' institutional frameworks for concentration of ownership. The results of studies for some of the Western European firms are summarised in Table 2.2.

Table 2.2: Summary of various studies on concentration of ownership in Western European countries

Country	Number of firms	Type of firm	Largest shareholding	Individual shareholding	Non-financial firms	Financial firms	State	Foreign investor
Germany	500	Unlisted	89.44%	NA	NA	4.9%	2.67%	NA
Italy (Bianchi, Bianco & Enriques, 2010)	1 000	Manufacturer	67.69%	48%	36.9%	0.17%	4.6%	8%
Italy (AIDA database)	3 800	Unlisted	70.71%	99.4% (families, individuals – local and foreign)	NA	0.2%	0.4%	NA
France (Bloch & Kremp, 1998)	282 322 (>500 employees) CAC 40	Mainly unlisted Listed	88% 20-30%	56% 7.2%	44% (financial & non-financial) 11.5%	13.4%	NA 4.8%	NA 4.n, m1%
UK (Goergen & Renneboog, 1999)	250 listed Non-financial firms 12 600	Listed for > 5 years Listed for < 5 years Unlisted	21% 19% 100%[1] >50%[2]	11% 22%	21% 19%	NA	NA	NA

Source: Adapted from Faccio and Lang (2002); Goergen and Renneboog (1999); Bloch and Kremp (1998)

[1] More than 78% of firms controlled by one shareholder; 2. 22% controlled by shareholder with 50% equity or more.NA – Data not available; The French stock market index (CAC 40) figures were calculated on a different basis

Faccio and Lang (2002:378) analysed shareholdings of over 5% of a firm's shares. Ownership of Western European firms was analysed at the 20% threshold; 36.83% and 44.29% of all firms were widely held and family controlled respectively. UK and Ireland exhibited a different pattern from continental Europe with widely held firms at 63.08% and 62.32% respectively. Among the continental European countries, Sweden had the largest proportion of widely held firms at 39.18% and Germany had the lowest at 10.37%.

Family-controlled firms showed opposite results to widely held firms, with the UK and Ireland having the lowest proportions of family-owned firms at 23.68% and 24.63% respectively. Norway had the lowest percentage of family-controlled firms at 38.55%.

Continental European firms were more family controlled than widely held, whereas the UK and Irish firms were more widely held with little control by families.

Faccio and Lang (2002:378) found that 1% of firms in the UK and Ireland were state controlled firms whereas the rest of Europe had over 10%. Financial institutions held about 10% of the shares, with some disparities between different countries. Corporations owned only 1.68% of other firms. The prevalence of cross-holdings among Western Europeans was low, accompanied by very small percentages.

Changing the threshold for ownership to 10% reduced the percentages of widely held firms to 13.72%, raised family-controlled firms to 55.85% and firms controlled by financial institutions to 18.34% but had little effect on cross-holdings, state shareholdings and holdings by widely held firms. These changes in the family-controlled firms probably illustrate the sensitivity of the data to the threshold used in the analysis.

When comparing ownership and control of financial versus non-financial firms, Faccio and Lang (2002:378) found that financial firms were likely to be widely held, to be controlled by widely held financial institutions and were less likely to be family controlled. Ownership and control of financial and non-financial firms in England and Ireland were not dissimilar. This was because ownership of firms in these two countries surveyed was generally widely held, as opposed to the dominant control found in Western European firms. In the case of ownership of financial and non-financial firms being controlled differently, Barth, Caprio and Levine (2000:32) proposed that differences in the regulation of financial firms can explain the differences between ownership. Using South African data, the current study will analyse non-financial firms and exclude financial firms for the reason put forward by Barth *et al*. (2000:32).

The effect of size on ownership was considered by some prior studies. Market capitalisation was used to denote size. Faccio and Lang's (2002:381) results showed that large firms were not likely to be controlled by families and that these firms were likely to be widely held. State ownership and control were also likely for such firms.

Mechanisms for increasing control of firms in excess of cash flow control studied by Faccio and Lang (2002:381) included dual-class share structures, pyramids through

multiple control holdings and cross-holdings. Other means used for the same purpose included golden shares (usually held by the state in privatised companies) and transfer restrictions on shares. Voting shares traded at a premium to non-voting shares, according to studies conducted in the USA and Western Europe (Braggion & Giannetti, 2013:1; Gompers, Ishii & Metrick, 2010:1068; Schultz & Shive, 2010:524). Pyramids were significant but multiple control chains were few, and cross-holdings almost non-existent. Faccio and Lang (2002:388) considered a controlling shareholder to be 'alone' if he or she controlled a firm and the next shareholder had less than 10% shareholding. They found that 53.99% of firms controlled in this manner were not widely held.

The presence of a second largest shareholder was discussed by Bennedsen and Wolfenzon (2000:127) and Gomes and Noaves (1999:1). Bennedsen and Wolfenzon (2000:114) discuss the two polar ends of share ownership in firms generally found in corporate finance literature, namely the dispersed and concentrated shareholdings. Ascribing the dispersed share ownership to Berle and Means (1932:84), they describe dispersed shareholders as being too small and fragmented to control the firm. In this case, the management controls the firm. Concentrated ownership is on the other end where there are dominant shareholders who are in charge of the corporations and other smaller shareholders and where management is unable to influence the direction of the firm. Bennedsen and Wolfenzon (2000:114) argue that where shareholders are large enough not to relinquish control to other parties, namely other shareholders or management, corporate policy becomes the product of interactions between the shareholders. This theoretical study discusses how an original shareholder chooses an ownership structure which prevents any other shareholder from making decisions that can hurt the founder. One assumption is that the ownership structure is determined by the balance between a firm's funding needs and the potential influence of the firm's control over ownership. Bennedsen and Wolfenzon (2000:115) argue that two opposing effects, the alignment and coalition effects, determine the ownership structure of a firm.

Family firms were considered to be run by a member of the controlling family if such a member of the family was a chief executive officer (CEO), honorary chairman, chairman or vice chairman (Faccio & Lang, 2002:388). Last names were used to identify the relatedness of management to the controlling family.

The use of names to identify management has the potential to understate the management numbers because relatives can use different names from those of the controlling family. On the other hand, if there is a preponderance of similar names in a particular country, the use of names to identify management could overstate the actual facts. Faccio and Lang (2002:388) acknowledged the defects of the procedure they used and conceded that it was imprecise but practical and found that in more than two-thirds of family-controlled firms, management was related to the controlling family.

The materiality level of shareholding used in the studies by Faccio and Lang (2002:389) and Claessens *et al*. (2000:85) is a minimum shareholding of 5%. Depending on the country's level of development and size of a firm, the cut-off point could be large or quite small. For large firms in an emerging market, the shareholdings could tend to be small, and any study in such an economy would have to be sensitive to such a possibility.

2.2.2 Concentration of ownership at country level

Concentration of ownership at macro level or across a country is an issue that has been of interest, as seen in Table 2.3. Faccio and Lang (2002:391), in their study of ownership of Western European firms, found Italy to have the largest number of firms controlled by a single family at 1.46 firms. Switzerland had the lowest number of firms per single controlling shareholder at 1.10 firms. Claessens *et al*. (2000:108), in their study of ownership of East Asian firms, found the following average number of firms per family, the percentage of total value of listed corporate assets controlled by the top 15 families and the percentage of gross domestic product associated with the top 15 families, as indicated in Table 2.3.

Table 2.3: Significance of ownership concentration in selected economies

Country	Average number of firms per family	% of total value of listed corporate assets which the top 15 families control (1996)	% of GDP contributed by firms owned by the top 15 families (1996)
Hong Kong	2.36	34.4	84.2
Indonesia	4.09	61.7	21.5
Japan	1.04	2.8	2.1
Korea	2.07	38.4	12.9
Malaysia	1.97	28.3	76.2
The Philippines	2.68	55.1	46.7
Singapore	1.26	29.9	48.3
Taiwan	1.17	20.1	17.0
Thailand	1.68	53.3	39.3

Source: Adapted from Claessens *et al*. (2000:108)

Total market capitalisation controlled by a family or any other controlling shareholder is another measure of macro or country level ownership concentration. Faccio and Lang (2002:391) calculated this measure by adding the market capitalisation for all the firms owned by a family and divided the sum by the total market capitalisation of all firms in the country. Where families had a large number of firms, such as Indonesia, at 4.09 and/or the percentage of listed corporate assets was high, such as the Philippines (55.1%) and Thailand (53.3%), their firms' contribution to gross domestic product was high. Such families could be expected to be influential in policy formulation in their countries.

Financial firms in Europe were found to be more diffusely held than non-financial firms (Faccio & Lang, 2002:378), while financial firms and utilities in the USA exhibited less concentrated ownership (Demsetz & Lehn, 1985:1170).

2.3 CAPITAL STRUCTURE THEORIES

Theoretical literature on firm ownership predicts higher or lower levels of financial leverage depending on the management's disposition towards risk, the firm's growth opportunities, monitoring costs and bankruptcy costs. A review of this literature is

provided by Myers (2001:81). One perspective is that firms with a controlling shareholder should have higher financial leverage because this gives the shareholder more voting control and reduces the probability of a hostile takeover (Stulz, 1988:42). Israel (1992:194,195) argues for the opposite, namely that where there are dual-class shares, the creditors, with the use of debt, are in a better position to control the major shareholder from consuming private benefits by placing covenants on their loans, leading to the expectation of lower financial leverage in firms with dual-class shares. The second argument is relevant to the current study to the extent that there are many dual-class shares in the sample. There has been an international trend towards the unification of dual-class shares (Maury & Pajuste, 2011:355) and South Africa is not expected to be an exception. Hence the extent to which firms have dual-class shares is not investigated in the current study.

Empirical findings on firm ownership and financial leverage produced mixed results. Negative relationships were found between managerial ownership and financial leverage (Holderness *et al.*, 1999:462), especially for entrenched managers who preferred to use equity rather than debt, which constrained their behaviour. Managers preferred not to have debt in the firm's capital structure and they perceived lenders as constraining their behaviour.

Other studies, such as that by Anderson and Reeb (2003b:653), found no relationship between managerial or family ownership and leverage. Positive results between ownership and leverage were obtained by Kim and Sorensen (1986:135), who found that financial leverage increased with managerial entrenchment or insider ownership. Due to a lack of direction from the theory or empirical results of prior studies, King and Santor (2008:2423) explored the relationship between ownership and financial leverage without any a priori position. Given these mixed results, it is imperative that studies be carried out in different jurisdictions to explore such relationships, hence the reason for the current study on South African companies.

Capital structure is a mix of debt and equity, which are used to finance the operations of a firm. Capital structure can be viewed as a means by which a firm is financed and is of importance due to its effects on availability and the cost of funds. Capital structure is important to providers of funds and managers of firms. A bad finance mix may affect a

firm's survival. Finance sources include ordinary shares, preference shares, reserves and retained earnings on the equity side and long and short-term debt and issue of bonds on the debt side. The main theories which attempt to explain capital structure are:

- Modigliani and Miller's irrelevance theory;
- the trade-off theory;
- asymmetric information theories (debt signalling and pecking-order theories);
- the product/input market interactions theory;
- the agency theory;
- the momentum profitability theory; and
- the free cash flow theory.

2.3.1 Modigliani and Miller's irrelevance theory

Capital structure theory can be traced back to Modigliani and Miller's (1958:268) seminal work in which they argue that the value of a levered firm is the same as that of an unlevered firm. This means that capital structure is irrelevant to the value of the firm. They assumed perfect markets in which deviations from the norm would speedily revert to equilibrium through the process of arbitrage. Their assumptions, including the absence of taxes, no transaction costs and homogeneous expectations, were challenged and this led them to adjust their theory by relaxing some of the assumptions.

2.3.2 Trade-off theory

Modigliani and Miller (1963:438) relaxed the tax assumption and this allowed for the tax deductibility of interest on corporate debt. Consequently, levered firms would have higher values than unlevered firms. The higher the level of debt in the capital structure, the higher the value of the firm. Taken to the limit, this would imply that a firm should maximise its debt level in order to maximise its value. In the presence of financial distress costs, the tax advantage would cease when the possibility of financial distress exceeded the tax benefits of interest. Financial distress may mean the costs of re-organisation or bankruptcy, and the agency costs which are associated with assessing

the creditworthiness of such a firm. Increases in debt are seen as increasing the potential for financial distress.

Non-debt tax shields such as depreciation, investment tax credits and tax loss carry forwards were considered by DeAngelo and Masulis (1980:22). The implication of interest on debt is that there should be higher leverage, so that the higher tax benefit can be utilised. The presence of non-debt tax shields reduces leverage by not enabling firms to use such tax benefits of interest on more debt.

The trade-off theory refers to balancing off the tax benefits of debt due to tax deductibility of interest, against the costs of increased probability of financial distress. The optimal capital structure under this scenario is one where there is maximum debt in order to take advantage of tax deductibility of interest. On the other hand, the higher debt ratio increases the risk of bankruptcy. The theory cannot explain the phenomenon observed by Wald (1999:179), where profitable firms have low debt ratios, when the opposite is expected.

2.3.3 Asymmetric information theories

Managers or corporate insiders are assumed to have private information about a firm's investment opportunities or return streams. Shareholders as outsiders do not have such information and this separation of access to levels of information is described as information asymmetry. Capital structure is expected to reduce the impact of such inefficiencies.

2.3.3.1 *Signalling theory of debt*

Issuance of debt by management is perceived as a way of communicating information to outside stakeholders. Such issuance implies that the firm is committed to meet its capital and interest obligations in the future. Non-adherence to these commitments leads to higher financial distress costs and increases bankruptcy risk. As a consequence, firms will only create such obligations when they are confident that they will discharge them. Ross's (1977:23) debt signalling model and Brealey, Leland and

Pyle's (1977:371) insider information model deal with the impact of debt signalling on capital structure.

2.3.3.2 *Pecking order theory*

Myers and Majluff (1984:188) demonstrate that if investors have less information than managers (insiders), the firm's equity may be incorrectly priced. They explain that if equity is used to finance a new project, new investors may get more than the net present value of the project, at a loss to the existing shareholders. This leads to a rejection of a project with a positive net present value, and results in underinvestment. A solution to this underinvestment problem is the financing of a project with an instrument with a lower potential for being underpriced. This could be in the form of debt or internal funds. Myers's (1984:589) pecking order theory of financing and extensions by Lucas and McDonald (1990:1019) state that firms prefer to use internal funds rather than external funds when financing investments; that if external finance is required, firms prefer to use debt rather than equity, and that equity is used only as a last resort.

Some implications of the pecking order theory are that leverage increases with information asymmetry and that if new equity is used to finance new investments, there will be a fall in the share price. Pecking order theory assumes that management acts in the best interest of current shareholders. According to Myers and Majluff (1984:188), management should be concerned if there is an over- or undervaluation of shares. Managers' possession of private information is taken for granted and not challenged under the pecking order theory.

2.3.4 Product/input interactions theory

Capital structure in this case is related to the strategy of a company on the one hand or to the products or inputs on the other. A firm's competitive strategy may affect capital structure. With a profit maximisation goal as propounded in industrial organisation literature and an equity value maximisation objective from finance literature, these two strands of the literature ignore the firm's strategy. By linking capital structure and product market strategy, the major objective becomes equity value maximisation instead of profit or total value maximisation. Any strategy which has a focus on equity implicitly affects

leverage. Brander and Lewis (1986:963) agree with Jensen and Meckling's (1976:339) concept that leverage increases risk and causes the equity investors to increase their risk appetite. They conclude that oligopolists take an aggressive output strategy.

The second strand of the product/input interactions literature discusses how debt influences a firm's interface with its suppliers or customers. Product input or output characteristics are identified and linked with leverage. Other aspects included in this literature are the bargaining power of workers or other suppliers and employment policies. Titman (1984:137) argues that a firm's liquidation affects its stakeholders such as workers and customers. When they view this perceived risk, employees and customers may place a premium on their labour and products respectively. He argues that these costs would be transferred to shareholders. The risk premia required by customers and employees can be controlled through capital structure policy. The author concludes that firms with higher liquidation costs as perceived by employees and customers will have lower leverage. Maksimovic and Titman (1991:175) extend this line of reasoning to non-durable and non-unique goods with similar conclusions.

2.3.5 Agency costs and capital structure

Jensen and Meckling (1976:305) approach capital structure from an agency theory perspective. They identify two types of agency costs, namely those associated with equity and those associated with debt. Agency costs of debt pertain to conflict between debt or lenders and equity investors while agency costs of equity relate to conflict between managers and shareholders.

2.3.5.1 *Conflict between equity investors and debt*

Conflict between equity investors and debt only arises if there is risk that there is a default, in which case equity investors can make a gain, to the lenders' detriment. Due to the residual nature of equity investors' claims, equity investors stand to gain if the value of debt falls. Where managers act in the shareholders' interests, they transfer firm value from the creditors to shareholders if there is a high probability of default. Such transfers could take several forms. According to Jensen and Meckling (1976:335), one way is for managers to take on higher risk by making investments in higher risk assets

or adopt riskier operating strategies. Creditors take the downside risk while shareholders get the upside risk.

Myers (1977:149) alludes to the underinvestment problem as another possible way to transfer value. Managers cease to use equity for new capital investments. Ordinarily, investments are made up to the point where the return equals the marginal cost of capital, which means that the present values of the cash inflows and the investment amount are equal. Current lenders share in the existing projects' cash inflows and if a new investment is to be made which is riskier, the lenders stand to gain more. Such an increase in market value could be considered like a tax and if that is high enough, managers may distribute the gain as cash to equity investors, leading to a decline in the value of the firm.

Smith and Warner (1979:138) discuss another possible way of transferring value, which is borrowing money and paying the cash to equity investors. This leads to a decline in the market value of debt, no change in the total value of the firm but the equity investors are better off. They conclude that shareholders should not borrow money in order to finance dividends.

Transfer of value also occurs when managers do not reveal adverse information to creditors who then fail or are unable to act to force reorganisation and bankruptcy. Effectively, the lenders are unnecessarily exposed for longer periods, which is to their disadvantage, and equity investors gain. Holders of bonds without adequate protection experience a decline in market value of their bonds at the announcement of a leveraged buyout. Using NASDAQ's exchange data, Alexander, Edwards and Ferri (2000:34) found a negative correlation between returns of junk bonds and equity during the announcement of events that tended to transfer wealth, such as leveraged buyouts.

Restructuring is another way for managers to transfer wealth, leading to a decline in the total value of listed securities (Parrino, 1997:242). The study shows how restructuring transfers wealth from lenders (bondholders) to equity investors. Lenders recognise and react to these wealth transfer issues in several ways. One way is the shortening of the term of debt (Myers, 1977:158). A second way is for lenders to issue convertible debt or debt with warrants. Yet another way, noted by Smith and Warner (1979:138), is for

covenants to be written into debt contracts, including restrictions on disposal of assets and distributions of dividends. A fourth method is the collateralisation of tangible assets in the debt contract.

Empirical studies on conflict between shareholders and lenders (debt holders) pay attention to how lenders attempt to secure their debt. Titman and Wessels (1988:3) use the proportion of fixed assets as an approximation for security available to lenders and such fixed assets are considered a risk mitigation for potential redistribution of wealth to shareholders and asset substitution. The use of the maturity structure of debt as a mitigating factor for underinvestment was explored by Barclay and Smith (1995:610). They found a negative relationship between growth opportunities (represented by market-to-book ratio and research and development expenditures) and debt maturity structure.

2.3.5.2 *Conflict between equity investors and managers*

Studies on the conflict between outside shareholders and owner-managers and between majority and minority shareholders are at the core of corporate governance literature (Berle & Means, 1932:120,121).

The problem of agency costs between shareholders and managers arises due to the separation of ownership and control. Managers, as agents, use the shareholders' (principals') funds, and the agents' interests are supposed to be aligned with those of shareholders. Shareholders expect fair returns for their investments. Agency costs are created in this relationship. Management has control of the firm's cash flows while its interests may be different from those of the providers of finance. Contracting between principal and agent should define what the latter can do with the cash flows and what dividend should be paid to the principal. Due to many situations that can arise in the management of a firm, it is impractical and impossible to contractually agree on what management should do under each and every set of circumstances. Shareholders therefore have to put monitoring devices in place to safeguard their interests. These equity agency costs can be resolved by agency theory in several ways.

Jensen and Meckling (1976:337) suggest that the use of more debt, which reduces the equity funding requirement, reduces the conflict between managers and equity

shareholders. However, as discussed above, the use of more debt increases the agency costs of debt. A second way of reducing equity agency costs is for managers to hold equity in the firm (Jensen & Meckling, 1976:313). Theoretically, the agency costs fall to zero if the management owns 100% of the equity. However, it is too costly for managers to attain such shareholdings, including possibly raising personal borrowings at a relatively high cost. This risk may be passed on back to the company as managers' demand increases remuneration.

Easterbrook (1984:650) suggests a third method of mitigating the agency costs due to conflict between managers and equity investors, namely to increase dividends. Such an action increases the chances that new external finance will be raised. By issuing new equity, monitoring of the firm by the stock market, investment brokers and the new shareholders increases. Managers are constrained to act in line with equity investors' interests due to the issuance of dividends. The cost of raising new capital, by way of floatation costs, needs to be taken into account.

Agency costs due to debt and equity reduce the value of the firm. Managers have to balance the benefits and costs of the finance that they use against that of paying dividends. Managers' motivation to adopt the least-cost financial policy is governed by competitive forces in the market and the wealth they stand to be rewarded by way of incentives. Despite incentives and monitoring mechanisms, conflict between management and shareholders still arises and Jensen (1986:323) proposes a search for other solutions, including free cash flow theory.

2.3.6 Momentum theory of capital structure

Momentum profitability or earnings momentum, a trading strategy of buying past winners and selling past losers has been extended to other areas of finance including capital structure, and can be traced to Jegadeesh and Titman (1993:67). The phenomenon violates the weak form of market efficiency and has been considered an anomaly (Fama & French 1996:55), while Schwert (2003:941) expected it to be short-lived. Jegadeesh and Titman (2001:699) confirmed its persistence in practice.Two strands of research emanated from attempts to explain momentum profitability. The first

thread attributed momentum profitability to behavioural explanations and psychological biases such as over-confidence, conservatism and slow dispersion of information and were grouped into the over-reaction and under-reaction hypotheses (Daniel, Hirschleifer & Subrahmanyam, 1998:1839; Barberis, Shleifer & Vishny, 1998:307). Risk-based approaches such as business cycles (Chordia & Shivakumar, 2002:986; Avramov & Chordia, 2006:1002) form the second group of explanations for momentum profitability. Psychological approaches appear to have gained more acceptance than risk-based approaches.

Avramov, Chordia, Jostova and Philipov (2007:2503) added a dimension to the literature by finding that momentum profitability was associated with firms with high credit risk but did not exist in firms with high credit quality. After excluding the highest risk firms from their analysis, Avramov *et al.* (2007:2519) concluded that less than 4% of the firms were affected by momentum trading, a number which they considered statistically insignificant after analysing credit-rated and unrated USA firms.

It can be argued that the firms with high credit quality (or low credit risk) are still subject to momentum profits since their low risk profiles enable them to continue to make profits under different circumstances, which is a form of momentum. In addition, the Avramov *et al.* (2007:2503) study's results could be highly dependent on the existence of a critical mass of rated firms in the total population. In markets where rated firms are few, it may be a challenge to draw parallels between the rated and unrated firms for the purposes of drawing conclusions from the rated sub-sample. In addition, if firms in a particular market have a high credit risk, then it would mean that the whole market may be subject to momentum profitability. Furthermore, the 4% which was subject to momentum profitability was obtained after excluding the highest risk firms. The highest risk firms could be considered outliers but since the total number excluded in that exercise was not disclosed in the study, the percentage could have been much higher, making it even statistically significant in that study. Avramov *et al.* (2007:2520) also found that momentum profitability varied with the business cycle during periods of economic expansion when there are few defaults and suggested this puzzle as an area for further research.

In their theoretical study, Avramov and Hore (2008:2) found that momentum profitability was concentrated in firms with high leverage and high cash flow volatility. This study linked momentum profitability to capital structure but did not extend it to different types of debt. Tancheva (2014:3) observed a robust relationship between momentum profitability and capital structure and showed that momentum returns increased with the levels of secured debt in small firms with high levels of information uncertainty and low credit ratings. However, no relationship was found between momentum profitability and covertible debt. Momentum profitability has been associated with firm characteristics such as risk, size and access to debt markets (Colla, Ippolito & Li, 2013:2117) while Maheshwari and Dhankar (2017:1) documented that momentum profitability persisted before, during and after the 2008 financial crisis.

Different facets of momentum profitability such as risk, effects of economic cycles and behavioural explanations have been considered in the literature, but the issue of momentum profitability still remains. In the study of the effects of ownership on capital structure, the issue of momentum profitability has to be kept in mind while interpreting the results, although it was not explicitly tested in the South African study.

2.3.7 Free cash flow theory and capital structure

The over-investment problem is considered a unique case of agency theory and can be explained as follows: managers have an impetus to maximise their own well-being (by giving themselves excessive perquisites, job security and exorbitant salaries) at the expense of shareholders; they effectively do this by making sure that corporate governance mechanisms, whether external or internal, do not regulate their behaviour; the prestige of being a manager of a big firm is considered to be a benefit which prompts managers to invest in projects that do not necessarily increase shareholders' wealth.

Jensen (1986:323) defines free cash flow as the cash flow over and above that which is necessary to finance projects with positive net present values. Such free cash flow may, instead of being distributed as dividends to shareholders, be invested in projects with net present values which are negative. He argues that this problem manifests itself more in mature firms with limited opportunities for growth. Jensen (1986:324) postulates

that debt has a monitoring role and reduces agency costs. He shows that firms that have a lot of free cash flow and low growth prospects use more debt in their capital structures as a monitoring mechanism. This leads to the conclusion that leverage and free cash flow are positively related or that leverage and growth opportunities are negatively related.

The free cash flow hypothesis was investigated in several studies. In one strand of research, studies examined the relationship between growth opportunities and leverage as part of the overinvestment problem. The relationship between free cash flow and debt is stated to be positive but a negative relationship is predicted between growth opportunities and debt.

In their analysis of the relationships between corporate finance structures, compensation choice and dividend policy, Smith and Watts (1992:264) predicted a negative relationship between growth prospects and debt. Their rationale was that firms with good prospects did not need much debt. By segregating the overinvestment and underinvestment problems and adding a free cash flow availability variable, Lang, Ofek and Stulz (1996:3) extended Smith and Watts's (1992:263) study. In line with the overinvestment hypothesis, they found a negative relationship between growth opportunities and debt in low growth firms. The result implies that gearing hampers investment by firms with poor growth prospects.

Crutchley and Jensen (1996:9) found a positive relationship between free cash flow changes and changes in leverage after regressing changes in debt ratios of firms and several proxy variables. Chaplinsky and Niehaus (1993:63) found that internal funds or free cash flows were an important determinant of leverage and their results were inconsistent with the free cash flow hypothesis. They found that the more internal funds a firm had, the lower the leverage. They concluded that the result did not support Jensen's (1986:324) free cash flow hypothesis but Myers's (1984:590) pecking order theory.

Another way of investigating the impact of the free cash flow hypothesis on capital structure is to examine specific events that have an impact on capital structure, or the

specific events approach. The idea is to show that the behaviour of firms is consistent with the free cash flow theory.

In a study of highly leveraged transactions, which were undergoing leveraged recapitalisation, Denis and Denis (1993:209) investigated how highly geared transactions affect the discretion of managers over corporate investment policy. An increase in debt was found to lead to a decrease in free or undistributed cash flow. The results show that an increase in leverage reduces managerial discretion by reducing free cash flow, in line with the free cash flow hypothesis.

Blanchard, Lopez-de-Silanes and Shleifer (1994:337) examined cases where firms won lawsuits leading to increases in cash inflow but without a commensurate increase in investment opportunities. The findings included the use of additional cash to make unsuccessful acquisitions; firms increased their leverage because investors in the highly liquid firm insisted on such and because there was a significant increase in managerial cash compensation and ownership. These results support Jensen's (1986:323) version of the free cash flow theory. Firm survival and managerial control (including investment in projects which are not ideal and preferring to keep cash rather than allowing outsiders to have access to it) appear to be managerial objectives.

The free cash flow hypothesis is a version of the agency theory of which the backbone is the principal-agent framework. Dividends are assumed to be a control mechanism to limit overinvestment by managers. Due to its control of the firm, management can invest in projects with negative net present value as long as its personal utility is increased. By paying dividends, free cash flow is reduced thereby limiting management's scope to over-invest (Jensen, 1986:323).

Jensen (1986:323) argues that when firms have free cash flow, they invest in projects which waste money instead of paying the money to the shareholders. This phenomenon is due to the fact that benefits and management compensation increase even if the investments are poor. Bad investments lead to poor corporate performance and tension between managers and shareholders. The tenet of his argument is that by paying dividends, free cash flow is reduced, thereby giving dividends a disciplining role. Due to stickiness of dividend policies, firms do not intend to reduce dividends and the consistent

dividend policies therefore act as a monitoring mechanism. The author therefore proposes that dividends should be paid only if the cash exceeds an optimal point, leading to a positive relationship between cash and dividends.

Crutchley, Jensen, Jahera and Raymond (1999:177) examined four methods which were expected to reduce agency costs, namely institutional ownership, insider ownership, dividend policy and financial leverage. Their data consisted of over 800 firms listed on the New York Stock Exchange from 1987 to 1993. They found a positive relationship between dividend payouts and institutional ownership and that the two factors were jointly determined for 1987. In 1993, a negative relationship was found between the dividend payout ratio and institutional ownership. No relationship was found between insider ownership and dividend policy.

2.4 TYPES OF OWNERSHIPS AND CAPITAL STRUCTURE

In Section 2.2, the extent to which a firm's ownership was concentrated or diffused and how such ownership concentration could be related to capital structure were discussed. Section 2.3 discussed capital structure theories. The preceding sections provided more insight into how the extent to which a firm was owned could be related to its capital structure. This section reviews the literature on different types of ownerships and how they relate to capital structure. The intention is to examine whether the extant literature provides consensus on how the identity of shareholders affects the leverage of a firm. The main categories or ownership identities reviewed include management, institutional investors, foreign and government.

2.4.1 Managerial/ family ownership and capital structure

The discussion on the effect of ownership concentration on capital structure partly covered the literature pertaining to the effects of management, institutional, state and family ownership on capital structure. In other words, studies on ownership concentration overlapped with issues of owner identity. Studies, such as that of Lo *et al.* (2016:115) treat the concentration of ownership and ownership identity issues for families interchangeably, the difference being a matter of degree of concentration or

using a dummy variable to switch from a controlling family to a non-controlling family. This section therefore discusses the literature on the effects of managerial and family ownership without reference to the concentration of such ownership.

Shares of firms can be held by large single-party non-managerial shareholders, such as institutions, the general public, employees and the firm's management (board members, top management or chief executive officers). Jensen and Meckling (1976:313) propose that when management has ownership, it is incentivised to act in line with equity investors' interests. If the management has a high ownership interest, it gains more wealth from behaving optimally.

Zwiebel (1996:1197) provides some theoretical evidence on how managers use debt in firms to build empires for themselves as well as voluntarily constrain themselves. He argues that the managers have to make a trade-off between building empires and ensuring that they do not trigger unnecessary control problems. The author further argues that a judicious dividend policy and the type of debt used in the firm depend on the opportunities available to the firm.

Novaes (2003:55) examines takeover threats and the use of debt to monitor management. Noaves (2003:51) defines *overleverage* as the level of debt which managers employ in the face of a takeover threat to deter a potential raider. The author further defines *underleverage* as the position where the debt in the capital structure is not high enough to deter a takeover threat. Noaves (2003:69) shows that the role of debt in capital structure is a tool in the hands of management rather than a monitoring tool). The view of debt as a management tool rather than as a monitor presents an interesting view of capital structure, and could have been more appropriate in the takeover scenario than in general corporate structures.

In their analysis of Australian data, Brailsford, Oliver and Pua (2002:4) found evidence of a non-linear relationship between ownership by insiders (management) and leverage. Their results support the convergence of interest hypothesis. De la Bruslerie and Latrous (2012:111) studied the relationship between shareholder ownership and leverage of 112 firms listed on the French stock exchange over the period 1998 to 2009

and found an inverted U-shaped relationship between shareholder ownership and leverage.

Berger, Ofek and Yermack (1997:1436) argue that management's objective is to maximise shareholders' wealth and maximise firm value by avoiding the costs of financial distress. They argue that a negative relationship is therefore expected between managerial ownership and leverage. In addition, as managers get entrenched due to their power and influence, the managers adjust the firm's debt ratio in line with their own interests. Such an action may include the acquisition of additional debt to fund investments which are less than optimal, or to build empires for management. Therefore, increased managerial shareholding leads to an alignment of interests between management and other shareholders. In this process, the entrenchment effect is reduced. Leverage is then reduced in an attempt to reduce the probability of bankruptcy. This reduction in leverage can also be viewed as an increase in agency benefits due to increased managerial shareholding.

Ruan *et al.* (2011:84) argue that there is an inverse "N" relationship between managerial ownership and capital structure (leverage). Ruan *et al*. (2011:77) propose that the relationship between managerial ownership and firm value is a non-linear "N" shape representing changes of alignment between managerial interests and wealth of shareholders.

Empirical work does not give clear-cut conclusions, with some results showing a positive relationship between managerial ownership and leverage, in contrast to Jensen's (1986:324) negative relationship. An argument for the positive relationship is that once the managers' interests are aligned with those of shareholders, the management prefers to assume more corporate debt.

Kim and Sorensen (1986:132) classified firms into those with high ownership by insiders and those with low insider ownership. They tested whether there was a relationship between corporate leverage and agency costs because of Jensen and Meckling's (1976:334) assertion that management's ownership affects the agency costs of equity. Their finding was that firms with high insider ownership had higher leverage than firms with lower inside ownership.

Agrawal and Mandelker (1990:143) analysed the relationship between ordinary shares and managerial stock options and firms' choices of investment and financing decisions. In line with Kim and Sorensen (1986:131), they found a positive relationship between managerial shareholdings and financial leverage changes, showing that managerial shareholdings reduced agency costs. In his investigation of the relationship between capital structure, executive compensation policy, monitoring by the board and major shareholders, Mehran (1992:540) obtained a positive relationship between managerial ownership and leverage.

One of the empirical studies on the effects of managerial ownership and entrenchment through leverage is that by Friend and Lang (1988:271), who investigated how managerial entrenchment due to managerial shareholdings affected capital structure decisions from one year to the next. Using cross-sectional analysis, Berger *et al*. (1997:1436) found that capital structure was affected by the extent to which management was entrenched and its propensity to avoid debt.

Ruan, Tian and Ma (2009:71) studied the effects of managerial ownership and capital structure on the Standard & Poor's 500 firms. They used capital structure as a variable that was affected by managerial ownership leading to an ultimate effect on firm performance. A non-linear relationship was observed between managerial ownership and capital structure. Using French data, Said (2013:162) examined the determinants of capital structure as part of agency theory, placing emphasis on the role of insiders and outsider ownership in explaining the debt ratio. A non-linear relationship was found between managerial ownership and capital structure. For higher levels of managerial ownership, he found that outside shareholdings did not significantly affect the debt ratio.

Another strand of research found a negative relationship between leverage and managerial ownership. The explanation for the negative relationship was that ownership by management and leverage were substitutes in disciplining management. Friend and Lang (1988:280) examined the relationship between leverage and ownership by insiders (management). They found that leverage decreased with increases in management ownership. This result was interpreted to mean that management intended to entrench itself. They also found that leverage was higher in firms which had

large principal investors who were not part of the management, when compared with firms that did not have principal investors. The study concluded that large non-management shareholders could be instrumental in aligning the interests of management and shareholders.

Crutchley and Hansen (1989:36) examined the relationship between leverage, dividend policies and managerial ownership and found that firms with great earnings' volatility had greater management ownership and larger dividends, but lower leverage. They concluded that the greater earnings' variability was associated with a higher risk of bankruptcy, which forced managers to reduce debt and use their ownership and dividends to manage agency costs. A similar study by Jensen, Solberg and Zorn (1992:261) on leverage, insider ownership and dividend policy using a simultaneous equations framework found that leverage had a negative relationship with the dividend payout ratio and managerial or insider ownership.

The impact of institutional investors and managerial ownership on a firm's capital structure was investigated by Firth (1995:175). Firth (1995:175) did not express managerial share ownership using a cut-off percentage as in the study by Friend and Lang (1988:275) and used other continuous variables. Firth (1995:167) found a negative relationship between a firm's debt-equity ratio and executive management share ownership.

Using a simultaneous equation system, Chen and Steiner (1999:119) examined the relationship between ownership of firms by management, risk-taking and debt policy. They introduced the phenomenon of substitution monitoring effect between insider or managerial ownership and debt and between dividend policy and managerial ownership. They also argued that the same effect was observed between institutional investors' and managerial ownership. Their results reinforce the theory that firms choose alternative forms of monitoring in order to reduce agency costs.

Rossi and Cebula (2016:889) investigated the effect of ownership structure on capital structure in non-financial Italian firms. Ownership structure consisted of ownership concentration and ownership identity. The percentage owned by the board of directors was one of the explanatory variables. There was an alternative dummy variable which

took the value of one if there was ownership of shares by the board of directors, or zero otherwise. In addition, the study also considered the interaction between institutional ownership and board ownership variables. Board ownership was from 0.00% to 71.08%, with an average of 9.94%. A statistically significant negative relationship was found between board ownership and leverage, showing that the board was averse to leverage. Managerial ownership had a negative relationship with the level of debt in the study by Lee and Kuo (2014:410).

The use of directors' shareholding as a measure of ownership is directly relevant to the South African study as managerial ownership may be measured by the shares owned by directors. Such information is disclosed in the annual financial reports of companies. Hence the results of the studies may be easily comparable if other relevant factors are similar.

Studies which found a positive relationship between firm ownership and leverage emphasised the role of debt as a disciplining device. In a study of 3 006 Italian medium to large firms and 2 730 small unlisted firms over the period 2001 to 2010, Gottardo and Moisello (2014:254) confirmed the assertion that family firms had more debt than non-family firms, which was a positive association between concentration of ownership by families and the level of debt. Firms analysed in this study were unlisted as opposed to those investigated in other studies, which were listed. The sample sizes were quite large, which was ideal for statistical/econometric analysis. However, because these samples were drawn from unlisted firms, they could still be very small fractions of the populations from which they were drawn, potentially making them a very small proportion of the population of such firms. King and Santor (2008:2423) found a similar result in a sample of Canadian firms.

Gama and Galvao (2012:199) argue that controlling family shareholders prefer more equity than debt in the capital structure of their investee firms due to families' aversion to bankruptcy. Such shareholders were found to use control-enhancing instruments, including dual-class shares and pyramid structures. In a study of German firms, Schmid (2013:257) found that family firms tended to avoid the use of debt when compared with non-family firms. Family firms were generally run by family members, making this study relevant to the analysis of the effect of managerial ownership on capital structure. It

would be expected that less debt would be found in firms that are owned by families than those having other types of shareholders if the results of this study were applicable to the South African-listed non-financial firms, which are the subject of the current study.

2.4.1.1 *All equity firms: managerial and family ownership*

Agrawal and Nagarajan (1990:1325) examined the corporate capital structure, agency costs and ownership control for all equity firms. Using a sample of 104 firms listed on the major USA stock exchanges, they compared financial, managerial and ownership characteristics of all-equity firms with those of levered and similar-sized firms. The results of the study showed that top managers had higher ownership stakes in all-equity firms than in geared firms. More family involvement in firms' operations was recorded in all-equity firms than firms that had debt. Ownership of all-equity firms was also found to be positively related to the degree of family involvement. Reduction of risk, which is linked to substantial undiversifiable investments of the human capital of families as well as their individual wealth, is given as a possible reason for the adoption of all-equity firms by management. All-equity firms were defined as those that did not have long-term debt over a five-year continuous period, namely 1979 to 1983, on the COMPUSTAT Annual Industrial files. Matching leveraged firms were selected using the Standard Industrial Classification (SIC) code and asset size. A 5% minimum debt ratio, defined as the ratio of book value of debt to total firm value, was used in selecting the matching firms. Comparison between all-equity firms and levered firms provided insights into determinants of capital structure and, in particular, the level of managerial ownership and capital structure.

Firms that did not use debt were found to be generally small, with fewer shareholders, having a lower ratio of current liabilities to current assets and higher liquid assets than geared firms. Due to these factors, the study concluded that all-equity firms appeared to have an aversion to any kind of debt and default risk. In 27% of the firms, at least two or more senior managers, who were defined as the five highest-paid executives, were related to each other or at least one senior manager was related to the principal shareholder; 5% shareholding was used as the threshold for a principal shareholder. In the case of concentration of shareholding, the threshold may be considered low, but if the shareholdings are dispersed, the same figure may be considered to be high. In a study of dual-listed firms, DeAngelo and DeAngelo (1985:54) propose that if more than

one family member is involved in the operations of a firm, the benefits of managerial votes are greater than if there is one family member. Low leverage and relationships among senior managers and board members were found in that study. Similarly, the relationships among senior managers in the Agrawal and Nagarajan (1990:1325) study suggest the existence of family relationships and an aversion to debt.

By separating the ownership by the top manager and that of the second-most senior manager, and then the rest of the directors and officers, the study could disaggregate managerial ownership, which is usually not easy due to data constraints. Such a classification also provides more insight into the relationships being studied. Managerial ownership will not be split into these lower levels in the current study.

Whereas Agrawal and Nagarajan (1990:1326) analysed data from a sample which represented 70% of all-equity firms on the database, the study did not provide information on the total number of firms on the database, irrespective of their capital structure. Such information is useful in assessing the prevalence of such firms in the market as a whole.

In order to test the results of their study over a slightly longer period than 1979 to 1983, Agrawal and Nagarajan (1990:1330) identified two groups of firms. One group consisted of firms which had moved from all-equity positions to including some debt in their capital structures and the other group, which consisted of companies that ceased having debt in their financing structures to all-equity positions. No significant difference was found in the level of managerial ownership in the year that the switch was made. The result could be attributed to the assertion that capital structures tended to change infrequently. Data for the current South African study will be collected for a longer period to enable the results to be more generalisable.

2.4.2 Institutional ownership and capital structure

Institutional investors are viewed as an alternative control mechanism for the over-investment problem, according to several studies. In a study of the role of large shareholders, Shleifer and Vishny (1987:754) argue that large shareholders monitor managers. Agrawal and Mandelkar (1990:145) state that institutional investors restrain managers' potentially sub-optimal behaviour and that they provide essential monitoring services. This monitoring role is attributed to the institutional investors' capacity and experience in analysing information on firms. Monitoring by institutional investors, which reduces the overinvestment problem, is through the governance process as well as nudging firms to increase leverage. The governance process is enhanced by institutional investors through insisting on the appointment of independent directors to the board. By such actions, the agency costs are reduced.

In general, firm ownership is associated with control of the firm that is owned. Hence the more that a shareholder owns, other things being equal, the more control the owner is expected to exert on the investee. This system is entrenched in shareholders' agreements, among other contracting documents, where, for example, the number of directors to the corporate board may be chosen to represent shareholders in accordance with their shareholdings. As discussed in the preceding paragraph, institutional investors are associated with monitoring managers of investee companies.

Davis (2008:11) observed a different type of phenomenon, namely that firm ownership in different countries was usually concentrated in some corporate ownership networks such as banks in Germany, chaebol in South Korea and keiretsu in Japan. In the USA, where share ownership was considered to be fairly diffuse, a new phenomenon was observed in the study, which was reconcentration of ownership. Mutual funds, or unit trusts, were found to be the source of re-concentration of ownership and high liquidity but control was avoided, holding about 30% of corporate ownership at the time of conducting the study, as opposed to 8% in 1990 (Davis, 2008:12). This phenomenon was attributed to the increased participation by households in equity markets, mainly through mutual funds. The funds then held sizeable cash balances and invested these

in equity markets. Hence mutual funds held ownership stakes in many different companies at the same time. Therefore, at company level, the mutual fund's shareholding may appear to be not out of the norm. However, when the different individual shareholdings are aggregated across firms, they show that these mutual funds have very large shareholdings. This would be a form of 'macro' concentration.

If large shareholders, especially institutional investors, can monitor investee companies' management, such concentration could be beneficial to the investee companies. Different trends were observed regarding the mutual funds. First and foremost, the study found that these large funds did not participate in corporate governance, unlike the large shareholders in other countries. Davis (2008:11) labels this system where there is substantial ownership without control the 'new finance capitalism'. The phenomenon was partly attributed to concentration and liquidity. Awareness of such developments assists in providing an interesting insight into the role of institutional investors, to the extent that they are found to be large or significant shareholders in the South African firms which are investigated in this study.

Another feature observed about the mutual funds was that their ownership was relatively transient. Mutual funds were found to hold their large shareholdings for five years or shorter periods. In addition, mutual funds were not keen to exercise their power. Possible reasons provided for their passive role included legislation, which was seen to be onerous once ownership reached certain thresholds. Secondly, mutual funds obtained sizeable administration business from the very corporates in which they were shareholders. Hence the mutual funds could not actively monitor or demand performance from the firms that provided them with another stream of income, apart from dividends. The last reason for the lack of activism was that it was perceived to be easier to walk away than having to mount up an activist stance with a low prospect of winning, and even if the activism paid off, the benefits would be shared by other shareholders (free riders).

Davis (2008:11) concluded that mutual funds in the USA, including the largest mutual funds, were more likely to exit the shareholding than to exercise their voices as shareholders. Such behaviour was characterised as being different from that of their predecessors, leading to a new version of American financial capitalism. Davis

(2008:12) states that this trend could be short lived rather than the new norm. However, the study is important in highlighting the dynamics of ownership of firms in the USA. The observations made in this study will be borne in mind in the current study. The issue regarding the level of activism, whether transient or permanent, is beyond the scope of the current study.

The study is also important for pointing out that dominant firm ownership in the USA has evolved. Around 1914, banks such as JP Morgan controlled firms, the earlier version of financial capitalism, followed by managerialism, and later on by the new form of financial capitalism. The study creates the impression that dominant ownership may be dynamic rather than static. The current South African study covers 11 years, a period which is long enough for relationships to be estimated.

Tilba and McNulty (2013:165) studied the behaviour of pension funds towards their investee companies in the UK. They analysed a sample of 35 local authority and occupational pension funds (with capital values ranging from more than £1 billion to £30 billion) using different methodologies including interviews, documentary analysis and observation in some fund investment meetings.

The results of the study showed that a very small percentage of pension funds which were well resourced and internally managed actually exhibited active ownership behaviour. Most pension funds were found to operate from a distance from the companies in which they owned shares. These pension funds delegated their pension fund investment duties to other firms such as actuaries, investment consultants and fund managers. The study observed that the parties which were subcontracted to look after the investee companies had interests which were different from those of the shareholders, namely the pension funds on whose behalf they acted. As a consequence, the pension funds focused their attention on the performance of the investment rather than being active as shareholders or paying attention to corporate governance matters.

Pension funds are not a monolithic investor group but rather vary in the type of fund, asset size, maturity, liquidity requirements and internal management expertise (Tilba & McNulty, 2013:166). The authors reckoned that all these differences could explain the

differences in pension fund behaviour towards investee companies. They describe the behaviour of institutional investors as more aligned towards being traders and exiting investments as opposed to being owners with a voice in the investee companies. Hirschman (1970:15) developed a framework for company investors selling their shares and leaving if they were unhappy with their investments ('exit') or engaging with management about their dissatisfaction ('voice'). The author classified the pension funds into those that were engaged and those that were disengaged.

The Tilba and McNulty (2013:165) study therefore extended the work carried out in the USA by Davis (2008:11) by analysing pension funds as opposed to mutual funds (unit trusts), by using a different methodology as well as carrying out the study in a different country, namely the UK. Similar results were obtained from the two studies. The role of institutional investors as monitors to management was also questioned and the effect of their ownership on a firm's capital structure remained open for investigation. Both studies viewed institutional investors as a mechanism for reducing asymmetries and therefore these investors could be viewed as a substitute to debt in monitoring management.

One of the studies finding a negative relationship between institutional investors' ownership and leverage is that of Michaely *et al.* (2015:1), who analysed a sample of companies in the USA over the period 1980 to 2013. Utilities and banks were excluded from the analysis because the researchers argued that capital structures of companies in these sectors were governed by regulation or law. The study found a negative and statistically significant relationship between corporate leverage and institutional investor ownership. Chung and Wang (2014:203) also found that the level of debt in the capital structure decreased with increases in the institutional investor shareholdings.

In theory, institutional investors have been associated with medium- to long-term, not short-term, investment horizons. Hence Rossi and Cebula (2016:887) refer to them as 'patient investors'. The long-term perspective of institutional investors enables them to take up their monitoring role. As discussed above in connection with studies about mutual funds in the USA and pension funds in the UK, most of the institutional investors in the samples had short-term perspectives. In addition, the institutional investors sampled were rather disengaged than engaged as shareholders, having ownership

without control. As Rossi and Cebula (2016:883) conducted their study in Italy, some of the conclusions reached by studies using data from the UK and USA may not be applicable.

Rossi and Cebula (2016: 884) analysed 369 firm-year observations (41 companies) from a sample of Italian-listed companies over the period 2005 to 2013. This period was split into the period prior to the financial crisis (2005 to 2008) and the crisis period and the subsequent recession phase (2009 to 2013). The presence of institutional investors in Italy was considered low when compared with that of similar countries. It was also observed that most of the institutional investors were foreign investors. The shareholding held by institutional investors during the period of the study was 3.7%. The ratio of debt to capital was 36.18%. Being a bank-centred country, it was expected that businesses would make extensive use of bank debt. Italy was also observed to have few listed companies, with most businesses being owned by families. The difference in leverage between the two periods was studied through the utilisation of a dummy variable.

Rossi and Cebula (2016:883) used a balanced panel data set to analyse nine-year data. They used the Hausman (1978:1264) test to determine the appropriateness of the random effects model. The fixed effects model was not used because it did not meet the requisite tests. Use of the random effects model was also justifiable because it was used in similar studies, such as that by King and Santor (2008:2427).

Reverse causality has been known to lead to endogeneity problems. A dynamic panel data econometric model, such as the two-step system generalised method of moments, was used to deal with the problems. The method was proposed to solve the two components of endogeneity caused by unobserved heterogeneity and simultaneity of the variables (Wintoki, Link & Netter, 2012:582). The study used lagged variables as part of the explanatory or independent variables set. The methodology applied to the study by Rossi and Cebula (2016:883) took into account some of the developments in econometrics and a similar approach will be considered for use in the South African study. The sample mainly consisted of manufacturing and other services companies and excluded financial firms. The basic format of the random effects model used in the study by Rossi and Cebula (2016:883) was as follows:

$y_{it} = \mu_{it} + \alpha_1 OWN\_STRUCTURE_{it} + \alpha_2 CONTROL\ VARIABLES_{it} + v_{it}$

Where:
y_{it} is the dependent variable;
μ_{it} is the constant;
α_1, α_2 are the coefficients; and
v_{it} is subdivided into two terms, namely e_{it}, which is the stochastic error term and u_{it}, representing the random individual differences.

Ownership structure was measured by ownership concentration variables, which were the sum of the percentage shares held by the top three shareholders, or the top, second or third major shareholders, a dummy variable for shareholding in excess of 50%, the Herfindahl index, and two variables reflecting the excess of the actual shareholding percentage in excess of the mean and the median respectively. There was also a variable representing the percentage of shares held by the board of directors (or a dummy variable representing the presence of directors' shareholding). Another variable represented the percentage of shares held by institutional investors. The control variables were return on assets, research and development, Tobin's Q, firm age, size and industry.

Rossi and Cebula (2016:889) applied a binary variable for ownership structure, which assumed a value of one if at least one shareholder was an institutional investor and a value of zero, if there was none. The analysis included interaction of the institutional ownership variable with the top three shareholdings' percentage, the Herfindahl index, the 50% shareholding dummy variable, and the percentage of shares owned by the board of directors, separately. The negative relationship between institutional ownership and capital structure was interpreted to mean that leverage and institutional ownership were substitutes in monitoring management's sub-optimal behaviour. Tong and Ning (2004:63) argue that institutional investors prefer low debt firms when selecting target firms.

Bathala *et al.* (1994:38) examined the relationship between management's equity ownership, institutional investors' ownership and leverage. They argued that the two

forms of ownership were substitutes in reducing agency costs. A simultaneous equation estimation procedure was used, in line with Jensen *et al.* (1992:248). They found a negative relationship between leverage and institutional investor ownership.

Grier and Zychowicz (1994:1) studied the effect of institutional ownership on the capital structure of firms. They found that ownership by institutional investors acted as a substitute for debt in monitoring management. A negative relationship between leverage and institutional ownership was found in this study. Increases in institutional ownership in the 1900s were found to be associated with decreases with leverage (Crutchley & Jensen, 1996:9).

2.4.3 Foreign ownership and capital structure

Under the first part of the main objective discussed in Chapter 1, namely investigating whether ownership affects the capital structure of a firm, it is important to consider whether ownership is indigenous or foreign. This discussion forms part of the literature which deals with the importance of types of owners and their effect on capital structure. The purpose of this section is to review the literature on the effects of foreign ownership on capital structure, because the literature identifies foreign investors as having a bearing on capital structure. An understanding of the relationship between these variables helps to understand the research problem and enables the formulation of the relevant hypotheses to be investigated by the study.

A strand of the literature on ownership deals with the origin of the owners of firms. Specifically, the relationship between capital structure and origin of ownership (local and foreign) has been investigated. Li *et al.* (2009:472) found that foreign-owned firms had lower financial leverage than local firms and that foreign-owned firms had longer-dated debt. This finding can be explained by foreign-owned companies having better access to capital, better governance and modern management practices. The argument that foreign-owned firms may have better access to capital has to be viewed against attempts by some governments to support indigenous firms. The relationship between ownership and capital structure (financial leverage) may partly depend on the institutional settings in the countries in which the firms are located. The inclusion of this

variable to the current study, which uses South African data, should provide some insight into the significance of this variable.

Phung and Le (2013:40) investigated the effect of foreign ownership on capital structure and performance of Vietnamese-listed non-financial firms using data covering the period 2008 to 2011. Most of their analysis was based on agency theory as expounded on by Jensen and Meckling (1976:308) and Jensen (1986:323). The study identified different types of ownerships. Using the Jensen and Meckling (1976:306) view, contributors of capital consist of inside investors or managers and other outside investors, who constitute debt and equity holders. This perspective emphasises the separation of ownership and management of firms. Another perspective is to define *ownership structure* as the proportion of shares held by an ownership group, such as institutional ownership, where the shares are held by institutions, managerial ownership, government ownership, family ownership and foreign ownership, where the shareholders are management, governments, families and foreign investors (Ezeoha & Okafor, 2010:249).

Ezeoha and Okafor (2010:253) investigated the nature, degree and direction of the effects of local ownership on capital structure in Nigeria. They used a sample of 71 non-financial Nigerian firms out of 192 firms listed in 2006 to estimate the relationship between firm ownership and leverage. Accounting and other data covered the period between 1990 and 2006. Their sample excluded financial firms, in line with prior studies. The study also excluded firms listed on the second tier of the Nigerian stock exchange. The fixed effects estimation approach was used. Ezeoha and Okafor (2010:258) concluded that whether a firm was locally or foreign owned affected capital structure. The study used different types of ownerships including institutional ownership, public and private ownership, managerial ownership, diverse and concentrated ownership, as well as local and foreign ownership. Some of these classifications will be used in the current study.

The question of foreign and indigenous ownership is important in countries which adopt indigenisation policies or which are contemplating such policies or those countries that place a limit on foreign ownership. Such countries would predominantly be from emerging markets. The fact that the Ezeoha and Okafor (2010:249) study was

conducted in what is now Africa's largest economy is significant so that smaller countries may take a cue from its results. However, it has to be considered that the unique circumstances in one country may be completely different from those of another country. Hence there is a need for a study using South African data, given that this economy was, for a long time (until the first quarter of 2014), the largest in Africa.

Some studies found a negative relationship between foreign ownership and capital structure. Such a relationship implies that foreign-owned firms use less debt in their capital structures. In their investigation of this relationship in Chinese firms, Li *et al.* (2009:472) found a negative relationship between foreign ownership and capital structure. *Capital structure* was defined as all types of debt. The reason was that Chinese (foreign) firms were taxed less than firms owned by local investors, thereby reducing the tax advantage of debt among foreign-owned firms. A possible implication from this result is that under a different tax environment, the relationship between foreign ownership and capital structure may change. Another reason for the negative relationship is that foreign firms have a wider market from which to access funds than locally owned companies, giving them wider financing choices. Such an explanation assumes that the foreign-owned companies originate in countries which have properly functioning financial markets and that there are no financial crises in such countries. If the countries of origin of the foreign shareholders face constraints, then the advantage over foreign companies may be reduced.

Huang *et al.* (2011:209) also analysed the relationship between foreign ownership and debt in listed Chinese firms and found a negative relationship, but a different reason was given for the result, namely the monitoring argument. An analysis of the types of foreign investors showed that most of them were institutional investors and these foreign investors had the ability to monitor and control management and reduce agency costs caused by the separation of ownership and control. The foreign institutional investors are viewed as substitutes to debt, in terms of controlling or monitoring management. The argument therefore is that if the foreign institutional investors are well positioned to monitor management, there is no need to increase the level of debt to effectively perform the same function.

Other studies also proposed a positive relationship between foreign ownership and capital structure (or debt) (Zou & Xiao, 2006:242). The actual results were not statistically significant. The basis of the hypothesis by Zou and Xiao (2006:246) was information asymmetry in emerging markets. Due to high levels of information asymmetry in emerging markets, foreign investors may prefer to invest in firms with high levels of debt, so that the debt can play the monitoring role. The insignificance of the results could mean that foreign ownership does not matter. A negative relationship would be expected if foreign ownership can undertake the monitoring role of debt. If there are information asymmetries, foreign ownership may want more debt in the capital structure to enable debt funders to monitor management, thereby reducing agency costs.

Phung and Le (2013:45) based their study on the prevalence of information asymmetry in emerging markets and postulated that foreign ownership would be positively related to capital structure. The information asymmetry arguments have been put forward in a number of studies including that of Vo (2011:4), who argues that in order to avoid information asymmetries, foreign investors select local firms with certain characteristics. He found that foreign firms preferred large local firms with, among other things, low leverage. A negative relationship was therefore found between foreign ownership and capital structure. In addition, the study found that foreign investors were averse to firms with a dominant shareholder (that is, firms with a high ownership concentration). Vo (2011:12) found a negative relationship between foreign ownership and ownership concentration. These results provided an indication of the type of relationship that could be expected between foreign ownership and capital structure. The types of foreign firms in the study consisted of foreign institutional investors such as mutual funds, hedge funds and foreign investment banks. Such foreign firms were said to be generally well capitalised. The current study will not identify foreign shareholdings in order to investigate the effects of foreign ownership on capital structure. This could be an area for further research.

A different view holds that foreign investors do not face greater risks or asymmetries in information than what local investors face but that the foreign investors prefer to use their better access to different sources of finance to increase the company's debt (Gurunlu & Gursoy, 2010:21). A positive relationship was hypothesised using the

argument that due to international diversification of their cash flows, international firms should have lower variability of cash flows and lower risk of bankruptcy, thereby enabling them to raise more debt than domestic firms. However, foreign firms have been said to face higher risks than domestic firms. Some of these risks are listed as business, currency, country and taxation and cultural differences. Mitigation measures for these risks include control of governance structures of the firms by the foreign owners. Foreign ownership is associated with access to capital markets, among other benefits, resulting in more equity and more debt at a lower cost. Book and market leverage were used as measures of capital structure, whereas the percentage of foreign shareholders was used as a measure of foreign ownership. Foreign ownership was employed as the primary explanatory variable and other variables such as size, tangibility and liquidity as control variables. The following multivariate regression models were estimated using the data set:

$$BLEV_{it} = \beta_0 + \beta_1 FRGN_{it} + \beta_2 SIZE_{it} + \beta_3 ROA_{it} + \beta_4 DOL_{it} + \beta_5 TNG_{it} + \beta_6 CAPEX_{it} + \beta_7 LIQ_{it} + \varepsilon_{it}$$

$$MLEV_{it} = \beta_0 + \beta_1 FRGN_{it} + \beta_2 SIZE_{it} + \beta_3 ROA_{it} + \beta_4 DOL_{it} + \beta_5 TNG_{it} + \beta_6 CAPEX_{it} + \beta_7 LIQ_{it} + \varepsilon_{it}$$

Where:
$BLEV_{it}$ is book leverage;
$MLEV_{it}$ is market leverage;
$FRGN_{it}$ is foreign ownership;
ROA_{it} is return on assets (profitability);
DOL_{it} is degree of operating leverage;
$SIZE_{it}$ is firm size;
TNG_{it} is tangibility;
$CAPEX_{it}$ is capital expenditure; and
LIQ_{it} is liquidity.

Using their data set from 2007 to 2008 for 143 non-financial firms listed on the Istanbul stock exchange, Gurunlu and Gursoy (2010:26) found a negative relationship between foreign ownership and long-term debt. This result was explained by foreign firms

providing more equity in the financing of their companies, leading to relatively less debt in their capital structures. Data on ownership and other factors was collected over a two-year period in this study, which is considered to be short. A longer period could present more representative results. In addition, the format of their regression equations, in which foreign ownership is one the main independent variables with the rest being control variables, provides an approach that would be considered in the current study. Additionally, the use of two variables (market and book leverage) to measure leverage, although not unique to this study, enabled the researchers to obtain better insight into the relationship between foreign shareholding and capital structure. Some variables used in the Turkish study will be employed in the current study.

Anwar and Sun (2015:32) conducted a study on the more general question of whether the presence of foreign investment affected the capital structure of domestic firms. The sample consisted of Chinese manufacturing firms with data collected from 2000 to 2007. This is a macroeconomic rather than a firm-level or micro study. However, it impinges on the foreign ownership because some of the foreign investments may be brought into the economy through foreign shareholding. The authors argue that foreign investment affects capital structure “through related spill-overs” (Anwar & Sun 2015:33), which means through increases in optimal debt available in the market and investment in domestic firms. The study had theoretical and empirical components and examined the effect of foreign presence on privately owned firms and firms which were owned by the state or owned co-operatively. The effect of foreign investment on the leverage of privately owned domestic firms was significantly negative. The negative relationship was attributed to the increase in supply of finance into the domestic economy, which led to an expansion of the private sector. Such an increase resulted in higher levels of competition and more funds available for lending.

The study was conducted in China where the state historically had significant ownership in the firms, relative to countries like South Africa due to the historical political ideologies of these nations. The study is important because the empirical component introduced foreign ownership as one of the determinants of capital structure. Variables found to be significant in determining capital structure in earlier research were treated as control variables.

Studies of the relationship between foreign ownership and capital structure also found a positive relationship between these variables. Mishra and Ratti (2011:182) analysed the relationship between foreign ownership and capital structure (debt) and found a positive insignificant relationship. This result meant that companies with foreign ownership had more debt in their capital structures than locally owned firms.

Phung and Le (2013:46) used data from the Ho Chi Minh stock exchange for non-financial firms covering the period 2008 to 2011. They used the following model to determine the effects of foreign ownership on capital structure:

$$CS_{it} = \alpha + \beta_2 FO_{it} + \gamma X_{it} + \varepsilon_{it}$$

Where:
CS_{it} is capital structure of firm i at period t;
FO_{it} is foreign ownership of firm i at time t; and,
X_{it} is a vector of control variables.

The control variables employed in this study were profitability, growth, tangibility, tax and firm age.

Using pooled data and ordinary least squares regressions, Phung and Le (2013:51) found a negative relationship between foreign ownership and capital structure, which was contrary to the positive sign they had expected. The negative relationship meant that foreign-owned firms had less debt in their capital structures than locally owned companies. In order to solve the problem of heterogeneity, which is associated with cross-sectional data, Phung and Le (2013:50) used the panel data approach and estimated fixed and random effects models. The robust version of the Hausman test was used to determine which of the two models was better suited to the data. The fixed effects model was selected. A positive and significant relationship between foreign ownership and capital structure was found using the new methodology. However, the R^2 (or coefficient of determination) was small (0.06%), showing very low explanatory power of the model. Results from the Phung and Le (2013:52) study appeared to be dependent on the model used to estimate the relationship because the relationship changed from negative to positive when the models were changed. Therefore, model

selection may be crucial in the current study. Irrespective of the methodological differences, the relationship between foreign ownership and capital structure remains unresolved hence the need for the current study, using South African data.

2.4.4 State ownership and firm capital structure

Shleifer (1998:147) discusses the question of state as opposed to private ownership. He argues that, generally, private ownership should be preferred to state ownership. He further argues that where there are social goals to be met, these should be dealt with through government contracting rather than ownership. Market failure is one of the arguments for state ownership. Despite the arguments against government ownership expounded in the study, state ownership is common, as reflected in some studies, and the effects of such ownership continue to be studied. In their discussion about privatisation in different parts of the world, Megginson and Netter (2001:331, 336) allude to the fact that the democratic political leadership of South Africa sold off some state-owned enterprises despite its dislike for privatisation. Given that the current study is conducted on South African firms and that the government disposed of some shareholdings and kept others, the study will seek to analyse the extent and the effects, if any, of such shareholdings on Johannesburg Stock Exchange-listed non-financial investee firms.

It may be expected that the capital structures of government-owned and privately owned firms should differ. Dewenter, Malatesta (2001:320) analysed the differences in profitability, leverage, and labour intensity in *Fortune* 500 firms owned by the state and those which were privately owned. They argue that state-owned companies receive guarantees from the government and may therefore be in a better position to borrow at lower rates of interest than privately owned firms. The assumption made by the study could be that the state has a higher credit rating than the firm that it owns. If this is not the case, the result may be indeterminate. In their analysis of determinants of capital structure in the Asia Pacific region, Deesomsak, Paudyal and Pescetto (2004:392) also mention the issue of government guaranteed loans to firms being priced at favourable rates, when compared with loans provided by banks to privately owned firms. If a privately owned firm has a good name in the market, it can attract more favourably

priced loans than a state-owned firm. As Ezeoha and Okafor (2010:252) state, such an argument applies to firms operating in well-developed financial markets.

Ezeoha and Okafor (2010:252) argue that governments may not be at liberty to issue more shares to the public when they want to raise more finance, like private companies. They posit that raising public funds is privatisation and that this process is governed by stringent procedures which make borrowing by a state-owned entity one of the only viable options, other than the use of retained earnings or an equity injection from the state. The stringent procedures for the participation of the private sector in providing services to public entities are meant to ensure that public assets do not fall into the hands of private owners without due process being followed and ensuring that the government obtains value for money. In addition, firms owned by the state are sometimes considered to be of national strategic importance so that private sector players are not allowed to partly own them. In the South African scenario, public procurement procedures are in place to uphold these concepts. The current study includes listed firms in which the state has shareholdings. The studies discussed above attempted to explain the determinants of capital structure. Most of them were conducted in advanced economies and these variables will need to be tested as control variables in an emerging economy such as South Africa.

Poyry and Maury (2010:311) explored the relationship between ownership structures and capital structures of firms in Russia. At the time of the study, the banking sector was state run, corporate governance systems were considered to be weak and ownership of firms was concentrated. Additionally, the Russian economy was characterised by firms which were politically connected. The study explored how Russian firms were financed and the extent to which economic or political connections affected the firms' access to external debt.

Owners of firms with requisite wealth and who exert political and economic pressure in Russia are referred to as oligarchs (Poyry & Maury, 2010:311). In the sample of Russian firms, 40% of sales were generated by firms owned by 22 oligarchs. Such a statistic shows a high level of concentration of ownership of resources in the Russian economy. In addition, 37% of the firms in the sample were state owned. The study argued that state-owned firms would have better access to debt in state-owned banks. Oligarch

firms were expected to obtain finance from other companies within the oligarch-controlled groups as well as from state-owned banks, because the owners were politically connected (Faccio, 2006:369). A combination of these factors was also expected to lead to a lower cost of debt, leading to an increase in the value of the firms. Firm ownership by the state and oligarchs would therefore be expected to lead to a different capital structure from all other firms, or at least in the level of debt. High firm valuations would potentially link such firm ownerships with firm performance.

A positive relationship was observed between state ownership and capital structure by Li *et al.* (2009:471) in their study of 650 Chinese publicly listed firms for the period 1999 to 2004. Firth *et al.* (2008:642) analysed the relationship between leverage and state ownership, among other issues, under a state-owned lending environment. They found that state-owned Chinese banks had fewer restrictions on capital expenditures by firms performing poorly or had low growth and firms with greater government ownership. This means that state-owned firms were treated preferentially by banks, which were also owned by the state, giving them an advantage over non-state-owned firms. Although Firth *et al*. (2008:642) analysed firms which obtained funding from the state whereas other studies examined firms obtaining funding from the private sector banks, there was a positive relationship between state ownership and leverage. The current study will analyse the effect of state ownership on leverage in listed non-financial South African firms where banks are predominantly owned by the private sector, with the exception of a few state-owned financial institutions, which can both lend to and invest in the corporate sector.

Megginson and Netter (2001:331) argue that due to implicit guarantees, the government will not allow large state-owned enterprises to face bankruptcy. Their study also showed that state-owned enterprises tended to have higher levels of debt and that these usually decreased after privatisation, essentially showing that state ownership had a positive relationship with capital structure.

Poyry and Maury (2010:312) analysed 95 firms, which were listed on the Russian stock market between 2000 and 2004. Profitability was found to be negatively related to debt finance, indicating that Russian firms preferred to use internally generated funds. In terms of reporting, the study found that firms that reported using Russian reporting

practices had lower levels of debt than those that reported their results using international standards.

Dong, Liu, Shen and Sun (2016:73) investigated whether state ownership mattered in determining access to bank loans using a sample of Chinese firms from a database for the period 1998 to 2007. *Long-term debt* was defined as the percentage of long-term debt divided by total assets and state ownership consisted of the percentage of shares owned by the state in the investee company. All continuous variables were winsorised at the 1% and 99% cent percentiles in order to reduce the effects of outliers. A matched sample was also used in this study where each firm in the sample with state ownership was matched with a similar firm which had similar characteristics except for state ownership. Matching is intended to alleviate problems of endogeneity but is not easy to attain in practice except if the population from which the sample is drawn is fairly large. Ordinary least squares, fixed effects and two-stage least squares regression methods were employed in the analysis. Control variables included in the study were tangible assets, sales growth and current ratio, among others.

The study found that state ownership did not lead to better access to finance. In their preliminary analysis, long-term debt ratios were consistently higher for firms with state ownership in cross-section. This would mean that there was a positive relationship between state ownership and leverage. When firm differences were taken into account, the positive relationship weakened. When the mechanical debt reduction process associated with privatisation in China was considered, the positive relationship disappeared. The study concluded that the presence of state ownership did not provide the investee firm with any advantage in obtaining finance. The researchers observed that their results could be specific to China because of the institutional set-up. The absence of a relationship between state ownership and leverage implies that the state may be viewed as a neutral shareholder which will not affect the capital structure of the firm. In such a case, no advantages or disadvantages can be ascribed to the state ownership.

Tian and Estrin (2008:86) note that state-owned firms have well developed networks of resources, especially in terms of funding, which they can easily draw from. Studies on the effects of government ownership tended to focus on economies with state-owned

banks or countries that were privatising government assets. The current study will provide insight into state ownership in an emerging economy where the state does not control banks.

2.4.5 Black ownership and capital structure

Ezeoha and Okafor (2010:253) contrasted firm ownership by local shareholders and foreign shareholders. Local shareholders were a homogeneous group. The current study extends the concept of *local ownership* to a sub-sector of local ownership.

Since becoming a democracy in 1994, the South African government embarked on a process of empowering previously disadvantaged people so that their access to economic opportunities resembled their demographic representation in the overall population of the country. This process was used as part of the criteria in awarding state tenders at national, provincial and local government levels. One of the components of this indigenisation policy was that the previously disadvantaged individuals were expected to own a certain percentage of the firms tendering for government contracts. Many companies which bid for government contracts therefore included black people in their ownership structures.

The policy of black empowerment could not be enforced for companies which did not bid for government tenders. There was no obligation for them to transform the composition of their owners. However, black economic empowerment charters were adopted by various industry bodies to try and increase black ownership of firms. Non-compliance under these charters does not have serious consequences for the firms. There are firms that do not belong to any particular industry group. Any form of empowerment undertaken by these firms would be purely voluntary on their part. Such an action would be equivalent to voluntary admission of black ownership. Listed companies are governed by the same rules of empowerment as other companies.

As the purchase of shares under black economic empowerment schemes was intended to promote shareholding of firms by previously disadvantaged individuals or groups, among other things, the financing of those ownership transactions was a challenge.

Most incoming shareholders did not have the resources to finance their prospective ownership stakes. Some firms created different classes of shares for the new shareholders. Other firms issued new shares of the same class to the incoming shareholdings as those held by the existing shareholders.

Black empowerment transactions were generally funded through loan structures in which loans were serviced by the incoming shareholders' future dividend streams. In this case, there was a mismatch between the cash flows from the shares (or dividends) and the cash flows required to service the loans. If no dividends were declared by the underlying company, then there was no cash flow to service the loan used to purchase the shares. A fairly aggressive dividend policy may be required on the part of the underlying company in order for the holders of loans not to be in default. In a rising or bull market, this model of financing may accomplish the ownership structure being targeted. However, if the market falls and/or the underlying company does not perform well, then there will be no cash flow to service the shareholder's debt. In addition, due to the loan structure used to fund equity shareholdings, the incoming shareholder may not receive a substantial dividend, other than for servicing the loans, until after the loans for the shares have been repaid, even with the risk that the loan may never be repaid, leaving the new shareholder with more personal debt. Other funding structures were used to finance these shareholdings but suffice it to say that there was a limit to which the black economic empowerment ownership schemes could be funded. Success has been recorded in some transactions.

One effect of the black economic empowerment share structures on the underlying firm's capital structure is that the firm has to distribute dividends to enable the incoming shareholders to service their personal debt for the shares in that company. Current shareholders have to be paid their dividends as well. The company may end up with low retained earnings and may be forced to borrow, thereby increasing its leverage. The growth opportunities of the firm may be impacted negatively, if no external cash is available to fund the firm.

The reason for the introduction of black economic empowerment ownership was not only to empower previously disadvantaged individuals in the South African economy but also to diversify and increase the opportunities set available to the underlying firm by

introducing a wider mixture of shareholders. As a starting point, the empowered firms qualify to tender for government business, which in some cases may be quite lucrative as well as providing a consistent income stream. The increase in share ownership may therefore be more than compensated for by the growth in opportunities available to the firm. If these opportunities persist, then the firm may end up with more internal finance. In accordance with the pecking order hypothesis, the firm may not need to borrow, leading to less debt in the firm's capital structure. Other black economic empowerment ownership structures are totally self-financing, that is, the shares are paid for directly by the new shareholders, leading to no demands on the cash flows of the underlying firms. However, it appears that such financing structures are few and far between. The current study includes black ownership as a type of ownership to be analysed. In particular, the effects of black ownership on capital structure are investigated.

2.4.6 Public Investment Corporation ownership and capital structure

The Public Investment Corporation is an entity which is wholly owned by the South African government and turned 100 years old in 2011. It had over ZAR1 trillion under its management, making it the largest investment management company in South Africa. The organisation manages the Government Employees Pension Fund and other funds on behalf of the government. In addition, the Public Investment Corporation outsources the management of some of its funds to other fund managers, which, in turn, report to it on their performance. Hence the Public Investment Corporation exhibits characteristics of a typical pension fund and yet it is unique in that it is owned by the government. For these reasons, it is categorised as a unique type of owner.

As an institutional investor, the Public Investment Corporation is expected to have the expertise and other resources to monitor the management of investee companies. If the organisation takes a monitoring role, then the investee company may have sufficient monitoring and will not need lenders to monitor that company. With low debt in the capital structure of the investee company, there could be a negative relationship between ownership by the Public Investment Corporation. In addition, as an institutional investor, the Public Investment Corporation has a strong balance sheet and has the capacity to follow on any equity call that may be made. For that reason, it might have

no aversion to subscribing to more equity if it is needed. Less debt may be required by the investee company in this case. The same strong balance sheet could also be attractive to lenders who may have an appetite to lend to companies in which such a financially sound organisation is a shareholder.

As a government entity, the Public Investment Corporation may be used as an arm of government to drive the latter's mandate. The lenders' view of the government on its fiscal discipline may affect how they perceive the capital structure of the investee company. The financial position of the investee company and that of the shareholders may be an important consideration as well. Given that the current study is probably the first to examine the effect of Public Investment Corporation ownership on capital structure, the results should assist in understanding the role of such organisations.

2.4.7 Company ownership and capital structure

Companies ordinarily invest in other companies. Large companies have substantial asset bases and can monitor the investee companies effectively. Such close monitoring may enable the investee firms to raise debt. The presence of the large company shareholder may also provide comfort to the lenders, leading them to having a favourable view of the investee company. A positive relationship between company ownership and capital structure may therefore be expected. Large company shareholders may also be in a position to inject equity into their investee companies, obviating the need for debt. This position may be bolstered by the inability of smaller shareholders to follow up on their equity calls due to their limited resources, leading to more control by the large companies. A negative relationship may therefore ensue between company ownership and capital structure.

In addition, when small companies or shelf companies are shareholders, they have neither the capacity to monitor management of the investee companies nor the large balance sheets that allow lenders to look favourably at the capital structure of the investee companies. Lenders may take the monitoring role, increasing debt in the capital structure. However, the unattractive balance sheets of the parent companies may not lead to increased borrowings. Small companies as shareholders may not have the

resources to follow up on equity calls because of the limited resources of their ultimate shareholders. South African companies that are shareholders will be studied in the current study to provide more insight into how they affect the capital structures of companies in which they hold shares.

2.5 MEASURES OF CAPITAL STRUCTURE AND OWNERSHIP

After reviewing studies on the effects of concentration of ownership, capital structure theories, and the effects of ownership identity on capital structure, the current section examines measures employed in estimating the relationship between ownership concentration and capital structure and types of ownerships or ownership identities and capital structures. In particular, control variables and dependent variables employed in earlier studies are discussed.

2.5.1 Control variables

In addition to the variables that are directly investigated in this study, namely ownership, capital structure and firm performance, other variables have traditionally been found to have a bearing on capital structure and firm performance determination. Such variables will be used as control variables in the current study. The relationships between these variables and capital structure are discussed.

Variables that were found to determine capital structure include size, profitability, growth, tangibility, non-debt tax shields, market-to-book ratio and operating risk (Ampenberger, Schmid, Achleitner & Kaserer, 2013:257; Burgstaller & Wagner, 2015:80; Eriotis, Vasiliou & Ventoura-Neokosmidi, 2007:327; Ju, Parrino, Poteshman & Weisbach, 2005:26; Korner, 2007:148; Schatzberg & Weeks, 2004:1489).

2.5.1.1 *Size*

Bankruptcy costs have been found to be relatively small in big firms and larger in small firms (Warner, 1977:337). Titman and Wessels (1988:6) argue that smaller firms are more likely to collapse than larger firms because the latter are more diversified. Additionally, size is seen as a proxy for information asymmetries and larger firms reveal

more information than smaller ones, leading to lower information asymmetries. The probability of failure of larger firms is lower than for small firms. Firm size is measured by the natural logarithm of total assets (Anwar & Sun, 2015:35; King & Santor, 2008:2428; Onaolapo & Kajola, 2010:73; Soumadi & Hayajneh, 2012:180). Size is also measured by the logarithm of sales (Ezeoha & Okafor, 2010:253). Rajan and Zingales (1995:1454), Wald (1999:183), Ampenberger, *et al*. (2013:261) and Anwar and Sun (2015:37) found a positive relationship between size and leverage. Anwar and Sun (2015:38) also found that ownership played an important role in determining leverage in that privately owned firms had lower leverage than state-owned firms. The authors ascribe this result to the fact that in China the state-owned and collectively owned companies had better access to finance from state-owned banks. Bhaduri (2002:211) and Li *et al.* (2009:478) found a firm's optimal capital structure to be negatively related to size. Alves and Ferreira (2011:131) found a positive relationship between size and leverage in their study of 31 countries, including South Africa. Rossi and Cebula (2016:889) measured size by the logarithm of total assets. The average of total assets obtained from the sample was €1 618.9m, which would seem to be representative of fairly large companies. The average size of South African companies is expected to be smaller, given the differences between the two economies.

2.5.1.2 *Profitability*

Where there is information asymmetry, firms place greater reliance on retained earnings as a source of finance (Myers & Majluff, 1984:217). As a result, a negative relationship between profitability and leverage is postulated. Using tax-based models, DeAngelo and Masulis (1980:7) state that the more profitable the firms are, the more they can increase their debt in order to benefit from tax shields. A positive relationship is predicted using this approach. Agency theory suggests that debt has a disciplining effect on management (Jensen, 1986:324). Profitable firms are expected to have more debt, which is a positive relationship. Cespedes, *et al*. (2010:250) point to the contradictory predictions of the different theories. Studies that found a negative relationship between leverage and profitability include those by Kester (1986:13), Rajan and Zingales (1995:1454), who investigated capital structures in Canada, France, Germany, Italy, Japan, the United Kingdom and the United States of America (G-7 countries); Li *et al*, (2009:476), Kayo and Kimura (2011:363) and Wald (1999:161), who analysed capital structure and firm characteristics in five major industrialised nations (France, Germany,

Japan, the UK and the USA). Bhaduri (2002:200) and Alves and Ferreira (2011:119) also obtained a similar result. Ezeoha and Okafor (2010:253) measured profitability as profit before interest divided by total assets.

Return on assets, which was defined as operating assets divided by total assets (Rossi & Cebula, 2016:889), was applied as a control variable representing profitability. The average return on assets from the study was 3.09%. Profitability and leverage had a statistically significantly negative relationship. Other profitability measures including return on equity were used in other studies.

2.5.1.3 *Growth*

According to Myers (1977:150), firms with high growth opportunities are considered to have higher agency costs of debt and are unable to borrow much money. Anwar and Sun (2015:36) state that the agency costs when a firm is faced with growth opportunities arise due to the conflict between shareholders and lenders. Under the pecking order theory, such firms are expected to have a higher need for funds and should borrow more. Firm growth has been measured by the difference between the book value of total assets at the end and beginning of the year divided by book value of total assets at the beginning of the period. The same ratio may be calculated in a similar way, using sales. A positive relationship was found in the research by Cespedes *et al*. (2010:254), Alves and Ferreira (2011:136), Bhaduri (2002:212), Wald (1999:181) and Kester (1986:13), while Kayo and Kimura (2011;367), De Jongh, Kabir and Nguyen (2008:1961), Rajan and Zingales (1995:1455) found a negative relationship.

Tobin's Q ratio, defined as book value of total assets less book value of shareholders' equity plus market value of shareholders' equity, all divided by book value of total assets, was used as a control variable for growth opportunities in the study by Rossi and Cebula (2016:889). The Italian study's mean Tobin's Q ratio was 1.26. The ratio is also used as a measure of firm performance.

2.5.1.4 *Tangibility*

Tangibility refers to the extent that fixed assets can be used as collateral if a firm wishes to borrow funds. In terms of the overinvestment problem (Jensen & Meckling, 1976:335), managers can invest unnecessarily and transfer wealth from lenders to shareholders.

Collateralisation restricts the use of borrowed funds in a certain way and ensures that the probability of loan repayment is increased. Fixed assets and inventory are generally used as proxies for tangibility. Tangibility has also been measured by dividing net fixed assets with the total assets (Ghosh, 2007:89; Margaritis & Psillaki, 2010:624; Soumadi & Hayajneh, 2012:1857; Weill, 2008:257). A positive relationship was found in the studies by Alves and Ferreira (2011:136), Ampenberger *et al*. (2013:261). Bhaduri (2002:209), Rajan and Zingales (1995:1453) and Wald (1999:176). Flath (1993:255) found a negative relationship between leverage and intangible assets. Anwar and Sun (2015:38) and Akhtar and Oliver (2009:5) found a negative relationship between tangibility and capital structure. Anwar and Sun (2015:38) explained that tangibility was perceived as reducing information asymmetries, and such reduction made equity relatively cheaper, resulting in less debt being required. Li *et al*. (2009:471) studied the ownership and debt financing of non-publicly traded Chinese firms, whereas Akhtar and Oliver (2009:1) analysed determinants of capital structure for Japanese domestic and multinational corporations.

Rossi and Cebula (2016:889) used intangible assets as measured by the logarithm of research and development costs as a proxy for tangibility. Such a measure would be expected to be related to leverage in an opposite way to tangibility. Leverage and research and development costs had a statistically significant negative relationship.

2.5.1.5 *Non-debt tax shields*

According to DeAngelo and Masulis (1980:22), the marginal tax benefit from additional debt decreases with increases in non-debt tax shields. The tax saving due to debt is positive at low levels of leverage because it can be fully utilised. However, at higher debt levels, the relationship becomes negative because there is a possibility that the tax benefit may never be fully utilised due to the firm filing for bankruptcy. Accordingly, a negative relationship is expected between leverage and non-debt tax shields.

There could be a positive relationship between debt and non-debt tax shields because of the link between debt tax shields and collateral. Non-debt tax shields could be due to substantial fixed assets within a firm. Such fixed assets may be used as collateral against borrowings. The larger the firm's fixed asset base (hence the higher the non-debt tax shield), the higher the leverage. The relationship between leverage and non-

debt tax shields is therefore indeterminate. Empirical studies found a negative relationship (Allen & Mizuno, 1989:575; Bartholdy, Boyle & Stover, 1997:72), as well as a positive relationship (Flath, 1993:255; Huang & Song, 2006:27).

2.5.1.6 *Operating risk*

In terms of the trade-off theory, firms with a high degree of operating risk have a higher probability of failure resulting in higher costs of bankruptcy (Bradley, Jarrell & Kim, 1984:876; DeAngelo & Masulis, 1980:21). The implication is that firms with high operating risk should have lower financial leverage. Burgstaller and Wagner (2015:91) and Kester (1986:13) found a negative relationship between financial leverage and operating risk or business risk. Positive relationships were found in Krishnan and Moyer (1997:135) and Wald (1999:174), while other results were mixed (Allen & Mizuno, 1989:575). The current study uses an appropriate measure of risk as a control variable.

2.5.1.7 *Agency costs of debt*

Jensen and Meckling (1976:305) and Myers (1977:160) studied the potential for shareholders to expropriate wealth from lenders, leading to investments which did not maximise wealth. The agency cost of debt is represented by the following ratios: cash and marketable securities to total assets, research and development expenditure to total assets and non-fixed assets to total assets. Myers (1977:148) and Prowse (1992:1131) postulate that these ratios show the ease with which a firm's assets can be manipulated by equity investors and are hypothesised to reduce leverage or the debt to total assets ratio. Titman and Wessels (1988:5) state that firms that have high research and development and advertising costs have features which potentially increase the agency costs of debt. Wald (1999:174) found a negative relationship between agency costs of debt and leverage, while Bartholdy *et al.* (1997:73) found a positive relationship using cash and marketable securities to total assets ratio. Krishnan and Moyer (1996:53) found a positive relationship between leverage and research and development costs.

2.5.1.8 *Tax rate*

The relationship between leverage and the corporate tax rate can be assumed to be negative because tax reduction forms the foundation of the trade-off theory. Krishnan and Moyer (1996:53) found a negative relationship for these variables. Negative and

positive relationships between the average tax rate and leverage were found in different studies.

2.5.1.9 *Dividend payout ratio*

Increases in the dividend payout ratio decrease the potential security available to lenders. Covenants in debt agreements limit increases in the dividend payout ratios above certain limits (Smith & Warner, 1979:117). Leverage, as measured by the debt ratio, is hypothesised to be negatively related to the dividend payout ratio. This result is supported by Allen and Mizuno (1989:576, 577).

2.5.1.10 *Age*

The age of a firm has been identified as a determinant or control variable of capital structure. It has been measured by the logarithm of age (Ezeoha & Okafor, 2010:253). Anwar and Sun (2015:36) argue that because older firms should have lower debt-related agency costs, they should have more debt, leading to a positive relationship between age and leverage. They also argue that if there are high information asymmetries, then the relationship can be negative. If an overall positive relationship is found in a study, this result may imply that the debt-related agency costs outweigh the information asymmetry effect. Ampenberger *et al*. (2013:261) found a positive relationship between firm age and leverage. Burgstaller and Wagner (2015:91) found an insignificant relationship between capital structure and firm age in their analysis of the relationship between family ownership and founder management and capital structure decisions in small and medium-sized firms.

Firm age was defined as the logarithm of the age of the firm since establishment (Rossi & Cebula, 2016:889). It was also used as a proxy for the life cycle of a firm. The average age of companies in the sample was 60.20 years, with a minimum of eight years and a maximum of 177 years. It has to be noted that in some jurisdictions, companies are formed and are actually dormant for some time before they become operational (shelf companies). To the extent that such a company registration regime prevails, the age of the company measured by the registration date may exceed the age of the operations of the company. The current study may consider the use of age as a control variable as well an appropriate definition of firm age. The current study uses the age of the firm as a control variable.

Two types of conflicts were identified by Jensen and Meckling (1976:313,337), namely conflict between shareholders and lenders and conflict between management and shareholders. In a study of Japanese firms, Flath (1993:256) found that firms in which banks and other shareholders had substantial shareholdings had higher financial leverage. Other shareholders had a negative sign, and this was interpreted to mean that the effect of other financial institutions on borrowing was similar to that of the main banks. A positive relationship between leverage and the level of firm ownership was found by Kim and Limpaphayon (1998:46). Foreign ownership and financial institution ownership appeared to have a negative relationship with leverage. They also found that corporate owners had a prime responsibility for increasing leverage.

Ezeoha and Okafor (2010:253) investigated the effects of ownership, local and foreign, on capital structure in Nigerian firms. The two ownership variables used were OWN1, which was a dummy variable taking the values of zero for foreign-owned firms and one for locally owned firms. Of the firms in their sample, 68% were locally owned with the rest foreign owned.

Concentration of ownership is another exogenous variable which represents ownership. Ezeoha and Okafor (2010:253) used a dummy variable, OWN2, which took the value of one for a company with concentrated ownership and zero for a diversely held firm. There was concentrated ownership in 68.2% of the firms. The study did not explicitly state what the cut-off values for foreign versus local ownership were. Neither did it explicitly state how concentration of ownership and diverse ownership were delineated. Such information is useful to enable comparison between different studies.

In their investigation of the effect of founding family firms on capital structure of firms in a bank-based economy, Ampenberger *et al*. (2013:253) analysed 660 listed industrial German firms. Their data was obtained from 1995 to 2006. Following Franks, Mayer, Volpin and Wagner (2012:1684), who argue that the measurement of shareholding by using direct shareholding may lead to different results, Ampenberger *et al.* (2013:253) used data of the ultimate owners of firms studied. Ampernberger *et al.* (2013:253) divided the owners into various groups such as families, the state and corporations.

The study found a significant negative relationship between family firm characteristics, such as family management, and the level of gearing. A possible explanation for the result is that because Germany is a bank-based economy, control of the firm by founding families can only be maintained by financing the firm with equity rather than debt, otherwise the firm would be subject to extensive debt covenants.

The Ampenberger *et al*. (2013:272) study has extensive definitions of variables, symptomatic of extensive data bases. This is exemplified by the ability of the study to obtain ultimate shareholders, as opposed to direct shareholders. In addition, all the various categories of family shareholding identified make it easier to conduct further analyses on family variables only. Furthermore, the typology of shareholders is fairly extensive, providing detailed insights into the types of companies investigated. The differentiation between strategic and holding shareholders could be small, leading to similar results for both entities.

Information on the variables and their definitions will be considered in choosing and defining variables for the current study of firms listed on the JSE Securities Exchange. In addition, other relevant variables which are applicable to the South African environment will be employed.

2.5.1.11 *Industrial classification*

The product/input market interactions theory holds that firms that produce specialised equipment and spare parts have higher costs of liquidation if a default occurs and will therefore use less debt. A negative relationship may be expected between leverage ratio and manufacturing industry ratio. Flath (1993:255) found such a result. On the other hand, Bhaduri (2002:211) and Alves and Ferreira (2011:146) found a positive relationship between industrial classification and optimal capital structure. Industry was used as a diversification indicator in the study by Rossi and Cebula (2016:889) and the financial sector was excluded from the sample, in line with previous studies. The study further created another variable, namely the pre-financial crisis/start of financial crisis period (2004 to 2008) and the crisis/post-financial crisis period (2009 to 2013). There was a difference in leverage between the pre-financial crisis/start of financial crisis period and start of crisis/post-financial crisis period. However, this difference was statistically insignificant. None of the other variables tested in the same manner (pre-

and post-crisis periods) showed a statistically significant difference between the means at the 5% level.

Regulated firms were found to have higher levels of debt (Smith & Watts, 1992:264). The relationship was attributed to regulatory restrictions that prohibited such firms from increasing their investments. As a result, only debt could be used as a means of raising funds. Additionally, implicit guarantees from their shareholders (mainly governments) enabled them to raise debt with ease. Other studies found a positive relationship between leverage and regulated industry.

2.5.2 Measures of capital structure

Capital structure or financial leverage is measured by various proxies, including total debt, long-term debt and short-term debt.

2.5.2.1 *Total debt*

One measure of capital structure is total liabilities divided by total assets (Ezeoha & Okafor, 2010:253). A positive relationship was found between ownership and total debt, showing that locally owned firms had higher leverage (84.3%) than foreign-owned firms (58.1%). Anwar and Sun (2015:37) defined *leverage* as the ratio of long-term debt divided by the sum of total debt and equity. Other studies (Li *et al*., 2009:471) showed that foreign-owned firms had higher leverage than locally owned ones.

Ezeoha and Okafor (2010:254) found that firms with concentrated ownership had higher leverage, as measured by total debt to total assets (75.6%), than those with diversified ownership (63.2%) and they found a positive but insignificant relationship between financial leverage and concentration of ownership. The positive relationship was construed to mean that owners preferred to protect their ownership control rather than to be diluted.

2.5.2.2 *Long-term debt*

Ampenberger *et al*. (2013:272) used a long-term market leverage ratio, which they defined as total liabilities less current liabilities divided by the sum of market value of

equity and total liabilities. Long-term liabilities divided by total assets is a measure of financial leverage, which reflects the extent to which a firm is financed using long-term liabilities (Ezeoha & Okafor, 2010:253). An industry leverage ratio was also calculated as the median leverage in a firm's industry, as indicated by the Standard Industrial Classification code.

2.5.2.3 *Short-term debt*

Capital structure is also measured as short-term liabilities divided by total assets. Abor (2005:441) measured capital structure using long-term debt, short-term debt and total debt. The current study adopts most measures used in previous studies.

2.6 EMERGING HYPOTHESES

Given the review of the literature in this chapter, the hypotheses to be tested can be considered. The objective is to investigate the effects of ownership on capital structure by examining in particular the effects of concentration of ownership on capital structure and the effects of ownership structure (owner identity) on capital structure. Measures of ownership concentration and a method of grouping or identifying owners need to be adopted.

The first hypothesis relates to the effect of ownership concentration. Owners take high stakes in firms for specific reasons but eventually, those stakes enable the owners to control the financial direction of the firm, including the extent to which that firm can use debt in its capital structure. High ownership concentration may lead to an increase in the use of debt in financing a firm if the shareholders perceive that raising more equity would lead to a dilution of their own shareholding. However, where ownership is concentrated, the shareholders may prefer to use less equity in their firm's capital structure due to a desire to reduce higher levels of monitoring associated with substantial debt. The first hypothesis is formulated as follows:

H_{01}: There is no significant relationship between concentrated ownership and capital structure.

H_{a1}: There is a significant relationship between concentrated ownership and capital structure.

The second set of hypotheses pertains to ownership structure or identity of owners and the effect of that type of owner on capital structure. Types of owners include families, management institutional investors, the state, other shareholders and foreign investors. South Africa has a policy of black economic empowerment, which encourages increased ownership of resources by previously disadvantaged groups, leading to the black ownership classification. With respect to families, the results of studies on the effect of family ownership on capital structure are mixed. On the one hand, family-controlled firms may prefer more debt in the capital structure in order to avoid dilution of their equity if they raised more finance by issuing shares. However, family-controlled firms may not prefer to raise equity through debt because they may not want lenders to control them by specifying strict debt covenants, which the owners have to abide by. In addition, the presence of more debt in the capital structure may be viewed by owners as an impediment because the debt will reduce the cash flow available to the owners. The second hypothesis is therefore formulated as follows:

H_{02}: There is no significant relationship between family ownership and capital structure.
H_{a2}: There is a significant relationship between family ownership and capital structure.

Studies on the effects of managerial ownership on capital structure have not yielded conclusive results. Management may decide to increase the firm's leverage if issuing equity can dilute its shareholding, given management's limited wealth. In this case, debt is positively related to managerial ownership. If management perceives that more debt in the firm's capital structure can lead to more monitoring and control by the firm's lenders, then management may decide to reduce the level of debt used to finance the firm. As a result, a negative relationship would be expected between managerial ownership and leverage. The third hypothesis is stated as follows:

H_{03}: There is no significant relationship between managerial ownership and capital structure.
H_{a3}: There is a significant relationship between managerial ownership and capital structure.

As shareholders, institutional investors usually have the resources to monitor management and may not need to rely on debt to perform that function. Less debt would be expected in firms owned by institutional investors. However, institutional investors may prefer to use debt for the purposes of increasing their equity returns due to the tax deductibility of interest. More debt may therefore be associated with institutional investor ownership. The fourth hypothesis is stated as follows:

H_{04}: There is no significant relationship between institutional ownership and capital structure.
H_{a4}: There is a significant relationship between institutional ownership and capital structure.

Foreign owners of firms have been associated with the advantage of obtaining access to relatively cheap finance in their home countries. For that reason, they may not need to raise debt to augment their financial resources. The relationship between foreign ownership and capital structure would be negative. On the other hand, foreign owners of local firms may not fully understand the nuances of operating in a foreign environment and may prefer to raise local debt as a means of gaining knowledge through a local finance partner without diluting their shareholding. A positive relationship between foreign ownership and capital structure would be the result. The fifth hypothesis is formulated as follows:

H_{05}: There is no significant relationship between foreign ownership and capital structure.
H_{a5}: There is a significant relationship between foreign ownership and capital structure.

Depending on the way black ownership is financed, it may be necessary for the underlying firm to declare dividends which, in turn, are used to service the loan used to finance the shareholding, if such a black ownership financial structure is adopted. The reduction in cash flow available to the underlying company may lead to the company borrowing money in order to finance its activities. A positive relationship between black ownership and capital structure would be the result. On the other hand, if the introduction of black ownership increases the opportunities available to the firm, then the company will generate more income and cash flow and may not need to borrow

money in order to finance its business. The effect of black ownership on capital structure in this case may be neutral or negative. The sixth hypothesis is therefore formulated as follows:

H_{06}: There is no significant relationship between black ownership and capital structure.
H_{a6}: There is a significant relationship between black ownership and capital structure.

The role of the state in firm ownership has been associated with increases in leverage because of implicit guarantees provided by the state to investee firms. Another view could be that the state may bail out loss-making enterprises by injecting more direct equity into such enterprises to restore the normal gearing. Lenders may take comfort from such operations and continue to lend even though ordinarily this would have been risky. A positive relationship is then expected between state ownership and leverage. On the other hand, state-owned enterprises have been associated with poor performance and weak corporate governance structures, leading to non-state-owned banks not preferring to lend much money to the state-owned enterprises due to their being perceived to be risky. A negative relationship between state ownership and capital structure could ensue. The hypothesis to be tested regarding state ownership is therefore as follows:

H_{07}: There is no significant relationship between state ownership and capital structure.
H_{a7}: There is a significant relationship between state ownership and capital structure.

Large companies as shareholders have expertise to monitor their investee companies and therefore may not need debt to do the same function. Such a relationship would imply a negative association between company shareholding and capital structure. On the other hand, small companies as shareholders may not have the resources to inject more equity when required to do so. Such companies would prefer to finance their investee companies with debt. Additionally, debt would assist with the monitoring of management, leading to a positive relationship between company ownership and capital structure. The hypothesis pertaining to company ownership and capital structure is stated as follows:

H_{08}: There is no significant relationship between company ownership and capital structure.
H_{a8}: There is a significant relationship between company ownership and capital structure.

The Public Investment Corporation is a large government-owned institutional investor and due to its size, financial institutions may want to lend money to companies in which it is a shareholder. Implicitly, the systems and expertise associated with such shareholders are expected to be brought to bear in their investments. More debt may therefore be available to such investee companies, resulting in a positive relationship between ownership by the Public Investment Corporation and capital structure. However, the Public Investment Corporation has the financial resources to inject in its investee companies as equity, with the potential for more control. Due to its own prudential limits and it being a government-owned institution, it would not be anticipated that the control motive would be dominant in the Public Investment Corporation. However, within those limits, the institution can raise its equity stake. A negative relationship between ownership by the Public Investment Corporation and capital structure may be anticipated. The hypothesis regarding ownership by Public Service Corporation and capital structure is stated as follows:

H_{09}: There is no significant relationship between the Public Investment Corporation ownership and capital structure.
H_{a9}: There is a significant relationship between the Public Investment Corporation ownership and capital structure.

The category of other shareholders was created to accommodate any shareholders not falling into the categories dealt with above but which have to be accounted for in the analysis of types of shareholders. The relationship between such shareholders and capital structure is indeterminate because the group is heterogeneous in its composition. The hypotheses for this group of shareholders and capital structure are as follows:

H_{010}: There is no significant relationship between other shareholders' ownership and capital structure.

H_{a10}: There is a significant relationship between other shareholders' ownership and capital structure.

2.7 CONCLUSION

The current chapter set out to review the literature on the effects of ownership structure and capital structure. The concept of *ownership* was further delineated into the concentration of ownership and ownership identity. Ownership concentration in some countries is not only high at firm level, as in the percentage owned by one group of shareholders, but can be so high that firms within the group and owned by the same shareholders constitute a highly significant percentage of a stock exchange's market capitalisation. In some cases, as is the case in some East Asian countries, the concentration of ownership is high enough for the market capitalisation of shares owned to be calculated as a percentage of a country's gross domestic product. The high levels of ownership concentration have significant effects on the way the economies where these firms are located function, in terms of efficiency and effectiveness. Ownership concentration in most developed economies is found to be moderate to very low. Studies in different countries, especially emerging markets, yield peculiarities depending on their institutional arrangements.

The review of studies on the effects of ownership concentration on capital structure yielded mixed results. Positive and negative relationships between capital ownership concentrations were found. These studies were also conducted mainly in developed countries and some emerging markets. The extent to which the results of these studies can be applied to South African firms is largely unexplored. It is important to understand the extent to which ownership is concentrated and the effect of such concentration on capital structure; hence the need for the current study.

The other component of ownership structure reviewed in the literature was the importance of ownership identity and its effect on capital structure. Types of owners include families or individuals, management, institutional investors, foreign owners, the state, companies, and for the South African study, black ownership. This category is unique to South Africa and is not covered by studies from other countries. The effect of

ownership by the Public Investment Corporation is also explored. Each type of shareholder identity was found to have an effect on capital structure but the results for each element were mixed. The dominant types of shareholders in the South African landscape will be identified and their effects on capital structure investigated.

The current study will address a specific gap on the effects of black ownership on the capital structure in South African listed firms, given that South Africa has a black empowerment policy which aims at increasing black ownership of firms in line with the demographical representation of black people in the country's poulation. In addition, the Public Investment Corporation (PIC), which is government-owned and manages US$157 billion of mainly government pension fund money, is one of the largest institutional investors in the country. The Public Investment Corporation holds substantial shareholdings in listed South African firms. The extant literature has not addressed the effects of government-owned institutional investors ownership on capital structure. The current study also seeks to fill this gap.

Panel data analysis was used to analyse the effects of ownership on capital structure in most of the studies reviewed. The appropriateness of other statistical methods will be examined and the most applicable ones chosen. These analytical methods are discussed in Chapter 4. Chapter 3, which follows the current chapter, examines the literature on the effects of ownership on firm performance.

CHAPTER 3

LITERATURE REVIEW OF THE RELATIONSHIP BETWEEN OWNERSHIP AND FIRM PERFORMANCE

3.1 INTRODUCTION

This chapter focuses on the effects of ownership on firm performance, particularly the effect of ownership concentration on firm performance and the effect of type of ownership or ownership identity on firm performance, in line with the second objective of the study. Chapter 2 reviewed previous studies on the effects of ownership on capital structure. Building on the literature review on ownership provided in Chapter 2, the current chapter enhances understanding of how ownership affects the performance of firms. The chapter reviews prior studies on ownership, especially ownership concentration and ownership identity and their effects on firm performance, with the intention of understanding the issues involved and approaches employed to their resolution.

This section summarises the review of the literature on the effects of ownership on firm performance. Section 3.2 discusses the effects of ownership concentration on firm performance. Section 3.3 reviews the effects of managerial and family ownership on firm performance, with a view to establishing the different views and whether there is agreement on how such ownership affects firm performance. The effect of state ownership and firm performance is discussed in Section 3.4. Section 3.5 discusses the relationship between institutional ownership and firm performance. Section 3.6 examines the effects of foreign ownership on firm performance. The potential effects of black ownership on firm performance are discussed in Section 3.7. Company ownership and firm performance are discussed in Section 3.8 and the Public Investment Corporation and other ownership and firm performance in Section 3.9. Section 3.10 discusses measures of firm performance and control variables. Emerging hypotheses

which emanate from a review of the literature are discussed in Section 3.11. Section 3.12 provides a summary of the chapter and relates it to Chapters 2 and 4.

3.2 EFFECTS OF OWNERSHIP CONCENTRATION ON FIRM PERFORMANCE

The results of studies on the impact of concentrated share ownership on performance are mixed or have yielded inconclusive results (Wang & Shailer 2015:210), irrespective of whether the owners are insiders or outsiders. Better performance may result from concentrated insider ownership because of the alignment between other shareholders and management, reducing agency costs (Jensen & Meckling, 1976:334). Non-management block shareholders have been shown to control and monitor management (Shleifer & Vishny, 1986:461). Another reason for better performance in family-owned firms is better decision-making due to superior knowledge and long investment time horizons.

Veltri and Mazzotta (2016: 317) studied the association between board composition and intellectual capital in a high ownership concentration context in Italy. The variables of interest for the study were ownership concentration and firm performance. The study found a positive relationship between ownership concentration and firm performance, which was measured by return on assets. Data was collected from Italian non-financial listed firms over a three-year period from 2008 to 2010. The current study examines data over a longer period, namely 11 years, with the intention of capturing the trends and relationships over a longer period.

The Italian study states that in the context where ownership is highly concentrated, the problems of corporate governance are not just between shareholders or principals and managers or agents, which they call the Type I problem (Veltri & Mazzotta, 2016: 317). They argue that the problem between large and small shareholders, which they refer to as the Type II problem, is also important. Additionally, the study argues that company directors have to oversee not only the Type I problem but also ensure that the small shareholders, as a part of the Type II problem, have their interests safeguarded. In a corporate performance context, this may mean that the performance of the firm, whether positive or negative, from the large and small shareholders' perspectives, has to be

equally felt. Any potential skewness in favour of the larger shareholders would have to be resolved directly in the corporate governance structure. Such a structure mitigates the potentially negative effects of the expropriation hypothesis (Alipour, 2013:1140).

A positive relationship was found between firm performance measures and ownership concentration when majority shareholders owned between 5% and 10%, but not for higher levels of concentration (Abdallah & Ismail, 2017:99). At shareholdings between 20% and 25%, there was no relationship between ownership concentration and firm performance. Abdallah and Ismail (2017:98) studied ownership structure and firm performance in Gulf Corporation Council countries using a sample of 532 publicly listed firms over the period 2008 to 2012 using three measures of firm performance, namely Tobin's Q, return on assets and return on equity. They employed the instrumental generalised method of moments approach to analyse the effect of ownership concentration on firm performance.

Control variables employed in the study included leverage, free cash flow, sales growth rate, industry and firm age. All the variables were winsorised at the 1% level. The same regression models were run for each level of concentrated ownership; that is where block-holders have more than 5%, 10%, 20% or 25%. The same models were run with each ownership type, namely corporate, government, private and foreign ownership. The local corporate investor was then labelled as an institutional investor; and *private ownership* was defined as ownership by an individual investor (or family). Government and foreign investors were identified by the percentages of shares that they owned. Individual and family investors were grouped together, presumably due to the difficulty of separating the two types of ownerships. A similar approach may be considered in the current study.

Nguyen *et al.* (2015:148) found a positive relationship between ownership concentration and firm performance, using the generalised method of moments approach, in both a developed country (Singapore) and an underdeveloped country (Vietnam) in the same study. National governance was found to play a role in the findings and the results showed a stronger positive relationship in the under-developed country (Vietnam). The explanation for this result was that corporate governance compensated for weak national governance. Good corporate governance in this study was attributed to the

monitoring role of the large shareholders. Studies on the effect of concentrated ownership on firm performance are generally conducted in a single country, which implies that all the firms in the sample are subject to the same level of national governance. By conducting the study in two countries at different levels of economic development, the role of national governance became a relevant factor. The current study will analyse the effect of ownership concentration in a single economy, South Africa, and will therefore not observe the effect of a change in national governance.

Jadoon and Bajuri (2015:200) investigated the relationship between ownership concentration and firm performance using 262 non-financial firms in listed companies on the Karachi stock exchange in Pakistan. Data analysis was for a period of six years, which was in line with similar studies. Studies using data for longer periods could provide more insight into whether the relationships established over a shorter period would hold over the longer periods. The study measured concentration of ownership using three measures, namely the percentages of ownership held by the largest shareholder, the five largest shareholders and the 10 largest shareholders.

The measures of concentration of ownership used by Jadoon and Bajuri (2015:202), namely the percentage owned by the largest shareholder, the five largest shareholders and the 10 largest shareholders, were used in earlier studies but not necessarily concurrently. Hautz *et al.* (2013:108) used the percentage of voting shares held by the largest shareholder as a measure of ownership concentration in a study of the joint effects of ownership identity and concentration on corporate diversification. Onder (2003:189) and Gonenc (2006:199) used the shareholding of the three largest shareholders as a measure of concentration of ownership. Earle, Kucsera and Telegdy (2005:256) used the voting shares of the top five shareholders as a measure of ownership concentration in their study of the ownership and firm performance on the Budapest stock exchange. Yasser and Mamun (2015:169) measured ownership concentration using the percentage of the top 10 shareholders in their study of the effects of concentration of ownership on performance of firms in Pakistan. These measures provided different aspects of concentration of ownership and may be used in the current research.

Firm performance was measured using accounting-based performance measures, return on assets and return on equity and market-based measures (Tobin's Q) (Jadoon & Bajuri, 2015:203). *Return on assets* was defined as operating income divided by total assets, while *return on equity* was calculated as operating income divided by equity. *Tobin's Q* was measured as the sum of the market value of equity and the book value of liabilities divided by the total assets. These definitions were used in line with those employed in earlier studies. Measuring firm performance using multiple measures was encouraged by Daily and Johnson (1997:107) in their study of the power and financial performance of chief executive officers.

A positive relationship was found between concentrated ownership and firm performance in the study by Singal and Singal (2011:380). Firms with dispersed ownership performed worse than those with concentrated ownership. The researchers started from observing that in developed economies such as the USA, there is a positive relationship between concentrated ownership and firm performance. These firms are predominantly family owned. Agency theory predicts that owner- management should reduce the agency costs. Hence a family-owned firm is expected to perform well under agency theory because the owners usually run such firms. Ownership and management are aligned. The problem that arises with the results of the studies showing positive performance and having concentrated ownership by families is whether the good performance is due to concentrated ownership, by a family or any other type of shareholder, or due to family ownership, independently of concentrated ownership. The study is important in its examination of different types of concentrated ownerships.

Jadoon and Bajuri (2015:202) employed three multiple regression models to investigate the effect of ownership concentration on firm performance. Each model was based on the dependent variable, return on assets, return on equity and Tobin's Q, as follows:

- Model 1 was used to determine the effect of concentrated ownership on return on assets: $ROA = \alpha + \beta_1 LSH + \beta_1 5LSH + \beta_1 10LSH + \beta_2 Age + \beta_3 Size + \beta_4 LEV + \varepsilon$

Where:
ROA is return on assets;
α is a constant term;

LSH is largest shareholder;
5LSH is shareholding of largest five owners;
10LSH is shareholding of largest 10 owners;
AGE is age of firms;
Size is the log of total assets;
LEV is leverage of firms; and
$\beta_{1,2,3,4}$ are coefficients.

- Model 2 was used to determine the effect of concentrated ownership on return on equity: $ROE = \alpha + \beta_1 LSH + \beta_1 5LSH + \beta_1 10LSH + \beta_2 Age + \beta_3 Size + \beta_4 LEV + \varepsilon$

Where, ROE is return on equity and the rest of the variables are the same as in Model 1.

- Model 3 was used to determine the effect of concentrated ownership on Tobin's Q: $TQ = \alpha + \beta_1 LSH + \beta_1 5LSH + \beta_1 10LSH + \beta_2 Age + \beta_3 Size + \beta_4 LEV + \varepsilon$

Where: TQ is Tobin's Q and the rest of the variables are the same as in Model 1.

These models are symptomatic of other models used in similar studies and have the flexibility to accommodate different definitions of variables and can be enhanced with additional variables. However, different measures of ownership concentration are sometimes not used concurrently. This could be explained by the use of one coefficient for all the levels of shareholdings.

Control variables used by Jadoon and Bajuri (2015:203) are size, as measured by the logarithm of the book value of the firm's assets, and leverage or the debt-equity ratio and firm age, which was measured as the number of years since a firm was incorporated. Isik and Soykan (2013:29) used firm size and leverage as control variables in their study. The appropriateness of these control variables will be considered in the current study using South African data.

Using data from the Indian corporate sector, Singal and Singal (2011:374) found that firms with concentrated ownership outperformed those that had diffused ownership.

This result is consistent with the findings in studies carried out in developed economies. In addition, no differences in performance were found between firms controlled by families, foreign corporations and the state. Based on these results, the researchers concluded that it was concentrated ownership and not family ownership which leads to better firm performance.

The current study examines the level of ownership concentration and its effects on corporate performance using South African data. Thereafter, the study will investigate the effects of ownership type on firm performance. Isik and Soykan (2013:32) found a positive relationship between ownership and firm performance in their study of 164 industrial firms listed on the Istanbul stock exchange. Data used in the panel data analysis was from 2003 to 2010. The study sought to investigate whether large shareholdings in Turkish companies solved two problems identified in agency theory. The first problem was the potential conflict between shareholders and management, or the principal-agent problem (Jensen & Meckling, 1976:309). Internal and external corporate control mechanisms were viewed as solutions to this problem. The internal corporate control mechanisms were listed as concentrated share ownership, managerial shareholdings and board of directors while external control mechanisms included labour, capital, product markets and legal framework (Isik & Soykan, 2013:24). On the other hand, large shareholders who expropriated the firm's wealth to themselves at the expense of the smaller shareholders created a problem. Hence large shareholdings were expected to provide a monitoring effect to management.

Isik and Soykan (2013:28) tested their first hypothesis, namely that the presence of large shareholders should be positively related to the performance of the firm (efficient monitoring hypothesis). Under the efficient monitoring hypothesis, higher levels of ownership concentration enable large corporate shareholders to reduce costs of monitoring management (Alipour, 2013:1140). Isik and Soykan (2013:24) argue that the presence of large shareholders minimises the agency problems between small shareholders and management. Their second hypothesis was that concentrated ownership at higher levels would lead to negative performance, due to the expropriation effect (expropriation hypothesis).

Isik and Soykan's (2013:23) sample consisted of manufacturing firms listed on the Istanbul stock exchange. *A large shareholder* was defined as one who held more than 10% of the outstanding shares of a firm. This definition was used in earlier studies. The firms were divided into three shareholder groups, namely ownership of 0-10%, 10-50% and >=50%. These groups were not mutually exclusive as there was some overlap. An explanation for not delineating the categories could be that not many shareholdings were expected on the edges of the groupings, therefore the groups did not create a significant problem to the analysis. In the design of any groups in the current study, such overlaps will be avoided, irrespective of their perceived materiality. In the Turkish study, dummy variables were used to accommodate the various levels of ownership. This approach of providing different levels of shareholdings differs from that of other studies in that it allows for examination of the influence of different levels of ownership on the firm performance.

A similar approach was used by Wellalage and Locke (2012:52) in their exploration of the relationship between capital structure and firm performance on 152 firms listed on the Colombo stock exchange in Sri Lanka. Ownership structure was divided into the following categories: local, insider and institutional. The study further categorised insider ownership as 0%, 0-30%, 30-70% and 70-100%. It is noteworthy that the classification did not use 50% as a significant point of control as that percentage of shares gave rise to a different level of ownership from 30%, for example. A shareholding in excess of 50% ordinarily gives rise to control of the company, other things being equal.

Wellalage and Locke (2012:62) report an inverse U-shaped relationship between the levels of insider ownership and firm performance, with an overall positive relationship. The inverse U-shaped relationship means that as insider ownership increases, firm performance also increases up to a maximum point. When insider ownership increases beyond that point, firm performance ceases to increase and actually decreases. The authors ascribe this phenomenon to entrenchment, especially of management. With insider entrenchment, it means that when the shareholding of insiders reaches a certain level, there is either a relaxation of efforts to improve performance or the insiders start expropriating the benefits arising due to the higher shareholding to themselves, at the expense of the smaller outside shareholders (expropriation hypothesis).

Hassan, Hassan, Karim and Salamuddin (2016:523) found no evidence of non-linearity between ownership concentration and firm value in Malaysian firms. Ownership concentration was measured by the percentage of shareholding of the largest shareholder and the shareholdings of the five largest shareholders. No point of inflection was found, but rather an inverse U-shape between the two variables. Variables analysed in the Malaysian study will be considered for use in the current South African study.

Isik and Soykan (2013:30) used *return on assets*, which they defined as the ratio of net income/total assets, and *Tobin's Q*, defined as the market value of equity plus debt, all divided by total assets. These performance measures or dependent variables are in line with those used in other studies (Mandaci & Gumus, 2010:62; Wellalage & Locke, 2012:57). Return on equity was also used as a performance measure (Abbas, Naqvi & Mirza, 2013:1145; Chen, Cheung, Stouraitis & Wong, 2005:433). *Independent variables* or *ownership variables* were defined as the existence of a larger shareholder, denoted by a dummy variable, which took the form of one if there was a large shareholder, or zero otherwise; the large shareholder owned 10-50% of the shares, and the largest shareholder owned 50% or more. In both cases of large shareholder ownership, dummy variables were employed and they took the values of one if the percentages (10-50% and 50-100%) held, otherwise they took the value of zero.

Isik and Soykan (2013:34) suggest that future research should consider using economic value-added, or the difference between the excess value over and above the required rates of return by debt and equity holders, and market value added, which is the difference between a firm's current market value and the capital contributed by the investors, as possible dependent variables, and the results should be compared with other measures. To the extent that the use of such measures is feasible in the current study, the proposition may be considered. Table 3.1 provides a summary of studies on the effects of concentration of ownership on firm performance.

Table 3.1: Summary of studies on the effects of concentration of ownership on firm performance

Study	Data source	Sample firms	Large shareholder measure	Corporate performance measure	Relationship
Wiwattanakantang (2001)	Stock exchange of Thailand, Thailand	270 listed non-financial: 1996	>25% of shares held by largest shareholder and management ownership	Tobin's Q, sales-asset ratio, ROA	a) +ve for ROA and sales-asset ratio b)–ve management holds 25-50% on same ratios
Onder (2003)	Istanbul stock exchange, Turkey	All listed companies : 1996-2006	% held by largest shareholder and 3 largest shareholders	Tobin's Q, ROA	a) no relationship for ROA b) +ve quadratic for Tobin's Q
Gonenc (2006)	Istanbul stock exchange , Turkey	185 industrial companies: 1992-1998	% held by 3 largest shareholders and management ownership	ROA and market-to-book ratio	a) –ve when ownership is exogenous b) performance has –ve effect on ownership
Alonso-Bonis & Andres-Alonso (2007)	Madrid stock exchange, Spain	101 Spanish non-financial firms: 1991-1997	% held by the largest shareholders and % held by management	Tobin's Q	+ve significant relationship
Chen, Cheung, Stouraitis and Wong (2005)	Hong Kong	412 listed firms: 1995-1998	% shares held by the controlling family	ROA, ROE, and market-to-book ratio	No significant relationship
Andres (2008)	Frankfurt stock exchange, Germany	275 German-listed firms: 1998-2004	Founding family holds >25% of voting shares or, if less, family member is executive or board member.	ROA (with EBITDA as numerator) ROA (with EBIT as numerator) Tobin's Q	Family-held firms perform better than those with few controlling shareholders or widely held ones
Mandaci & Gumus (2010)	Istanbul stock exchange, Turkey	203 listed non-financial firms: 2005	Ownership concentration and managerial ownership	ROA and Tobin's Q	a) +ve significant for ownership concentration b) –ve between managerial ownership and Tobin's Q

Table 3.1 (*continued):* Summary of studies on the effects of concentration of ownership on firm performance

Study	Data source	Sample firms	Large shareholder measure	Corporate performance measure	Relationship
Pervan, Pervan & Todoric (2012)	Zagreb stock exchange, Croatia	All firms: 2003-2010	% held by the 4 largest shareholders	ROA	-ve effect on performance
Cameron (2012)	JSE Securities Exchange, South Africa	172 listed industrial firms listed between 2010-2011	% held by top 5 and top 10 shareholders	Tobin's Q and ROCE	No relationship between ownership concentration and performance
Al-Saidi (2013)	Kuwait stock exchange, Kuwait	130 non-financial firms: 2009-2012	% of shares held by the largest shareholders with 5% of total equity	Tobin's Q and ROA	No relationship
Isik & Soykan (2013)	Istanbul stock exchange, Turkey	164 listed manufacturing firms: 2003 to 2010	Existence of large shareholder: holds 10-50%; and holds 50-100%	ROA, Tobin's Q	a)+ve between large shareholder % and firm performance b) +ve at high levels of ownership
Jadoon & Bajuri (2015)	Karachi stock exchange, Pakistan	262 listed non-financial firms: 2006-2011	% held by largest shareholders and 10 largest shareholders	ROA, ROE and Tobin's Q	+ve relationship for market and accounting measures
Wang & Shailer (2015)	18 emerging markets	419 correlations from 42 primary studies: 1999-2010 and data from 1989-2008.		ROA, ROE, EVA and Tobin's Q	-ve relationship
Yasser & Mamun (2015)	Karachi stock exchange, Pakistan	KSE-100 indexed companies:2007-2011	% held by top 1, 2, 3, 5, and 10 shareholders	EVA, ROE, ROA, and Tobin's Q.	No relationship

Source: Compiled by author from relevant sources

EBIT: earnings before interest and tax; EBITDA: earnings before interest, tax, depreciation and amortisation; EVA: economic value-added; ROA: return on assets; ROCE: return on capital employed; ROE: return on equity.

Concentrated ownership was found to have no effect on firm performance (Al-Saidi, 2013:813; Demsetz & Lehn, 1985:1155; Demsetz & Villalonga, 2001:209; Najjar, 2012:13; Yasser & Mamun, 2015:162). Demsetz and Lehn (1985:1165) examined the relationship between ownership and market-based performance measures. Their results are in line with the hypothesis that ownership is endogenous, that is, it is not a determinant of performance. Studies using accounting-based measures of performance such as return on equity or return on assets obtained this result. Himmelberg, Hubbard and Palia (1999:355) and Coles *et al.* (2012:150) ascribe the results partly to the use of econometric methods that do not take into account the endogeneity problem. The argument for this position is based on efficient markets, namely that efficient markets ensure optimal capital structure and that firms with sub-optimal capital structures cease to exist in due course. This discussion impacts on the dichotomy between rational and behavioural economics.

Yasser and Mamun (2015:169) analysed the association between five types of concentrated ownerships and corporate performance in Pakistan. The sample consisted of 100 indexed-listed firms on the Karachi stock exchange from 2007 to 2011. Companies in the Karachi stock exchange 100 index were analysed. The index was constructed by selecting the largest firm in each of 33 sectors. The balance of the firms was selected on the basis of capitalisation and in descending order. The open-ended mutual fund sector was excluded, leaving 32 sectors. Data availability led to a final choice of 95 firms with data for the full five-year period (2007 to 2011). Firm performance was measured using four variables, namely economic value-added, return on equity, return on assets and Tobin's Q. Economic value-added was measured as net operating profit after tax less (weighted average cost of capital x invested capital). *Invested capital* was further defined as total equity less total liabilities less non-interest-bearing current liabilities. In essence, the economic value-added was calculated as the net profit after tax less the opportunity cost of capital. The use of four performance variables in this study deepened the level of analysis because earlier studies used fewer variables. In addition, the spread of performance variables to take account of accounting, market and economic dimensions provided wider insight into the behaviour of performance variables.

Five independent variables were employed to measure the level of ownership concentration. These were the percentage of the largest shareholder to total equity, the percentage of the two largest shareholders, three largest shareholders, five largest shareholders and 10 largest shareholders. Prior studies were restricted to two or three such measures. It is a more comprehensive approach to use different levels of shareholding to study ownership concentration. Such an approach may be adopted in the current study in order to ensure that as wide a spectrum of ownership concentration as possible is analysed. In line with similar studies, control variables were used in the Pakistani study and these were firm leverage, firm age and firm size.

The equations used in the multiple regression models to investigate the relationship between concentrated ownership and firm performance were as follows:

$$EVA = \alpha + \beta_1 OCON1 + \beta_1 OCON2 + \beta_1 OCON3 + \beta_1 OCON5 + \beta_1 OCON10 + \beta_2 FAGE + \beta_3 FSize + \beta_4 FLEV + \varepsilon$$

$$ROE = \alpha + \beta_1 OCON1 + \beta_1 OCON2 + \beta_1 OCON3 + \beta_1 OCON5 + \beta_1 OCON10 + \beta_2 FAGE + \beta_3 FSize + \beta_4 FLEV + \varepsilon$$

$$ROA = \alpha + \beta_1 OCON1 + \beta_1 OCON2 + \beta_1 OCON3 + \beta_1 OCON5 + \beta_1 OCON10 + \beta_2 FAGE + \beta_3 FSize + \beta_4 FLEV + \varepsilon$$

$$Tobin's\ Q = \alpha + \beta_1 OCON1 + \beta_1 OCON2 + \beta_1 OCON3 + \beta_1 OCON5 + \beta_1 OCON10 + \beta_2 FAGE + \beta_3 FSize + \beta_4 FLEV + \varepsilon$$

Where:
OCCON1 is the percentage of the largest block-holder to equity;
OCCON2 is the percentage of the two largest block-holders to equity;
OCCON3 is the percentage of the three largest block-holders to equity;
OCCON5 is the percentage of the five largest block-holders to equity;
OCCON10 is the percentage of the 10 largest block-holders to equity;
EVA is economic value-added;
ROA is return on assets;
ROE is return on equity;

FAGE is firm age;
FSIZE is firm size;
FLEV is leverage;
α is a constant; and
$\beta_{1,2,3,4}$ are coefficients;

The study referred to variables that measured concentration of ownership as governance variables, which was an apt description of the phenomenon under investigation. Economic value-added was as defined above and return on equity, return on assets and Tobin's Q were defined in line with earlier studies.

Financial leverage was measured by the ratio of debt to total equity. Firm size was measured by the natural logarithm of total assets. A negative relationship was expected between firm size and ownership concentration, mainly because when firms get larger, more wealth is required from the shareholders to hold larger stakes in equity. The negative relationship is also expected due to shareholders' quest to diversify their risks and would therefore not invest most of their wealth in one firm. Larger firms are sometimes associated with good reputations. Therefore, the relationship between size and performance could be positive.

The study found that there was no significant association between ownership concentration and firm performance as measured using accounting, market-based measures and economic profit. According to Yasser and Mamun (2015:173), results from these studies depended on costs and benefits of ownership concentration. Factors they ascribed to the differences in results included quality of data, heterogeneity in the types of firms for which data was analysed and the methods used in estimating the relationships.

This study is significant because it implies that ownership concentration has no effect on firm performance. In other words, whether a firm has concentrated ownership or diffuse ownership has no effect on the firm's performance. As a consequence, the proposition that, for example, concentrated ownership assists with the control of management in the principal-agency relationship, is not supported. In the study of South African-listed firms, the issues raised by Yasser and Mamun (2015:173) such as quality

of data, estimation methods and the diversity of companies being studied will be borne in mind when interpreting the results.

Cameron (2012:1) investigated the relationship between ownership concentration and financial performance in South African-listed industrial firms. Ownership concentration was measured by the percentage shareholdings of the five and 10 largest shareholders. Market capitalisation was also used as one of the independent variables. Firm performance was measured using Tobin's Q and return on capital employed. The study found no statistically significant relationship between ownership concentration and firm performance for both measures of performance, namely Tobin's Q and return on capital employed.

One of the implications of such a result, as pointed out in the study, is that separation of ownership and control appears to have no negative effect in the South African context. This means that the level of ownership of a firm does not matter, certainly as far as the performance of a firm is concerned. A significantly positive result was found between market capitalisation and firm performance. Cameron (2012:70) suggests that future studies should be conducted to confirm the results obtained in his study. The current study takes cognisance of the Cameron (2012:1) study and extends it in the same institutional setting, namely on non-financial firms listed on the JSE Securities Exchange.

No relationship was found between firm performance (profit rate) and ownership concentration, after showing evidence of endogeneity of a firm's ownership by Demsetz and Lehn (1985:1173). After accounting for endogeneity of ownership structure in US firms, Demsetz and Villalonga (2001:209) found no statistically significant relationship between ownership structure and firm performance. In his Korean study, Chang (2003:250) investigated chaebol families and found no relationship between concentrated ownership and firm performance.

The relationship between ownership and firm performance has also been found to be negative. One argument is that some level of shareholding may prevent takeovers and entrench management (Barclay & Holderness, 1989:384; Stulz, 1988:26). Another reason could be that controlling shareholders may consume perquisites, give

themselves high salaries, pursue sub-optimal corporate policies or employ less qualified family members at the expense of better candidates (Anderson & Reeb, 2003a:1306; Morck *et al*., 1988:293; Morck *et al.*, 2005:676; Ongore, 2011:2122). Morck *et al*. (2005:675,694) argue that due to family legacies, family-owned businesses may be risk averse and make conservative decisions, which may constrain the growth of the business.

Ongore (2011:2120) analysed 42 companies listed on the Nairobi stock exchange. The study was aimed at exploring the relationship between ownership structure and its effects on firm performance in general. Predictor variables studied were ownership concentration, foreign ownership, institutional ownership, government ownership, diverse ownership, board effectiveness and managerial insider ownership. The study covered a wide range of types of ownerships and their effects on firm performance. Ownership concentration, among others, was found to have a significant negative relationship with firm performance. This study also investigated the effects of diverse ownership on firm performance. It was hypothesised that diverse ownership would have a negative effect on firm performance. Results of the analysis showed that diverse ownership had a positive effect on firm performance.

Results obtained from the Ongore (2011:2120) study were different from those obtained in earlier studies. The study did not state what types of firms were studied, that is, whether they included and excluded financial firms. Financial firms have been excluded from such studies due to their perceived peculiarities from non-financial firms. More information on the sectors from which the firms were drawn could have provided more insight into the analysis of the results. The current study will therefore have to be explicit regarding the types of firms whose data has been analysed in order to make it easier to compare it with other studies.

The size of the sample in the Ongore (2011:2120) study was smaller than the size of the samples in some of the studies reviewed, in the summary table (Table 3.1). Such a sample size could be due to the size of the Kenyan market, which appeared to have a relatively small number of listed firms. As the sample size was greater than the minimum size of 30 required for parametric tests and analyses to be conducted, the results must be taken as a reflection of the underlying phenomena rather than due to statistical

problems. Studies of this nature tend to use data from one country or stock exchange at a time in order to control for other variables like differences in legal systems when more than one country is involved. There should potentially be more firms from the current study because the stock market in South Africa is perceived to be broader than the Kenyan one.

Ownership concentration in the study by Ongore (2011:2124) could have arisen from any of the categories of the identified owners such as government, institutions, foreign investors or management. The same study found a negative relationship between government ownership and firm performance. To the extent that concentrated ownership was due to government ownership, it could be plausible that the result was also negative for generic ownership concentration. Ownership concentration was measured by the shareholdings of the top five shareholders. The use of a certain number of top shareholders to measure ownership concentration has been adopted in some studies and will be considered in the current study.

Earlier studies on concentration of ownership were conducted in developed countries or countries outside the African continent. For example, ownership concentration was found to be negatively related to firm performance (Pervan *et al.*, 2012:81). Kirchmaier and Grant (2005:231) found a negative association between ownership concentration and firm performance in their study of 100 public firms in five major European countries. Ongore (2011:2120) contributed significantly to the literature on concentration of ownership and firm performance on the African continent.

The studies on the effects of ownership concentration on firm performance reviewed above showed mixed results. There is a need to conduct studies in different jurisdictions, including South Africa, in order to shed more light on whether concentrated ownership affects firm performance, and if it does, whether and why it affects firm performance positively or negatively.

Wang and Shailer (2015:202) analysed 42 primary studies on the relationship between concentration of ownership and firm performance in 18 emerging markets. They concluded that sampling error contributed very little to the results of the studies examined. Using metaregressions, they found that the way the endogeneity problem

was treated, differences in populations and the models used by researchers contributed to differences in research findings. Wang and Shailer (2015:222) adjusted for these factors and found concentration of ownership to be negatively related to performance across all countries.

Wang and Shailer (2015:202) analysed different studies and employed a different methodology. They identified the studies, coded the results and characteristics, computed effect sizes, calculated the population correlations and tested the differences of the effect sizes. They also used metaregressions to analyse where differences could be in relation to the reported studies. For inclusion in the sample, a study had to have analysed listed non-financial firms and reported results only from one country, among other things. These criteria are applicable to the current study of South African firms because it only considers listed non-financial firms in one country, namely South Africa.

Notably, South Africa is not one of the 18 emerging market countries from which the sample of 42 studies was collected, indicating a dearth of studies of this nature and highlighting the importance of the current study. The 18 countries were Brazil, Chile, China, Colombia, the Czech Republic, Egypt, Hungary, Jordan, Korea, Kuwait, Malaysia, Nigeria, Pakistan, Poland, Russia, Thailand, Tunisia and Turkey. Given South Africa's position in emerging markets, it could have been expected that at least one study would have emanated from it. In addition, the sample of countries consisted of developing nations. Results from such studies are directly relevant to the current study, given that the data will be from a developing country. Noteworthy is also the absence of studies from India, another member of the BRICS (Brazil, Russia, India, China and South Africa) group of countries whose aim is to foster economic development among emerging market countries.

Wang and Shailer (2015:203) collected the coefficients of concentration of ownership and their t-statistics, standard errors, and p-values as the variables of interest. Studies which did not report these statistics and other relevant information and where that data could not be obtained from the authors were excluded from the analysis. The importance of reporting all relevant statistics in research is underscored by the way the study was carried out. Omission of such information makes it difficult for further investigations to be conducted. The effect size was calculated as the partial correlation coefficient, which

was used to measure the degree of association between firm performance and ownership concentration. Fixed and random effects metaregression analyses were considered and the latter approach was opted for because of its suitability. Additional statistical tests were conducted to ensure robustness of the results.

Wang and Shailer (2015:205) indicate four sources of heterogeneity or sources that can lead to different results from the studies. The first source is the populations from which the samples are extracted. Most studies draw their samples from specific countries and therefore studies from two countries may not necessarily be expected to lead to the same results. A second source is sampling choices, namely whether the firms studied include or exclude financial firms. Modelling choices, which include the variables used to measure ownership concentration and performance, is the third source of heterogeneity. To the extent that variables are defined differently, the results from such studies cannot be expected to be the same. A last source of heterogeneity is whether or not a study is published in a referred journal. This source would imply that studies in referred and non-referred journals differ, perhaps due to the extent of the rigour applied to the work.

As the current study is conducted using data from a single country, namely South Africa, the issue population difference may not arise. However, on whether or not financial firms should be included, Wang and Shailer (2015:207) argue that biases could be introduced. They further suggest that the two types of firms differ in regulatory requirements, standards used in accounting and their financial characteristics. Due to the perceived differences which could introduce biases, financial firms are excluded from the current study.

Ownership concentration was measured by the concentration ratio in 77% of the studies reviewed by Wang and Shailer (2015:207) and may be considered for use in the current study. A summary of the accounting and market measures of performance employed in studies reviewed is given in Table 3.2.

Table 3.2: Accounting and market measures of firm performance

Accounting-based measures of performance	Market-based measures of performance
Return on assets	Tobin's Q
Return on equity	Market-to-book ratio
Return on sales	Market-to-sales ratio
Employee productivity	Market stock returns
Dividend payout ratio	Price-to-earnings ratio
Sales growth	
Sales to total assets ratio	

Source: Adapted from Wang and Shailer (2015:208)

Wang and Shailer (2015:208) indicate that the accounting measures are backward-looking, which means that they use historical information and are excessively dependent on procedures employed in preparing the accounts and may be subject to manipulation. On the other hand, the market-based measures were described as forward-looking because of their reflection of investors' expectations but are subject to the sentiments of investors. Hence such measures may be affected by investors' views of the company rather than the fundamental or underlying performance of a firm. Subjectivity, rather than rationality, plays a role in the formation of investor sentiment.

Any analysis which uses accounting and market data would therefore have to bear in mind the potential shortcomings and advantages of each approach. In addition, the performance measures reviewed were not exhaustive because they excluded other measures such as economic value-added and market value-added. However, the list provides a useful basis from which to select performance measures for use in the current study.

Alipour (2013:1137) investigated the association between ownership structure (ownership concentration and ownership type) and corporate performance of firms listed on the Tehran stock exchange from 2005 to 2009 and found mixed results. Ownership type consisted of the state, firm or legal person, individual, family and institutions. Hence the study examined five types of ownerships. The use of these five dimensions to study the ownership-value relationship enhanced the ownership-firm value relationship. The South African study seeks to increase the types of ownerships, taking advantage of some of the ownership types used in this study.

Alipour (2013:1137) applied panel data regression analysis and conducted two-stage least squares analysis. Ownership concentration was measured by the ownership percentage held by the company's largest shareholder. Ownership concentration was found to be positively related to return on equity and to be negatively related to return on assets. Therefore, the relationship between concentration of ownership and performance depended on the variable used to define performance. In terms of ownership types, firms (legal persons) and institutional ownership had a positive relationship with firm performance, whereas state, family and individual ownership were negatively related to firm performance. The mixed results for ownership concentration and ownership type lead to the need for further studies to examine these relationships in different jurisdictions. Berrone *et al.* (2007:828) found the impact of large shareholders on research and development investments to be negative when the shareholders were banks, positive when shareholders were non-financial companies and no relationship when block-holders were individuals. A generalised method of moments approach was used and they observed that a higher level of concentration led to higher market performance but lower accounting performance. Family firms had lower performance for lower risk and government-owned firms had lower accounting performance and higher risk. Ting *et al.* (2016:1) investigated the effect of ownership structure on firm performance as well as the role of research and development in Malaysia, using the generalised method of moments approach, and found that a higher level of ownership concentration led to higher market performance, as measured by accounting ratios. In the same study, family firms had lower performance for lower risk and government-owned firms had lower accounting ratios but higher market performance ratios with higher risk.

A review of studies focusing on the effects of ownership concentration on firm performance shows that the relationships were positive, negative and mixed. Different institutional settings, different methodologies as well as different samples were used in the studies. The current study investigates the same problem using a sample of non-financial firms listed on the JSE Securities Exchange.

Shleifer and Vishny (1986:461) found that if monitoring by owners improves managerial decision-making and there are no other effects of concentration of ownership, then firm

performance and ownership concentration should be positively related. This is the essence of the monitoring hypothesis.

In terms of agency theory, concentration of ownership may lead to decisions which are not value maximising because of the existence of costs linked to ownership concentration, and Shleifer and Vishny (1997:758) identify the expropriation effect on minority shareholders as one such major cost (expropriation hypothesis).

3.3 TYPES OF OWNERSHIPS AND CORPORATE PERFORMANCE

3.3.1 Managerial ownership and corporate performance

Some studies examined the relationship between ownership structure and firm performance and they argued that USA corporations were generally widely held by small shareholders and that insiders (management) controlled such firms and that they performed poorly. In their theoretical study, Jensen and Meckling (1976:327) developed the theory of the classical agency problem between owners and managers, which they proposed could be mitigated by managerial share ownership. They argue that such managerial ownership would discourage management from engaging in activities which are sub-optimal, such as expropriating the wealth of shareholders or consuming perquisites. Managerial shareholding is viewed as a mechanism for aligning managerial and shareholder interests, leading to lower agency costs. In this view, managerial ownership leads to better firm performance. Ownership concentration has been measured by the one, three, five or 10 largest shareholders or by significant shareholders (Demsertz & Villalonga, 2001:214; Isik & Soykan, 2013:30; Jadoon & Bajuri, 2015:202; McConnell & Servaes, 1990:608; Wang & Shailer, 2015:220, 222; Yasser & Mamun, 2015:169) and in these empirical studies, the relationship between managerial ownership and firm value or performance is mixed.

Studies investigated the effects of managerial ownership on firm value, such as the study by Denis and McConnell (2003:1). The studies generally agree that managerial and shareholders' interests are not entirely congruent. Agency theory propounds that when insider ownership (board members and management) increases, insider and

outsider shareholders' interests are well aligned (convergence of interests), thereby reducing managers' inclination to use resources in their own best interest (Jensen & Meckling, 1976:313). Hence conflict between managers and outside shareholders is resolved. Better decision-making also results from this level of shareholding and leads to increases in firm value.

On the other hand, managers or owner-managers may also make decisions which reduce the value of the firm by expropriating wealth from outside shareholders. When managerial shareholding increases, according to Jensen (1993:863), there are likely to be fewer non-executive directors on the board because these latter directors have a role in exercising potential decision control and the board is likely to be larger than normal. Faccio and Lasfer (2000:71) further argue that co-ordination and communication problems increase and monitoring of the board becomes more difficult. Firm value decreases under such circumstances.

Claessens *et al*. (2000:103) studied firms in nine East Asian countries and found that the effect of ownership varied with the block-holder's identity. Studies in bank-based economies (countries in which banks play a more dominant role relative to the country's stock exchange) showed a negative relationship between firm performance and bank ownership (Morck, Nakamura & Shivdasani, 2000:541).

The relationship between firm performance and concentration of ownership was analysed by Beiner, Drobetz, Schmid and Zimmermann (2006:249) and McConnell and Servaes (1990:595). They tested for the monitoring and expropriation hypotheses and found positive and negative effects respectively. Adams and Santos (2006:55), Short and Keasey (1999:79) and Morck *et al*. (1988:293) analysed the costs and benefits in the relationship between insider ownership and firm performance and tested the entrenchment and convergence of interest hypotheses. The relationship between control of corporates and firm performance yielded mixed and weak results (Sanchez-Ballesta & Garcia-Meca, 2007:890). A possible reason for these results, according to Demsetz and Villalonga (2001:214), is that ownership structure is not treated appropriately. They argue that the dimensions of ownership, namely the type of ownership, such as insider holdings, and the concentration of such ownership should be considered in order to get a better understanding of the relationship between

ownership and firm performance. Both dimensions of ownership concentration and ownership type will be taken into account in the current study.

Garcia-Meca and Sanchez-Ballesta (2011:41) analysed the effect on firm value of the proportion of shares owned by significant shareholders and the proportion of shares owned by management. They studied these aspects and included the effect of bank ownership, a significant type of shareholder in the Spanish market. Non-financial firms listed on the Madrid stock exchange between 1999 and 2002 were used in the sample. Different studies on the relationship between ownership structure and corporate performance yielded positive, negative and insignificant relationships. The relationships seemed to depend on entrenchment and alignment effects. Relevant studies include those by Gadhoum, Lang and Young (2005:339) on US firms, Faccio and Lang (2002:365) on European companies, Claessens *et al.* (2000:81) and Lins (2003:170) on Asian and emerging market companies, Attig, Fong, Gadhoum and Lang (2006:2875), Short, Keasey and Duxbury (2002:375) on UK firms, Brailsford, Oliver and Pua (2002:5) on Australian firms, King and Santor (2008:2423) on Canadian firms, Moscu *et al.* (2015:194) on Romanian firms and Xia and Walker (2015:576) on Chinese firms.

Moscu *et al.,* (2015:194) examined whether ownership structure affected firm performance. The sample consisted of 55 companies listed on the Bucharest stock exchange from 2010 to 2013. They used three ownership variables, namely majority shareholders (where the top three shareholders owned more than 50%), state shareholding, and managerial shareholding. Performance was measured using return on assets and return on equity. Control variables were size and debt-equity ratio. A positive relationship was found between managerial ownership and firm performance, as measured by return on equity. This result is in line with the theoretical proposition under agency theory that management ownership reduces principal-agent problems. However, the study did not examine the effect on performance at differing levels of management ownership. Company size and firm performance when measured by return on equity also had a positive relationship. It was conjectured that larger companies probably had better reputations which they used to charge higher prices for their products. It may also be plausible that firms may have grown larger because they were profitable.

Insider or managerial ownership had a positive association with firm performance in a study of 152 Sri Lankan firms, analysed using the generalised method of moments approach (Wellalage & Locke, 2012:58). Similarly, Uwuigbe and Olusanmi (2012:212) observed a positive relationship between board ownership and corporate performance in their analysis of 31 Nigerian-listed financial institutions. The sample covered all listed Nigerian financial firms. The current study investigates South African-listed non-financial firms.

Gao and Song (2008:382) and Holderness (2003:58) found a positive relationship between firm performance and insider ownership by top management. Gao and Song (2008:375) examined the effect of managerial ownership on performance. They used panel data analysis on Chinese firms and found top management ownership to be positively related to firm performance. Other studies which found a positive relationship between chief executive officers' shareholdings and firm performance are those by Mehran (1995:175), McConnell and Servaes (1990:604) and Morck *et al.* (1988:301). Gorton and Schmid (2000:70) found a positive relationship between bank ownership and bank performance in their analysis of universal banks in Germany. Krivogorsky (2006:176) studied the influence of board of directors' compositions and ownership on firm performance. She used return on assets and return on equity as performance measures for 87 European companies which were also listed in the USA. The results indicated a strong relationship between ownership and performance but found no significant relationship between managerial ownership and firm performance in continental European countries.

Ruan *et al.* (2011:78) examined the effect of managerial ownership on firm value, through the capital structure choices using a sample of Chinese civilian-run firms. The firms were listed on the Chinese stock market from 2002 to 2007. In the Chinese securities market (Shanghai and Shenzhen), firms are classified as civilian-run if their ownership and management are dominated by civilians. Their results showed that managerial ownership affected firms' capital structure and firm value in a non-linear way. At lower levels of managerial ownership, firm value was low, then it rose with ownership until firm value started to fall with increased managerial ownership. Morck *et al*. (1988:302), in their study in a developed economy, found the turning points of managerial ownership of 5% and 25%, compared with 7% and 38% found by Cho

(1998:104) in his study of Chinese privatised companies. Ruan *et al*. (2011:75) found higher turning points of 18% and 64%. They concluded that their findings implied that the managerial "interest convergence" and "entrenchment effects'" can be used to explain the behaviour of managers of civilian-run Chinese firms. Similar results were obtained in earlier studies (Cho, 1998:120) McConnell & Servaes, 1990:595). Ruan *et al*. (2011:82) observed that the turning points in developed economies for similar studies such as that of Morck *et al*. (1988:302) occurred at 5% and 25%.

Morck *et al*. (1988:293) studied the relationship between management ownership and firm value using data from 371 of the Fortune 500 companies in 1980. They estimated the relationship between Tobin's Q ratio and board of directors' shareholdings and employed piecewise linear regressions. A positive relationship was found between the two variables when board shareholdings were between 0% and 5%, and above 25%. They ascribed this relationship to the convergence of interest effect. This meant that management and other shareholders' interests were aligned within the relevant shareholding ranges. In the range between 5% and 25%, a negative relationship was found, and this was attributed to the entrenchment effect.

McConnell and Servaes (1990:597) used regression analysis to explore the relationship between corporate insiders' shareholdings and Tobin's Q and found a curvilinear relationship between firm value and managerial ownership. The study was replicated in the UK by Short and Keasey (1999:79) and in Spain by De Miguel, Pindado and De La Torre (2004:1201), who found similar results. The managerial shareholdings were extended from cubic (or third degree) to quintic (fifth degree) specifications by Davies, Hillier and McColgan (2005:652) and the relationship between management shareholding and firm value was found to be non-linear.

Berger *et al.* (1997:1436) and Friend and Lang (1988:277) state that due to managerial entrenchment, managerial ownership drives capital structure in a non-linear way. However, the direction of the non-linearity for managerial ownership and capital structure and the direction of managerial ownership and firm value have an inverse relationship. Ruan *et al*. (2011:73) also state that the influence of managerial ownership on capital structure overshadows that of managerial ownership and firm value.

Studies on the relationship between corporate ownership and corporate performance were conducted mainly in developed economies. Wei, Xie and Zhang (2005:89) state that emerging economies, such as South Africa, generally do not have the essential legal protections and governance mechanisms and would therefore have more severe agency problems than those found in developed markets. Claessens and Djankov (1999:498) studied the relationship between equity incentives for management and firm performance and found that the equity incentives were important in enabling better corporate performance in 706 Czech companies. The relationship between debt, managerial performance and firm performance in Thai and Indonesian markets was investigated by Bunkanwanicha, Gupta and Rokhim (2008:1578). Lins (2003:159) investigated whether management share ownership and large non-managerial share ownership were related to firm value. The study analysed 1433 firms from 18 emerging market countries. Where the management's control rights were greater than dividend rights, firm values were found to be lower and non-management block-holdings were found to be positively related to firm value. The earlier result could be due to managerial entrenchment whereas the latter result could be due to active monitoring by the large non-managerial shareholders.

The studies reviewed above found a non-linear relationship between firm value (as a measure of corporate performance) and managerial share ownership. In particular, at low levels of management ownership, the relationship between firm value and managerial ownership was positive but at higher levels of management ownership, management became more entrenched (Cho, 1998:105) and corporate value was reduced. However, when managerial shareholding reached a much higher level, outside shareholders' and managerial interests were aligned and managerial performance accelerated and firm value increased.

Using ordinary least squares regression, Cho (1998:103) found that company ownership affected firm value. However, using simultaneous regressions, ownership was found to be endogenous and therefore company ownership could affect ownership structure. The study raised questions about the assumption that ownership was independently determined. Alternatively, analytical methods which provide for endogeneity such as the generalised method of moments could have been employed and the results observed and compared with the original results.

The importance of country-specific institutional arrangements to managerial ownership agency problems was highlighted by Lauterbach and Vaninsky (1999:189). They studied the effects of ownership on firm performance using data envelopment analysis to analyse 280 Israeli firms. They found professionally (non-owner) managed firms to be more efficient than owner-managed firms and that family firms run by their owners performed the worst. Lauterbach and Vaninsky (1999:191) used an ownership classification scheme which distinguished between non-owner-managed firms, firms controlled by organisations, firms controlled by families, and firms controlled by a group of individuals (or partners). The superior performance of professionally managed firms may have implications for firms in the current study to the extent that firms which are owner managed could be expected to perform poorly. However, the finding by Lauterbach and Vaninsky (1999:189) must be contrasted with other studies which found that owner-managed firms performed better. In the current study, the classifications of ownership types will take cognisance of those used in earlier studies, including that of Lauterbach and Vaninsky (1999:193).

3.3.2 Family ownership and corporate performance

A unique category of large shareholders is family firm ownership. This group is associated with special reasons for owning and managing firms such as efforts to guard the reputations of the families and businesses and survival of their businesses. Family ownership as large shareholders was proposed as mitigation for agency costs (Anderson *et al.,* 2003:264).

Family firms with large individual or personal owners outperformed non-family firms (Anderson & Reeb, 2003a:1303; King & Santor, 2008:2423; Maury, 2006:321; Villalonga & Amit, 2006:412). Large controlling family shareholders of firms in Western Europe were found to benefit minority shareholders (Maury, 2006:322). Due to this finding, Margaritis and Psillaki (2010:623) argue that the effect of family ownership on corporate performance would be positive.

King and Santor (2008:2423) state that the different studies produced mixed results due to problems of model misspecification and model estimation. Villalonga and Amit (2006:386) argue that the relationship between family ownership and performance cannot be understood until the issues of control (in terms of voting rights) and ownership (claims against cash flow of the corporate) are separated. The suggestion is that inconclusive results emanate from studies that do not separate these issues. The problem of unobserved firm heterogeneity also arises where studies such as that of Coles *et al.* (2012:151) point out that performance and managerial ownership are endogenous.

King and Santor (2008:2423) used a comprehensive database on ownership, distinguished family ownership and control, used accounting and market measures of performance and tested various theories which related ownership to capital structure and firm performance. They concluded that, in line with studies conducted in the USA by Anderson and Reeb (2003a:1301) and Villalonga and Amit (2006:385), single-share family-owned companies performed like other firms, based on Tobin's Q ratios, but performed better, using return on assets and had higher leverage, based on debt to total assets ratios. Dual-class shares owned by families had lower values than other firms but had similar performance and financial leverage. Studies in the USA and other countries had similar results regarding the discount on dual-class shares (Claessens *et al*., 2002:2742; Gompers *et al.*, 2010:1068).

Ting *et al.* (2016:1) investigated the effect of ownership on firm performance and the role of research and development in Malaysia. Family ownership was measured by dividing the total family ownership included in the top 30 shareholders. This implied that shareholdings in excess of the top 30 were disregarded. The fraction of shareholdings beyond the top 30 might have been insignificant or data availability could have been a problem. A similar approach of establishing a cut-off for the number of shareholders may be adopted for the current study. However, the use of the top 30 shareholdings as the divisor may lead to potential distortions in the percentage shareholdings of families because the total number used as a divisor may be far smaller than 100%, which is the total for all shareholders. To the extent that such shareholdings are available as percentages of the total shareholding, the result will be more accurate, even if an arbitrary cut-off of the top shareholders is used. In the latter case, the percentages will

not change in line with the cut-off. However, the cut-off will have the effect of excluding shareholdings beyond the cut-off number but will always be expressed as fractions of 100, irrespective of the cut-off point for the number of top shareholders. The total percentage shareholding at the arbitrary cut-off point may not be used as a divisor in such a case.

Results from the study showed that family ownership was significantly and positively related to both measures of firm performance (Tobin's Q and return on assets). Greater interest in the business by family members and their better understanding of the business were the explanations provided for the relationship.

A positive relationship between family ownership and firm performance in USA firms (Lee, 2004:49) was attributed to high levels of trust and greater family commitment. A Chilean study observed that 100 family-owned firms performed significantly better than 75 firms which were not owned by families, over a 10-year period (Martinez *et al.,* 2007:83). It was argued that better monitoring of management and better investment decisions could explain the better performance by family-owned firms. Longer investment horizons of family firms were also used to explain the positive relationship between family ownership and firm performance in the Indian corporate sector (Singal & Singal, 2011:391).

The age of the shareholder has generally not been considered when investigating the effect of ownership and performance. Lozano *et al.* (2016:1333) analysed the effect of the main shareholder on the value of the firm in relation to different levels of ownership. The study also analysed the negative effect on firm value for different levels of investor protection. They showed that because different types of owners did not behave in the same way towards the firm, such behaviours affected shareholder value or performance. The study focused on young family-owned businesses and the relationship that the main shareholder had with other shareholders.

Young family businesses were defined as firms in which the largest shareholder was a family company which was not more than 30 years old. Use of firm age was justified as a proxy for conflicts within a family, which, in turn, would have an effect on the potential level of expropriation of other shareholders. The authors hypothesised that the

involvement of owners of a young family-owned business in the affairs of the investee firm in which the young family-owned business was a majority shareholder discouraged the majority shareholder from extracting benefits. The non-extraction of benefits led to increased firm value. The study also tested whether being a young family-owned business reduced the conflict between majority and minority shareholders using a sample of firms from 16 European countries for the period 2000 to 2009. The sample excluded financial companies and regulated public utilities.

Effects of age of family firms on firm value were analysed in the study, contributing to the disaggregation of the concept of ownership. When family ownership was treated as a homogeneous group, family ownership was found to have no effect on firm performance. According to the authors, such a result was due to aggregation. A life cycle approach to firm ownership and its effects on firm performance was therefore indirectly examined by the study. The study could also be considered an analysis of the effects of corporate ownership on firm performance, with a positive relationship.

Panel data analysis was employed to investigate the effects of young family firms on firm performance. Potential problems of endogeneity, according to the authors, could be solved through the use of instrument variables. It was recognised that the effects of unobservable factors which could be correlated with independent variables could affect the results of the study. The system generalised method of moments approach was used, because of its capacity to resolve these two problems and to provide consistent results, which other methodologies could not attain. As a result, the current study will use the panel data methodology and the generalised method of moments, among other analytical approaches such as ordinary least squares, to investigate the effects of ownership on firm performance.

The dependent variable used for firm performance was firm value, which was measured by multiplying the number of shares by the year-end price. One of the independent variables was ownership concentration and this was measured by the percentage of shares held by the largest shareholder. A company was defined as a *family business* if a family held more than 15% of the voting shares of the company and was the largest shareholder. In the current study, use of the percentage of shares held by the largest

and other top shareholders as a measure of ownership concentration will be considered as well as the selection of appropriate measures of performance.

Lozano *et al.* (2016:1333) state that when the main owner does not have absolute control of the firm, the second shareholder is significant. This means that the main shareholder can collude with the other shareholders or can be controlled by them. In that case, the relationship between firm performance and ownership is an inverted U-shape. Such a relationship implies that at lower levels of ownership, firm performance is positive but at higher levels of ownership, firm performance is negative. A similar relationship, namely an inverted U-shape, was found between family ownership and firm performance in the study by Anderson and Reeb (2003a:1323), in an environment where ownership of companies was not concentrated.

On the other hand, Lozano *et al.* (2016:1334) also analysed cases where the top or main shareholder had a large enough shareholding to command complete control of the company or if the main shareholder did not command an absolute majority shareholding but the second-largest shareholder did not control the main shareholder, the relationship between ownership concentration and firm performance was found to be U-shaped. This result meant that firm performance declined as ownership concentration increased, at lower levels of share ownership, but at higher levels of ownership concentration, performance increased.

Lozano *et al.* (2016:1334) argue that depending on the shareholdings of the majority shareholder, the second major shareholder may either collude or monitor the first shareholder. The study shows the importance of the second-largest shareholder, which ordinarily has not been given prominence in the literature, other than in Bennedsen and Wolfenzon (2000:127) and Gomes and Noaves (1999:1), among others, discussed in Chapter 2. The study is therefore significant for exploring the importance of the nature of interactions between the first and second major shareholders and how such interactions may affect firm performance. Lozano *et al.* (2016:1334) also argue that they differentiate family ownership from managerial ownership, as opposed to other studies which treat them as one category (Garcia-Ramos & Garcia-Olalla, 2011:220). Block, Jaskiewicz and Miller (2011:232) earlier observed that family ownership and family management could affect the value of a firm differently. The South African study will

adopt appropriate definitions which will enable the analysis of the effects of ownership on firm performance to be conducted.

A U-shaped relationship was observed between family ownership and firm performance by Che and Langli (2015:1216), who analysed the effect of the second-largest shareholder on firm performance, which was positive. They studied private family firms in Norway over an 11-year period. At low levels of family ownership, firm performance was negative, but after a certain threshold, it became positive. Ultimate owners were identified and family relationships were established using data on kinship, marriage and adoption. The study is unique for its use of private data on firms and relationships and for its in-depth examination of family relationships. Firm performance was higher when the second shareholder was a non-family member. Additional contributions of this study are the examination of the effect of the second shareholder on firm performance and the finding that performance was enhanced when the second shareholder was not a family member. Small unlisted family firms are also generally expected to have one family as a shareholder. The phenomenon of more than one shareholder may be associated with larger and, usually, listed companies. It would appear from the study that the presence of a non-family member as a second shareholder assisted the firm to perform better, presumably by bringing in a different perspective to the business from that of the family.

A negative relationship with corporate performance was found when private individuals and families were major shareholders in the study by Abdallah and Ismail (2017:111).

Certain studies focused on family-owned firms and who ran them. Villalonga and Amit (2006:414) recorded a positive impact on market and accounting profitability when firm founders were chief executive officers or chairmen. Succession of founder members by family members resulted in underperformance, which led to the conclusion that nepotism was not good for firm performance. Family-owned firms were found to use more control-enhancing mechanisms than widely held firms.

Villalonga & Amit (2006:285) considered family ownership, control and mangement, which constitute family involvement, and their effects on firm value. Family ownership includes direct and indirect onwership (through pyramids or by way of investments in

other companies). Control may be exercised by the use of indirect ownership or over-representation on the board of diectors, and shares with different voting rights, among other mechanisms. Participation by a family member means that the person is involved in the top management or board of the company. Management can be divided into founders and heirs. Family firms which were managed by founders performed better than non-family firms in studies by Andres (2008:431) and Gonzalez, Guzman, Pombo and Trijillo (2012:626). Corporate performance decreased with firm size. Firms managed by heirs did not perform better that non-family firms (Gonzalez *et al.,* 2012:626). Family succession in management had negative relationships with corporate performance in companies with a skilled labour force (Bennedsen, Perez-Gonzalez and Wolfenzon, 2007:647) and firms operating in competitive sectors (Cucculeli & Micucci, 2008:17). Decay in performance was attributed to dilution of ownership over time and control then vests in several heirs who are equally influential (Bertrand, Johnson, Samphantharak & Schoar, 2008:466).

Cronqvist and Nilsson (2003:695) differentiated between family ownership and their control of cash flows and their voting rights, which are ownership and control issues, but did not delineate the effect of family management. Anderson and Reeb (2003a:1301) analysed family ownership and management but did not separate ownership and control.

Gonzalo *et al.* (2012:626) contributed to the literature by analysing mainly non-listed firms from Colombia, an emerging economy, in constrast to earlier studies which examined listed firms from developed countries. The study discussed corporate governance characteristics of firms in emerging markets with a focus on family involvement.

The South African study did not simultaneously examine family ownership and management by family members. Instead, family ownership and managerial ownership were analysed separately. In addition, only direct family ownership as a component of family involvement was considered, since indirect ownership, control and the associated family management could not be examined, due to data constraints and focus on other types of ownership.

Poutziouiris, Savva and Hadjielias (2015:14) examined family involvement and firm performance in UK firms listed on the London Stock Exchange. Family ownership and mangement constituted family involvement, in this study, which was a narrower concept than that used in Gonzalez *et al.* (2012:626), with the exclusion of control. Poutziouiris *et al.* (2015:14) observed a non-linear relationship between family ownwership and performance. Family ownership increased with firm performance up to 31% and then decreased. The results also showed that the higher the involvement of the family in the management and/or the board of directors, the higher the firm performance, irrespective of whether the founder or heirs were involved. Poutziouiris *et al.* (2015:17) split the management involvement of the family into the managerial and board representation components, which was not the case with earlier studies. In addition, the relationships between the presence of heirs on the boards of directors, chief executive officer-chairman duality and firm performance were explicitly examined. The study used the stewardship theory which advocates that managers do not necessarily seek to satisfy their personal interests but work as stewards of the firms (Davis, Schoorman & Donaldson, 1997:20). In a family firm context, when family members, who are managers, view themselves as stewards of the firm, then firm performance can be expected to be enhanced (Miller & Le Breton-Miller, 2006:74).

The family involvement literature has added more light to the issue of corporate performance by enabling researchers to examine the various facets involved and their effects on firm performance.

3.3.3 Dual-class shares and corporate performance

Studies of foreign firms with dual-class shares found a negative relationship between the size of the difference or wedge between cash flow rights and control rights and firm performance (Cronqvist & Nilsson, 2003:709; Villalonga & Amit, 2006:414). Lauterbach and Pajuste (2015:171) studied long-term effects of voluntary dual-class unifications in Europe. Weak results from USA firms by Gompers *et al.* (2010:1053) were because of low concern by USA investors about possible expropriation. This low risk of expropriation was attributed to monitoring by financial institutions and regulators which provided de facto investor protection to minority shareholders. This is known as the

bonding hypothesis. The lower private benefits of control for USA-listed firms were confirmed by other studies. In a study of foreign firms with dual-class shares listed on a USA exchange, it was found that minority shareholders benefited proportionately more as the voting premium between the classes of shares narrowed.

Attig (2005:6), in a study of Canadian firms, found that firms owned in a pyramid structure had lower Tobin's q ratios, but the same result was not obtained for dual-class shares. The prevalence and valuation of dual-class shares have been the subject of a number of studies. Attig *et al*. (2006:2879) studied the impact of large shareholdings taking account of dual-class shares and pyramid structures on liquidity of stocks. Dual-class firms were observed to trade at a discount when compared with widely held firms in Canada and had lower Tobin's q ratios. Cross-listing of Canadian firms on USA exchanges reduced the valuation discount, in line with the bonding hypothesis.

Lauterbach and Pajuste (2015:171) studied 12 share unifications (the process of reducing dual-class shares to single-class shares) in Europe from 1999 to 2009. They argue that corporate governance is improved by reducing the wedge between ownership and voting rights and by reducing the voting power of controlling shareholders. The study found a significant appreciation in Tobin's Q ratio in the firms that unified their shares.

Bennedsen and Nielsen (2010:2219) state that apart from dual-class shares, other mechanisms used by controlling shareholders to generate additional power include cross-ownerships, golden shares and pyramids (or chains of corporate ownership). They found that the dual-class structure caused a 20% discount to the market valuation of firms in Europe. A dual-class share structure has two classes of shares of ordinary shares, namely high-voting and low-voting shares. Controlling shareholders take high-voting shares and the public holds shares with low votes. The control rights of the high-voting shares are in excess of their cash flow rights arising from dividends.

Lauterbach and Pajuste (2015:172) suggest that agency problems caused by dual-class shares can be solved by dual-share unification so that one share carries one vote. They also argue that this process dilutes the voting rights of the controlling shareholders by placing them on par with the rest of the ordinary shareholders. The study found a

significant peak in relative firm valuation, using Tobin's Q, in the year when unification took place. Significant shareholdings were sold during this period at high prices and the study calls this process 'financial tunnelling' or 'equity tunnelling'. The concept is used to refer to situations where shareholders can extract benefits from a firm for personal gain. By using this concept, the process of wealth accumulation resulting from the sale of shares is seen as expropriation rather than a simple gain to the seller of the shares.

A major contribution of the Lauterbach and Pajuste (2015:171) study to the literature is the application of the financial tunnelling concept with reference to the once-off selling of shares at a premium in the process of dual-share unification.

Studies on dual-class shares and unifications are reviewed because of their impact on firm valuations or firm performance. In addition, dual-class shares affect the perception of ownership and ownership concentration. The JSE Securities Exchange has listed dual-class shares. To the extent that there are dual-class shares in the sample of the current study, it is important to understand how this class of shares affects ownership and firm performance. A detailed examination of the relationship between dual-class shares and corporate performance is beyond the scope of the current study and could be a subject for further research.

3.3.4 State ownership and firm performance

The effect of state ownership on firm performance is important, among other things, in guiding policy on issues such as whether the state should increase or decrease its ownership in firms in its economy. Wortzel and Wortzel (1989:633) argue that when state-owned enterprises are created, they face problems such as lack of explicit goals and objectives, and not having organisational cultures and proper systems to enable them to accomplish their objectives. Due to the multiplicity of problems faced by these enterprises, the state may decide to privatise them. Again, this route has its own issues and Wortzel and Wortzel (1989:633) argue that this course of action is not necessarily the answer. They argue that ownership of the firms is not the matter, but how firms are managed. In essence, they argue for a different style of management, given a certain

type of ownership. However, ownership is important because owners appoint and monitor managers.

Arcas and Bachiller (2008:107) studied the performance in terms of profitability and efficiency of privatised state-owned firms in Europe and compared them with their private sector counterparts. They found that the privatised firms were not less efficient than firms with private ownership. Martin and Parker (1995:225) studied 11 privatised firms in the UK and could not find evidence to sustain the hypothesis that privately owned firms were unequivocally better performers than state-owned firms. The sample analysed was small. In addition, the process of earmarking firms for privatisation could have had an impact on the performance of the firms.

Government ownership had no impact on the performance of 58 banks in the Gulf Co-operation Council countries (Arouri *et al.*, 2014:117). The study on banks differed from other studies reviewed because the sample consisted of banks or financial firms. Studies usually exclude financial firms. Therefore, the exclusion of non-financial firms makes the sample fairly homogeneous for the financial sector. Tobin's Q was used to measure firm performance. The study analysed one year's data, namely 2010, which is a short period for this type of study. As a result, only limited analyses could be conducted. The study was also conducted across several countries, Different results may be obtained if the data from each country is analysed individually. However, the sample sizes would be very small. Therefore, the contribution of this study was to demonstrate that financial institutions from different countries could be analysed in a single sample. In addition, the study showed that similar analyses to those conducted on non-financial firms could also be carried out for financial firms.

Xia and Walker (2015:580) investigated the contribution of firm ownership to a firm's performance, and included other factors such as industry, firm size and location. Ownership was classified into state, private ownership and foreign categories. They observed that there was a prevalence of government ownership in developing economies in contrast with the reduced role of the state in more developed countries. Data was collected on manufacturing firms in mainland China from 1998 to 2007. The manufacturing sector was chosen because it was considered to be the most representative of the sectors where the three types of ownerships, namely the state,

foreign and private were represented. The study found that ownership type had a significant effect on firm performance. The result was interpreted to be a reflection of China's decentralisation and privatisation policies. Indirectly, the impact of government and private ownership was alluded to.

According to the authors, China was one of the countries that shifted to the capitalist model and did so successfully. Although the authors acknowledged that China's good performance was an exception in emerging market economies, partly due to its size, they noted that state ownership and control were still prevalent in many sectors through partial as well as total ownership. Direct ownership by the state was split into different levels and regions. The study found that ownership affected performance. The study was important for delineating state and private and foreign ownership. By treating private ownership as one category and not breaking it down further, the study adopted a wider approach to private ownership. Private ownership is broken down further in the current study in order to obtain additional insight into the effects of different types of private ownerships on performance.

In the case of China, privately owned firms were found to perform better in terms of sales and profitability than state-owned firms (Bai *et al.*, 2009:453). When state-ownership was reduced below majority status, the contrast was even more marked, in favour of private ownership. However, the same study found that employment did not change. There was anecdotal evidence in the study to show that management structures in state-owned enterprises were bloated and that such firms had excessive managerial expenses. The current study on the effect of ownership on firm performance, including state ownership in South Africa, seeks to compare the results of such ownership with those from China and other emerging markets, bearing in mind some of the notable differences such as the size of the economy.

Estrin *et al.* (2009:609) reviewed the empirical literature on the effects of privatisation on firm performance, among other variables, in China, Central and Eastern Europe and the Commonwealth of Independent States. They found that privatisation to foreign owners led to better performance, whereas privatisation to domestic shareholders yielded mixed results in firm performance. In addition, the results obtained in their sample differed from one region to another.

The study concluded that privatisation, or non-state ownership, was not necessarily a panacea for deriving better firm performance. Rather, the type of private ownership and the legal and institutional systems, among other factors, seemed to play a role in determining firm performance. Although the study was a survey of certain aspects of firm performance after privatisation and identified the types of owners who eventually owned the firms, its results were important for distinguishing between performance of state-owned firms and privately owned firms. The differences in results in diverse jurisdictions warrant the investigation of the performance of state and non-state-owned enterprises in other countries, including South Africa.

A positive relationship between government ownership and firm performance in the Gulf Co-operation Council countries, namely Qatar, Kuwait, Saudi Arabia, Bahrain and Oman, was also observed in Zeitun (2014:75). Data was collected for the period 2000 to 2010. Most of the companies in these countries were reported to be government-controlled although governments exercised no operational control but had disproportionate control rights. Government-linked companies were similarly found to perform better than non-government-linked companies in Singapore (Ang & Ding, 2006:64).

Ting *et al.* (2016:1) investigated the effect of structure, including state ownership on firm performance as well as the role of research and development in Malaysia. A negative and statistically significant relationship was observed between government ownership and firm performance. Government ownership was measured by dividing the sum of the government ownership by the sum of the top 30 shareholdings. Government ownership consisted of direct government, government agency and government financial institution ownership. In this study, different government institutions were classified as one group. To the extent that there are different but material categories of government ownership, such categories could be analysed separately and the results compared with those from other studies.

Control variables used in the study by Ting *et al*. (2016:12) were firm size and debt. The study showed a positively significant relationship between firm size and firm performance. This was explained by the fact that if a firm could generate increased

revenues from its products, these revenues should translate into increased profitability, if the costs were managed commensurately. Debt, as a control variable, had a mixed relationship with firm performance. Although it had a positive relationship with Tobin's Q, it had a negative association with return on assets. Similar results were observed by Gursoy and Aydogan (2002:6) in their study of Turkish firms. The problem of endogeneity, for example, whether firm performance leads to government or other ownership or ownership leads to better performance might have existed in the Ting *et al.* (2016:16) study and was not dealt with but was pointed out as an area for future research. The current South African study will take cognisance of the endogeneity or reverse causality issue and use appropriate analytical methods to deal with it.

Results from the ordinary least squares regression analysis showed that government ownership did not have an impact on Tobin's Q but had a significant negative relationship with return on assets because of the investee company's focus on provision of social benefits on behalf of the government instead of profit maximisation. Different measures of performance will be used in the current South African study.

Zeitun (2009:96) found a statistically significant negative relationship between state ownership and firm performance in an analysis of a sample of 167 Jordanian firms over the period 1989 to 2006. The study concluded that reducing the level of government ownership would improve firm performance. The mechanism for decreasing the percentage owned by the state would depend on the regulatory framework and the government's view on such policies. In some cases, such a move may be construed as partial privatisation, which the government may be averse to or there may be very elaborate processes to achieve such an outcome. The status quo may therefore be maintained in such cases in order to avoid going through these procedures. On the other hand, with a fair and transparent process to achieve the reduction in shareholding, the government and other shareholders would get better value for their money if the reduction was effected.

Zeitun and Tian (2007b:66) studied the effect of ownership on firm performance using a sample of 59 Jordanian firms. Data was collected for the period 1989 to 2002. Ownership was found to have an effect on firm performance, especially on accounting measures of performance, such as return on assets. A negative relationship was

reported between state ownership and return on equity. The study also suggested that profitability could be increased by reducing state ownership. A negative relationship was observed between state ownership and firm performance in state-owned firms with easy access to long-term debt by Liu *et al.* (2009:471). Pervan *et al.* (2012:81) also found a negative relationship between state ownership and firm performance.

In an analysis of 276 companies in China over the period 1999 to 2002, Wei (2007:519) found that at low levels of state ownership, the relationship between ownership and performance was not negative, but when state ownership exceeded 50%, the relationship between state ownership and firm performance became negative. The study concluded that the relationship was neither U-shaped nor inverted U-shaped but non-linear. In particular, when the proportion of state ownership was small, the relationship with firm performance was not negative. However, beyond 50%, the relationship became significantly negative. The period over which the sample was analysed was fairly short. State ownership of 50% would mean that the government was the majority shareholder and the firm was a government subsidiary. Such levels of ownership indicated considerable ownership concentration, which could be understandable, given that China was moving away from state ownership.

A U-shaped relationship between state ownership and firm performance was documented by Yu (2013:75), in a study of a sample of Chinese firms for the period 2003 to 2009. The study concluded that the superior performance after a certain shareholding was reached, or the positive relationship between firm performance and state ownership, was due to support from the government and political connections. Where government support or political connections were absent, the relationship could be different.

Tian and Estrin (2008:75) investigated 9 594 firm-year observations of Chinese state-owned enterprises from 1994 to 2004. The effects of different levels of government ownership on two measures of corporate value were investigated. Corporate performance was measured using Tobin's Q ratio and return on assets. The 10 largest shareholders in the Chinese-listed companies analysed were divided into domestic industrial companies, investment funds, foreign investors, family or individual owners and government. Five categories of the top 10 shareholders were used in this study. In

addition, the study identified the controlling shareholders. Comparisons were made between firms in which the state was the controlling shareholder and those where the controlling shareholder was not the state. Proportions of single shareholders holding in excess of 10%, 30% and 50% were also identified. The current study, using South African data, will have more ownership groups, including black ownership, among others, and will use several levels of ownership. The regression equation used in estimating the relationship between state ownership and performance is given as:

$$V_{it} = c + \alpha \times Government_{it} + \beta \times Control_{it} + \varepsilon_{it}$$

Where:
V_{it} denotes corporate value as represented by Tobin's Q and return on assets;
$Government_{it}$ is a measure of government shareholding;
$Control_{it}$ represents a vector of control variables for firm i in year t; and,
c is a constant.

Estimation methods used in the Tian and Estrin (2008:83) study included ordinary least squares, quantile, random effects, fixed effects and two-stage least square regressions. Fixed effects regressions were used for single equation regressions while random effects regressions were employed for two-stage regressions. Tests were conducted to determine the appropriate method. The application of these estimation methods will be considered in the current study. Two-stage regressions were used to investigate whether government ownership was determined by firm performance, or to solve the problem of reverse causality. A contribution of this study was the inclusion of a variable for strategic industries where government would not disinvest from because of the perceived strategic nature of the firm or the industry. In such a case, performance of the firm could be seen as a secondary issue.

The relationship between state ownership and corporate value was found to be non-monotonic. This relationship was found to be U-shaped. This implied that as state ownership increased, firm performance declined initially and then turned at 25% and increased. When state ownership was large, the effect of state ownership on performance was positive, in comparison to instances where state and private

shareholdings were balanced. The authors reported that the non-linear convex relationship was obtained because there were inherent benefits due to government ownership. These benefits were realised when the state shareholding was large enough. In the Chinese state-owned corporate environment, some of the benefits from such shareholdings included the government's ability to remove managers when a firm made losses for three successive years, privileged access to resources, explicit bias in instances where the government was the regulator, large orders if the firm was a supplier to government and lower-priced purchases if the government was a supplier and direct subsidiary (Tian & Estrin, 2008:88). Pursuance of political objectives rather than profit maximisation was offered as a possible explanation for the observed relationship.

The effect of state ownership on firm performance was shown to be positive, negative, non-linear or non-existent. *State ownership* was also defined to include direct government ownership, parastatal (state-owned enterprise) ownership and other combinations of ownership. Another thread of literature discusses majority ownership by the state as opposed to a low level of ownership (namely concentration of ownership by the state). The current study explores the levels of ownership and the types of state ownerships and examines the effects of such ownership on firm performance.

3.3.5 Institutional ownership and corporate performance

Pound (1988:237) proposes three hypotheses to explain the role of institutional investors and their effect on firm performance, namely the conflict of interest hypothesis, strategic alignment hypothesis and the efficient monitoring hypothesis.

Shleifer and Vishny (1986:465) show that agency costs can be reduced by large equity shareholders such as institutional investors because they are better positioned to monitor and discipline managers.

Firm characteristics were used as control variables in analysing the relationship between institutional shareholding and the firm's stock price and earnings (or performance) in Demsetz and Lehn (1985:1165), Demirguc-Kunt and Maksimovic

(1999:316) and Jiambalvo, Raigopal and Venkatachalam (2002:128). O'Brien and Bhushan (1990:60) and Brailsford *et al.* (2002:1) also found that the proportion of institutional shareholding was related to a firm's characteristics and the nature of its industry.

Arora and Sharma (2016:420) studied corporate governance and firm performance in India. Their sample covered 20 industries in the manufacturing sector with 2 431 firms over the period 2001 to 2010. Measures used for firm performance were return on assets, return on equity, net profit margin, as well as Tobin's Q and stock returns as market-based performance measures. Institutional ownership was one of the alternative *corporate governance measures*, defined as shares held by local (Indian) financial institutions, promoter financial institutions and non-promoter financial institutions. The authors state that due to the monitoring role attributed to institutional shareholders, a positive relationship was therefore expected between institutional ownership and firm performance. Control variables used in the study included firm age, leverage, firm size (measured by the natural log of sales) and advertising intensity. According to the authors, the ordinary least squares method could yield biased results because it was assumed that corporate governance variables were influenced by past performance. The potential problem of omitted variables in estimation was thought to be present, hence the fixed effects method was used. The system generalised method of moments approach was also used in order to overcome problems of endogeneity and simultaneity bias. Sargan's (1958:393) test was used to test for correlation between instruments and residuals.

Using the ordinary least squares fixed effects estimator, corporate governance variables did not have a significant impact on return on assets, a performance variable. When the exercise was repeated with return on equity as the dependent variable, the results did not appear to be sizable and statistically significant. Similar results were obtained for net profit margin as the dependent variable. The relationship between corporate governance and performance variables was generally insignificant under the ordinary least squares fixed effects method. Five different analyses were then conducted under the system generalised method of moments approach with five performance variables, namely return on assets, return on equity, net profit margin, Tobin's Q and stock returns, with lagged values of the dependent variables as instruments. The relationship between

some of the independent variables and corporate performance turned out to be statistically insignificant, except for Tobin's Q, which had a positive relationship with institutional share ownership. Arora and Sharma (2016:430) suggest that institutional shareholding may provide a key signal to other investors regarding firm profitability. Such an argument may imply that institutional shareholding has information content and provides strong signals for other potential shareholders to buy shares in the investee companies. Alternatively, there could be a potential free-riding issue where other shareholders may depend on the resources of the institutional investors to conduct research and subsequently monitor investee firms. The positive demand for the shares increased the market valuations of the investee companies. Other measures of performance such as return on equity, net profit margin and stock returns did not have statistically significant relationships with corporate governance variables. This result shows the importance of using different corporate performance measures. Some variables and analytical methods used in the study will be used in the current South African study.

A statistically significant positive relationship was found between the percentage of ownership by institutional investors and firm performance, as measured by Tobin's Q (McConnell & Servaes, 1990:595). Similarly, a positive relationship was found between Swedish firms' performance and shareholdings by foreign institutional investors (Dahlquist & Robertsson, 2001:432). However, the fact that the institutional investors were foreign may mean that the result could be applied to the foreign ownership part of the current study as well. In a study of 58 banks in the Gulf Co-operation Council countries, Arouri *et al.* (2014:117) found institutional ownership to have a positive effect on firm performance. In Nigeria, Uwuigbe and Olusanmi (2012:208) observed a significant positive statistical relationship between institutional ownership and firm performance in their analysis of 31 listed Nigerian financial sector firms. The Nigerian and Gulf Co-operation Council countries' studies analysed financial sector firms, whereas most studies tended to analyse non-financial firms. However, they obtained similar results with regard to the effects of institutional ownership on corporate performance.

Using Tobin's Q and return on assets as measures of firm performance, Alfaraih, Alanezi and Almujameda (2012:192) found a positive relationship between institutional

investor ownership and firm performance, by analysing a sample of 134 listed firms in Kuwait.

Institutional ownership had no impact on firm performance in the study by Zeitun (2014:75), in which firms in the Gulf Co-operation Council countries were investigated. The result implied that institutional ownership did not make a difference to the performance of investee firms.

A negative relationship was observed between institutional ownership and firm performance, as measured by return on assets, in a sample of 152 Sri Lankan firms using the generalised method of moments approach (Wellalage & Locke, 2012:58). No relationship was found between institutional ownership and performance, using Tobin's Q. On the other hand, a statistically significant and negative relationship was found between institutional ownership and firm performance by Zeitun (2009:96), but a positive and statistically significant relationship using a market-related measure and the random effects statistical method was found. The results of the Zeitun (2009:96) study depended on the measure of performance. The difference could be due to the fact that one measure, namely return on assets, was accounting based, while the other measure, Tobin's Q, was market based. The results of the two studies were contrary to each other, especially for return on assets as a measure of performance. Different measures of performance will also be used in the current study in order to determine the consistency of results across different measures of performance.

Mixed results were obtained from studies on the relationship between ownership by institutional investors and corporate performance. The current study intends to examine the problem using South African data.

3.3.6 Foreign ownership and corporate performance

Foreign ownership was found to be an important factor for ownership of firms in emerging markets (Douma George & Kabir, 2006:638; Phung & Le, 2013:52). In their analysis of the effect of foreign ownership on firm performance, some studies found a positive relationship. Basing their analysis on agency theory and institutional investor

theory, Oxelheim and Randoy (2003:2382) found a positive relationship between foreign board membership, which was a function of foreign ownership, and firm performance in Swedish and Norwegian companies. The use of board composition as a proxy ownership was a different approach from using ownership data.

The effect of foreign board membership and firm performance in Korean firms was investigated by Choi *et al.*, (2012:207). They found a non-linear (or an inverted U-shaped) relationship. At lower levels of foreign ownership, they found a positive relationship, meaning that the presence of foreign ownership was associated with better firm performance. At higher levels of foreign ownership, a negative relationship was found. This phenomenon was explained by observing that at lower levels, foreign ownership was deemed to be independent of managers from majority shareholders, whereas at higher levels, the foreign ownership used its power for its own advantage, leading to a reduction in firm value. An explanation of the observed relationship could be expropriation of the firm's resources by foreign investors at higher levels of shareholding.

Reasons for the better performance by foreign-owned firms have been identified to include technical skills, managerial efficiency, monitoring, higher productivity and better technology introduced by the foreign shareholders. In the study of Korean firms, better monitoring by foreign firms was given as a possible explanation for this relationship. The non-linearity of the relationship appeared similar to the entrenchment effects found in some managerial ownership studies.

Phung and Mishra (2016:64) used the system generalised method of moments approach to study the impact of foreign ownership on performance of Vietnamese firms. Firm performance increased with the level of foreign ownership up to a level of 43% and then decreased. Hence the relationship between foreign ownership and firm performance was an inverted U-shape. Firm performance was measured using two variations of Tobin's Q: one where the market value of equity was added to the book value of debt and the sum was divided by the book value of total assets. In the second measure, the numerator was similar to the first measure but the denominator consisted of the replacement value of assets. Foreign ownership was measured by the percentage of shares owned by foreign investors. Both measures of firm performance were

positively correlated with foreign ownership. In order to accommodate the possible non-linearity of the relationship between foreign ownership and firm performance, an additional variable, which was the square of the foreign ownership, was added. In addition, year dummies were included to control for the year effects.

The squared foreign ownership variable was negative and not statistically significant. The positive result was in line with earlier studies such as that by Nakano and Nguyen (2012:41), who analysed firms in the Japanese electronics industry. When the unobserved firm effects were assumed not to change with time, the relationship between foreign ownership and corporate performance was positive. This assumption was deemed to be unrealistic for the electronics industry, which was subject to rapid changes. Using the generalised method of moments approach, they concluded that initially, foreign ownership did not make a significant impact on firm performance but was beginning to make an impact in later periods. They used Tobin's Q and return on assets as dependent variables and size and tangibility, among others, as control variables.

Phung and Mishra (2016:86) further argue that foreign ownership has a monitoring role, provides managerial skills, access to international capital markets, advanced technologies and experience. Beyond a certain level, foreign investors get entrenched, performance is reduced, and the smaller investors may be expropriated by the foreign investors. Performance increased up to 43% with foreign ownership in Vietnamese firms, after which it started to decline. The position of the turning point showed that ownership concentration was high. The entrenchment effect for top managers was also observed in Morck *et al.* (1988:293).

In the analysis of the effect of foreign ownership and firm performance, studies found a positive relationship. Basing their study on agency theory and institutional investor theory, Oxelheim and Randoy (2003:2382) found a positive relationship between foreign board membership, which was a function of foreign ownership, and firm performance in Swedish and Norwegian firms. This study used board membership as a proxy for foreign ownership. In the analysis of the effects of ownership on capital structure and firm performance in South African firms, foreign ownership will be measured by the percentage owned by foreign investors rather than the composition of board members.

Foreign ownership was associated with higher productivity when compared with local Russian firms (Yudaeva *et al.*, 2003:407). A positive relationship between foreign ownership and firm performance was found in Douma *et al*. (2006:637), in their analysis of foreign ownership in India. The results were attributed to better corporate governance systems of foreign firms, which enhanced monitoring, leading to a reduction in agency costs, with the consequence of better performance. Kim (2011:88) and Mishra and Ratti (2011:179) found a positive relationship between foreign ownership and firm performance. Reduction in agency costs and better monitoring respectively were posited as the causes of such performance. The results also implied that foreign ownership was preferable up to a certain point in order for a firm to perform better. Beyond that point, the performance of the firm decreased.

Foreign ownership was also linked to better experience, technological and financial resources, leading to superior performance, when compared with locally owned firms. Romalis (2011:107) used an event study approach and showed weak evidence that foreign ownership increased profitability of firms in cross-border acquisitions, especially if the target was in a country facing a crisis. Romalis (2011:108) argues that the transfer of comparative advantages such as skills, know-how and technologies creates value for local firms. Huang and Shiu (2009:567) and Gurbuz and Aybars (2010:358) argue that better performance of foreign-owned firms is due to their long-term perspective, which allows them to invest in research and development. The conclusion was arrived at using Taiwanese and Turkish data respectively. Huang and Shiu (2009:567) argue that when foreign ownership increases, the investee companies can tap into better resources, including financial resources, of the foreign company. The financial resources would imply better access to capital, which may mean cheaper funding, hence an advantage for corporate performance. Domestic investors would only have the advantage of knowing the local environment, among other things. The effect of foreign ownership needs to be tested using South African data.

Dahlquist and Robertsson (2001:439) found that foreign investors preferred large firms with high cash balances, declared low dividends and had dispersed ownership. They found that most of the foreign investors in the sample were institutional investors. Hence the conclusion about foreign investors' preference to invest in large firms was also

imputed onto institutional investors. The study identified the countries of origin of foreign investors in Swedish firms and it was observed that most of them originated from the USA. Data constraints usually make it difficult to identify the source of the foreign investors. Hence the identification of the origin of foreign investors was an important contribution of the study. The fact that most of the foreign investors were institutional investors depended on the countries being analysed. Studies from other jurisdictions may yield different results. In addition, the origin of foreign investors in any country may be tied up to historical and other factors. Such differences are part of the motivation for the current study, so that the factors which are unique to firms in a particular country may be analysed and understood. However, an analysis of the origin and type of the foreign investors is beyond the scope of the current study.

Ting *et al.* (2016:1) investigated the effect of ownership structure, including foreign ownership on firm performance, as well as the role of research and development in Malaysia. Data for 201 non-financial firms listed on the Malaysian stock exchange was analysed for the period 2002 to 2011. Tobin's Q and return on assets were the performance measures. Control variables were firm size, measured by the logarithm of sales, and debt, which was the ratio of total debt to total equity. King and Santor (2008:2427) explained that Tobin's Q was a forward-looking measure, calculated using market values, whereas return on assets was a backward-looking measure, based on historical data. In addition, there were year dummies and sector dummies. *Foreign ownership* was defined as the percentage held by foreign shareholders in a company, including foreign investors and foreign institutions such as foreign banks, insurance companies and securities' companies. The definition of foreign shareholders was in line with the study by Abor and Biekpe (2007:293), where a dummy variable took the value of one if the firm was foreign owned or zero if the firm was Ghanaian-owned, in their sample of 120 firms with less than 100 employees. Given the number of employees in the sample firms, small companies were investigated in the Ghanaian study. Such results may not be applicable to larger firms. Results from the ordinary least squares regressions by Ting *et al.* (2016:1) showed that foreign ownership was statistically significantly and positively related to Tobin's Q and return on assets (firm performance).

Abdallah and Ismail (2017:98) found evidence of a positive relationship performance of the firms listed in the Gulf Co-operation Council countries and foreign ownership.

Tobin's Q, return on assets and return on equity were used to measure firm performance in their study. They also found that, similar to Jeon, Lee and Moffett (2011:344) and Dahlquist and Robertsson (2001:439), most of the foreign investors in the study were institutional investors.

Positive relationships between foreign ownership and firm performance were observed in Nigeria by Uwuigbe and Olusanmi (2012:208), in Japan by Ghahroudi (2011:126), in Turkey by Halkos and Tzeremes (2010:167) and in Taiwan by Huang and Shiu (2009:567). Uwuigbe and Olusanmi (2012:208) analysed the relationship between ownership structure and performance in 31 listed Nigerian financial sector firms, which was the total number of listed financial firms in that economy in 2010. Foreign ownership was measured as the percentage of shares owned by foreigners to total shareholding. Performance was measured using return on assets. This study is relevant to the current study because it is one of the few studies reviewed which investigated this relationship using a sample of firms exclusively from the financial sector. Other studies mostly excluded the financial sector. In addition, the study also used similar measures of performance methodology to the studies on non-financial firms. In the Korean banking sector, Choi and Hasan (2005:215) observed a positive association between bank returns and foreign ownership.

Emerging markets in general suffer from poor corporate governance systems and problems of information asymmetry. Foreign shareholders, in line with advantages associated with them, could lead to increases in firm values or performance of the firms in which they invest by introducing better monitoring and reducing agency costs. Phung and Le (2013:48) argue that if foreign investors are not permitted to own majority stakes in local companies, the purported benefits of foreign ownership could be lost, leading to a negative relationship between foreign ownership and performance. Their study was conducted in Vietnam and there were rules which prohibited foreign firms from owning more than 49% of the shares of local companies, leading to a 'glass ceiling' effect in which foreign investors knew that no matter what effort they put into the local companies that they invested in, they would never be allowed to control them. Presumably, such a result would be obtained where the foreign investor intended to obtain control of the firm and was precluded from such an action, due to the prevailing regulatory environment. If

the foreign investor never intended to control the investee firm in the first place, it is possible that the foreign investor would not be hindered by the inability to gain control.

Tobin's Q was used as a measure of performance in the studies by Phung and Le (2013:45) and Zeitun and Tian, (2007a:44). The percentage of shares held by foreign shareholders was used to represent foreign ownership (Gurunlu & Gursoy, 2010:25; Huang et al., 2011:213; Phung & Le, 2013:45). Use of percentage shareholding is a more direct method of reflecting ownership, when compared with other methods such as shareholder representation on the board. This is because the appointment of directors may be influenced by factors other than just ordinary shareholding.

Phung and Le (2013:45) used data from the Ho Chi Minh stock exchange in Vietnam. Data was collected for the period 2008 to 2011 and excluded financial firms, in line with previous studies. The performance model used in the study was:

$$FP_{it} = \alpha + \beta_1 FO_{it} + \gamma Z_{it} + \varepsilon_{it}$$

Where:
FP_{it} is financial performance of firm i at period t;
FO_{it} is foreign ownership of firm i at time t; and
Z_{it} is a vector of control variables.

The control variables employed in this study were firm size, investment, liquidity, profitability, tangibility and leverage.

Mean foreign ownership was 12.1% and mean Tobin's Q was 1.1. The results of the correlation analysis showed low correlation coefficients between the variables, which indicated that regression analysis could be appropriately used to analyse the data. Pooled ordinary least squares analysis showed a negative relationship between firm performance and foreign ownership, which was in line with the hypothesised relationship. This implied that the higher the foreign ownership, the lower the performance of the firm. However, the regression coefficient was not statistically significant.

In the African context, Agyemang *et al.* (2016:227) analysed the prevalence of foreign ownership in African economies between 2009 and 2012. Foreign ownership data was obtained from the World Competitiveness report and the level of foreign ownership was classified as one for very rare foreign ownership and seven, which was defined as highly prevalent. Hence the data did not provide absolute ownership percentages. The method of gauging foreign ownership in the study may not enable easy comparisons with other studies which had ownership percentages. However, the study is important in that it provided pertinent information on the extent to which firms in different economies had foreign ownership.

In the Southern African region, Botswana recorded the highest foreign ownership between 2010 and 2013, with South Africa performing above the average over the period except for 2011. It should be noted that the level of foreign ownership used in the study was recorded at country or macro level rather than at company level. In addition, foreign ownership is generally analysed for listed companies. The Agyemang *et al*. (2016:229) investigation was not intended to provide the listed or unlisted foreign ownership data. As a result, although foreign ownership data was analysed in that study, the current South African study of the effects of ownership on corporate performance may not be able to compare its results with those from the Agyemang *et al.* (2016:229) study, though the latter study showed that the level of foreign ownership in South Africa was significant. Foreign ownership is one of the variables that will be examined in the current study. Among other methods, the study used the generalised method of moments estimation technique on the lagged variables in analysing the determinants of foreign ownership, including rule of law and political stability. One of the conclusions of the study was that west, east and southern Africa seemed to attract the largest number of foreign investors.

Foreign ownership was found to have no impact on firm performance in Zeitun's (2014:76) study of firms in the Gulf Co-operation Council countries in his analysis of 203 firms for the period 2000 to 2010. The results meant that the presence or absence of foreign ownership did not make a difference to the performance of firms studied.

Given the different results observed in other studies, the current study will examine the level of foreign ownership in a sample of listed South African non-financial firms and the effect of such ownership on firm performance.

3.3.7 Black ownership and corporate performance

Black economic empowerment ownership as prescribed by the South African government after the democratic elections in 1994 was targeted at qualifying black shareholders obtaining significant minority stakes in the existing companies. Depending on the concentration of ownership in the firm prior to the introduction of black ownership, the new black shareholder could or could not influence the firm. If ownership was concentrated and the diluting owners had shareholdings in excess of the black shareholders after their introduction, the control of the firm did not necessarily change. However, if the effect of the introduction of black ownership resulted in the incoming shareholders having a significant shareholding in relation to the rest of the shareholders, the new shareholders could have had a bigger role to play in the management of the firm. Corporate performance could be affected.

It is expected that because the black ownership criteria were part of the government's policy to award contracts to companies which complied with its regulations, the companies which anticipated to win such contracts were in the forefront of taking on black shareholders. Other companies might have taken on black shareholders in line with their policies to be good corporate citizens and comply with government policies. Companies that relied on government contracts prior to the introduction of the black empowerment policies could be expected to comply early on in order to protect their revenue streams. The performance of such companies would, at worst, remain unchanged after taking on new black ownership, and be expected to decline if they did not comply with the policy. The current study seeks to analyse the effects of ownership, including black ownership, on firm performance.

3.3.8 Public Investment Corporation ownership and corporate performance

The Public Investment Corporation is a government entity which manages government employees pension funds and manages other South African government funds. The funds under its management make it one of the largest pension fund managers in the country. It also uses other fund managers to invest on its behalf. Therefore, due to the stature and characteristics of the Public Investment Corporation, it is treated as a separate type of ownership, which had institutional investor and government facets. As an institutional investor, the Public Investment Corporation can perform a monitoring role on investee firms, leading to a positive relationship between corporate performance and its ownership. On the other hand, as a government entity, it can have objectives which are in line with those of the state, which may or may not necessarily lead to investee companies increasing their performance.

3.3.9 Corporate ownership and firm performance

Companies are in many cases also owners of other companies. The use of a company as an investment vehicle is mainly to separate the personal liability of the individual from that of the vehicle that is used to invest in another company. In addition, other types of ownerships such as institutional investors, families, governments, foreign investors and management may buy shares in companies not as individuals but as companies. This might be the reason why the ownership of shareholdings by companies is rarely provided as a category of investors. In addition, due to the amorphous nature of the types of companies, little attention is paid to the company as a type of investor. Studies generally go one level up to the owners of the company and use that top layer as the owner, for example, a family, as opposed to the legal entity.

In other studies, companies are also classified as institutional investors. When ultimate owners use companies as mere conduits or vehicles through which they transact, decisions of the company may be more reflective of the views of the ultimate owners rather than the company itself. This is important in South Africa due to the preponderance of shelf companies which, by definition, are not operational. Due to

separation of ownership and management, the companies may invest in a way which is quite different from that of the ultimate owners.

Using three performance measures, namely Tobin's Q, return on assets and return on equity, Abdallah and Ismail (2017:109) found evidence of a positive relationship between performance of the firms listed in the Gulf Co-operation Council countries and corporate ownership. A statistically significant positive relationship was found between corporate ownership and firm performance in Kenya (Ongore, 2011:2120).

3.4 MEASURES OF FIRM PERFORMANCE AND CONTROL VARIABLES

3.4.1 Performance variables

Sample performance measures are described next. In examining the relationship between ownership and corporate performance, firm value (Tobin's Q) and profitability (return on equity) were used as measures of firm performance (Soumadi & Hayajneh, 2012:180). Other measures used in the literature include *return on assets* (Abel & Le Roux, 2016:849; Veltri & Mazzotta, 2016:319), which are defined as the ratio of net income to net total assets, gross profit margin ratio and earnings to stock price ratio. The use of accounting-based measures such as return on assets has sometimes been proposed on the basis that such measures are not affected by market inefficiency and are available for both listed and unlisted companies. In the current study, the sample consists of listed companies only and hence the use of both accounting- and market-based ratios is justifiable. In addition, market inefficiency could equally affect all the companies in the sample as they are all listed on one stock exchange.

Return on equity measures the return that shareholders obtain for the equity they invested and shows how efficiently it was employed by management. Return on equity is obtained by dividing net income after tax by book value of equity (Krishnan & Moyer, 1997:132; Onaolapo & Kajola, 2010:72). Abel and Le Roux (2016:849) used the return on equity as a measure of profitability in their study of determinants of profitability in the Zimbabwean banking sector.

The Tobin's Q ratio is a measure which is obtained by dividing the sum of market value of owners' equity plus book value of total liabilities by book value of total assets (Aggarwal & Zhao, 2007:288; Ghosh, 2007:86; King & Santor, 2008:2426;). Ruan *et al*. (2011:79) measured Tobin's Q as the ratio of market value of a firm's shares divided by the book value of the company's equity and used it as a proxy for the company's performance or firm value. Hovey, Li and Naugton (2003:114) propose that the ratio can assist in the assessment of whether the value of a firm as a business in operation is greater than the cost of the assets used to create its cash flow. The use of Tobin's Q was prevalent in other studies (Davies *et al*. 2005:650; McConnell & Servaes, 1990:604, 1995:133; Morck *et al*., 1988:294).

3.4.2 Control variables

Control variables have been used in some studies for the analysis of the effects of ownership on corporate performance. Tangible assets are a control variable and are measured by dividing net fixed assets by total assets (Ghosh, 2007:89; Margaritis & Psillaki, 2010:624; Weill, 2008:257).

Firm size is also a control variable and is measured by the natural logarithm of total assets (King & Santor, 2008:2426; Onaolapo & Kajola, 2010:73). The natural logarithm of sales has also been used as a control variable for firm size in order to reduce scale effects (Veltri & Mazzotta, 2016:320). The natural logarithm of the replacement value of total assets was used as a control variable for firm size (Lozano *et al.*, 2016:1338). The same study used risk as a control variable and defined *risk* as the standard deviation of monthly stock returns. Given that the current study mainly aims to use annual data, an appropriate risk measure will be developed.

Age, firm size and other firm-specific variables were also shown to be related to ownership concentration by Hassan *et al.* (2016:523). Their study found expected firm age to be negatively related to firm value, arguing that newer firms had better growth prospects than older firms, which hypothesis was supported. The relationship was statistically insignificant. Older firms could be expected to have higher values than younger firms due to their better experience, in terms of markets and technologies,

among other variables. A significant positive relationship was observed between size and firm value (Hassan *et al*., 2016:532). Larger firms had bigger firm values than smaller firms.

Firm growth is a control variable which may be measured by the difference in book value of total assets at the end and beginning of the period divided by the book value of total assets at the beginning of the period. In the investigation of the effect of ownership on firm performance, financial leverage is a control variable. Financial leverage is measured by dividing the book value of total liabilities by the book value of total assets (Ghosh, 2007:89; King & Santor, 2008:2426; Margaritis & Psillaki, 2010:624; Veltri & Mazzotta, 2016:319; Weill, 2008:257), among other definitions. Other control variables which were used in prior studies and are appropriate for the current study will be used.

3.5 EMERGING HYPOTHESES

The review of the literature undertaken in the current chapter leads to the formulation of hypotheses to be tested. The second objective of the study is to investigate the effects of ownership on firm performance both in terms of ownership concentration and ownership type (or identity of owners) by examining in particular the effects of concentration of ownership on firm performance and the effects of ownership type on firm performance. Appropriate measures of ownership concentration and a method of classifying or identifying owners need to be adopted. The extant literature is a major source as well as knowledge of the relevant issues that could be applicable to the study in the contemporary South African context.

Hypotheses relating to the effects of ownership on capital structure were discussed in Chapter 2. Additional hypotheses relating to the effects of ownership on corporate performance were added to those already formulated in the previous chapter.

The eleventh hypothesis relates to the effects of ownership concentration on firm performance. Owners have high shareholdings in firms for specific reasons, including controlling and directing the firm in the way they like. On the other hand, diffuse ownership implies that decisions are generally based on a consensus reached between

the parties and no one party can take direct responsibility for the actions of the firm. Concentrated ownership may therefore lead to better firm performance. However, concentration of ownership may lead to owners making decisions which are in their own interest instead of the best interest of the firm in which they own shares. In this case, these owners may make decisions which do not lead to optimal firm performance. Concentrated ownership may therefore not necessarily lead to better corporate performance. The eleventh hypothesis is formulated as follows:

H_{011}: There is no significant relationship between concentrated ownership and corporate performance.
H_{a11}: There is a significant relationship between concentrated ownership and corporate performance.

Similar to the discussion in Chapter 2, hypotheses which relate to owner identity rather than general ownership concentration also have to be made in relation to firm performance. A similar classification to the one adopted in Chapter 2 is applied in this chapter. Types of owners identified are families, management, institutional investors, foreign investors, companies, government, Public Investment Corporation, other shareholders and black economic empowerment. The last type of shareholding is a result of South Africa's policy of encouraging ownership of resources by previously disadvantaged groups. Family-controlled firms have been found to perform better than non-family-owned firms. These families establish long-term relationships in the economies in which they operate and are therefore able to use these relationships with their various stakeholders, be they for inputs, production processes, outputs or sourcing of finance, to their firms' advantage. In this case, family ownership is positively related to firm performance. However, families have also been found to be motivated to take actions which are in their best interests rather than those of the firm or other shareholders. Specifically, families may be more interested in running a firm as a dynasty, only allowing family members to be at the helm of the firm, to the exclusion of more competent professional managers. Legacy issues may also take precedence over rationality whereby the family-controlled firm may not discontinue certain unprofitable operations, a decision which could increase firm performance, because the family is historically closely linked to such operations. Firm performance may therefore be

compromised by family ownership, leading to a negative relationship with firm performance. The twelfth hypothesis is therefore formulated as follows:

H_{012}: There is no significant relationship between family ownership and firm performance.
H_{a12}: There is a significant relationship between family ownership and firm performance.

Agency theory is premised on the separation of ownership and control in firms. Management is assumed to act in its own interest by consuming perquisites, taking on prestige projects and the like, at the expense of optimising the value of the firm. Due to entrenchment, managerial ownership may lead to corporate managers acting against the firm's best interest. The effect of management ownership and control is less than optimal in such cases and can even be negative. On the other hand, when management is incentivised by being owners of the firm, theory states that there is an alignment between management and other shareholders' interests, thereby increasing firm value. Increased managerial ownership is therefore associated with positive firm performance. The thirteenth hypothesis is stated as follows:

H_{013}: There is no significant relationship between managerial ownership and corporate performance.
H_{a13}: There is a significant relationship between managerial ownership and corporate performance.

Institutional investors, as opposed to other types of shareholders, generically have the capacity to monitor firms in which they invest because they have the resources to perform such a function. Additionally, they invest in many different firms and are therefore able to apply the most appropriate approaches to issues they may face in their investee companies. Institutional ownership is therefore associated with positive firm performance. However, institutional investors may have portfolios which cover a wide spectrum of industries under their purview and they may not dedicate the necessary time required for the individual firm's optimal performance. Negative firm performance may then be associated with institutional investor ownership. The fourteenth hypothesis is stated as follows:

H_{014}: There is no significant relationship between institutional ownership and corporate performance.
H_{a14}: There is a significant relationship between institutional ownership and corporate performance.

Foreign ownership has been associated with better systems, experienced management and increased productivity. These factors augur well for increased firm performance and therefore foreign ownership is expected to be positively related to corporate performance. In other situations, foreign investors are unfamiliar with the local environment and unable to adapt to local demands. Foreign ownership in these cases is negatively related to firm performance. The fifteenth hypothesis is formulated as follows:

H_{015}: There is no significant relationship between foreign ownership and corporate performance.
H_{a15}: There is a significant relationship between foreign ownership and corporate performance.

Black ownership may be financed in several ways, including loan financing relying on dividends from the underlying company. Such continued reliance could, in the absence of other competitively priced and structured financing, constrain a firm's cash flow, leading to slower growth. If such finance is obtained at a higher cost, firm performance may fall. Similarly, the fact that the firm has black ownership is not a guarantee that the state will award it lucrative contracts. In addition, if the government is implementing austerity measures, there may be few contracts to be awarded. The effect of black ownership on firm performance in this instance could be negative. On the other hand, black shareholding could increase a firm's access to contracts from government and government-related institutions, increasing the firm's performance. The sixteenth hypothesis is therefore formulated as follows:

H_{016}: There is no significant relationship between black ownership and corporate performance.
H_{a16}: There is a significant relationship between black ownership and corporate performance.

State ownership of firms has been associated with objectives which may not necessarily lead to maximisation of corporate performance. Specifically, employment creation and keeping strategic assets may be reasons, among others, for state shareholdings. A negative relationship could be anticipated between state ownership and corporate performance. However, if state ownership exposes investee firms to lucrative contracts within government, the performance of such firms could improve, leading to a positive relationship between state ownership and corporate performance. The hypothesis pertaining to state ownership is as follows:

H_{017}: There is no significant relationship between state ownership and corporate performance.
H_{a17}: There is a significant relationship between state ownership and corporate performance.

Corporate shareholders may consist of large companies with experience and expertise as well as resources to monitor investee companies. The relationship between the ownership of such companies and the performance of their investee companies may be expected to be positive. If the company shareholders are shelf or non-operational companies, these companies may not be in a position to monitor management of investee firms. A negative relationship could be expected between company ownership and corporate performance of the investee companies. A similar relationship may also be expected if the corporate shareholder is large and is in a position to expropriate the smaller shareholders. The hypothesis for company ownership and corporate performance is therefore as follows:

H_{018}: There is no significant relationship between company ownership and corporate performance.
H_{a18}: There is a significant relationship between company ownership and corporate performance.

As an institutional investor, Public Investment Corporation should have the experience and resources to monitor investee companies' management to ensure that they perform well. A positive relationship is therefore expected between ownership and corporate

performance of the Public Investment Corporation. However, the Public Investment Corporation is a state institution and its objectives, in line with those of the state, may not necessarily be maximising the investee corporate performance. They may include social objectives, which may reduce corporate performance. The hypothesis for Public Investment Corporation ownership is as follows:

H_{019}: There is no significant relationship between Public Investment Corporation ownership and corporate performance.
H_{a19}: There is a significant relationship between Public Investment Corporation ownership and corporate performance.

The last shareholder group, namely other shareholders, is residual, and was created to accommodate any shareholder which did not fall into the other specified categories. Hence the relationship between such a shareholder and firm performance could not be determined a priori. The hypothesis regarding the other shareholders' ownership is therefore formulated as follows:

H_{020}: There is no significant relationship between other shareholders' ownership and corporate performance.
H_{a20}: There is a significant relationship between other shareholders' ownership and corporate performance.

3.6 CONCLUSION

This chapter reviewed literature on the effects of ownership on firm performance. Two strands of the research were reviewed, namely the effects of ownership concentration on firm performance and the effects of types of ownerships (or ownership identity) on firm performance. Results of the studies on the effects of ownership concentration on corporate performance were mixed with some studies finding positive relationships and others showing negative relationships. Yet other results showed non-linear and no relationships.

The literature review also showed that owner identity was important and affected firm performance. In line with the review conducted in Chapter 2, the main types of owners were families, management, institutional investors, black people, government, companies, Public Investment Corporation, foreign investors and other shareholders. Black ownership was included due to its relative importance and peculiarities in the South African context. The extent of these ownership types and their effects on firm performance will be investigated using South African data. Given the mixed results obtained in the studies reviewed, this study could be part of the literature that provides more insight into the effects of ownership on corporate performance.

The study of the effects of black ownership on corporate performance fills a gap in the literature. There is an implicit assumption in the literature that the question of ownership is a choice that everyone is free to exercise. In the case where some lucrative government contracts can only be obtained if there is a certain percentage of black shareholding present in a company, as regulated in South Africa, the relationship between such ownership and corporate performance should generate interest. In addition, the effect of government-owned institutional investors, such as the Public Investment Corporation in South Africa, on corporate performance, has not been examined explictly. The current study fills that gap.

The methodology employed in carrying out the study is discussed in Chapter 4. Issues of research design, research questions raised in Chapter 1, and the hypotheses formulated in Chapters 2 and 3 are dealt with in Chapter 4.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

Chapters 2 and 3 reviewed the literature on the effects of ownership on capital structure and the effects of ownership on corporate performance respectively. Each chapter led to the development of hypotheses intended to solve the research problem. Chapter 4 presents the research methodology employed to solve the research problem. Based on the theories discussed in the preceding chapters, Chapter 4 examines and adopts suitable methods used in research with the aim of resolving research questions, objectives and to test the hypotheses which were proposed in earlier chapters. The chapter provides a link between earlier chapters, which review the literature on the effects of ownership on capital structure and corporate performance, and the later chapters.

The study uses data from South Africa, an emerging economy, to establish the effects of ownership on capital structure and corporate performance. To establish whether there is a relationship between the variables under analysis, namely ownership and capital structure and ownership and analysis performance, correlational and multiple regression analyses are conducted.

4.2 RESEARCH PARADIGM AND PHILOSOPHY

A paradigm is an agreed pattern in the way that scientists comprehend and search into the world (Easterby-Smith, Thorpe & Jackson, 2012:344). It encompasses beliefs and values and guides the way problems are solved. The paradigm is guided by philosophical assumptions concerning beliefs (ontology), how people know (epistemology) and ethics and value systems (axiology) (Patton, 2002:134). The paradigm used in this research is positivist and due to its nature, it tends to assume a

quantitative methodology (Blumberg, Cooper & Schindler, 2008:23). In terms of ontology, positivists believe in objective truth which is independent of the researcher's interest. Epistemologically, positivists view knowledge through empirical testing of hypotheses and axiologically, neutrality and objectivity are important so that the process is value-free.

The beliefs in the current research are that ownership affects capital structure and also that ownership affects firm performance and that these beliefs have to be tested empirically to arrive at the truth.The processes of reviewing the literature, formulating hypotheses, collecting quantitative data, analyzing it and making conclusions have to be objective and value-free, in line with the positivist paradigm.

4.3 DATA AND SAMPLE

The population of this study consists of all firms listed on the JSE Securities Exchange for the period 2004 to 2014. At 31 December 2014, 380 companies were listed on the JSE Securities Exchange. Data for the study was obtained from the IRESS database. The database contains information required for the purposes of the study. The sample in the study consists of non-financial firms listed on the JSE Securities Exchange for the years 2004 and 2014. Financial firms are not included because of different regulatory requirements. Ownership data was extracted from the shareholders section of the IRESS database, a research data source which provides financial and other data on firms from South Africa and some African countries. The study used panel data and had 2 981 (271 firms x 11 years) observations.

For inclusion in the sample, the firms had to meet the following criteria:

1) The firm had to be listed on the JSE Securities Exchange between 31 December 2004 and 31 December 2014. The 11-year period is reasonable, when compared with other studies. Dates before 2004 could not be considered due to lack of information on individual share ownership on the database.
2) Firms had to be listed either on the main board or Alt-X board or other boards of the JSE Securities Exchange. Main board firms tend to be the large and older firms. Alt-X firms and firms from other boards are usually smaller and younger.

3) Only non-financial firms were included in the study. The list of firms included in the sample is shown in Appendix 4.1. It is generally accepted that financial firms have different characteristics from non-financial firms, including the way they are regulated. Such peculiarities can lead to results which are biased if financial firms are analysed together with non-financial firms. All firms listed under the financial sector, namely banks, insurance, real estate and financial services firms, were excluded.
4) Firms had to have ownership and financial information for at least two years up to 31 December 2014. Companies that had ownership and financial information for less than two years were excluded.

Industrial classification of firms analysed in the study was according to the JSE Securities Exchange. Industrial classifications could be considered to be fairly broad and could combine firms whose activities might be fairly different, although they were in the same industry. Sectoral classifications, which were a level lower than industrial classifications, could obviate the problem. However, the number of sectors was fairly large and would make the use of dummy variables fairly cumbersome. Hence the industrial classification was used in the study, in line with previous studies.

Firms in the sample belonged to eight industries, namely basic materials (BCM), consumer goods (CNG), consumer services (CNS), healthcare (HTC), industrials (IND), oil and gas (OAG), technology (TEC) and telecommunications (TEL). The ninth industry, utilities, consisted of one firm only, which did not meet the requirements for analysis and was excluded. Abbreviations in brackets were used as industry codes for the purposes of this study. Each industry was represented by a dummy variable and only significant industry variables were included in the models. The distribution of firms among the various industries is shown in Table 4.1.

Table 4.1: Industrial classification of non-financial firms

Industry classification code	Industry name	Number of listed firms by industry as at 31 December 2014	Percentage of firms in industry (%)
BCM	Basic materials	77	28.4
CNG	Consumer goods	29	10.7
CNS	Consumer services	43	15.9
HTC	Healthcare	10	3.7
IND	Industrials	81	29.9
OAG	Oil and gas	5	1.8
TEC	Technology	20	7.4
TEL	Telecommunications	5	1.8
UTIL	Utilities	1	0.4
TOTAL		**271**	**100.0**

Source: Compiled by author from JSE Securities Exchange list

Although the JSE Securities Exchange has been in existence since 1887, data from the IRESS database for individual shareholdings was available from 2004, as stated above. Data availability over a longer period would have provided more information on the effects of ownership on capital structure and corporate performance. The study used a panel data approach. Data for a single firm was studied over a number of years. The data was collected per year, hence each annual data observation was a data point. Ownership data, for both ownership concentration and ownership identity, was collected as at 31 December of each year. Capital structure, performance and control variables were collected for the same period and the data would be spread over the year, since companies have year-ends on different months. Hence the version of data collected from IRESS for these three sets of variables was “Annual Published”.

Panel data enables analysis of data from one object of interest over time. As ownership, capital structure and corporate performance are variables which need to be studied over time and across different firms for the purposes of this study, panel data analysis is an appropriate approach.

4.4 VARIABLES OF THE STUDY

4.4.1 Ownership and capital structure

In studying the effect of ownership on capital structure, the dependent, independent, industry and control variables are examined. Capital structure is represented by leverage as the dependent variable and is measured using book value and market value. Long-term, short-term and total debt are the specific variations of leverage employed in the study. In addition, the leverage factor is also used. The definition of each variable is provided in Table 4.2.

Table 4.2: Dependent variables: effects of ownership on capital structure

Book values			Market values		
Code	**Description**	**Formula**	**Code**	**Description**	**Formula**
LLB	Long-term debt ratio based on book value	Long-term debt/Total assets	LLM	Long-term debt ratio based on market value	Long-term debt/(Total debt + market value of equity)
LSB	Short-term debt ratio based on book value	Short-term debt/Total assets	LSM	Short-term debt ratio based on market value	Short-term debt/(Total debt + market value of equity)
LTB	Total debt ratio based on book value	Total debt/Total assets	LTM	Total debt ratio based on market value	Total debt/(Total debt + market value of equity)
LVF	Leverage factor	(Profit after taxation / Total owners' interest) / Profit before interest and tax (EBIT) / (Total profits of extraordinary nature – Taxation) / Total assets			

Using the book value approach, the denominator incorporates the value of equity at cost. The denominator under the book value approach does not change across the three types of debt, namely long-term, short-term and total debt. *Total assets* are defined as excluding intangible assets. Leverage based on market values is calculated by changing the denominator to be the sum of debt (long-term, short-term or total) at book value and market value of equity. *Market value of equity* is defined as the product of the number of shares in issue at the company's year-end and the value-weighted share price at the

year-end (VWEP). The value-weighted share price at the end of the year is calculated by dividing the total value of shares traded during the month of the year-end by the total number of shares traded in the same month. The reason for using a weighted price is to avoid high spikes or low dips in prices being used as a representation of the share prices at the company's year-end. However, if the share price during the last month of the year is not representative of the share price during the year, then the problem of being unrepresentative still remains. Since the share price can be considered a snapshot at any particular time, the weighted average method is considered realistic. The leverage factor is the extent to which money borrowed by a business is used and essentially reflects the return on equity divided by return on assets.

Independent variables used are ownership concentration and ownership identity. Ownership concentration is measured by the percentage of ownership held by the top one, two, three, five and 10 shareholders of the Herfindahl index at the same levels. As discussed in Chapter 2, the Herfindahl index is calculated as the sum of squares of the proportions of shareholdings in excess of 5% (Brendea, 2014a:324). Therefore, potentially, 10 measures of ownership concentration are available for use in the analysis. The list of variables representing ownership concentration is given in Table 4.3.

Table 4.3: Ownership concentration variables

CN1	Percentage held by the largest shareholder
CN2	Percentage held by the two largest shareholders
CN3	Percentage held by the three largest shareholders
CN4	Percentage held by the five largest shareholders
CN5	Percentage held by the 10 largest shareholders
CN1HI	Herfindahl index for the largest shareholder
CN2HI	Herfindahl index for the two largest shareholders
CN3HI	Herfindahl index for the three largest shareholders
CN4HI	Herfindahl index for the five largest shareholders
CN5HI	Herfindahl index for the 10 largest shareholders

In calculating ownership concentration, the following caveats, also found in La Porta *et al*. (1998:1146), should be borne in mind:

1) No correction is made for large shareholders which are affiliated to each other.

2) If an investee company owns shares in its shareholders (cross-holdings), this fact is not taken into account. These factors, if adjusted for, are expected to increase ownership concentration.
3) Only one level (flat) of ownership is considered. Pyramidal structures are not taken into account.
4) The fact that companies could be shareholders of their own shares is not considered. These factors would lead to a reduction in the measure of ownership concentration.
5) No distinction is also made between large shareholders who are management and those who are affiliated to management.

Ownership identity is the second independent variable and refers to the type as opposed to the name of each shareholder. The groups identified are directors (including management) of the firm, institutional investors, families and individuals including family trusts, companies, foreign ownership, government, the Public Investment Corporation, which manages the Government Employees Pension Fund, black ownership, and any other shareholders. The classifications used in this study were used in prior studies except for the Public Investment Corporation and black ownership, which are unique to this study. Table 4.4 shows the ownership identity variables employed in the study.

Table 4.4: Ownership identity variables

INS	Percentage of shares held by institutional investors
PIC	Percentage of shares held by the Public Investment Corporation
FAM	Percentage of shares held by individuals, families, family trusts
COM	Percentage of shares held by companies (private or public)
DIR	Percentage of shares held by directors (including management)
BLK	Percentage of shares held by black shareholders (Africans, Coloureds, Indians and Chinese people) and organisations owned or controlled by them
FRN	Percentage of shares held by foreign investors
GOV	Percentage of shares held by the South African government or its organisations, other than the Public Investment Corporation, not classified under companies (COM) above.
OTH	Percentage of shares held by shareholders other than those defined above

Note: All variables were considered at the top one, two, three, five and 10 shareholders levels.

Ownership by directors includes executive management, chief executive officers, directors of the board and chairman of the board.

Ownership by institutional investors includes only South African institutional investors. This category includes asset management companies (excluding the Public Investment Corporation (PIC)), banks, brokerage houses, insurance companies such as Old Mutual, Liberty, Sanlam, Momentum, Hollard, Channel Life, Metlife and Sage, and retirement funds.

The Public Investment Corporation ownership consists of any shares listed under the Public Investment Corporation and the Government Employees Pension Fund directly and ownership by other institutional investors such as banks on behalf of these organisations.

4.4.1.1 *Family ownership*

The ownership held by a family, individuals and family trust is treated as family ownership. Members of the firm's management team may own shares in their individual names or family trusts which may appear in the top 10 shareholders. Such shareholders are classified as family ownership as well. The IRESS database provides, among others, the names of the people or family trusts which own shares in companies. Such names and family trusts were classified under this group if they were not considered to be black ownership, as discussed below.

4.4.1.2 *Black ownership*

Black ownership consists of ownership by black people as defined in South Africa, namely Africans, Coloureds, Indians and Chinese and ownership by organisations predominantly owned and managed by these groups. The South African government has been keen to ensure increased ownership by this type of owner since the country became a democracy in 1994. Inclusion of this type of ownership is perceived by the South African government as a catalyst for economic growth because it means inclusion of the largest population group in the mainstream economy. The names of owners listed on the IRESS database were classified according to whether the names were considered to belong to any of these groups.

African names and some Indian names generally were relatively easy to classify. However, some names were not easily classified into this group because they were not readily identifiable as such. This may therefore lead to an understatement of the percentage of ownership by this group. The same comment would apply to names of organisations owned by such shareholders. In other words, companies with typical African names were classified as black-owned. There could also be classification issues with organisations owned by shareholders who do not belong to the black community but use typical African names for their investment vehicles. Such organisations could be misclassified as black-owned when in fact they are not. In order to reduce such misclassifications, some organisational names were checked on the World Wide Web for their identity. The limited searches predominantly confirmed the presupposition that most of the firms with typical African names were associated with black ownership. Non-African names used by black shareholders would be difficult to identify. The potential problem of misclassification is not considered large enough to affect the results of the study.

4.4.1.3 *Company ownership*

Company ownership in this study refers to ownership by South African private and public companies. Foreign companies were classified as foreign shareholders, which are discussed below. As is understandable from corporate law, the corporate is a vehicle that limits the liability of the shareholder in the company in which he or she invests. This leads to scenarios where companies are controlled by a family, directors, black shareholders, but such ownership is masked under a company name. The current study classified such ownership as corporate, since the ultimate shareholders of companies were not analysed.

Data on foreign shareholdings was provided for certain years but not for others by the IRESS database. However, using the names of the top 10 shareholders, it was reasonably possible to determine which shareholders were local and which ones were foreign.

Names of foreign shareholders could be identified because some of them were names of international financial banks, while others could be identified because some shareholder names included the name of the country of origin of the shareholder.

Another group of foreign shareholders also had extensions to their names which were indicative of a foreign company, such as German companies which use the abbreviation GmbH.

4.4.1.4 *Government ownership*

Government ownership consists of ownership by the South African government at any of its three levels, namely national, provincial and local, including corporations owned by any of these three tiers of government, except the Public Investment Corporation. All government-owned corporations such as the Industrial Development Corporation and National Empowerment Fund belong to this group.

All shareholders which could not be classified into the groups listed above but were in the list of the top 10 shareholders were classified as other shareholders. These included not-for-profit organisations and nominee shareholders.

There are shareholders whose names were not provided directly on the list of shareholders on the IRESS database. Instead, such shareholders appeared under the term “Certificated shareholdings”. This group of shareholders did not transfer from the paper-based ownership certificates to the electronic platform where share ownership is reflected through electronic book entries. To the extent that these certificated shareholdings were part of the top 10 shareholders, they were classified as “other” shareholders. However, the frequency of occurrence of this type of shareholding was considered low enough not to affect the results of the study.

The control variables used in this study and their definitions are listed on Table 4.5. These variables include size and asset tangibility. When analysing effect of ownership on capital structure, firm performance is an additional control variable, which is indicated as performance. Some studies adopted a similar procedure.

Table 4.5: Control variables: effects of ownership on capital structure

Control variable	Variable description	Definition
AGE	Age	Number of years since company was incorporated
DPR	Dividend payout ratio	Dividend paid/Net income after interest and tax
GRW	Growth sales Total assets	$(Sales_{t1} - Sales_{t0})/ Sales_{t0}$ $(Total\ assets_{t1} - Total\ assets_{t0})/ Total\ assets_{t0}$
LIQ	Liquidity Current ratio Quick ratio	 Total current assets/Total current liabilities (Total current assets – Total stock)/Total current liabilities
NDT	Non-debt tax shields	Depreciation/Total assets Earnings before interest, tax, depreciation and amortisation or operating income Earnings before interest, tax, depreciation and amortisation/Depreciation
PRF	Performance/ ProfitabilityReturn on assets Return on equity	 ((Profit before interest and tax (EBIT) – Total profit of extraordinary nature)/Total assets (Profit after taxation/Total owners' interest)
RSK	Operating risk	Standard deviation of earnings before interest, tax, depreciation and amortisation or operating income for two years
SZE	Firm size	Logarithm of sales and total assets
TAN	Asset tangibility	Net fixed assets/Total assets

4.4.2 Ownership and corporate performance

In studying the effect of ownership on firm performance, the dependent, independent, industry and control variables are examined. Firm performance is the dependent variable and it is measured by return on assets (ROA), return on equity (ROE), Tobin's Q ratio, economic value-added (EVA) and market value-added (MVA). Table 4.6 provides the definitions of the dependent variables.

Table 4.6: Dependent variables: effects of ownership on corporate performance

Code	Description	Definition
ROA	Return on assets	((Profit before interest and tax (EBIT) – Total profit of extraordinary nature)/Total assets) * 100
ROE	Return on equity	(Profit after taxation/Total owners' interest) * 100
TQR	Tobin's Q ratio	(Market value of equity + book value of interest-bearing debt)/Fixed assets valued at replacement cost
EVA	Economic value added/ Capital employed	(Return on capital employed/Weighted average cost of capital) * Capital employed/capital employed = (Return on capital employed/Weighted average cost of capital)
MVA	Market value added	(Market value of equity + interest-bearing debt)/ Total capital at book value

The independent variables are ownership concentration and ownership identity, as discussed under the capital structure section above. The measures used for ownership concentration and ownership identity are in terms of Table 4.3 and Table 4.4 respectively.

EVA is calculated as follows:

EVA = Spread x CE

Spread = (ROCE/WACC)

ROCE = NOPAT/CE

WACC = Cost equity x %Equity + Cost of debt after Tax x %Debt

$= E / V \times R_e + D/V \times R_d \times (1 - T_c)$

Cost of Equity (R_e) $= R_f + (R_m - R_f)\beta$

Where:

β is Beta, which is calculated using regression analysis of returns for the security against those of the market. The beta as the company's year-end is used in the analysis;

CE is Capital employed;

D is Market value of the firm's debt;

D/V is Debt value as a percentage of total funding;

E is Market value of the firm's equity;

E/V is Equity value as a percentage of total funding;
NOPAT is Net operating profit after tax;
R_d is Cost of debt;
R_f is Risk-free rate, R153 or R157, which are RSA government bonds;
R_m is Return on the market (JSE Securities Exchange);
(R_m – R_f) is Equity premium or Return on the market (JSE Securities Exchange) less Risk-free rate, 6%;
ROCE is Return on capital employed;
T_c is Corporate tax rate;
V is E + D; and
WACC is Weighted average cost of capital.

Economic value-added is normalised by dividing it by capital employed. This study therefore uses the economic value-added variable to refer to the normalised ratio rather than the value.

The current study defines *market value-added* as the difference between an enterprise's market value and the economic book value of the capital it utilises. This measure is considered to be forward looking. It is the difference between the total market value of debt and equity (MV) and total book value capital (TC), which is the sum of funds provided by lenders and shareholders. Effectively, this means that the total capital is made up of book value of debt and the adjusted book value of fixed assets. Whereas the market value-added reflects expected performance, economic value-added reflects current enterprise performance. Hence the market value-added of a firm is equal to the discounted present value of the yearly economic value-added. To take account of size, market value-added is calculated as the ratio of market value divided by total capital (MV/TC). The calculation of market value-added is calculated as follows:

(Market value of equity + interest – bearing debt)/ Total capital at book value

Tobin's Q ratio (TQR) is used in this study as a performance variable. The ratio is considered to be a measure of wealth creation, and is similar to market value added. It is obtained by dividing the value of a firm's assets, adjusted for inflation, into the market value of equity. The following equation expresses how Tobin's Q ratio is calculated:

Tobin's Q ratio = (Market value of equity + book value of interest-bearing debt)/Fixed assets valued at replacement cost.

The control variables used in investigating the effect of firm ownership on firm performance are the same as those employed in analysing the effect of ownership on capital structure in Table 4.5. However, when examining the effect of ownership on performance, leverage becomes an additional variable and the profitability or performance variable is excluded from the control variables. The total debt ratio based on book value, calculated under the capital structure section, is used as the control variable. It is calculated as Total debt/Total assets. This procedure was adopted in prior studies.

The same sample of firms used in the analysis of the effects of ownership on capital structure is used and the same analytical methods are applied to the analysis of the effects of ownership on corporate performance.

4.5 ANALYSIS OF DATA

The study on the effects of ownership on capital structure and corporate performance utilises EViews Version 9.5 to analyse the data.

The relationships between ownership and capital structure and between ownership and firm performance are explored using correlation analysis. This analysis is meant to indicate any links between the variables in question. Additionally, tests for multicollinearity such as the variance inflation factor or its equivalent will be undertaken.

Multiple regression analysis is conducted for further analysis of the extent of the relationships between the variables. Pooled and panel regression models will be considered in order to analyse the relationships between ownership and capital structure and ownership and corporate performance after taking into account control variables of firm-specific factors and the impact of firm-specific factors. Hsiao (2003:3) posits that panel or longitudinal data analysis has advantages over cross-sectional or time series analysis because it provides many data points, leading to increased degrees

of freedom and reduced collinearity of the independent variables. Efficient econometric estimates are expected to emanate from all these advantages.

Simultaneously, the panel data model may be used to conduct the fixed effects and random effects variations. The regression models are as follows:

$Y_{it} = \alpha + \beta x_{it} + \varepsilon_{it}$ (Pooled model)
$Y_{it} = \alpha_i + \beta x_{it} + \varepsilon_{it}$ (Fixed effects model)
$Y_{it} = \alpha + \beta x_{it} + (\varepsilon_{it} + \mu_i)$ (Random effects model)

Where:
Y_{it} is the dependent variable (the capital structure variable, or the firm performance variable);
i represents the firm; and
t is time.

If the error term ε_{it} is independent of x_{it} and unobserved heterogeneity is missing, then the estimators of the ordinary least squares are consistent and unbiased. Pooled ordinary least squares analysis does not take account of the endogeneity problem, which is the result of measurement errors, simultaneity and heterogeneity. Such heterogeneity is due to unobserved individual effects or firm-specific effects.

The error term ε_{it} equals μ_i plus $\varepsilon_{it,}$ where μ_i represents the error portion at individual firm level and $\varepsilon_{it,}$ is the unsystematic or idiosyncratic error, which is independent of $\varepsilon_{it,}$ and μ_i.

Baltagi (2005:4) suggests that the use of panel data analysis can solve for unobserved heterogeneity. Driffield, Mahambare and Pal (2007:549) observe that cross-sectional data cannot show the variation of an individual firm's data over time. Choi *et al.* (2012:216) argue that panel data regressions can control for unobserved variables which do not vary with time and that biased results can be obtained if better methods like panel data analysis are not used. Previous studies conducted fixed effect and variable effect analyses on data in order to control for unobserved effects and measurement errors.

After the addition of the individual firm error μ_i, the pooled ordinary least squares model changes to:

$$Y_{it} = \alpha + \beta x_{it} + (\varepsilon_{it} + \mu_i)$$

Fixed effects models (or least squares with dummy variables) have non-random cross-sectional or time series effects whereas random effects models have random effects. Fixed effects regression models have dummy variables that represent those effects and the ordinary least squares method is considered appropriate for estimation. The random effects model is effected using two stages. In the first stage, variance components are calculated using several possible statistical methods. Variance components for both balanced and unbalanced panels are used to standardise data in the second stage, before ordinary least squares regression is applied.

In a balanced panel data set, all entities have data points for all time periods. When entities do not have all the observations due to missing values, the panel data set is not balanced. The panel in this study is unbalanced, or there will be years without data for some companies because there were companies which were listed after 2004, the first year for which data was collected, among other reasons. The shortest period over which a company could be listed and still be included was for at least the last two years, namely 2013 and 2014. Statistical methods and tests that are applicable to unbalanced panels are used and those applicable to balanced panels are excluded. Missing dependent, independent or control variables are treated as part of the unbalanced panel analysis due to the fact that the number of observations over time over different cross-sections is not equal. Unbalanced panels over long time periods are considered a solution to the problem of attrition, which results from de-listing of companies for various reasons, and then being removed from the company database.

In the equation which incorporates the individual firm effect error term (μ_i) above, if μ_i is correlated with x_{it}, which means that the total error term is correlated with x_{it}, then the fixed effects model would give better results than the ordinary least squares method. If the individual firm error term (μ_i) is not correlated with x_{it}, the ordinary least squares estimators would be consistent but inefficient due to the total error term under ordinary

least squares term being heteroskedastic and serially correlated. The random effects model is used in this case so that the efficiency of the model is enhanced.

Park (2009:4) posits that the difference between the fixed and random effects models lies in the treatment of dummy variables. Where dummy variables are considered to be part of the intercept, this is a fixed effects model. Where dummy variables are part of the error term, the model is a random effects model. In a fixed group effects model, differences in intercepts are examined, with slopes and variances across entities assumed to be constant. Baltagi, Matyas and Sevestre (2008:5).criticised the fixed effects model and the random effects model in terms of econometric soundness. (

Brendea (2014b:1) used a dynamic fixed effects model with a first-order lag of the dependent variable in her analysis of ownership and capital structure and the random effects model to evaluate the effect of ownership on firm performance. Three reasons were given for the use of the random effects model to analyse the effects of ownership concentration on firm performance (Brendea 2014b:5). The first one was that the sample size (n) was considered large (69) and the number of periods was small (T=5). It was therefore inferred that the number of parameters to be estimated if a fixed effects model was used would be larger than the available data points. Secondly, the sample was taken out of a very large population and as a result, the data was not exhaustive. Lastly, the study used the Breusch-Pagan Lagrange multiplier test (Breusch & Pagan, 1980:239) to evaluate the applicability of the random effects model.

By way of summary, the selection of the appropriate model may be conducted using the F-test for the fixed effects model, the Breusch-Pagan Lagrange multiplier test for the random effects model and the Hausman test (Hausman, 1978:1264) or similar tests for the fixed and random effects models. When the null hypothesis is not rejected under the F-test, the fixed effects model is not appropriate, and if the same hypothesis is not rejected under the Breusch-Pagan Lagrange test, the random effects model is also not appropriate, leading to the selection of the pooled ordinary least squares model.

When the null hypothesis is rejected using the F-test, but not rejected under the Breusch-Pagan test, the fixed effects model is appropriate. If the null hypothesis is

rejected under the F-test and under the Breusch-Pagan test, but not rejected under the Hausman test, the fixed effects model is selected.

The random effects model is chosen where the null hypothesis is not rejected under the F-test, but is rejected under the Breusch-Pagan test. The same model is also appropriate where both the F-test and Breusch-Pagan tests reject the null hypothesis but the Hausman test does not reject it.

Rossi and Cebula (2016:883) explain that the random effects model is used where certain variables either are time invariant or should not change substantially over the period of analysis, a condition which is assumed in the study. Additionally, the random effects model also assumes that individual-specific effect is a random variable, which bears no correlation to the independent or explanatory variables, and that the control variables do not exhibit collinearity, meaning that they have linear relationships among themselves. Rossi and Cebula (2016:888) argue that use of the fixed effects model would lead to inaccurate results under these circumstances.

The efficiency of the estimators could potentially be enhanced by the calculation of robust standard errors if the problems of autocorrelation and heteroscedasticity are found. Wintoki *et al.* (2012:586) argue that although models with standard errors can solve the problems of heteroscedasticity and autocorrelation, they do not resolve the endogeneity problem. The argument used is that fixed effects and random effects models deal with problems of unobserved heterogeneity rather than endogeneity. The causes of the endogeneity problem are said to include reverse causality, endogenous variables and measurement errors. Cameron and Trivedi (2005:705) posit that the fixed effects and random effects models could still be biased for short panel data.

Potential solutions for the problems are the use of instrument variable estimators and/or the dynamic panel generalised method of moments approach. Instrumental variables have been associated with the problem of finding variables which are valid instruments. The generalised method of moments framework, as expounded by Arellano and Bond (1991:277), is considered adequate to deal with the problem of the lack of exogeneity of regressors, or the endogeneity problem.

The generalised method of moments approach is credited with the advantage of having instrument variables as exogenous variables in time periods other than the current ones (or lagged variables). In this way, the lag of variables can be used as instruments in the current period, in the place of endogenous variables. The Arellano and Bond estimator is said to be appropriate for short panels, namely where there are few time periods but the number of objects (n) is large. Roodman (2009b:121) suggests that where the panel is large, then other methods than the Arellano and Bond estimator have to be used. The data in the study extends over an 11-year period. Therefore, the Arellano and Bond generalised method of moments model is appropriate.

The Arellano and Bond (1991:277) version is called the difference generalised method of moments approach and it has been considered inappropriate if the regression variables follow a random walk. The reason for this is that such past variables do not provide any indication regarding future values. The difference generalised method of moments method bears such a name because the data is first differenced to eliminate fixed effects before the estimation is undertaken (Roodman, 2009a:137). Roodman (2009b:104) also mentions that another shortcoming of the difference generalised method of moments approach is the presence of gaps in variables. Levine, Loayza and Beck (2000:52) argue that if the original model has levels, first differencing reduces the power of tests to be conducted by reducing the extent of variability in the explanatory variables. Griliches and Hausman (1986:95) argue that first differencing increases the measurement errors in the dependent variables.

Econometric shortcomings of the difference generalised method of moments models led to a further refinement to the system generalised method of moments models (Arellano & Bover, 1995:29; Blundell & Bond, 2000:321; Roodman, 2009a:137). In system generalised method of moments models, the original equation is added to increase instruments. Lagged variables are treated as instrument variables for equations in levels. The lagged levels are used as instruments for equations in first differences. Stated differently, the system generalised method of moments approach augments the difference generalised method of moments approach by simultaneously estimating differences and levels using two equations with different instruments.

Two tests are proposed by Arellano and Bond (1991:277) to test whether the generalised method of moments model is appropriate. One such test is the Sargan test or Hansen test of identification. The overidentification restrictions of the generalised method of moments approach have to be valid for it to be used as a tool of analysis. The Hansen test produces a J-statistic with a chi-square (χ^2) distribution under the null hypothesis of the validity of all the instruments. The second of the two tests is the Arellano-Bond test for autocorrelation errors. Whereas first differences (AR(1)) may correlate, no autocorrelation is expected in second differences (AR(2)).

Roodman (2009a:135) notes that despite the increasing popularity of the difference and system generalised method of moments models, their complexity can create potentially suspect estimates. His study discusses the problem of proliferation which overfits the endogenous variables to the extent of weakening the Hansen test of instruments' joint validity. He identifies symptoms of instrument proliferation as the overfitting of endogenous variables, imprecise estimates of the optimal weighting matrix, downward bias in two-step standard errors and weak Hansen tests of instrument validity. The study cites the problem of weak Hansen tests as being particularly serious because it makes it difficult for the researcher to detect that the test is providing an inappropriate result. As a result, the test provides what appears to be a plausible result when that is not the case. He suggests two methods for reducing instruments used in the analysis. These are the use of an appropriate number of lags, and the combination of instruments addition, resulting in smaller sets (Roodman, 2009a:148).

Wintoki *et al.* (2012:591) ran simulations which pointed out a key caveat to the use of the dynamic panel generalised method of moments model estimation. They argue that even if the null hypothesis of second-order serial correlation and the null hypothesis of instrument validity may not be rejected, there may be bias in estimates due to unobservable time varying heterogeneity. The researchers caution about the need to ensure that observable control variables which may affect dependent and explanatory variables are incorporated into the empirical model.

Grieser and Hadlock (2016:1) observe that researchers in finance recognise that contemporaneous exogeneity of the error term is necessary for the fixed effects or the first difference estimators in parameter estimation, but that this assumption is

untestable. Roberts and Whited (2012:9) state that the issue of endogeneity, which can be considered as a correlation between the error term and explanatory variables in a regression equation (Wooldridge, 2010:50), can never be testable because the error term (μ) cannot be observed. The other requirement for such models, namely strict exogeneity (Grieser & Hadlock, 2016:2), which is testable, is often not taken into account. Strict exogeneity requires that there should be no correlation between the error term in the model and any of the variables at all leads and lags (or for all time periods) (Wooldridge, 2010:146). The strict exogeneity assumption is violated if the control or explanatory variables and dependent variables are affected by common external shocks. In this case, an external force or third variable affects the dependent and explanatory variables simultaneously.

Grieser and Haddock (2016:3) point out that the Wooldridge (2010) test (Semykina & Wooldridge, 2010:376), which is used to determine the presence or absence of strict heterogeneity, does not eliminate the problem of contemporaneous exogeneity but allows a researcher to empirically take account of this concern. They analysed several studies from finance journals and found that where the first difference and fixed effects models gave the same signs of estimates, the actual estimates could have differences as high as 50%. Other results showed that the two methods provided estimators with opposite signs. The researchers concluded that it was therefore necessary to conduct tests of strict exogeneity, or use dynamic generalised method of moments models, among other solutions, to obviate the problems that are linked with strict exogeneity, among others.

Knowledge of these potential problems and approaches may provide a better understanding of some of the issues that are associated with the analysis of data in the current study. The current study will consider the use of ordinary least squares regressions, random effects, fixed effects and generalised method of moments models and compare their results.

In order to check for robustness of the results in some studies, regressions are run with industry dummy variables as well as year-dummy variables. Alternative measures of dependent, independent, and/or control variables will be used to test the validity of the results. Alternatively, running the same models with variables at different levels can

indicate the robustness of the results. In their analysis of the effect of ownership on firm performance, Lozano *et al.* (2016:1337) used at least six consecutive years of data for each firm in their generalised method of moments analysis, specifically, the system generalised method of moments estimator, arguing that such a series of data is necessary to calculate tests of the absence of second-order serial correlation in the first difference residuals. One advantage ascribed to the generalised method of moments approach is that it controls for individual effects or unobserved heterogeneity. These could be other factors which could, for instance, affect the extent of a family's level of ownership in the business. Such heterogeneity was controlled by modelling it as Lozano *et al*. (2016:1338) modelled the error term $\varepsilon_{it,}$ by splitting it into three components, namely the individual effects, $\eta_{i;}$ time dummies d_t, and the random disturbance term, v_i. Another advantage of the generalised method of moments estimation method is its capacity to mitigate the endogeneity problem (when the error term is correlated with any of the explanatory variables). If there is an endogeneity issue, one of the main assumptions of the ordinary least squares method is violated. This problem could be solved through the use of instrument variables, and the use of the system generalised method of moments approach overcomes the problem of weak instruments, which the difference generalised method of moments approach suffers from.

Lozano *et al*. (2016:1338) estimated two equations for all models: equations in differences and equations in levels. Specification tests are conducted on the estimated models, including the Hansen test, for ascertaining the lack of correlation between the instruments and the random error term. A second test is the m_2 test (Arellano & Bond, 1991:282), used to check for the absence of second-order serial correlation of first differenced residuals. Lastly, Wald tests, which are joint tests to check for the significance of the coefficients, industry and other variables, are also conducted.

In addition, Rossi and Cebula (2016:888) used the two-step system generalised method of moments approach, which is a dynamic econometric panel data model, in line with Wintoki *et al.* (2012:581). Lagged variables were used as instruments which acted as independent variables. The Sargan test (used to test if instruments are over-identified) measured the validity of the instruments under the null hypothesis of no correlation between the instruments and the variables. To test for the joint significance of the coefficients, the Wald test was used. Autoregressive terms (AR(1) and AR(2)) are

measures of first- and second-order serial correlation respectively. As long as there is no second-order serial correlation, the model in question should be valid. A test was also undertaken for multicollinearity and the level of the variance inflation factor established. Results obtained using the generalised method of moments approach were more robust and more statistically significant than the ones that were obtained using the random effects model (Rossi & Cebula, 2016:893).

The discussion of the different types of models leads to the construction of empirical models that are to be used to analyse the effects of ownership on capital structure and the effects of ownership on firm performance.

4.6 EMPIRICAL MODELS

4.6.1 Ownership and capital structure models

In order to determine the effect of concentrated ownership and ownership identity on long-term leverage (book value) (LLB), the following model is used:

$$LLB = \alpha + \beta_1 CN1 + \beta_1 CN2 + \beta_1 CN3 + \beta_1 CN4 + \beta_1 CN5 + \beta_1 CN1HI + \beta_1 CN2HI + \beta_1 CN3HI + \beta_1 CN4HI + \beta_1 CN5HI + \beta_2 INS + \beta_3 PIC + \beta_4 FAM + \beta_5 COM + \beta_6 DIR + \beta_7 BLK + \beta_8 FRN + \beta_9 GOV + \beta_{10} OTH + \beta_{11} SZE + \beta_{12} TAN + \beta_{13} NDT + \beta_{14} RSK + \beta_{15} DPR + \beta_{16} AGE + \beta_{17} GRW + \beta_{18} LIQ + \beta_{19} PRF + \varepsilon \quad \textbf{(4.1)}$$

All variables are as defined in Tables 4.2 to 4.5, α is the constant term, β's are the coefficients and Ɛ is the error term. The following model is used to determine the effect of concentrated ownership and ownership identity on long-term leverage (market value) (LLM):

$$LLM = \alpha + \beta_1 CN1 + \beta_1 CN2 + \beta_1 CN3 + \beta_1 CN4 + \beta_1 CN5 + \beta_1 CN1HI + \beta_1 CN2HI + \beta_1 CN3HI + \beta_1 CN4HI + \beta_1 CN5HI + \beta_2 INS + \beta_3 PIC + \beta_4 FAM + \beta_5 COM + \beta_6 DIR + \beta_7 BLK + \beta_8 FRN + \beta_9 GOV + \beta_{10} OTH + \beta_{11} SZE + \beta_{12} TAN + \beta_{13} NDT + \beta_{14} RSK + \beta_{15} DPR + \beta_{16} AGE + \beta_{17} GRW + \beta_{18} LIQ + \beta_{19} PRF + \varepsilon \quad \textbf{(4.2)}$$

All variables are as defined in Tables 4.2 to 4.5, α is the constant term, β's are the coefficients and Ɛ is the error term.

The following equations are used to determine the effect of concentrated ownership and ownership identity on short-term leverage (book value) (LSB) and short term leverage (market value) (LSM) respectively:

$$LSB = \alpha + \beta_1 CN1 + \beta_1 CN2 + \beta_1 CN3 + \beta_1 CN4 + \beta_1 CN5 + \beta_1 CN1HI + \beta_1 CN2HI + \beta_1 CN3HI + \beta_1 CN4HI + \beta_1 CN5HI + \beta_2 INS + \beta_3 PIC + \beta_4 FAM + \beta_5 COM + \beta_6 DIR + \beta_7 BLK + \beta_8 FRN + \beta_9 GOV + \beta_{10} OTH + \beta_{11} SZE + \beta_{12} TAN + \beta_{13} NDT + \beta_{14} RSK + \beta_{15} DPR + \beta_{16} AGE + \beta_{17} GRW + \beta_{18} LIQ + \beta_{19} PRF + Ɛ \quad \textbf{(4.3)}$$

$$LSM = \alpha + \beta_1 CN1 + \beta_1 CN2 + \beta_1 CN3 + \beta_1 CN4 + \beta_1 CN5 + \beta_1 CN1HI + \beta_1 CN2HI + \beta_1 CN3HI + \beta_1 CN4HI + \beta_1 CN5HI + \beta_2 INS + \beta_3 PIC + \beta_4 FAM + \beta_5 COM + \beta_6 DIR + \beta_7 BLK + \beta_8 FRN + \beta_9 GOV + \beta_{10} OTH + \beta_{11} SZE + \beta_{12} TAN + \beta_{13} NDT + \beta_{14} RSK + \beta_{15} DPR + \beta_{16} AGE + \beta_{17} GRW + \beta_{18} LIQ + \beta_{19} PRF + Ɛ \quad \textbf{(4.4)}$$

All variables are as defined in Tables 4.2 to 4.5, α is the constant term, β's are the coefficients and Ɛ is the error term.

The next measure of capital structure is total leverage. The two equations below are employed to determine the effect of concentrated ownership and ownership identity on total leverage (book value) (LTB) and total leverage (market value) (LTM) respectively:

$$LTB = \alpha + \beta_1 CN1 + \beta_1 CN2 + \beta_1 CN3 + \beta_1 CN4 + \beta_1 CN5 + \beta_1 CN1HI + \beta_1 CN2HI + \beta_1 CN3HI + \beta_1 CN4HI + \beta_1 CN5HI + \beta_2 INS + \beta_3 PIC + \beta_4 FAM + \beta_5 COM + \beta_6 DIR + \beta_7 BLK + \beta_8 FRN + \beta_9 GOV + \beta_{10} OTH + \beta_{11} SZE + \beta_{12} TAN + \beta_{13} NDT + \beta_{14} RSK + \beta_{15} DPR + \beta_{16} AGE + \beta_{17} GRW + \beta_{18} LIQ + \beta_{19} PRF + Ɛ \quad \textbf{(4.5)}$$

$$LTM = \alpha + \beta_1 CN1 + \beta_1 CN2 + \beta_1 CN3 + \beta_1 CN4 + \beta_1 CN5 + \beta_1 CN1HI + \beta_1 CN2HI + \beta_1 CN3HI + \beta_1 CN4HI + \beta_1 CN5HI + \beta_2 INS + \beta_3 PIC + \beta_4 FAM + \beta_5 COM + \beta_6 DIR + \beta_7 BLK + \beta_8 FRN + \beta_9 GOV + \beta_{10} OTH + \beta_{11} SZE + \beta_{12} TAN + \beta_{13} NDT + \beta_{14} RSK + \beta_{15} DPR + \beta_{16} AGE + \beta_{17} GRW + \beta_{18} LIQ + \beta_{19} PRF + Ɛ \quad \textbf{(4.6)}$$

All variables are as defined in Tables 4.2 to 4.5, α is the constant term, β's are the coefficients and Ɛ is the error term.

Leverage factor (LVF) as defined above, is another capital structure measure used in this study. This measure is similarly represented in the following equation:

$$LVF = \alpha + \beta_1 CN1 + \beta_1 CN2 + \beta_1 CN3 + \beta_1 CN4 + \beta_1 CN5 + \beta_1 CN1HI + \beta_1 CN2HI + \beta_1 CN3HI + \beta_1 CN4HI + \beta_1 CN5HI + \beta_2 INS + \beta_3 PIC + \beta_4 FAM + \beta_5 COM + \beta_6 DIR + \beta_7 BLK + \beta_8 FRN + \beta_9 GOV + \beta_{10} OTH + \beta_{11} SZE + \beta_{12} TAN + \beta_{13} NDT + \beta_{14} RSK + \beta_{15} DPR + \beta_{16} AGE + \beta_{17} GRW + \beta_{18} LIQ + \beta_{19} PRF + Ɛ \quad \textbf{(4.7)}$$

All variables are as defined in Tables 4.2 to 4.5, α is the constant term, β's are the coefficients and Ɛ is the error term.

4.6.2 Ownership and corporate performance models

The following equations are used to determine the effect of concentrated ownership and ownership identity on corporate performance, as measured by ROA, ROE, TBQ, EVA and MVA respectively:

$$ROA = \alpha + \beta_1 CN1 + \beta_1 CN2 + \beta_1 CN3 + \beta_1 CN4 + \beta_1 CN5 + \beta_1 CN1HI + \beta_1 CN2HI + \beta_1 CN3HI + \beta_1 CN4HI + \beta_1 CN5HI + \beta_2 INS + \beta_3 PIC + \beta_4 FAM + \beta_5 COM + \beta_6 DIR + \beta_7 BLK + \beta_8 FRN + \beta_9 GOV + \beta_{10} OTH + \beta_{11} SZE + \beta_{12} TAN + \beta_{13} NDT + \beta_{14} RSK + \beta_{15} DPR + \beta_{16} AGE + \beta_{17} GRW + \beta_{18} LIQ + \beta_{19} LTB + Ɛ \quad \textbf{(4.8)}$$

$$ROE = \alpha + \beta_1 CN1 + \beta_1 CN2 + \beta_1 CN3 + \beta_1 CN4 + \beta_1 CN5 + \beta_1 CN1HI + \beta_1 CN2HI + \beta_1 CN3HI + \beta_1 CN4HI + \beta_1 CN5HI + \beta_2 INS + \beta_3 PIC + \beta_4 FAM + \beta_5 COM + \beta_6 DIR + \beta_7 BLK + \beta_8 FRN + \beta_9 GOV + \beta_{10} OTH + \beta_{11} SZE + \beta_{12} TAN + \beta_{13} NDT + \beta_{14} RSK + \beta_{15} DPR + \beta_{16} AGE + \beta_{17} GRW + \beta_{18} LIQ + \beta_{19} LTB + \quad \textbf{(4.9)}$$

$$TBQ = \alpha + \beta_1 CN1 + \beta_1 CN2 + \beta_1 CN3 + \beta_1 CN4 + \beta_1 CN5 + \beta_1 CN1HI + \beta_1 CN2HI + \beta_1 CN3HI + \beta_1 CN4HI + \beta_1 CN5HI + \beta_2 INS + \beta_3 PIC + \beta_4 FAM + \beta_5 COM + \beta_6 DIR + \beta_7 BLK + \beta_8 FRN + \beta_9 GOV + \beta_{10} OTH + \beta_{11} SZE + \beta_{12} TAN + \beta_{13} NDT + \beta_{14} RSK + \beta_{15} DPR + \beta_{16} AGE + \beta_{17} GRW + \beta_{18} LIQ + \beta_{19} LTB + Ɛ \quad \textbf{(4.10)}$$

$$EVA = \alpha + \beta_1 CN1 + \beta_1 CN2 + \beta_1 CN3 + \beta_1 CN4 + \beta_1 CN5 + \beta_1 CN1HI + \beta_1 CN2HI + \beta_1 CN3HI + \beta_1 CN4HI + \beta_1 CN5HI + \beta_2 INS + \beta_3 PIC + \beta_4 FAM + \beta_5 COM + \beta_6 DIR + \beta_7 BLK + \beta_8 FRN + \beta_9 GOV + \beta_{10} OTH + \beta_{11} SZE + \beta_{12} TAN + \beta_{13} NDT + \beta_{14} RSK + \beta_{15} DPR + \beta_{16} AGE + \beta_{17} GRW + \beta_{18} LIQ + \beta_{19} LTB + \varepsilon \quad \textbf{(4.11)}$$

$$MVA = \alpha + \beta_1 CN1 + \beta_1 CN2 + \beta_1 CN3 + \beta_1 CN4 + \beta_1 CN5 + \beta_1 CN1HI + \beta_1 CN2HI + \beta_1 CN3HI + \beta_1 CN4HI + \beta_1 CN5HI + \beta_2 INS + \beta_3 PIC + \beta_4 FAM + \beta_5 COM + \beta_6 DIR + \beta_7 BLK + \beta_8 FRN + \beta_9 GOV + \beta_{10} OTH + \beta_{11} SZE + \beta_{12} TAN + \beta_{13} NDT + \beta_{14} RSK + \beta_{15} DPR + \beta_{16} AGE + \beta_{17} GRW + \beta_{18} LIQ + \beta_{19} LTB + \varepsilon \quad \textbf{(4.12)}$$

The variables in equations (8) to (12) are as defined in Tables 4.3 to Table 4.6, α is the constant term, β's are the coefficients and Ɛ is the error term. LTB is in Table 4.2.

4.7 CONCLUSION

The data required for the analysis of the effects of ownership on capital structure and the effects of ownership on corporate performance, the variables (dependent, independent and control), and methods of analysis normally used in such studies were discussed above. The structures of the models to be used in the analysis for each of the two sections of the study were developed in this chapter. The results are reported in Chapters 5 and 7, for ownership and capital structure and in Chapters 6 and 8, for ownership and performance.

CHAPTER 5

DESCRIPTIVE STATISTICS AND CORRELATION ANALYSIS OFTHE RELATIONSHIP BETWEEN OWNERSHIP AND CAPITAL STRUCTURE

5.1 INTRODUCTION

The current chapter examines the relationships between ownership and capital structure and between ownership structure and firm performance. In particular, the relationships between firm ownership, in terms of ownership concentration and ownership identity, and capital structure and ownership concentration and ownership identity are analysed. Studies use different measures of ownership, both in terms of concentration and of ownership identity as well as capital structure and the measures used in this study are largely in line with previous studies.

Measures of ownership in terms of ownership concentration and ownership identity and measures of capital structure are identified in this chapter. The relationships between the variables are also explored in this chapter. Correlation analysis is used to examine the relationships between the various variables used in the study. Pearson's correlation coefficients are used to determine the most appropriate combinations of the variables of ownership and capital structure. Identification of the best combinations of variables will enable further analysis to be conducted on the selected variables.

This chapter is organised as follows: Section 5.2 provides a descriptive summary of the data and variables; Section 5.3 presents the descriptive statistics for ownership concentration and ownership identity and capital structure; in Section 5.4, Pearson's correlation coefficients for ownership, capital structure and control variables are described; Section 5.5 describes the preliminary tests on the data while Section 5.6 concludes.

5.2 OWNERSHIP, CAPITAL STRUCTURE AND CONTROL VARIABLES

Data used in this study covered an 11-year period, from 2004 to 2014 for each firm. Some firms were listed after 2004, while others were suspended in the intervening period, resulting in fewer firm-years. The theoretical total number of observations is therefore 2 981, being the product of 271 non-financial firms over 11 years, out of a total of 380 listed firms, as at 31 December 2014. The data was collected from the IRESS database, a company which provides financial and other information on South African, African and global companies. Due to later listings than the first year, suspensions, delistings and unavailability of data, no more than 205 firms and 1 942 observations were used in the study. The number of companies from each selected industry used in this study is shown in Table 5.1.

Table 5.1: Number of companies from each selected industry

Industry code	Industry name	Number of companies	Number of observations
BCM	Basic materials	59	540
CNG	Consumer goods	24	234
CNS	Consumer services	35	357
HTC	Healthcare	5	43
IND	Industrials	65	598
OAG	Oil and gas	2	21
TEC	Technology	9	99
TEL	Telecommunications	6	50
Total		**205**	**1942**

Ownership variables were divided into ownership concentration and ownership identity variables. The ownership concentration variables which could be used consisted of the sum of the shareholdings of the top one, two, three, five and 10 shareholders, as well as the Herfindahl index at each level of shareholding, except for directors' ownership, which was represented by their total shareholding in each firm, at each level. Hence the total shareholding at each level was higher. This option was chosen due to the type of data that was readily available. Ownership identity variables were institutional investors, the Public Investment Corporation, family ownership, company ownership, black ownership, other ownership, government ownership, foreign ownership and directors' ownership. Since these types of ownerships were defined as the categories to be used for this study, for any particular firm, certain categories or ownership types did not apply,

while other firms had those types of owners. The ownership types were therefore exhaustive.

Potential capital structure indicators were ratios of long-term loans to total assets based on book value, long-term loans to total assets based on market value, short-term loans to total assets based on book value, short-term loans to total assets based on market value; total debt to total assets based on book value, total debt to total assets, based on market value and the leverage factor. In line with the extant literature, control variables were used in the study, and these were as follows: age, risk, dividend payout ratio, tangibility, non-debt tax shields (based on depreciation/total assets or earnings before interest, tax depreciation and amortisation/total assets), growth prospects (based on sales or total assets), liquidity (calculated as current ratio or quick ratio), size (based on sales or total assets) and profitability, measured by return on assets or return on equity.

Variables which were most appropriate to the analysis of the relationship between ownership and capital structure were identified in this part of the analysis. These variables were then subject to further analysis in subsequent chapters.

5.3 DESCRIPTIVE STATISTICS FOR OWNERSHIP, CAPITAL STRUCTURE AND CONTROL VARIABLES

Summary statistics of all the variables used as proxies for ownership (ownership concentration and ownership identity), capital structure and control variables are presented in Table 5.2.

Table 5.2: Descriptive statistics: Ownership and capital structure (top one shareholder)

	Units	Mean	Median	Maximum	Minimum	Std. dev.	Observations
Concentration							
CN Top 1 shareholder	Decimal	0.2016	0.1334	0.8551	0.0000	0.1797	1792
HI Top shareholder	Index	0.0729	0.0178	0.7312	0.0000	0.1243	1792
Shareholder type							
Institution - Top 1 shareholder	Decimal	0.0137	0.0000	0.5309	0.0000	0.0479	1566
Public Investment Corporation- Top 1 shareholder	Decimal	0.0226	0.0000	0.2670	0.0000	0.0472	1566
Family - Top 1 shareholder	Decimal	0.0347	0.0000	0.8500	0.0000	0.1138	1792
Company - Top 1 shareholder	Decimal	0.0724	0.0000	0.8551	0.0000	0.1631	1792
Black - Top 1 shareholder	Decimal	0.0146	0.0000	0.5707	0.0000	0.0624	1792
Other - Top 1 shareholder	Decimal	0.0020	0.0000	0.2321	0.0000	0.0150	1566
Government - Top 1 shareholder	Decimal	0.0030	0.0000	0.2991	0.0000	0.0273	1566
Foreign - Top 1 shareholder	Decimal	0.0389	0.0000	0.7997	0.0000	0.1192	1792
Director - Top 1 shareholder	Decimal	0.1929	0.0521	3.9418	0.0000	0.3595	1792
Capital structure							
Long-term debt ratio, book value	Decimal	0.1261	0.0800	1.9500	0.0000	0.1657	1566
Long-term debt ratio, market value	Decimal	0.1411	0.0988	0.9161	0.0001	0.1382	1566
Short-term debt ratio, book value	Decimal	0.3685	0.3400	1.0500	0.0100	0.2042	1566
Short-term debt ratio, market value	Decimal	0.2631	0.2234	0.9939	0.0037	0.1844	1566
Total debt ratio, book value	Decimal	0.4948	0.4900	2.3300	0.0100	0.2420	1566
Total debt ratio, market value	Decimal	0.4044	0.3697	1.0000	0.0038	0.2225	1566
Leverage factor	Decimal	2.2653	1.1717	291.68	-96.59	13.3576	1566
Control variables							
Non-debt tax shields (Depreciation/Total assets)	Decimal	0.0337	0.0300	0.2800	0.0000	0.0258	1566
Non-debt tax shields (EBITDA/Depreciation)	Decimal	7.8561	4.7300	800.7400	-798.29	42.9597	1566
Risk	Standard deviation	0.0514	0.0210	12.3801	4.3300	0.3204	1566
Dividend payout ratio	Decimal	0.4156	0.2300	112.3500	-29.64	3.6401	1792
Age in years	Years	25.6311	16.000	55.0000	0.0000	20.273	1792
Growth - Sales	Decimal	0.3592	0.1189	114.6822	-1	3.4386	1566
Growth - Total assets	Decimal	0.3437	0.1069	136.0357	-1	3.6696	1566
Liquidity (Current ratio)	Ratio	1.9117	1.4450	63.1700	0.1800	2.4403	1566
Liquidity (Quick ratio)	Ratio	1.4268	1.0000	63.1700	0.0900	2.3898	1566
Size (Sales)	Logarithm	6.4487	6.5128	10.7846	0.0000	1.0297	1566
Size, Total assets	Logarithm	6.4583	6.4699	11.4273	3.6567	0.9383	1566
Profitability - Return on assets	Decimal	0.1100	0.1176	1.3138	-5.9714	0.2853	1566
Profitability - Return on equity	Decimal	0.1039	0.1577	11.1502	-53.8612	1.5559	1566
Tangibility	Decimal	0.2736	0.2300	0.9000	0.0000	0.2116	1566

Note: HI is Herfindahl index and CN is shareholding percentage in decimals

The mean for the concentration of ownership at the top one shareholder level was 20.16% with a maximum of 85.51% and a median of 13.34%. The corresponding Herfindahl index was 7.29%. This means that on average, the highest shareholder held 20.16% of the shares. The inclusion of directors' shareholding in total, rather than for only one director, could imply that the actual level was lower. In addition, ownership by management included all management. Hence the manager with the highest shareholding could have held a small percentage of the shares. Faccio and Lang (2002:365) found lower levels of ownership concentration in developed economies whereas Claessens *et al.* (2000:100) observed higher levels of concentration in developing countries. The mean levels of ownership by the top shareholders were as follows: companies (7.24%), foreigners (3.89%), families (3.87%), Public Investment Corporation (2.26%), institutions (1.38%), black people (1.46%), government (0.30%), other shareholders (0.20%) and directors (19.29%). With the exception of directors' ownership whose data was in total rather than for the first shareholder, companies had the largest shareholding, followed by foreign shareholders and then family shareholders. The Public Investment Corporation shareholding was higher than that of all other institutional investors. Black shareholders held a small percentage, although this was more than that held by government. These results could indicate that these shareholders preferred to be the main shareholders in accordance with this order.

For the capital structure variables, the total debt ratio at book value was 49.48% and its equivalent at market value was 40.44%, with minimum values of 1.00% and 0.38% respectively and maxima, which make some firms almost all-debt firms. The results indicate that the South African firms had higher leverage than that found in other countries such as those in the study by De la Bruslerie and Latrous (2012:118), where the average was 22% for French companies from 1996 to1998. Cespedes *et al.* (2010:251) studied Brazilian companies, among others, and found a total debt to total debt and equity at book value ratio of 35.9%. A possible reason for the result is that South Africa is a bank-based economy although it also has a developed stock market. Companies develop long-standing relationships with banks and raise debt from them. Companies seemed to prefer to raise funding from the banks rather than the stock market.

The average short-term debt ratios were 36.85% at book value and 26.31% at market value. These were lower than the total debt ratios but were higher than the long-term debt ratios at book value (12.61%) and at market value (14.11%). Companies preferred to use more short-term debt than long-term debt in their capital structures. The leverage factor had an average of 2.26 with a maximum of 29.68 and a minimum of -96.59, revealing a high degree of variation. This ratio was not employed in any of the studies reviewed.

For the control variables, the average age of a firm was 25.63 years with a maximum of 55.00 years. This indicates that the firms investigated had been in business for fairly long periods.

Table 5.3 reports the means of ownership variables at the top two shareholders level.

Table 5.3: Descriptive statistics: Ownership and capital structure (top two shareholders)

	Mean	Median	Maximum	Minimum	Std. dev.	Observations
Concentration						
CN Top 2 shareholders	0.2814	0.2163	0.9318	0.0000	0.2093	1792
HI Top 2 shareholders	0.0824	0.0248	0.7371	0.0000	0.1290	1792
Shareholder type						
Institution - Top 2 shareholders	0.0280	0.0000	0.5473	0.0000	0.0584	1566
Public Investment Corporation - Top 2 shareholders	0.0286	0.0000	0.2670	0.0000	0.0493	1566
Family - Top 2 shareholders	0.0493	0.0000	0.8641	0.0000	0.1307	1792
Company - Top 2 shareholders	0.0899	0.0000	0.9318	0.0000	0.1765	1792
Black - Top 2 shareholders	0.0207	0.0000	0.5707	0.0000	0.0755	1792
Other - Top 2 shareholders	0.0046	0.0000	0.2321	0.0000	0.0221	1566
Government - Top 2 shareholders	0.0060	0.0000	0.2998	0.0000	0.0339	1566
Foreign - Top 2 shareholders	0.0546	0.0000	0.8550	0.0000	0.1360	1792
Directors - Top 2 shareholders	0.1929	0.0521	3.9418	0.0000	0.3595	1792

Note: HI is Herfindahl index and CN is shareholding percentage in decimals

The average percentage shareholding for the top two shareholders was 28.14% with a maximum of 93.18%. The average Herfindahl index for the top two shareholders was 0.08, which was marginally higher than the same measure at the top one shareholder level. The average shareholdings by companies, foreigners and families were 8.99%, 5.46% and 4.93% respectively. The Public Investment Corporation and the institutional investors held very similar percentages of 2.86% and 2.80% respectively, although the

institutional investors had a maximum ownership of 54.73% whereas the Public Investment Corporation had 26.70%. This could indicate that the Public Investment Corporation was not keen on holding very large shareholdings in investee companies. All other types of owners had high maximum ownership percentages, such as foreigners at 85.5%, reflecting their appetite to take ownership stakes when they deemed it fit. Average ownership by black people, government and other shareholders was 2.07%, 0.60% and 0.46% respectively reflecting the low ownership by black people and government. The government also had a low maximum shareholding of 29.98%.

Table 5.4 shows the summary statistics for ownership variables at the top three shareholders level. The average shareholding for the top three shareholders was 33.02% with a median of 26.90% showing that the typical shareholding was lower than the average. The Herfindahl index was 0.08 with a median of 0.03. Ownership by companies (9.86%), foreigners (6.36%), families (5.92%), institutional investors (3.98%), Public Investment Corporation (3.29%) and black people (2.35%) were in nearly the same range as at the top two shareholders levels. Government and other ownerships were below 1% while directors' shareholding was at the same level as explained above.

Table 5.4: Descriptive statistics: ownership and capital structure (top three shareholders)

	Mean	Median	Maximum	Minimum	Std. dev.	Observations
Concentration						
CN Top 3 shareholders	0.3302	0.2690	0.9623	0.0000	0.2206	1792
HI Top 3 shareholders	0.0850	0.0283	0.7371	0.0000	0.12977	1792
Shareholder type						
Institution - Top 3 shareholders	0.0398	0.0000	0.5473	0.0000	0.0646	1566
Public Investment Corporation - Top 3 shareholders	0.0329	0.0000	0.2670	0.0000	0.0496	1566
Family - Top 3 shareholders	0.0592	0.0000	0.8688	0.0000	0.1418	1792
Company - Top 3 shareholders	0.0986	0.0000	0.9318	0.0000	0.1798	1792
Black - Top 3 shareholders	0.02345	0.0000	0.5707	0.0000	0.0781	1792
Other - Top 3 shareholders	0.0070	0.0000	0.2321	0.0000	0.0255	1566
Government - Top 3 shareholders	0.0067	0.0000	0.2998	0.0000	0.0345	1566
Foreign - Top 3 shareholders	0.0636	0.0000	0.8550	0.0000	0.1391	1792
Directors - Top 3 shareholders	0.1929	0.0521	3.9418	0.0000	0.3595	1792

Note: HI is Herfindahl index and CN is shareholding percentage in decimals

Summary statistics for ownership variables at the top five shareholders level are shown in Table 5.5. The average shareholding for the top five shareholders was 39.16%, including the management shareholding at all levels as explained above. The Herfindahl

index increased slightly to 0.09. Companies, foreigners and families remained the largest shareholders with 10.59%, 7.55% and 7.02% respectively. Institutional investors, Public Investments Corporation and black people held 5.92%, 3.68% and 2.61% of the shares respectively. Institutional investors held a larger percentage of shares than Public Investment Corporation, while black people held a low percentage. Other shareholders ownership increased slightly below 1% while government ownership remained below 1%, showing that it is a small investor in listed companies.

Table 5.5: Descriptive statistics: ownership and capital structure (top five shareholders)

	Mean	Median	Maximum	Minimum	Std. dev.	Observations
Concentration						
CN Top 5 shareholders	0.3917	0.3433	0.9767	0.0000	0.2289	1792
HI Top 5 shareholders	0.0862	0.0297	0.7371	0.0000	0.1296	1792
Shareholder type						
Institution - Top 5 shareholders	0.0592	0.0354	0.6171	0.0000	0.0771	1566
Public Investment Corporation - Top 5 shareholders	0.0368	0.0000	0.2670	0.0000	0.0506	1566
Family - Top 5 shareholders	0.0702	0.0000	0.8824	0.0000	0.1517	1792
Company - Top 5 shareholders	0.1059	0.0248	0.9318	0.0000	0.1811	1792
Black - Top 5 shareholders	0.0261	0.0000	0.5947	0.0000	0.0806	1792
Other - Top 5 shareholders	0.0102	0.0000	0.2321	0.0000	0.0278	1566
Government - Top 5 shareholders	0.0066	0.0000	0.2998	0.0000	0.0338	1566
Foreign - Top 5 shareholders	0.0755	0.0146	0.8581	0.0000	0.1446	1792
Directors - Top 5 shareholders	0.1929	0.0521	3.9418	0.0000	0.3595	1792

Note: HI is Herfindahl index and CN is shareholding percentage in decimals

Table 5.6 shows the summary statistics of the top 10 shareholders.

Table 5.6: Descriptive statistics: ownership and capital structure (top ten shareholders)

	Mean	Median	Maximum	Minimum	Std. dev.	Observations
Concentration						
CN Top 10 shareholders	0.4770	0.4505	0.9835	0.0005	0.2362	1792
HI Top 10 shareholders	0.0863	0.030	0.7371	0.0000	0.1296	1792
Shareholder type						
Institution - Top 10 shareholders	0.0892	0.0646	0.5815	0.0000	0.0924	1566
Public Investment Corporation - Top 10 shareholders	0.0426	0.0145	0.3371	0.0000	0.0548	1566
Family - Top 10 shareholders	0.0835	0.0017	0.8928	0.0000	0.1612	1792
Company - Top 10 shareholders	0.1247	0.0396	0.9339	0.0000	0.1981	1792
Black - Top 10 shareholders	0.0289	0.0000	0.6109	0.0000	0.0810	1792
Other - Top 10 shareholders	0.0132	0.0000	0.4280	0.0000	0.0351	1566
Government - Top 10 shareholders	0.0072	0.0000	0.2998	0.0000	0.0347	1566
Foreign - Top 10 shareholders	0.0927	0.0345	0.8658	0.0000	0.1382	1792
Directors - Top 10 shareholders	0.1912	0.0516	3.9418	0.0000	0.3593	1792

Note: HI is Herfindahl index and CN is shareholding percentage in decimals

The average shareholding of the top 10 shareholders was 47.70%, with a median of 45.04%. This indicates that the top 10 shareholders comprised a large portion of the total shareholdings. The Herfindahl index remained unchanged at 0.09 from the top five

shareholders level to the top 10 shareholders level. This indicates that the shareholdings were largely below 5% for each of the successive shareholders after the top five shareholders level. Ownership by companies, foreigners and institutions was 12.47%, 9.27% and 8.92% respectively. Institutional ownership slightly surpassed family ownership (8.35%), perhaps reflecting the strong role played by institutional investors. Public Investment Corporation ownership and black ownership were at 4.26% and 2.89% respectively.

Considering that the Public Investment Corporation is a single entity, as compared with all other shareholders which are made up of different entities, this shows that it is an important player in the market. Directors' ownership was 19.12% in total, including all other shareholders beyond the top 10 level. This percentage indicates that the directors or management had a significant role in ownership of firms in South Africa. Black ownership was 2.89%. The government's shareholding was below 1%, while other shareholders owned 1.32% of listed shares. These results show that government ownership excluding Public Investment Corporation ownership was very low.

Table 5.7 shows the descriptive statistics for capital structure by industry. At the top 10 shareholders level, the consumer service industry had the highest shareholding at 56.37%. Directors held the largest shareholding in this industry. Government had no shareholding in consumer services and technology industries. Different shareholders held their shares in different industries.

The healthcare industry had the highest long-term debt ratio at book value (30.07%), while the technology had the maximum on short-term debt ratio at book value of 50.79%. Short-term ratios at both book and market values exceeded long-term debt ratios. Healthcare and oil and gas industries had the highest total debt ratios at book values of 66.62% and 61.52% respectively. The capital structure of firms varied across the different industries.

Table 5.7: Descriptive statistics for ownership and capital structure variables by industry (top 10 shareholders)

	Basic materials	Consumer goods	Consumer services	Healthcare	Industrials	Oil and gas	Technology	Telecommunications
Top 10 shareholding	0.4230	0.4809	0.5636	0.4266	0.4837	0.36444	0.5363	0.4654
Top 10 shareholding Herfindahl	0.0917	0.1074	0.1185	0.0318	0.0635	0.0742	0.0631	0.1062
Black Top 10 shareholders	0.0510	0.0129	0.0083	0.1170	0.0198	0.0070	0.0444	0.0071
Company Top 10 shareholders	0.0966	0.17513	0.1685	0.0491	0.1176	0.1632	0.1452	0.0909
Directors Top 10 shareholders	0.0965	0.0526	0.3450	0.1467	0.2254	0.1002	0.2972	0.2249
Family Top 10 shareholders	0.0409	0.048	0.1437	0.0156	0.1002	0.0421	0.1263	0.1571
Foreign Top 10 shareholders	0.1168	0.0851	0.0993	0.0842	0.0780	0.0676	0.0564	0.0908
Government Top 10 shareholders	0.0199	0.0052	0	0.0065	0.0035	0.0157	0	0.0007
Institutions Top 10 shareholders	0.0627	0.1091	0.0863	0.0532	0.1065	0.00871	0.1314	0.0517
Other Top 10 shareholders	0.0144	0.0078	0.0144	0.0116	0.0198	0.0150	0.01618	0.0073
Public Investment Corporation Top 10 shareholders	0.0277	0.0429	0.0415	0.0897	0.0420	0.0452	0.01656	0.0597
Long-term debt ratio, Book value	0.1047	0.1099	0.0905	0.3007	0.1512	0.1824	0.0468	0.1161
Short-term debt ratio, Book value	0.2597	0.3530	0.4087	0.3633	0.4088	0.4319	0.5079	0.4629
Total debt ratio, Book value	0.3645	0.4624	0.4990	0.6663	0.5598	0.6152	0.5546	0.5794
Leverage factor	2.9004	8.3806	1.8541	1.3949	2.4081	5.1196	1.9614	1.1070
Long-term debt ratio, Market value	0.1865	0.1088	0.0934	0.1952	0.1565	0.1836	0.0544	0.0974
Short-term debt ratio, Market value	0.1988	0.2197	0.2466	0.1276	0.3336	0.3102	0.3483	0.2749
Total debt ratio, Market value	0.3749	0.3271	0.3337	0.3095	0.4875	0.4938	0.3934	0.3722

Table 5.8 records the descriptive statistics of firms across different years. The ratios fluctuated across time but seemed to have no upward trend. The long-term debt ratio at book value was 11.60% and 11.83% in 2004 and 2014 respectively. A similar trend is noticed for the total debt ratio at market value, which was 41.38% in 2004 and 40.77% in 2014. The different shareholdings also exhibited a similar trend with the top 10 shareholders owning 50.42% and 49.73% of the share in 2004 and 2014 respectively. Directors' shareholding decreased slightly from 21.32% in 2004 to 14.52% in 2014, while foreign ownership increased from 7.80% to 10.32% during the same period.

Table 5.8: Descriptive statistics for ownership and capital structure variables by year (top 10 shareholders)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Long-term debt ratio, book value	0.1160	0.1106	0.11631	0.1099	0.1228	0.1439	0.1234	0.1120	0.11487	0.1209	0.1183
Short-term debt ratio, book value	0.3891	0.3762	0.3814	0.3799	0.3660	0.3495	0.3445	0.3473	0.3888	0.3455	0.3774
Total debt ratio, book value	0.5049	0.4868	0.4978	0.4897	0.4886	0.4931	0.4682	0.4594	0.5033	0.4672	0.4951
Leverage factor	3.9558	1.6107	1.9889	2.4037	2.3530	2.4134	1.6992	2.7882	0.9175	10.0602	3.0087
Long-term debt ratio, market value	0.1240	0.1081	0.1155	0.1031	0.1414	0.1746	0.1527	0.1473	0.1566	0.1598	0.1518
Short-term debt ratio, market value	0.2985	0.2357	0.2336	0.2077	0.2585	0.2856	0.2666	0.2691	0.2677	0.2686	0.2633
Total debt ratio, market value	0.4138	0.3382	0.3458	0.3069	0.3950	0.4518	0.4145	0.4098	0.4158	0.4214	0.4077
Top 10 shareholders	0.5043	0.4828	0.4689	0.4627	0.4749	0.4712	0.4778	0.4853	0.4908	0.4916	0.4973
Top 10 shareholders Herfindahl index	0.1016	0.0907	0.0810	0.0814	0.0805	0.0775	0.0805	0.0852	0.0919	0.0915	0.0988
Black: Top 10 shareholders	0.0146	0.0176	0.0197	0.0216	0.0276	0.0350	0.0355	0.0345	0.0340	0.0300	0.0311
Company: Top 10 shareholders	0.1525	0.1361	0.1243	0.1255	0.1253	0.1171	0.1144	0.1243	0.1245	0.1316	0.1369
Directors: Top 10 shareholders	0.2132	0.2037	0.2179	0.2183	0.2119	0.1974	0.1909	0.1886	0.1835	0.1640	0.1453
Family: Top 10 shareholders	0.0769	0.0767	0.0786	0.0792	0.0887	0.0868	0.0976	0.0882	0.0932	0.0855	0.0831
Foreign: Top 10 shareholders	0.0781	0.0848	0.0858	0.0911	0.0848	0.0874	0.0959	0.1002	0.0975	0.1005	0.1032
Government: Top 10 shareholders	0.0055	0.0081	0.0076	0.0094	0.0072	0.0089	0.0076	0.0075	0.0074	0.0072	0.0067
Institutions: Top 10 shareholders	0.1157	0.1068	0.1004	0.0888	0.0898	0.0879	0.0781	0.0802	0.0832	0.0814	0.0804
Other: Top 10 shareholders	0.0278	0.0237	0.0204	0.0142	0.0187	0.0156	0.0128	0.0109	0.0097	0.0119	0.0098
Public Investment Corporation: Top 10 shareholders	0.0309	0.0340	0.0326	0.0330	0.0325	0.0352	0.0387	0.0410	0.0434	0.0444	0.0476

5.4 CORRELATION ANALYSIS FOR OWNERSHIP AND CAPITAL STRUCTURE VARIABLES

Pearson's correlation coefficients were used to assess the presence of a linear relationship between ownership variables, as represented by ownership concentration variables and ownership-type variables as the independent variables, and capital structure variables as the dependent variables and control variables. Pearson's correlation coefficient was appropriate because the variables used in the study were continuous in nature. The correlation coefficients (r) vary from -1 for perfect negative correlation and +1 for perfect positive correlation. The p-values, representing the levels of significance of the correlation coefficients for the variables, are generally measured at the 1%, 5% and sometimes up to the 10% levels of significance. When the p-values obtained are below 0.01, 0.05 and 0.10 for the 1%, 5% and 10% levels of significance respectively, then the results are said to be statistically significant at that level. P-values in excess of the cut-off values are said to be insignificant.

5.4.1 Pearson's correlation coefficients for capital structure variables

Seven capital structure variables were employed in this study, namely long-term debt ratio calculated using book value, long-term debt ratio calculated using market value, short-term debt ratio calculated using book value, short-term debt ratio calculated using market value, total debt ratio based on book value, total debt ratio based on market value, and the leverage factor. Pearson's correlation coefficients for alternative capital structure variables are shown in Table 5.9.

Table 5.9: Pearson's correlation coefficients for capital structure variables: period 2004 to 2014

Null hypothesis: H_o: r = 0							
	Long-term debt ratio (BV)	**Long-term debt ratio (MV)**	**Short-term debt ratio (BV)**	**Short-term debt ratio (MV)**	**Total debt ratio (BV)**	**Total debt ratio (MV)**	**Leverage factor**
Long-term debt ratio (BV)	1.0000						
p-value							
Long-term debt ratio (MV)	0.6755	1.0000					
p-value	0.0000						
Short-term debt ratio (BV)	-0.1570	-0.3722	1.0000				
p-value	0.0000	0.0000					
Short-term debt ratio (MV)	-0.1819	-0.0460	0.6175	1.0000			
p-value	0.0000	0.0790	0.0000				
Total debt ratio (BV)	0.4920	0.0984	0.7823	0.4300	1.0000		
p-value	0.0000	0.0002	0.0000	0.0000			
Total debt ratio (MV)	0.2561	0.5638	0.2864	0.7990	0.4147	1.0000	
p-value	0.0000	0.0000	0.0000	0.0000	0.0000		
Leverage factor	0.0156	0.0183	-0.0085	-0.0065	0.0029	0.0057	1.0000
p-value	0.5530	0.4844	0.7453	0.8055	0.9131	0.8287	

BV = book value and MV = market value

Results shown in Table 5.9 compare the extent to which possible measures of capital structure, which are dependent variables in this study, are associated with each other. The highest and positive Pearson's correlation coefficient in the table is 0.80, which is statistically significant at the 1% level, showing the association between the short-term debt ratios based on market value and total debt ratios based on market value. The positive relationship means that high levels of short-term debt ratios based on market value are associated with high values of total debt ratios based on market value. Short-term debt ratio based on market value is a direct component of the total debt ratio based on market value. Hence this could explain the reason for the high correlation coefficient between the two capital variables.

The correlation coefficient between short-term debt ratios based on book value and total debt ratio based on book value is 0.78, which is positive and statistically significant at the 1% level. The short-term debt ratios measured from book value are components of the total debt ratios measure using book value. The relationship between these variables could therefore explain the degree of association found between these capital structure variables.

Another high, positive and statistically significant correlation coefficient (r=0.67 and p-value = 0.00) is found between long-term debt ratio measured at book value and long-term debt measured at market value. This result is significant at the 1% level. The relationship means that high levels of long-term debt ratio based on book value are associated with high levels of long-term debt ratio based on market value. The reason for this result could be that the two variables measure the same underlying concept, namely long-term debt ratio, but using different methods of measurement, which are book value and market value.

Short-term debt ratios based on book value have a high and positive correlation coefficient (0. 62) with short-term debt ratios based on market value. The result is significant at the 1% level. Since both ratios measure the percentage of short-term debt, albeit using different measurement methods, this could explain the degree of association between these variables.

Pearson's correlation coefficients between capital structure variables in the study are statistically significant, mainly at the 1% level, with a number of them being high, while others are low. To the extent that there are high correlations between the variables, it has to be decided whether or not the variables should be used together or independently, in the further analysis. It appears that the evidence points to the use of the capital structure variables separately in the analysis of the effects of ownership on capital structure in South African-listed non-financial firms.

5.4.2 Correlation analysis for concentration of ownership variables

The concentration of ownership variables used in the study is percentages of shares owned by top shareholders and the Herfindahl index. The top shareholders are the top one, two, three, five and 10 shareholders and the Herfindahl index is calculated for each corresponding level of shareholding. Pearson's correlation coefficients for the ownership concentration variables are presented in Table 5.10.

Table 5.10: Pearson's correlation coefficients for ownership concentration variables with capital structure as the dependent variable: period 2004 to 2014

Null hypothesis: Ho : r = 0										
	Top 1 shareholder	**Top 2 shareholders**	**Top 3 shareholders**	**Top 5 shareholders**	**Top 10 shareholders**	**H I Top 1 shareholder**	**H I Top 2 shareholders**	**H I Top 3 shareholders**	**H I Top 5 shareholders**	**H I Top 10 shareholders**
Top 1 shareholder	1									
p-value										
Top 2 shareholders	0.9670	1								
p-value	0.0000									
Top 3 shareholders	0.9413	0.9914	1							
p-value	0.0000	0.0000								
Top 5 shareholders	0.8992	0.9639	0.9876	1						
p-value	0.0000	0.0000	0.0000							
Top 10 shareholders	0.8231	0.8984	0.9349	0.9727	1					
p-value	0.0000	0.0000	0.0000	0.0000						
H I Top 1 shareholder	0.9567	0.8903	0.8511	0.7936	0.7087	1				
p-value	0.0000	0.0000	0.0000	0.0000	0.0000					
H I Top 2 shareholders	0.9638	0.9251	0.8900	0.8349	0.7499	0.9932	1			
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000				
H I Top 3 shareholders	0.9646	0.9303	0.8992	0.8469	0.7635	0.9911	0.9994	1		
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			
H I Top 5 shareholders	0.9644	0.9319	0.9028	0.8531	0.7712	0.9896	0.9986	0.9997	1	
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
H I Top 10 shareholders	0.9643	0.9319	0.9029	0.8534	0.7718	0.9895	0.9985	0.9996	1.0000	1
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	

HI - Herfindhal index calculated on individual shareholdings of 5% or more

Pearson's correlation coefficients for all the variables are high and statistically significant at the 1% level, with a minimum coefficient of 0.71 and a maximum of nearly one. The high covariance between the measures of ownership concentration means that their explanatory power would be low if they were used together in further analysis. The addition of another variable which has a high correlation coefficient would not provide further information in the attempt to examine the relationship between ownership of a firm and its capital structure. Pearson's correlation coefficients between the shareholding percentages of the top one, two, three, five and 10 shareholders have an even higher minimum of 0.82 and a p-value of 0.00, which is statistically significant at

the 1% level. This result is interpreted to mean that the variables of the ownership by the top one, two, three, five and 10 shareholders have to be used separately as independent variables and not be combined in a single equation. The analysis therefore proceeds on the basis that each level of shareholding will be treated separately from the other levels.

A possible reason for the high correlation coefficients is that the five levels of ownership concentration, namely top one shareholding, top two, top three, top five and top 10 shareholdings, are cumulative. The first level of shareholdings is included in the second level shareholdings, up to the top 10 shareholding. As the shareholdings start with the largest, the next levels tend to be smaller, thereby exacerbating the effect of the earlier shareholdings in the relationship. Use of each level of shareholding separately enables independent examination of the effects of ownership concentration on capital structure.

The Herfindahl index variables form the second set of ownership concentration variables calculated at the levels of the top one, two, three, five and 10 shareholders ownership percentages and the results from Pearson's correlation coefficients show that they are highly correlated, with a minimum coefficient of 0.99 and a p-value of 0.00, which is significant at the 1% level. An explanation for the even higher levels of correlation is that the Herfindahl indices are only calculated for any single shareholder of 5% or more. As a result, if the increase in shareholding percentage from the top one shareholder to the top two shareholders, and further, is below 5% shareholding for any new (incoming) shareholder, then the index will not change from top one shareholder to top two shareholders and beyond. Such an occurrence is not unlikely given that the increase in shareholding from one level to the next is in decreasing order, thereby increasing the probability of additional individual shareholdings which are less than 5%. These results also mean that Herfindahl index variables must only be used separately because of the high levels of correlation.

Pearson's correlation coefficients between the levels of shareholdings and the Herfindahl indices at those levels are slightly smaller with the minimum coefficient of 0.71, with a p-value of 0.00, which is statistically significant at the 1% level. This result when the Herfindahl index is calculated for the top one shareholder and the total shareholding is for the top 10 shareholders. The results mean that the measures of

ownership concentration, namely the percentages of ownership at different levels of shareholding, and the Herfindahl indices at those levels cannot be combined to explain the relationships between ownership and capital structure and ownership and firm performance.

The implication of these results is that the Herfindahl indices are used separately from each other in the models, the levels of shareholdings are used separately from each other in the models and that the Herfindahl indices and the levels of shareholdings have to be separated in the further analysis.

5.4.3 Correlation analysis for ownership-type variables

Ownership type was divided into the following categories: black, company, directors, family, foreign, government, institutional investors, other and Public Investment Corporation. The analysis was conducted for the top one shareholder, top two shareholders, top three shareholders, top five shareholders and top 10 shareholder levels.

5.4.3.1 *Correlation coefficients for top one shareholder*

For the top one shareholder, the highest Pearson's correlation coefficient between the ownership-type variables is between the director and family ownerships, which is positive and statistically significant at the 1% level (r = 0.35, p-value = 0.00). Directors' ownership increased with family ownership. However, the correlation coefficient is considered to be low enough to render the use of the two variables meaningful. Ownership by companies and Public Investment Corporation has the next highest Pearson's correlation coefficient, which is negative and statistically significant at the 1% level (r = -0.22, p-value 0.00). This means that increased company ownership is associated with decreased Public Investment Corporation ownership.

Most of Pearson's correlation coefficients at the top one shareholder level are negative. Some variables have statistically insignificant relationships while others have statistically significant relationships with each other. However, the correlation coefficients are low (below 10%). The extent of the relationships points to the

confirmation that the types of ownerships could be used in further analysis. Results from the Pearson's correlation analysis of these variables are shown in Table 5.11.

Table 5.11: Pearson's correlation coefficients for ownership-type variables: period 2004 to 2014 for the top one shareholder

Null hypothesis: Ho: r = 0									
	Black: Top 1 shareholder	**Company: Top 1 shareholder**	**Directors: Top 1 shareholder**	**Family: Top 1 shareholder**	**Foreign: Top 1 shareholder**	**Government: Top 1 shareholder**	**Institutions: Top 1 shareholder**	**Other: Top 1 shareholder**	**Public Investment Corporation: Top 1 shareholder**
Black: Top 1 shareholder p-value	1								
Company: Top 1 shareholder p-value	-0.1040 0.0001	1							
Directors: Top 1 shareholder p-value	0.0041 0.8765	0.1528 0.0000	1						
Family: Top 1 shareholder p-value	-0.0692 0.0082	-0.1358 0.0000	0.3474 0.0000	1					
Foreign: Top 1 shareholder p-value	-0.0730 0.0053	-0.1433 0.0000	-0.0968 0.0002	-0.0954 0.0003	1				
Government: Top 1 shareholder p-value	-0.0229 0.3833	-0.0448 0.0871	-0.0319 0.2239	-0.0298 0.2548	-0.0298 0.2548	1			
Institutions: Top 1 shareholder p-value	-0.0658 0.0120	-0.1290 0.0000	0.0005 0.9845	-0.0859 0.0010	-0.0859 0.0010	-0.0284 0.2793	1		
Other: Top 1 shareholder p-value	-0.0317 0.2264	-0.0622 0.0176	0.0020 0.9395	-0.0414 0.1140	-0.0414 0.1140	-0.0137 0.6020	-0.0393 0.1332	1	
Public Investment Corporation: Top 1 shareholder p-value	-0.1117 0.0000	-0.2192 0.0000	-0.2134 0.0000	-0.1459 0.0000	-0.1459 0.0000	-0.0482 0.0659	-0.1386 0.0000	-0.0668 0.0107	1

5.4.3.2 *Correlation coefficients for top two shareholders*

Pearson's correlation coefficients for ownership-type variables at the top two shareholders level are shown in Table 5.12.

Table 5.12: Pearson's correlation coefficients for ownership-type variables: period 2004 to 2014 for the top two shareholders

Null hypothesis: Ho: r = 0									
	Black: Top 2 shareholders	**Company: Top 2 shareholders**	**Directors: Top 2 shareholders**	**Family: Top 2 shareholders**	**Foreign: Top 2 shareholders**	**Government: Top 2 shareholders**	**Institutions: Top 2 shareholders**	**Other: Top 2 shareholders**	**Public Investment Corporation: Top 2 shareholders**
Black: Top 2 shareholders	1								
p-value									
Company: Top 2 shareholders	-0.1032	1							
p-value	0.0001								
Directors: Top 2 shareholders	0.0085	0.1632	1						
p-value	0.7456	0.0000							
Family: Top 2 shareholders	-0.0808	-0.0903	0.3839	1					
p-value	0.0020	0.0006	0.0000						
Foreign: Top 2 shareholders	-0.0775	-0.1552	-0.1165	-0.1147	1				
p-value	0.0031	0.0000	0.0000	0.0000					
Government: Top 2 shareholders	0.0901	0.0350	-0.0651	-0.0598	0.0143	1			
p-value	0.0006	0.1820	0.0128	0.0224	0.5853				
Institutions: Top 2 shareholders	-0.1048	-0.1180	-0.0038	-0.0854	-0.1102	-0.0730	1		
p-value	0.0001	0.0000	0.8847	0.0011	0.0000	0.0053			
Other: Top 2 shareholders	-0.1048	-0.0697	0.0228	-0.0408	-0.0665	-0.0369	-0.0353	1	
p-value	0.0001	0.0078	0.3834	0.1190	0.0111	0.1593	0.1779		
Public Investment Corporation: Top 2 shareholders	-0.1158	-0.1895	-0.2480	-0.2113	-0.0672	-0.0931	-0.1287	-0.0839	1
p-value	0.0000	0.0000	0.0000	0.0000	0.0103	0.0004	0.0000	0.0013	

Pearson's correlation coefficient between the top two shareholders for families and top two shareholders for directors is the largest at the top two shareholders level, at 0.38 and a p-value of 0.00, making it significant at the 1% level. The second-highest absolute

correlation coefficient is between ownership by the Public Investment Corporation and ownership by directors, which is negative, at -0.25 and a p-value of 0.00, making it significant at the 1% level. It appears that directors did not prefer to own shares in companies where Public Investment Corporation was one of the top two shareholders. This could imply that the Public Investment Corporation was seen as an institutional investor with a monitoring capacity, which was not desirable to directors. Pearson's correlation coefficients between other variables are low and mainly statistically significant at the 1% and 5% levels. It is concluded on this basis that the ownership-type variables are not significantly correlated and therefore are used as a group in further analysis of the effects of ownership on capital structure.

5.4.3.3 *Correlation coefficients for top three shareholders*

Pearson's correlation coefficient between ownership by directors and by families is 0.41, with a p-value of 0.00. Ownership by directors increased with ownership by families, which is a statistically significant correlation at the 1% level. Apart from the negative correlation coefficient of -0.27 between ownership by directors and Public Investment Corporation ownership, the other coefficients are much smaller, signifying the lack of a strong relationship between the variables. However, the small correlation coefficients are, in the main, statistically significant at the 1% level. The direction of the relationship is mixed, with both positive and negative coefficients. Therefore, the types of ownership variables can be used together to explore the effects of ownership on capital structure. Pearson's correlation coefficients for ownership-type variables at the top three shareholders level are shown in Table 5.13.

Table 5.13: Pearson's correlation coefficients for ownership-type variables: period 2004 to 2014 for the top three shareholders

Null hypothesis: Ho: r = 0									
	Black: Top 3 shareholders	**Company: Top 3 shareholders**	**Directors: Top 3 shareholders**	**Family: Top 3 shareholders**	**Foreign: Top 3 shareholders**	**Government: Top 3 shareholders**	**Institutions: Top 3 shareholders**	**Other: Top 3 shareholders**	**Public Investment Corporation: Top 3 shareholders**
Black: Top 3 shareholders	1								
p-value									
Company: Top 3 shareholders	-0.0991	1							
p-value	0.0002								
Directors: Top 3 shareholders	0.0080	0.1740	1						
p-value	0.7590	0.0000							
Family: Top 3 shareholders	-0.0874	-0.0718	0.4057	1					
p-value	0.0008	0.0061	0.0000						
Foreign: Top 3 shareholders	-0.0787	-0.1321	-0.1281	-0.1239	1				
p-value	0.0026	0.0000	0.0000	0.0000					
Government: Top 3 shareholders	0.1090	0.0237	-0.0649	-0.0611	0.0090	1			
p-value	0.0000	0.3668	0.0131	0.0197	0.7321				
Institutions: Top 3 shareholders	-0.0869	-0.1246	-0.0270	-0.1064	-0.1608	-0.0678	1		
p-value	0.0009	0.0000	0.3036	0.0000	0.0000	0.0096			
Other: Top 3 shareholders	-0.0162	-0.0862	0.0296	-0.0295	-0.0397	-0.0487	0.0149	1	
p-value	0.5353	0.0010	0.2591	0.2598	0.1294	0.0630	0.5694		
Public Investment Corporation: Top 3 shareholders	-0.1017	-0.1744	-0.2735	-0.2559	0.0054	-0.0551	-0.1344	-0.1073	1
p-value	0.0001	0.0000	0.0000	0.0000	0.8378	0.0354	0.0000	0.0000	

5.4.3.4 *Correlation coefficients for top five shareholders*

At the top five shareholders ownership level, the highest and next highest Pearson's correlation coefficients are similar to the ones at the lower levels, but the correlation coefficients are slightly higher, at 0.42 and -0.30 respectively, with both being

statistically significant at the 1% level, with p-values of 0.00. The directions of the relationships between the remainder of the variables remain largely the same at the top five shareholders level. Even at the higher levels, the correlation coefficients are judged to be small enough not to influence the results of further analysis, leaving all nine variables as explanatory variables. Table 5.14 shows Pearson's correlation coefficients for ownership-type variables at the top five shareholders level.

Table 5.14: Pearson's correlation coefficients for ownership-type variables: period 2004 to 2014 for the top five shareholders

Null hypothesis: Ho: r = 0									
	Black: Top 5 shareholders	**Company: Top 5 shareholders**	**Directors: Top 5 shareholders**	**Family: Top 5 shareholders**	**Foreign: Top 5 shareholders**	**Government: Top 5 shareholders**	**Institutions: Top 5 shareholders**	**Other: Top 5 shareholders**	**Public Investment Corporation: Top 5 shareholders**
Black: Top 5 shareholders	1								
p-value									
Company: Top 5 shareholders	-0.0991	1							
p-value	0.0002								
Directors: Top 5 shareholders	0.0079	0.1895	1						
p-value	0.7631	0.0000							
Family: Top 5 shareholders	-0.0771	-0.0502	0.4189	1					
p-value	0.0032	0.0554	0.0000						
Foreign: Top 5 shareholders	-0.0615	-0.1369	-0.1458	-0.1402	1				
p-value	0.0189	0.0000	0.0000	0.0000					
Government: Top 5 shareholders	0.0961	0.0218	-0.0644	-0.0636	0.0127	1			
p-value	0.0002	0.4050	0.0139	0.0152	0.6279				
Institutions: Top 5 shareholders	-0.1088	-0.1350	-0.0449	-0.1287	-0.2038	-0.0652	1		
p-value	0.0000	0.0000	0.0866	0.0000	0.0000	0.0128			
Other: Top 5 shareholders	-0.0260	-0.0676	0.0486	0.0101	-0.0572	-0.0507	0.0636	1	
p-value	0.3212	0.0099	0.0636	0.6988	0.0289	0.0529	0.0151		
Public Investment Corporation: Top 5 shareholders	-0.0816	-0.1691	-0.2871	-0.3010	0.0495	-0.0440	-0.0985	-0.1110	1
p-value	0.0018	0.0000	0.0000	0.0000	0.0587	0.0931	0.0002	0.0000	

5.4.3.5 *Correlation coefficients for top 10 shareholders*

Pearson's correlation coefficient between ownership by directors and by families is 0.43 with a p-value of 0.00 and between ownership by families and by Public Investment Corporation -0.34 with a p-value of 0.00. The correlation coefficients between other ownership-type variables increased very slightly but remained small enough not to affect the decision on the issue of whether the composition of the ownership-type variables should be changed. Incremental changes in the correlation coefficients could be attributed to the changes in the variables as the number of shareholders increased.

Black ownership had a negative association with all other ownership types except directors and government. A possible reason for the positive association with government ownership was that government ownership included ownership by state-owned corporations such as the Industrial Development Corporation of South Africa, a development financial institution which is, among other things, tasked with enlarging the country's industrial base by funding previously disadvantaged individuals, namely black people. The positive association with directors could be that some of the directors were black. Negative associations could be due to the emotive connotations that have been generally associated with black ownership, including re-distribution of wealth. Pearson's correlation coefficients for ownership-type variables at the top 10 shareholders level are shown in Table 5.15.

Table 5.15: Pearson's correlation coefficients for ownership-type variables: period 2004 to 2014 for the top 10 shareholders

Null hypothesis: Ho: r = 0									
	Black: Top 10 shareholders	**Company: Top 10 shareholders**	**Directors: Top 10 shareholders**	**Family: Top 10 shareholders**	**Foreign: Top 10 shareholders**	**Government: Top 10 shareholders**	**Institutions: Top 10 shareholders**	**Other: Top 10 shareholders**	**Public Investment Corporation: Top 10 shareholders**
Black: Top 10 shareholders	1								
p-value									
Company: Top 10 shareholders	-0.1102	1							
p-value	0.0000								
Directors: Top 10 shareholders	0.0166	0.1474	1						
p-value	0.5271	0.0000							
Family: Top 10 shareholders	-0.0380	-0.0611	0.4353	1					
p-value	0.1469	0.0197	0.0000						
Foreign: Top 10 shareholders	-0.0397	-0.1433	-0.1672	-0.1995	1				
p-value	0.1292	0.0000	0.0000	0.0000					
Government: Top 10 shareholders	0.0956	0.0012	-0.0691	-0.0720	0.0182	1			
p-value	0.0003	0.9650	0.0084	0.0059	0.4884				
Institutions: Top 10 shareholders	-0.1010	-0.1800	-0.0544	-0.0979	-0.2353	-0.0668	1		
p-value	0.0001	0.0000	0.0378	0.0002	0.0000	0.0107			
Other: Top 10 shareholders	-0.0472	-0.0393	0.0660	0.0173	-0.0186	-0.0255	0.0489	1	
p-value	0.0717	0.1337	0.0117	0.5100	0.4774	0.3310	0.0618		
Public Investment Corporation: Top 10 shareholders	-0.0885	-0.1971	-0.2926	-0.3434	0.1756	-0.0586	-0.0514	-0.1029	1
p-value	0.0007	0.0000	0.0000	0.0000	0.0000	0.0252	0.0499	0.0001	

The main conclusion from this section is that all the ownership-type variables had low correlation but statistically significant coefficients with each other and will therefore be used as explanatory variables in further analysis.

5.4.4 Correlation analysis for concentration of ownership and ownership-type variables

The extent to which the two sets of independent variables, ownership concentration and ownership type were related, was examined in order to understand the extent to which they were correlated. In terms of the way the data was structured, only correlation coefficients for the concentration levels directly related to the number of shareholders

were considered. Top one shareholdings and Herfindahl indices at the top one shareholdings were compared with types of ownerships at top one shareholder level only, all the way to the top 10 level.

Table 5.16 shows Pearson's correlation coefficients between ownership concentration variable and ownership-type variables, namely black ownership and company ownership.

Table 5.16: Pearson's correlation coefficients between black ownership and ownership concentration variables and between company ownership and ownership concentration variables: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Black Top 1 shareholder	**Black Top 2 shareholders**	**Black Top 3 shareholders**	**Black Top 5 shareholders**	**Black Top 10 shareholders**	**Company Top 1 shareholder**	**Company Top 2 shareholders**	**Company Top 3 shareholders**	**Company Top 5 shareholders**	**Company Top 10 shareholders**
Top 1 shareholder	0.0994	0.0950	0.0919	0.0851	0.0801	0.6086	0.6124	0.6218	0.6150	0.6549
p-value	0.0001	0.0003	0.0004	0.0011	0.0022	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 1 shareholder	0.0430	0.0314	0.0287	0.0203	0.0137	0.6100	0.6033	0.6084	0.5986	0.6394
p-value	0.1007	0.2310	0.2738	0.4388	0.6022	0.0000	0.0000	0.0000	0.0000	0.0000
Top 2 shareholders	0.1213	0.1288	0.1268	0.1219	0.1161	0.5629	0.5958	0.6120	0.6098	0.6722
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 2 shareholders	0.0507	0.0429	0.0401	0.0322	0.0249	0.6062	0.6137	0.6211	0.6124	0.6628
p-value	0.0531	0.1014	0.1256	0.2187	0.3413	0.0000	0.0000	0.0000	0.0000	0.0000
Top 3 shareholders	0.1222	0.1323	0.1343	0.1312	0.1290	0.5326	0.5706	0.5943	0.5959	0.6692
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 3 shareholders	0.0512	0.0441	0.0422	0.0347	0.0282	0.6037	0.6134	0.6228	0.6149	0.6684
p-value	0.0507	0.0922	0.1069	0.1858	0.2819	0.0000	0.0000	0.0000	0.0000	0.0000
Top 5 shareholders	0.1220	0.1345	0.1385	0.1386	0.1427	0.4987	0.5382	0.5666	0.5739	0.6444
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 5 shareholders	0.0508	0.0440	0.0425	0.0352	0.0295	0.6029	0.6132	0.6234	0.6166	0.6705
p-value	0.0524	0.0931	0.1044	0.1786	0.2609	0.0000	0.0000	0.0000	0.0000	0.0000
Top 10 shareholders	0.1159	0.1284	0.1323	0.1354	0.1533	0.4479	0.4873	0.5181	0.5307	0.5906
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 10 shareholders	0.0507	0.0439	0.0424	0.0351	0.0293	0.6030	0.6133	0.6236	0.6167	0.6706
p-value	0.0531	0.0941	0.1056	0.1802	0.2631	0.0000	0.0000	0.0000	0.0000	0.0000

HI - Herfindhal index calculated on individual shareholdings of 5% or more

For the black ownership variable and concentration of ownership variables, Pearson's correlation coefficients are positive and statistically significant at 1%, with a maximum of 0.15 and p-value of 0.00 for black ownership under the top 10 shareholders. Apart from being statistically significant, Pearson's correlation coefficients between ownership concentration and black ownership are small and it is decided that potentially the black

ownership variable could be used together with the ownership concentration variables. On the other hand, the high levels of statistical significance indicate that the correlation between the two variables cannot be ignored.

Pearson's correlation coefficients between company ownership and ownership concentration variables are positive and statistically significant at 1%, with a maximum of 0.67 and a p-value of 0.00, when the top 10 shareholdings are compared with company ownership. Similar results are obtained for the correlation between ownership concentration variables and company ownership. High correlation coefficients indicate multicollinearity, meaning that the variables (company ownership and ownership concentration variables) cannot be used together if unbiased results are to be obtained.

Pearson's correlation coefficients between ownership concentration and directors' and family ownership variables are shown in Table 5.17 Directors' ownership variables are positively and statistically significantly related to the ownership concentration variables, with the highest Pearson's correlation coefficient at 0.27 and a p-value of 0.00, which is achieved at the level of the top five shareholdings. Smaller but statistically significant coefficients, at the 1% level, are obtained with the other ownership-type variables. Directors' shareholdings increased with whatever level of ownership concentration was found in the firms. The correlation coefficients are low enough for the directors' ownership and ownership concentration variables to be used together in the analysis.

Family ownership and ownership concentration variables have positive Pearson's correlation coefficients, which increased with the levels of ownership concentration only, but not with the Herfindahl indices. The positive relationship means that family ownership was positively associated with all levels of ownership. The highest correlation coefficient is with shareholding at the top 10 shareholding level, at 0.41, with a p-value of 0.00, which is significant at the 1% level. The coefficients are low but statistically significant, leading to the conclusion that the variables can be used in further analysis concurrently.

Table 5.17: Pearson's correlation coefficients between directors' ownership and ownership concentration variables and between family ownership and ownership concentration variables: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Directors Top 1 shareholder	Directors Top 2 shareholders	Directors Top 3 shareholders	Directors Top 5 shareholders	Directors Top 10 shareholders	Family Top 1 shareholders	Family Top 2 shareholders	Family Top 3 shareholders	Family Top 5 shareholders	Family Top 10 shareholders
Top 1 shareholder	0.2458	0.2458	0.2458	0.2458	0.2433	0.3654	0.3509	0.3459	0.3220	0.3005
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 1 shareholder	0.2306	0.2306	0.2306	0.2306	0.2300	0.3574	0.3253	0.3135	0.2849	0.2596
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Top 2 shareholders	0.2512	0.2512	0.2512	0.2512	0.2474	0.3598	0.3751	0.3795	0.3619	0.3357
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 2 shareholders	0.2351	0.2351	0.2351	0.2351	0.2340	0.3650	0.3460	0.3370	0.3095	0.2810
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012
Top 3 shareholders	0.2650	0.2650	0.2650	0.2650	0.2604	0.3568	0.3818	0.3945	0.3841	0.3598
p-value	0.0000	0.0000	0.0000	0.0000	0.2650	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 3 shareholders	0.2408	0.2408	0.2408	0.2408	0.2395	0.3673	0.3508	0.3440	0.3182	0.2899
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007
Top 5 shareholders	0.2726	0.2726	0.2726	0.2726	0.2668	0.3539	0.3899	0.4100	0.4109	0.3929
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 5 shareholders	0.2441	0.2441	0.2441	0.2441	0.2425	0.3688	0.3542	0.3491	0.3253	0.2974
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006
Top 10 shareholders	0.2631	0.2631	0.2631	0.2631	0.2566	0.3367	0.3803	0.4037	0.4144	0.4125
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 10 shareholders	0.2443	0.2443	0.2443	0.2443	0.2428	0.3689	0.3544	0.3493	0.3258	0.2980
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006

HI - Herfindhal index calculated on individual shareholdings of 5% or more

Table 5.18 shows Pearson's correlation coefficients between foreign ownership and ownership concentration variables and between government ownership and ownership concentration variables. Foreign ownership variables have positive and statistically significant (at the 1% level) relationships with ownership concentration variables. The highest coefficient is 0.35 with a p-value of 0.00. Foreign ownership therefore increased with all levels of ownership concentration. The correlation coefficients are small and therefore the ownership variables can be used in further analysis together with foreign ownership variables.

Table 5.18: Pearson's correlation coefficients between foreign ownership and ownership concentration variables and between government ownership and ownership concentration variables: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Foreign Top 1 shareholder	Foreign Top 2 shareholders	Foreign Top 3 shareholders	Foreign Top 5 shareholders	Foreign Top 10 shareholders	Government Top 1 shareholder	Government Top 2 shareholders	Government Top 3 shareholders	Government Top 5 shareholders	Government Top 10 shareholders
Top 1 shareholder	0.3550	0.3395	0.3236	0.3024	0.1707	0.0138	0.1076	0.1034	0.1038	0.1033
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.5987	0.0000	0.0001	0.0001	0.0001
H I Top 1 shareholder	0.3444	0.3216	0.3021	0.2800	0.1289	-0.0113	0.0781	0.0720	0.0741	0.0717
p-value	0.0000	0.0000	0.0000	0.0000	0.0025	0.6674	0.0028	0.0059	0.0046	0.0062
Top 2 shareholders	0.3532	0.3544	0.3424	0.3225	0.1826	0.0250	0.1299	0.1276	0.1267	0.1278
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.3394	0.0000	0.0000	0.0000	0.0000
H I Top 2 shareholders	0.3495	0.3324	0.3133	0.2903	0.1322	-0.0079	0.0883	0.0825	0.0842	0.0821
p-value	0.0000	0.0000	0.0000	0.0000	0.0012	0.7638	0.0007	0.0016	0.0013	0.0017
Top 3 shareholders	0.3558	0.3625	0.3538	0.3355	0.1944	0.0245	0.1252	0.1243	0.1237	0.1244
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.3499	0.0000	0.0000	0.0000	0.0000
H I Top 3 shareholders	0.3530	0.3368	0.3182	0.2951	0.1350	-0.0082	0.0878	0.0822	0.0841	0.0817
p-value	0.0000	0.0000	0.0000	0.0000	0.0007	0.7551	0.0008	0.0017	0.0013	0.0018
Top 5 shareholders	0.3334	0.3450	0.3400	0.3264	0.2060	0.0153	0.1074	0.1073	0.1068	0.1080
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.5589	0.0000	0.0000	0.0000	0.0000
H I Top 5 shareholders	0.3534	0.3375	0.3189	0.2960	0.1361	-0.0087	0.0867	0.0811	0.0829	0.0804
p-value	0.0000	0.0000	0.0000	0.0000	0.0006	0.7407	0.0009	0.0020	0.0015	0.0021
Top 10 shareholders	0.3024	0.3174	0.3175	0.3115	0.2281	0.0011	0.0820	0.0826	0.0819	0.0830
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.9667	0.0017	0.0016	0.0017	0.0015
H I Top 10 shareholders	0.3533	0.3375	0.3189	0.2960	0.1361	-0.0087	0.0866	0.0809	0.0828	0.0803
p-value	0.0000	0.0000	0.0000	0.0000	0.0006	0.7399	0.0009	0.0020	0.0016	0.0022

HI - Herfindhal index calculated on individual shareholdings of 5% or more

Government ownership has a positive but statistically significant relationship with ownership-type variables and a negative relationship and statistically insignificant relationship with the Herfindahl index for the top one shareholding. The highest correlation coefficient is 0.13 with a p-value of 0.00, which is significant at the 1% level. Government ownership in general increased with increases in ownership concentration. With low Pearson's correlation coefficients, it is concluded that the ownership-type variables should be used with foreign ownership in further analysis of the relationship between ownership and capital structure.

Pearson's correlation coefficients between institutional ownership and ownership concentration and between other types of ownerships and ownership concentration variables are displayed in Table 5.19. There is a negative association between

institutional ownership and all levels of ownership concentration. This means that in general, institutional ownership decreased with any level of ownership concentration. Such a result can be interpreted to mean that institutional investors preferred to own shares in companies where there were no dominant shareholders. The correlation between institutional ownership and the Herfindahl index for the top 10 shareholding is the highest absolute number, at -0.19, and a p-value of 0.00, making it statistically significant at the 1% level. Other correlation coefficients are below 10%; some being significant and others insignificant. Hence the institutional ownership variable can be used in further analysis with the ownership concentration variables.

Table 5.19: Pearson's correlation coefficients between institutional ownership and ownership concentration variables and between other ownership and ownership concentration variables: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Institutions Top 1 shareholder	**Institutions Top 2 shareholders**	**Institutions Top 3 shareholders**	**Institutions Top 5 shareholders**	**Institutions Top 10 shareholders**	**Other Top 1 shareholders**	**Other Top 2 shareholders**	**Other Top 3 shareholders**	**Other Top 5 shareholders**	**Other Top 10 shareholders**
Top 1 shareholder	-0.0283	-0.0297	-0.0659	-0.0935	-0.1513	-0.0676	-0.0738	-0.0757	-0.0305	-0.0305
p-value	0.2795	0.2575	0.0118	0.0003	0.0000	0.0098	0.0048	0.0038	0.2441	0.2441
H I Top 1 shareholder	-0.0505	-0.0588	-0.0972	-0.1299	-0.1864	-0.0622	-0.0806	-0.0916	-0.0918	-0.0693
p-value	0.0537	0.0247	0.0002	0.0000	0.0000	0.0176	0.0021	0.0005	0.0004	0.0082
Top 2 shareholders	-0.0115	-0.0147	-0.0510	-0.0762	-0.1372	-0.0627	-0.0587	-0.0465	-0.0355	0.0062
p-value	0.6612	0.5759	0.0516	0.0036	0.0000	0.0166	0.0251	0.0761	0.1754	0.8131
H I Top 2 shareholders	-0.0440	-0.0526	-0.0922	-0.1262	-0.1888	-0.0627	-0.0785	-0.0839	-0.0842	-0.0588
p-value	0.0930	0.0446	0.0004	0.0000	0.0000	0.0167	0.0027	0.0013	0.0013	0.0248
Top 3 shareholders	-0.0082	-0.0121	-0.0469	-0.0677	-0.1240	-0.0594	-0.0490	-0.0312	-0.0146	0.0278
p-value	0.7531	0.6444	0.0733	0.0097	0.0000	0.0233	0.0614	0.2341	0.5768	0.2882
H I Top 3 shareholders	-0.0439	-0.0531	-0.0931	-0.1271	-0.1902	-0.0634	-0.0775	-0.0814	-0.0803	-0.0539
p-value	0.0939	0.0425	0.0004	0.0000	0.0000	0.0154	0.0031	0.0019	0.0021	0.0395
Top 5 shareholders	0.0027	0.0007	-0.0304	-0.0411	-0.0833	-0.0506	-0.0332	-0.0085	0.0172	0.0609
p-value	0.9187	0.9784	0.2466	0.1172	0.0015	0.0534	0.2050	0.7445	0.5114	0.0201
H I Top 5 shareholders	-0.0437	-0.0534	-0.0939	-0.1280	-0.1909	-0.0639	-0.0777	-0.0803	-0.0784	-0.0507
p-value	0.0953	0.0413	0.0003	0.0000	0.0000	0.0147	0.0030	0.0021	0.0027	0.0527
Top 10 shareholders	0.0213	0.0239	0.0015	0.0065	-0.0071	-0.0354	-0.0068	0.0269	0.0625	0.0997
p-value	0.4161	0.3615	0.9532	0.8043	0.7871	0.1768	0.7945	0.3049	0.0170	0.0001
H I Top 10 shareholders	-0.0436	-0.0535	-0.0939	-0.1280	-0.1909	-0.0640	-0.0779	-0.0802	-0.0781	-0.0504
p-value	0.0958	0.0412	0.0003	0.0000	0.0000	0.0145	0.0029	0.0022	0.0028	0.0545

HI - Herfindhal index calculated on individual shareholdings of 5% or more

Other types of ownerships comprised any type of ownership other than black, company, directors', family, foreign, government, institutional and Public Investment Corporation ownership. The highest correlation coefficient is the top 10 shareholding variable and is positive and statistically significant at the 1% level, at 0.10 with a p-value of 0.00.

However, most of the coefficients are negative, showing that other ownerships decreased as the ownership concentration variables increased. As the correlation coefficients are low, they will be used together in further data analyses.

Public Investment Corporation ownership and concentration of ownership variables have negative Pearson's correlation coefficients between them, as shown in Table 5.20.

Table 5.20: Pearson's correlation coefficients between Public Investment Corporation ownership and ownership concentration variables: period 2004 to 2014

Null hypothesis: Ho: r = 0					
	Public Investment Corporation Top 1 shareholder	**Public Investment Corporation Top 2 shareholders**	**Public Investment Corporation Top 3 shareholders**	**Public Investment Corporation Top 5 shareholders**	**Public Investment Corporation Top 10 shareholders**
Top 1 shareholder	-0.2226	-0.2079	-0.1841	-0.1911	-0.2091
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 1 shareholder	-0.2217	-0.2040	-0.1844	-0.1902	-0.2078
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Top 2 shareholders	-0.2233	-0.2078	-0.1871	-0.1969	-0.2148
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 2 shareholders	-0.2305	-0.2137	-0.1954	-0.2214	-0.2214
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Top 3 shareholders	-0.2204	-0.2052	-0.1846	-0.1945	-0.2101
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 3 shareholders	-0.2318	-0.2176	-0.2081	-0.2272	-0.2272
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Top 5 shareholders	-0.2103	-0.1951	-0.1767	-0.1845	-0.1952
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 5 shareholders	-0.2358	-0.2195	-0.2020	-0.2099	-0.2283
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Top 10 shareholders	-0.1874	-0.1697	-0.1521	-0.1573	-0.1588
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 10 shareholders	-0.2360	-0.2197	-0.2023	-0.2102	-0.2287
p-value	0.0000	0.0000	0.0000	0.0000	0.0000

HI - Herfindhal index calculated on individual shareholdings of 5% or more

The highest absolute correlation coefficient is between Public Investment Corporation ownership and the Herfindahl index for the top 10 shareholding, at -0.23 with a p-value of 0.00, making it statistically significant at the 1% level. High levels of Public Investment Corporation ownership were associated with low levels of ownership concentration variables, implying that Public Investment Corporation preferred to own shares in

companies with dispersed ownership. This result is similar to that obtained for institutional ownership. This could be explained by the fact that the Public Investment Corporation is a special type of institutional investor, which manages funds on the South African government employees' behalf. All other coefficients are statistically significant and low, leading to the conclusion that ownership by the Public Investment Corporation variables can be used together with the ownership concentration variables to determine the effects of ownership on capital structure.

Pearson's correlation coefficients between ownership-type and ownership concentration variables are generally low, except for company ownership but statistically significant at the 1% level. Under the circumstances, the decision is made to include the two sets of variables in the same equations in line with earlier studies and relatively low levels of multicollinearity between the ownership-type and ownership concentration variables.

5.4.5 Pearson's correlation coefficients for control variables with capital structure as the dependent variable

The control variables used in analysing the effects of ownership in capital structure were the ages of the firms, dividend payout ratio, firm's growth rate as measured by growth in sales or by growth in total assets, liquidity, as represented by the current ratio or quick ratio, non-debt tax shields based on the ratio of depreciation to total assets or ratio of earnings before tax, depreciation and amortisation divided to depreciation, profitability, measured by return on assets and return on equity, risk, size, as measured by the logarithm of sales or logarithm of total assets and tangibility.

Alternative measures were available for five control variables. The size variable was measured based on the logarithm of sales and logarithm of total assets. Liquidity was based on the current ratio and the quick ratio. Non-debt tax shields were calculated based on the ratio of depreciation to total assets for one measure and earnings before interest and tax, depreciation and amortisation divided by depreciation, for the second measure. The firm growth rate was based on sales and total assets. Firm profitability

was measured using the return on assets and return on equity ratios. Pearson's correlation coefficients of the control variables are presented in Table 5.21.

Pearson's correlation coefficient for the firm size variable based on sales and size based on total assets is positive, high, and statistically significant at the 1% level (r = 0.87, p-value = 0.00). The size variable based on total assets is selected for use in further analysis. The correlation coefficient for liquidity as measured by the current ratio and liquidity based on quick ratio is high and statistically significant at the 1% level (r = 0.98, p-value = 0.00). The liquidity ratio based on the current ratio is selected.

Pearson's correlation coefficient for non-debt tax shields calculated from the ratio of depreciation to total assets and non-debt tax shields based on the ratio of earnings before interest and tax, depreciation and amortisation is low and negative but statistically significant at the 1% level (r = -0.11). The non-debt tax shield variable based on the ratio of depreciation / total assets is chosen. Firm growth rate measures of sales and total assets have a Pearson's correlation coefficient of 0.55 and this result is statistically significant at the 1% level (p-value = 0.00). The firm growth variable based on total assets is opted for. The profitability variable's two measures, namely return on assets and return on equity, have a positive Pearson's correlation coefficient, which is statistically significant at the 1% level (r = 0.24, p-value = 0.00). In analysing the effects of ownership on capital structure, the control variable chosen to measure profitability is return on assets.

Tangibility has a positive and statistically significant correlation coefficient at the 1% level with non-debt tax shield variable when measured as the ratio of depreciation to total assets (r = 0.43, p-value = 0.00). As tangibility refers to the extent to which assets are tangible or fixed in nature, and depreciation (which is used in the non-debt tax shield ratio) is calculated using the fixed assets cost as a base, these two variables are likely to be related to each other. Many correlation coefficients are below 10% and statistically insignificant. Hence the control variables are considered to be eligible for use in further analysis.

Table 5.21: Pearson's correlation coefficients for control variables with capital structure as the dependent variable: period 2004 to 2014

Null hypothesis: H_o : r = 0														
	Age	**Dividend Pay-out ratio**	**Growth (Sales)**	**Growth (Total assets)**	**Liquidity (Current ratio)**	**Liquidity (Quick ratio)**	**Non-debt tax shields (Depreciation/Total assets)**	**Non-debt tax shields (EBITDA/Depreciation)**	**Profitability - Return on Assets**	**Profitability - Return on Equity**	**Risk**	**Size (Sales)**	**Size (Total assets)**	**Tangibility**
Age p-value	1.0000													
Dividend Pay-out ratio p-value	0.0330 0.2085	1.0000												
Growth (Sales) p-value	-0.0375 0.1523	-0.0135 0.6073	1.0000											
Growth (Total assets) p-value	0.0113 0.6660	-0.0105 0.6884	0.5474 0.0000	1.0000										
Liquidity (Current ratio) p-value	0.0243 0.3533	0.0003 0.9913	-0.0001 0.9960	-0.0101 0.6997	1.0000									
Liquidity (Quick ratio) p-value	-0.0215 0.4128	-0.0012 0.9630	0.0024 0.9266	-0.0037 0.8863	0.9838 0.0000	1.0000								
Non-debt tax shields (Depreciation/Total assets) p-value	0.0286 0.2747	0.0266 0.3096	-0.0438 0.0947	-0.0528 0.0440	-0.1179 0.0000	-0.0998 0.0001	1.0000							
Non-debt tax shields (EBITDA/Depreciation) p-value	0.0854 0.0011	-0.0021 0.9348	0.0432 0.0995	0.0743 0.0045	-0.0582 0.0263	-0.0679 0.0095	-0.1091 0.0000	1.0000						
Profitability - Return on Assets p-value	0.0494 0.0595	0.0098 0.7087	0.0456 0.0816	0.0186 0.4790	-0.0195 0.4575	-0.0275 0.2932	-0.0618 0.0183	0.1850 0.0000	1.0000					
Profitability - Return on Equity p-value	0.0259 0.3239	0.0075 0.7737	0.0152 0.5623	0.0111 0.6729	0.0097 0.7125	0.0043 0.8710	0.0074 0.7788	0.0896 0.0006	0.2384 0.0000	1.0000				
Risk p-value	0.0135 0.6067	0.0023 0.9297	0.0196 0.4551	-0.0068 0.7958	0.0175 0.5051	0.0065 0.8030	0.0108 0.6804	-0.0110 0.6745	-0.0395 0.1320	-0.0159 0.5436	1.0000			
Size (Sales) p-value	0.2664 0.0000	0.0223 0.3940	0.0335 0.2015	0.1097 0.0000	-0.1977 0.0000	-0.2056 0.0000	0.0458 0.0802	0.1708 0.0000	0.3289 0.0000	0.1816 0.0000	-0.0945 0.0003	1.0000		
Size (Total assets) p-value	0.2599 0.0000	0.0176 0.5024	0.0400 0.1272	0.1447 0.0000	-0.1190 0.0000	-0.1147 0.0000	0.0535 0.0413	0.1027 0.0001	0.1529 0.0000	0.1036 0.0001	-0.0742 0.0046	0.8685 0.0000	1.0000	
Tangibility p-value	-0.0314 0.2301	-0.0059 0.8225	-0.0206 0.4316	0.0129 0.6227	-0.1210 0.0000	-0.0924 0.0004	0.4288 0.0000	-0.0778 0.0030	0.0757 0.0038	0.0548 0.0365	0.0283 0.2800	0.0919 0.0004	0.1204 0.0000	1.0000

5.4.6 Pearson's correlation coefficients between ownership and capital structure variables

Pearson's correlation coefficients between ownership structure, namely ownership-type and ownership concentration variables, as independent variables in the study, and capital structure variables, as dependent variables, are examined in this section.

5.4.6.1 *Pearson's correlation coefficients between ownership concentration and capital structure variables*

Ownership concentration variables used in the study are the percentage shareholdings of the top one, two, three, five and 10 shareholders and the Herfindahl indices calculated for each level. Pearson's correlation coefficients for the ownership concentration and capital structure variables are presented in Table 5.22.

Table 5.22: Pearson's correlation coefficients for ownership concentration and capital structure: period 2004 to 2014

Null hypothesis: Ho: r = 0							
	Long-term debt ratio (BV)	**Long-term debt ratio (MV)**	**Short-term debt ratio (BV)**	**Short-term debt ratio (MV)**	**Total debt ratio (BV)**	**Total debt ratio (MV)**	**Leverage factor**
Top 1 shareholder	-0.1060	-0.0212	-0.1050	0.0014	-0.1600	-0.0118	0.0262
p-value	0.0000	0.4176	0.0001	0.9583	0.0000	0.6539	0.3168
H I Top 1 shareholder	-0.1028	-0.0205	-0.1097	-0.0105	-0.1622	-0.0211	0.0212
p-value	0.0001	0.4336	0.0000	0.6900	0.0000	0.4208	0.4190
Top 2 shareholders	-0.0992	-0.0155	-0.0933	0.0195	-0.1454	0.0067	0.0155
p-value	0.0001	0.5535	0.0004	0.4579	0.0000	0.7989	0.5543
H I Top 2 shareholders	-0.0999	-0.0162	-0.1086	-0.0021	-0.1593	-0.0116	0.0178
p-value	0.0001	0.5373	0.0000	0.9362	0.0000	0.6591	0.4974
Top 3 shareholders	-0.1037	-0.0262	-0.0772	0.0332	-0.1340	0.0117	0.0095
p-value	0.0001	0.3178	0.0032	0.2047	0.0000	0.6558	0.7170
H I Top 3 shareholders	-0.1015	-0.0184	-0.1062	0.0016	-0.1582	-0.0098	0.0161
p-value	0.0001	0.4834	0.0000	0.9505	0.0000	0.7084	0.5397
Top 5 shareholders	-0.1058	-0.0442	-0.0510	0.0393	-0.1123	0.0059	0.0027
p-value	0.0001	0.0918	0.0514	0.1341	0.0000	0.8233	0.9175
H I Top 5 shareholders	-0.1016	-0.0199	-0.1039	0.0025	-0.1563	-0.0099	0.0149
p-value	0.0001	0.4485	0.0001	0.9228	0.0000	0.7043	0.5693
Top 10 shareholders	-0.1129	-0.0715	-0.0094	0.0494	-0.0801	-0.0022	0.0023
p-value	0.0000	0.0063	0.7208	0.0594	0.0022	0.9341	0.9315
H I Top 10 shareholders	-0.1015	-0.0199	-0.1039	0.0025	-0.1562	-0.0100	0.0147
p-value	0.0001	0.4467	0.0001	0.9243	0.0000	0.7018	0.5753

HI - Herfindahl index calculated on individual shareholdings of 5% or more

A large number of the coefficients is negative, showing that as ownership concentration increases, leverage decreases. The correlation coefficients have a maximum absolute value of -0.16, with a p-value of 0.00, which is between the Herfindahl index for the top

one shareholder and the total debt ratio based on book value. Many correlation coefficients are below 10%, with some which are statistically significant and others which are not statistically significant. The overall picture is therefore that the ownership concentration variables as independent variables do not vary with the capital structure variables or dependent variables.

5.4.6.2 *Pearson's correlation coefficients between ownership-type and capital structure variables*

The correlation coefficients between ownership-type variables and capital structure variables are analysed for the top one shareholder, top two shareholders, top three shareholders, top five shareholders and for the top 10 shareholders, in turn.

a) Pearson's correlation coefficients between top one shareholder and capital structure variables

Table 5.23 shows the correlation coefficients between the top one shareholder and capital structure variables. The highest Pearson's correlation is 0.27 with a p-value of 0.00, which is statistically significant at the 1% level. This correlation coefficient is between the short-term debt ratio based on market value and directors' ownership at the top one shareholder level. Most correlation coefficients are below 10% and have statistically insignificant relationships, making them ideal for use in further analysis. The relationships between shareholdings and leverage ratios are both positive and negative. Black ownership, for example, has a negative association with all the capital structure variables, except for the leverage factor. A possible reason for the negative relationship could be that funding for black ownership, in most instances, was provided as debt or preference shares, which could be seen as increasing the leverage of the firm, although the ownership by black shareholders would appear as equity in the company's financial statements. Due to such financial structures, the company potentially never defaulted on black shareholders' equity, although if the company performed badly, then there would be no dividends for the black shareholders leading to potential defaults on their own financial commitments as 'borrowers' of their own equity capital.

Table 5.23: Pearson's correlation coefficients for the top one shareholder and capital structure variables: period 2004 to 2014

Null hypothesis: Ho: r = 0							
	Long-term debt ratio (BV)	**Long-term debt ratio (MV)**	**Short-term debt ratio (BV)**	**Short-term debt ratio (MV)**	**Total debt ratio (BV)**	**Total debt ratio (MV)**	**Leverage factor**
Black: Top 1 shareholder	-0.0381	0.0376	-0.0911	-0.0680	-0.1042	-0.0336	0.0293
p-value	0.1458	0.1516	0.0005	0.0094	0.0001	0.1995	0.2630
Company: Top 1 shareholder	-0.0622	-0.0709	-0.0169	0.0127	-0.0544	-0.0321	-0.0228
p-value	0.0175	0.0068	0.5186	0.6284	0.0379	0.2203	0.3849
Directors: Top 1 shareholder	-0.0580	0.0296	-0.0134	0.2704	-0.0484	0.2414	-0.0319
p-value	0.0269	0.2581	0.6084	0.0000	0.0644	0.0000	0.2237
Family: Top 1 shareholder	-0.0720	-0.0241	0.0328	0.1501	-0.0163	0.1095	-0.0239
p-value	0.0060	0.3584	0.2103	0.0000	0.5347	0.0000	0.3614
Foreign: Top 1 shareholder	-0.0367	0.0450	-0.1145	-0.1042	-0.1249	-0.0591	0.0727
p-value	0.1618	0.0860	0.0000	0.0001	0.0000	0.0241	0.0055
Government: Top 1 shareholder	0.0256	0.1330	-0.0487	-0.0007	-0.0281	0.0795	-0.0076
p-value	0.3287	0.0000	0.0629	0.9787	0.2832	0.0024	0.7705
Institutions: Top 1 shareholder	0.0760	0.0451	-0.0304	0.0358	0.0213	0.0567	0.0028
p-value	0.0037	0.0854	0.2458	0.1717	0.4171	0.0305	0.9141
Other: Top 1 shareholder	-0.0231	-0.0362	0.0499	0.0442	0.0295	0.0147	-0.0084
p-value	0.3778	0.1675	0.0568	0.0915	0.2602	0.5739	0.7475
Public Investment Corporation: Top 1 shareholder	0.0511	-0.0224	0.0231	-0.1156	0.0531	-0.1091	0.0263
p-value	0.0512	0.3928	0.3779	0.0000	0.0427	0.0000	0.3158

b) Pearson's correlation coefficients between the top two shareholders and capital structure variables

Table 5.24 shows the correlation coefficients between the top two shareholders and capital structure variables. Pearson's correlation coefficient between short-term debt ratio calculated on a market value basis and directors' ownership is the highest, positive and statistically significant at the 1% level (r = 0.27 and p-value = 0.00). High directors' ownership is associated with high short-term debt ratios, based on market value. The relationship between directors' ownership and long-term debt ratio (based on market value) is positive but statistically insignificant (r = 0.03 and p-value = 0.26). The resulting relationship is a positive and statistically significant relationship between directors' ownership and total debt ratios, based on market value. Such a result could be due to directors not wanting to dilute their shareholdings and therefore preferring to raise funding through debt, rather than equity. The correlation coefficients with some measures of leverage are negative, indicating a possible aversion to debt while they are

positive with other capital structure variables. Correlation coefficients between capital structure variables and Public Investment Corporation ownership, other ownership and institutional ownership, among others, are statistically insignificant. As a result, the variables are used in further analysis of the investigation between ownership and capital structure.

Table 5.24: Pearson's correlation coefficients for the top two shareholders and capital structure variables: period 2004 to 2014

Null hypothesis: Ho: r = 0							
	Long-term debt ratio (BV)	**Long-term debt ratio (MV)**	**Short-term debt ratio (BV)**	**Short-term debt ratio (MV)**	**Total debt ratio (BV)**	**Total debt ratio (MV)**	**Leverage factor**
Black: Top 2 shareholders	-0.0193	0.0609	-0.0940	-0.0770	-0.0949	-0.0270	0.0198
p-value	0.4609	0.0201	0.0003	0.0033	0.0003	0.3027	0.4500
Company: Top 2 shareholders	-0.0701	-0.0753	-0.0341	0.0179	-0.0743	-0.0305	-0.0335
p-value	0.0074	0.0040	0.1926	0.4951	0.0045	0.2444	0.2007
Directors: Top 2 shareholders	-0.0580	0.0296	-0.0134	0.2704	-0.0484	0.2414	-0.0319
p-value	0.0269	0.2581	0.6084	0.0000	0.0644	0.0000	0.2237
Family: Top 2 shareholders	-0.0725	-0.0379	0.0700	0.1887	0.0162	0.1333	-0.0272
p-value	0.0056	0.1485	0.0075	0.0000	0.5373	0.0000	0.2989
Foreign: Top 2 shareholders	-0.0288	0.0441	-0.0943	-0.1056	-0.1021	-0.0608	0.0697
p-value	0.2722	0.0926	0.0003	0.0001	0.0001	0.0202	0.0078
Government: Top 2 shareholders	0.0401	0.1572	-0.0976	-0.0383	-0.0619	0.0630	-0.0114
p-value	0.1257	0.0000	0.0002	0.1441	0.0181	0.0162	0.6640
Institutions: Top 2 shareholders	0.0533	0.0502	-0.0472	0.0358	-0.0079	0.0597	0.0120
p-value	0.0417	0.0551	0.0718	0.1720	0.7631	0.0226	0.6480
Other: Top 2 shareholders	0.0248	-0.0055	0.0405	0.0314	0.0510	0.0226	0.0405
p-value	0.3432	0.8351	0.1219	0.2311	0.0517	0.3885	0.1222
Public Investment Corporation: Top 2 shareholders	0.0425	-0.0508	0.0445	-0.1255	0.0661	-0.1345	0.0171
p-value	0.1044	0.0526	0.0893	0.0000	0.0116	0.0000	0.5148

c) Pearson's correlation coefficients between the top three shareholders and capital structure variables

The relationships between the ownership-type variables for the top three shareholdings and capital structure variables are shown in Table 5.25. Pearson's correlation coefficient between the directors' ownership and short-term debt ratio based on market value is the highest and similar to the coefficient under the top one shareholder, at 0.27 and a p-value of 0.00. This result is due to the fact that the directors' ownership did not vary with the number of shareholders selected. Instead, data on ownership by directors covered their total shareholdings up to the smallest director's shareholding. Potentially,

the directors' shareholdings could be larger when compared with the other shareholdings. However, the correlation is small. Short-term debt ratio based on market value and family ownership has the next highest Pearson's correlation coefficient of 0.21 and a p-value of 0.00, which is statistically significant at the 1% level. The correlation coefficients between government ownership and both long-term debt ratios (based on book value and market value) are positive, which is probably reflective of the long-term perspectives of some of the institutions which partly make up government ownership, such as the Industrial Development Corporation. Pearson's correlation coefficients for the bulk of the variables are small and statistically insignificant, showing that they can be used together in the analysis at the top three shareholder level.

Table 5.25: Pearson's correlation coefficients for ownership-type variables and capital structure variables for the top three shareholders: period 2004 to 2014

Null hypothesis: Ho: r = 0							
	Long-term debt ratio (BV)	**Long-term debt ratio (MV)**	**Short-term debt ratio (BV)**	**Short-term debt ratio (MV)**	**Total debt ratio (BV)**	**Total debt ratio (MV)**	**Leverage factor**
Black: Top 3 shareholders	-0.0202	0.0573	-0.0864	-0.0773	-0.0889	-0.0295	0.0197
p-value	0.4419	0.0287	0.0010	0.0031	0.0007	0.2601	0.4517
Company: Top 3 shareholders	-0.0769	-0.0840	-0.0281	0.0214	-0.0735	-0.0329	-0.0353
p-value	0.0033	0.0013	0.2836	0.4151	0.0050	0.2095	0.1781
Directors: Top 3 shareholders	-0.0580	0.0296	-0.0134	0.2704	-0.0484	0.2414	-0.0319
p-value	0.0269	0.2581	0.6084	0.0000	0.0644	0.0000	0.2237
Family: Top 3 shareholders	-0.0741	-0.0403	0.0830	0.2124	0.0266	0.1513	-0.0354
p-value	0.0046	0.1238	0.0015	0.0000	0.3093	0.0000	0.1766
Foreign: Top 3 shareholders	-0.0332	0.0307	-0.0874	-0.1147	-0.0987	-0.0764	0.0705
p-value	0.2057	0.2410	0.0008	0.0000	0.0002	0.0035	0.0071
Government: Top 3 shareholders	0.0567	0.1627	-0.1071	-0.0522	-0.0598	0.0547	-0.0110
p-value	0.0305	0.0000	0.0000	0.0461	0.0224	0.0367	0.6735
Institutions: Top 3 shareholders	0.0658	0.0731	-0.0593	0.0324	-0.0106	0.0710	0.0190
p-value	0.0119	0.0052	0.0236	0.2156	0.6854	0.0067	0.4676
Other: Top 3 shareholders	0.0262	-0.0004	0.0273	0.0320	0.0408	0.0261	0.0422
p-value	0.3176	0.9872	0.2975	0.2219	0.1193	0.3186	0.1074
Public Investment Corporation: Top 3 shareholders	0.0338	-0.0536	0.0350	-0.1440	0.0524	-0.1514	0.0115
p-value	0.1968	0.0407	0.1813	0.0000	0.0456	0.0000	0.6595

d) Pearson's correlation coefficients between the top five shareholders and capital structure variables

Correlation coefficients between ownership-type variables at the top five shareholders level and capital structure variables are presented in Table 5.26. Apart from the

directors' ownership and short-term debt ratio based on market value, family shareholdings have a positive and statistically significant relationship with the short-term debt ratio, based on market value of 0.22 with a p-value of 0.00. Family ownership has negative and statistically significant associations at the 10% level, with both measure of long-term debt ratios (market and book value). Higher levels of family ownership are associated with lower long-term debt ratios and higher short-term debt ratios, although the coefficients are largely below the 10% level. The result could mean that families had an aversion to long-term debt but an affinity to short-term debt. Pearson's correlation coefficients between institutional ownership and capital structure variables are predominantly positive and low with some statistically significant and insignificant results. The results show that the ownership-type variables at the top three shareholding level and capital structure variables are not highly correlated.

Table 5.26: Pearson's correlation coefficients for ownership-type variables and capital structure variables for the top five shareholders: period 2004 to 2014

Null hypothesis: Ho: r = 0							
	Long-term debt ratio (BV)	**Long-term debt ratio (MV)**	**Short-term debt ratio (BV)**	**Short-term debt ratio (MV)**	**Total debt ratio (BV)**	**Total debt ratio (MV)**	**Leverage factor**
Black: Top 5 shareholders	-0.0156	0.0539	-0.0785	-0.0755	-0.0790	-0.0299	0.0214
p-value	0.5514	0.0395	0.0027	0.0039	0.0025	0.2541	0.4142
Company: Top 5 shareholders	-0.0752	-0.0828	-0.0136	0.0351	-0.0594	-0.0208	-0.0372
p-value	0.0041	0.0016	0.6043	0.1804	0.0232	0.4277	0.1555
Directors: Top 5 shareholders	-0.0580	0.0296	-0.0134	0.2704	-0.0484	0.2414	-0.0319
p-value	0.0269	0.2581	0.6084	0.0000	0.0644	0.0000	0.2237
Family: Top 5 shareholders	-0.0658	-0.0435	0.0972	0.2148	0.0444	0.1514	-0.0398
p-value	0.0120	0.0968	0.0002	0.0000	0.0901	0.0000	0.1289
Foreign: Top 5 shareholders	-0.0417	0.0156	-0.0820	-0.1279	-0.0994	-0.0965	0.0671
p-value	0.1117	0.5529	0.0017	0.0000	0.0001	0.0002	0.0104
Government: Top 5 shareholders	0.0576	0.1513	-0.1014	-0.0497	-0.0539	0.0500	-0.0092
p-value	0.0278	0.0000	0.0001	0.0580	0.0396	0.0565	0.7255
Institutions: Top 5 shareholders	0.0609	0.0716	-0.0348	0.0505	0.0076	0.0849	0.0096
p-value	0.0200	0.0062	0.1838	0.0540	0.7710	0.0012	0.7131
Other: Top 5 shareholders	0.0001	-0.0297	0.0225	0.0196	0.0201	-0.0014	0.0277
p-value	0.9965	0.2570	0.3901	0.4552	0.4426	0.9588	0.2898
Public Investment Corporation: Top 5 shareholders	0.0378	-0.0558	0.0463	-0.1439	0.0650	-0.1527	0.0190
p-value	0.1487	0.0330	0.0773	0.0000	0.0131	0.0000	0.4687

e) Pearson's correlation coefficients between ownership-type variables for the top 10 shareholders and capital structure variables

Pearson's correlation coefficients between capital structure and types of ownership variables for the top 10 shareholders are shown in Table 5.27. Short-term debt ratio calculated on a market value basis and directors' ownership have the highest correlation coefficient. Short-term debt ratio calculated on a market value basis and family ownership have the next highest correlation coefficient of 0.24 with a p-value of 0.00. Negative relationships are observed between both long-term debt ratios and family ownership variables. However, the correlation coefficients between family ownership and both total debt ratios are positive and statistically significant and such a result could be due to a higher influence of the positive short-term debt relationship.

The correlation coefficients between foreign ownership and capital structure variables are negative, low and statistically insignificant for the two long-term debt ratios; negative, low and statistically significant at the 1% level for the two short-term ratios and negative, small but slightly larger and statistically significant at the 1% level for both total debt ratios. At the 10% shareholding level, increases in foreign ownership are associated with decreases in all debt ratios. Institutional investors have positive correlations with all capital structure variables except for the leverage factor, although most of the correlation coefficients are small (below 10%) and statistically insignificant.

Table 5.27: Pearson's correlation coefficients for ownership-type variables and capital structure variables for the top 10 shareholders: period 2004 to 2014

Null hypothesis: Ho: r = 0							
	Long-term debt ratio (BV)	**Long-term debt ratio (MV)**	**Short-term debt ratio (BV)**	**Short-term debt ratio (MV)**	**Total debt ratio (BV)**	**Total debt ratio (MV)**	**Leverage factor**
Black: Top 10 shareholders	-0.0177	0.0468	-0.0668	-0.0678	-0.0699	-0.0278	0.0283
p-value	0.4994	0.0743	0.0108	0.0096	0.0075	0.2883	0.2801
Company: Top 10 shareholders	-0.0903	-0.0917	-0.0345	0.0062	-0.0876	-0.0500	-0.0455
p-value	0.0006	0.0005	0.1880	0.8123	0.0008	0.0565	0.0822
Directors: Top 10 shareholders	-0.0580	0.0296	-0.0134	0.2704	-0.0484	0.2405	-0.0311
p-value	0.0269	0.2581	0.6084	0.0000	0.0644	0.0000	0.2356
Family: Top 10 shareholders	-0.0603	-0.0421	0.1240	0.2361	0.0712	0.1699	-0.0430
p-value	0.0212	0.1083	0.0000	0.0000	0.0065	0.0000	0.1005
Foreign: Top 10 shareholders	-0.0256	-0.0106	-0.0766	-0.1600	-0.0842	-0.1387	0.1097
p-value	0.3292	0.6868	0.0034	0.0000	0.0013	0.0000	0.0000
Government: Top 10 shareholders	0.0562	0.1592	-0.1146	-0.0624	-0.0666	0.0442	-0.0028
p-value	0.0319	0.0000	0.0000	0.0172	0.0110	0.0913	0.9162
Institutions: Top 10 shareholders	0.0273	0.0599	0.0095	0.0854	0.0255	0.1066	-0.0272
p-value	0.2972	0.0222	0.7174	0.0011	0.3297	0.0000	0.2998
Other: Top 10 shareholders	0.0270	-0.0089	-0.0041	0.0124	0.0132	0.0054	0.0241
p-value	0.3029	0.7340	0.8754	0.6361	0.6149	0.8363	0.3588
Public Investment Corporation: Top 10 shareholders	0.0419	-0.0551	0.0563	-0.1405	0.0765	-0.1495	0.0241
p-value	0.1094	0.0355	0.0315	0.0000	0.0035	0.0000	0.3576

An examination of the relationships for the Pearson's correlation coefficients between the ownership-type and capital structure variables reveals low levels of correlation at the top one, two, three, five and 10 shareholders levels. Hence all types of ownerships at all levels of shareholdings as independent variables and capital structure variables as dependent variables are eligible for use in an analysis of the effects of ownership on capital structure.

5.4.7 Pearson's correlation coefficients between control variables and ownership structure variables and between control variables and capital structure

Pearson's correlation coefficients between control variables and independent variables (ownership concentration and ownership types) and between control variables and

dependent variables (capital structure) are conducted to ensure that any multicollinearity can be detected.

5.4.7.1 *Pearson's correlation coefficients between ownership concentration and control variables when capital structure is the dependent variable*

Pearson's correlation coefficients for ownership concentration and control variables are presented in Table 5.28. Profitability, as measured by the return on assets, and size, as measured by sales, jointly have the highest absolute correlation coefficient of -0.25 with the same ownership concentration variable, namely the top 10 shareholding. The result is statistically significant for both correlation coefficients at the 1% level. Decreases in profitability and sales are associated with increases in shareholdings for the top 10 owners of firms.

Low and negative correlation coefficients are found between ownership concentration variables and growth, as measured by total assets, both profitability ratios (return on assets and return on equity), risk and firm size as measured by sales and total assets. Correlation coefficients between growth and ownership concentration variables are insignificant, while for profitability, some correlation coefficients are significant at the 1% level. Age, dividend payout ratio and non-debt tax shields, based on the ratio between depreciation and total assets, have small and positive correlation coefficients with ownership concentration variables. Increases in firm age are associated with increases in ownership concentration. Increases in dividend payout ratios are also associated with increases in firm ownership concentration. The relationships between the control variables and ownership concentration variables are low, though significant at the 1% level in some cases, making it possible for them to be used together in examining the effects of ownership on capital structure.

Table 5.28: Pearson's correlation coefficients for ownership concentration and control variables with capital structure as the dependent variable: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Top 1 shareholder	**Top 2 shareholders**	**Top 3 shareholders**	**Top 5 shareholders**	**Top 10 shareholders**	**H I Top 1 shareholder**	**H I Top 2 shareholders**	**H I Top 3 shareholders**	**H I Top 5 shareholders**	**H I Top 10 shareholders**
Age	0.1173	0.1009	0.0788	0.0432	0.0114	0.1297	0.1263	0.1211	0.1167	0.1163
p-value	0.0000	0.0001	0.0026	0.0989	0.6639	0.0000	0.0000	0.0000	0.0000	0.0000
Dividend payout ratio	0.0693	0.0482	0.0389	0.0299	0.0247	0.0840	0.0770	0.0749	0.0734	0.0734
p-value	0.0081	0.0655	0.1375	0.2538	0.3461	0.0013	0.0033	0.0042	0.0051	0.0051
Growth (Sales)	0.0127	0.0066	0.0058	0.0026	-0.0028	0.0103	0.0095	0.0099	0.0098	0.0098
p-value	0.6290	0.7998	0.8257	0.9200	0.9142	0.6934	0.7170	0.7065	0.7077	0.7078
Growth (Total assets)	-0.0309	-0.0372	-0.0392	-0.0430	-0.0502	-0.0185	-0.0198	-0.0196	-0.0194	-0.0194
p-value	0.2387	0.1558	0.1349	0.1011	0.0553	0.4814	0.4490	0.4548	0.4601	0.4593
Liquidity (Current ratio)	0.0321	0.0362	0.0350	0.0195	-0.0079	0.0405	0.0438	0.0462	0.0461	0.0462
p-value	0.2209	0.1675	0.1823	0.4575	0.7617	0.1223	0.0947	0.0779	0.0784	0.0781
Liquidity (Quick ratio)	-0.0036	-0.0032	-0.0029	-0.0167	-0.0424	0.0063	0.0072	0.0096	0.0095	0.0095
p-value	0.8911	0.9039	0.9118	0.5242	0.1058	0.8092	0.7849	0.7142	0.7170	0.7174
Non-debt tax shields (Depreciation/ Total assets)	0.0799	0.0457	0.0353	0.0267	0.0230	0.0836	0.0715	0.0688	0.0667	0.0664
p-value	0.0023	0.0813	0.1784	0.3075	0.3800	0.0014	0.0063	0.0086	0.0109	0.0112
Non-debt tax shields (EBITDA/Depreciation)	-0.0337	-0.0465	-0.0544	-0.0578	-0.0609	-0.0122	-0.0174	-0.0196	-0.0198	-0.0197
p-value	0.1991	0.0757	0.0378	0.0272	0.0200	0.6411	0.5060	0.4545	0.4505	0.4517
Profitability - Return on Assets	-0.0740	-0.1004	-0.1213	-0.1354	-0.1345	-0.0522	-0.0642	-0.0711	-0.0750	-0.0752
p-value	0.0047	0.0001	0.0000	0.0000	0.0000	0.0465	0.0143	0.0066	0.0042	0.0041
Profitability - Return on Equity	-0.1286	-0.1657	-0.1973	-0.2278	-0.2509	-0.0828	-0.0975	-0.1063	-0.1110	-0.1113
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0016	0.0002	0.0000	0.0000	0.0000
Risk	-0.0158	-0.0246	-0.0300	-0.0402	-0.0547	0.0001	-0.0013	-0.0015	-0.0020	-0.0020
p-value	0.5456	0.3487	0.2522	0.1246	0.0366	0.9976	0.9614	0.9533	0.9405	0.9394
Size (Sales)	-0.0740	-0.1004	-0.1213	-0.1354	-0.1345	-0.0522	-0.0642	-0.0711	-0.0750	-0.0752
p-value	0.0047	0.0001	0.0000	0.0000	0.0000	0.0465	0.0143	0.0066	0.0042	0.0041
Size (Total assets)	-0.1286	-0.1657	-0.1973	-0.2278	-0.2509	-0.0828	-0.0975	-0.1063	-0.1110	-0.1113
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0016	0.0002	0.0000	0.0000	0.0000
Tangibility	0.0025	-0.0320	-0.0464	-0.0632	-0.0854	0.0275	0.0149	0.0107	0.0077	0.0073
p-value	0.9254	0.2226	0.0768	0.0158	0.0011	0.2935	0.5696	0.6834	0.7688	0.7795

5.4.7.2 *Pearson's correlation coefficients between ownership-type and control variables*

Pearson's correlation coefficients between control variables and ownership-type variables (black, company, directors, family, foreign, government institutions, other and Public Investment Corporation) are discussed. Table 5.29 shows the correlation coefficients between black ownership at different levels and control variables and between company ownership and control variables. Black ownership and control variables have very low correlation coefficients (below 0.05), which are statistically

insignificant. The highest absolute coefficient of -0.13 with a p-value of 0.00, which is statistically significant at the 1% level, is between tangibility and black ownership at the top 10 shareholder level. Increases in black ownership are associated with decreases in tangibility, possibly due to the perception that increased black ownership is a form of redistribution of wealth. Control variables and black ownership variables can therefore be used together in further analysis.

Table 5.29: Pearson's correlation coefficients for black ownership, company ownership and control variables: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Black Top 1 shareholder	**Black Top 2 shareholders**	**Black Top 3 shareholders**	**Black Top 5 shareholders**	**Black Top 10 shareholders**	**Company Top 1 shareholder**	**Company Top 2 shareholders**	**Company Top 3 shareholders**	**Company Top 5 shareholders**	**Company Top 10 shareholders**
Age	-0.0055	0.0214	0.0018	-0.0045	-0.0390	0.0769	0.0572	0.0557	0.0540	0.0995
p-value	0.8342	0.4145	0.9445	0.8651	0.1366	0.0033	0.0288	0.0334	0.0394	0.0001
Dividend payout ratio	-0.0137	-0.0071	-0.0087	-0.0071	-0.0104	-0.0157	-0.0179	-0.0198	-0.0213	-0.0210
p-value	0.6007	0.7861	0.7410	0.7876	0.6910	0.5482	0.4954	0.4501	0.4159	0.4229
Growth (Sales)	-0.0100	-0.0075	-0.0056	-0.0063	-0.0121	-0.0228	-0.0142	-0.0141	-0.0145	-0.0135
p-value	0.7039	0.7744	0.8320	0.8095	0.6448	0.3836	0.5887	0.5918	0.5791	0.6057
Growth (Total assets)	-0.0100	-0.0117	-0.0132	-0.0143	-0.0140	-0.0191	-0.0219	-0.0173	-0.0172	-0.0085
p-value	0.7028	0.6566	0.6146	0.5853	0.5933	0.4661	0.4041	0.5086	0.5107	0.7467
Liquidity (Current ratio)	0.0169	0.0053	0.0057	-0.0016	-0.0121	-0.0041	0.0146	0.0144	0.0027	0.0305
p-value	0.5184	0.8384	0.8293	0.9501	0.6449	0.8759	0.5775	0.5838	0.9192	0.2448
Liquidity (Quick ratio)	0.0237	0.0142	0.0167	0.0112	0.0012	-0.0346	-0.0203	-0.0189	-0.0302	0.0045
p-value	0.3661	0.5876	0.5251	0.6686	0.9633	0.1873	0.4397	0.4710	0.2486	0.8631
Non-debt tax shields (Depreciation/ Total assets)	-0.0253	-0.0283	-0.0256	-0.0249	-0.0280	0.0116	-0.0080	-0.0057	0.0041	0.0014
p-value	0.3341	0.2807	0.3291	0.3424	0.2852	0.6586	0.7615	0.8276	0.8768	0.9584
Non-debt tax shields (EBITDA/Depreciation)	-0.0178	-0.0183	-0.0474	-0.0494	-0.0354	0.0060	0.0050	0.0024	-0.0007	-0.0107
p-value	0.4977	0.4861	0.0704	0.0595	0.1768	0.8186	0.8474	0.9284	0.9794	0.6833
Profitability - Return on Assets	-0.0082	-0.0156	-0.0112	-0.0126	-0.0245	0.0213	0.0255	0.0295	0.0434	0.0428
p-value	0.7547	0.5525	0.6685	0.6307	0.3503	0.4173	0.3309	0.2596	0.0974	0.1023
Profitability - Return on Equity	-0.0241	-0.0241	-0.0266	-0.0541	-0.0741	-0.0340	-0.0275	-0.0245	-0.0214	0.0381
p-value	0.3586	0.3578	0.3106	0.0388	0.0046	0.1948	0.2935	0.3508	0.4142	0.1456
Risk	-0.0003	-0.0001	0.0011	0.0004	0.0052	0.0028	0.0013	-0.0012	-0.0101	-0.0089
p-value	0.9897	0.9975	0.9669	0.9889	0.8430	0.9151	0.9618	0.9632	0.6990	0.7344
Size (Sales)	-0.0447	-0.0425	-0.0524	-0.0532	-0.0799	0.0243	0.0060	-0.0122	-0.0130	-0.0648
p-value	0.0880	0.1048	0.0453	0.0421	0.0023	0.3538	0.8191	0.6403	0.6201	0.0133
Size (Total assets)	-0.0039	0.0076	-0.0032	-0.0037	-0.0346	-0.0084	-0.0319	-0.0509	-0.0564	-0.1039
p-value	0.8812	0.7721	0.9024	0.8878	0.1867	0.7496	0.2237	0.0519	0.0313	0.0001
Tangibility	-0.0912	-0.1162	-0.1185	-0.1256	-0.1331	0.0243	0.0060	-0.0122	-0.0130	-0.0648
p-value	0.0005	0.0000	0.0000	0.0000	0.0000	0.3538	0.8191	0.6403	0.6201	0.0133

Pearson's correlation coefficients between company ownership and control variables are smaller than 5% and statistically insignificant. Hence the variables can be used jointly in analysing the effects of ownership on capital structure.

Table 5.30 presents Pearson's correlation coefficients between directors' ownership and control variables and between family ownership and control variables. Directors' ownership is measured across the total shareholding of the company rather than at the top one to top 10 shareholder levels. The database IRESS provided the data in this format and it was used as such. Hence the directors' ownership variables did not vary with the changes in the level of shareholding under consideration. The highest absolute correlation coefficient is between directors' ownership and the size variable, when measured using total assets, at -0.36 with a p-value of 0.00, which is statistically significant at the 1% level. Increases in firm size, measured using total assets, are associated with decreases in directors' shareholdings. A possible reason for such a negative association could be the limited wealth that directors had as individuals. Hence as the companies grew, their limited wealth inhibited them from providing further funding in terms of equity to the bigger corporation, leading to the dilution of their shareholdings. Correlation coefficients for other variables are below 0.05 and statistically insignificant. Hence all the variables are eligible for use in further data analysis.

Table 5.30: Pearson's correlation coefficients for directors' ownership, family ownership and control variables: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Directors Top 1 shareholder	**Directors Top 2 shareholders**	**Directors Top 3 shareholders**	**Directors Top 5 shareholders**	**Directors Top 10 shareholders**	**Family Top 1 shareholders**	**Family Top 2 shareholders**	**Family Top 3 shareholders**	**Family Top 5 shareholders**	**Family Top 10 shareholders**
Age	-0.0093	-0.0093	-0.0093	-0.0093	-0.0093	-0.1056	-0.1252	-0.1389	-0.1728	-0.1739
p-value	0.7218	0.7218	0.7218	0.7218	0.7218	0.0001	0.0000	0.0000	0.0000	0.0000
Dividend payout ratio	-0.0084	-0.0084	-0.0084	-0.0084	-0.0084	0.0751	0.0523	0.0394	0.0264	0.0217
p-value	0.7484	0.7484	0.7484	0.7484	0.7484	0.0041	0.0457	0.1329	0.3132	0.4079
Growth (Sales)	0.0154	0.0154	0.0154	0.0154	0.0154	0.0685	0.0530	0.0472	0.0435	0.0408
p-value	0.5579	0.5579	0.5579	0.5579	0.5579	0.0089	0.0432	0.0714	0.0968	0.1196
Growth (Total assets)	-0.0162	-0.0162	-0.0162	-0.0162	-0.0162	-0.0081	-0.0125	-0.0139	-0.0153	-0.0127
p-value	0.5361	0.5361	0.5361	0.5361	0.5361	0.7566	0.6322	0.5962	0.5603	0.6268
Liquidity (Current ratio)	0.0941	0.0941	0.0941	0.0941	0.0941	0.0238	0.0152	0.0145	0.0094	0.0000
p-value	0.0003	0.0003	0.0003	0.0003	0.0003	0.3644	0.5608	0.5807	0.7199	0.9986
Liquidity (Quick ratio)	0.0592	0.0592	0.0592	0.0592	0.0592	0.0128	-0.0007	-0.0026	-0.0075	-0.0153
p-value	0.0238	0.0238	0.0238	0.0238	0.0238	0.6261	0.9786	0.9215	0.7746	0.5582
Non-debt tax shields (Depreciation/ Total assets)	0.0375	0.0375	0.0375	0.0375	0.0375	0.0856	0.0494	0.0338	0.0100	-0.0002
p-value	0.1524	0.1524	0.1524	0.1524	0.1524	0.0011	0.0592	0.1973	0.7021	0.9929
Non-debt tax shields (EBITDA/Depreciation)	-0.0070	-0.0070	-0.0070	-0.0070	-0.0070	-0.0317	-0.0317	-0.0293	-0.0287	-0.0351
p-value	0.7886	0.7886	0.7886	0.7886	0.7886	0.2261	0.2268	0.2637	0.2730	0.1809
Profitability - Return on assets	0.0152	0.0152	0.0152	0.0152	0.0152	0.0362	0.0307	0.0255	0.0294	0.0227
p-value	0.5613	0.5613	0.5613	0.5613	0.5613	0.1674	0.2410	0.3308	0.2627	0.3872
Profitability - Return on equity	0.0033	0.0033	0.0033	0.0033	0.0033	0.0135	0.0086	-0.0012	-0.0017	-0.0021
p-value	0.8997	0.8997	0.8997	0.8997	0.8997	0.6061	0.7438	0.9626	0.9493	0.9349
Risk	-0.0191	-0.0191	-0.0191	-0.0191	-0.0191	-0.0073	-0.0118	-0.0129	-0.0155	-0.0183
p-value	0.4655	0.4655	0.4655	0.4655	0.4655	0.7804	0.6535	0.6226	0.5535	0.4860
Size (Sales)	-0.2507	-0.2507	-0.2507	-0.2507	-0.2507	-0.2073	-0.2347	-0.2582	-0.2873	-0.3093
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Size (Total assets)	-0.3570	-0.3570	-0.3570	-0.3570	-0.3570	-0.2989	-0.3437	-0.3726	-0.4066	-0.4387
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tangibility	-0.0248	-0.0248	-0.0248	-0.0248	-0.0248	0.0386	0.0019	-0.0190	-0.0320	-0.0412
p-value	0.3447	0.3447	0.3447	0.3447	0.3447	0.1406	0.9409	0.4687	0.2215	0.1157

The correlation coefficients between family ownership and firm age are negative and statistically significant at the 1% level and the correlation coefficients increased in size as the number of top shareholders increased. At the top 10 shareholder level, the correlation coefficient is -0.17 with a p-value of 0.00. As firm age increased, the family ownership decreased. The result could be linked to limited resources owned by families and that with time, firms required more resources from their owners and for families, these resources could be limited. Hence families' equity ownership could then decrease (or be diluted) as other types of shareholders who had the financial means to follow up on their rights increased their ownership stakes. Negative associations are found with

both size variables, risk and tangibility. As firms grew in size, the family ownership percentages decreased, which could have reinforced the limited resource proposition. The highest absolute Pearson's correlation coefficient is between firm size, measured by total assets and family ownership at the top 10 shareholders level. Given the low levels of the variables and predominantly statistically insignificant relationships, the family ownership and control variables are used together in analysing the effects of ownership on capital structure.

Pearson's correlation coefficients for foreign ownership and control variables and government ownership and control variables are shown in Table 5.31. Positive correlation coefficients are found between foreign ownership and firm age, dividend payout ratio, both measures of liquidity, firm size, based on total assets and to some extent, profitability, as measured by return on equity. As these control variables increased, foreign ownership also increased. In the case of firm age and firm size, foreign ownership increased as firm age and firm size increased. Size, based on total assets and foreign ownership at the top 10 shareholders level have the highest correlation coefficient of 0.20 and a p-value of 0.00, showing that the correlation is significant at the 1% level. Negative correlation coefficients are found between foreign ownership and tangibility, growth as measured by sales, and risk. Given the low correlation for foreign ownership and control variables, the study will use these variables in subsequent analyses.

Pearson's correlation coefficients between government ownership and control variables are mainly below 0.05 and statistically insignificant. Tangibility and government ownership at the top five shareholders level have the highest correlation coefficient of 0.11 and a p-value of 0.00, making it significant at the 1% level. Government ownership and dividend payout ratio have a negative correlation coefficient, which means increases in government ownership are associated with decreases in dividend payout ratios. Both measures of growth are negatively related to government ownership. Profitability, measured by the return on assets ratio, is negatively associated with government ownership. These variables imply that government ownership increased as firm profitability declined. Explanations for these associations could be that government was not a value-adding owner on the one hand, or that the state invested in loss-making strategic companies and tried to keep them afloat. The second explanation was suitable

for some state-owned financial institutions such as the Industrial Development Corporation of South Africa, which as one of the government entities with shareholding perceived their role, among others, as being counter-cyclical, namely investing in firms when they were almost failing in order to retain jobs and keep strategic industries afloat.

Table 5.31: Pearson's correlation coefficients for foreign ownership, government ownership and control variables: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Foreign Top 1 shareholder	**Foreign Top 2 shareholders**	**Foreign Top 3 shareholders**	**Foreign Top 5 shareholders**	**Foreign Top 10 shareholders**	**Government Top 1 shareholder**	**Government Top 2 shareholders**	**Government Top 3 shareholders**	**Government Top 5 shareholders**	**Government Top 10 shareholders**
Age	0.1740	0.1774	0.1816	0.1811	0.1009	0.0399	0.0399	0.0260	0.0157	0.0288
p-value	0.0000	0.0000	0.0000	0.0000	0.0001	0.1282	0.1282	0.3218	0.5484	0.2724
Dividend payout ratio	0.0625	0.0574	0.0631	0.0652	0.0760	-0.0107	-0.0057	-0.0056	-0.0048	-0.0060
p-value	0.0171	0.0285	0.0159	0.0128	0.0037	0.6839	0.8273	0.8319	0.8535	0.8197
Growth (Sales)	-0.0013	-0.0058	-0.0094	-0.0138	-0.0080	-0.0091	-0.0074	-0.0085	-0.0084	-0.0091
p-value	0.9596	0.8259	0.7213	0.5977	0.7592	0.7273	0.7791	0.7472	0.7488	0.7273
Growth (Total assets)	0.0028	-0.0005	-0.0036	-0.0088	-0.0128	-0.0078	-0.0095	-0.0102	-0.0101	-0.0104
p-value	0.9151	0.9854	0.8896	0.7382	0.6242	0.7658	0.7180	0.6977	0.7014	0.6913
Liquidity (Current ratio)	0.0345	0.0260	0.0227	0.0173	-0.0087	0.0153	0.0122	0.0088	0.0048	0.0101
p-value	0.1878	0.3213	0.3864	0.5099	0.7401	0.5584	0.6408	0.7362	0.8539	0.7011
Liquidity (Quick ratio)	0.0299	0.0259	0.0236	0.0180	-0.0137	0.0089	-0.0090	-0.0117	-0.0149	-0.0103
p-value	0.2533	0.3222	0.3674	0.4922	0.6005	0.7342	0.7302	0.6557	0.5694	0.6955
Non-debt tax shields (Depreciation/Total assets)	0.0803	0.0659	0.0604	0.0531	0.0238	-0.0451	0.0116	0.0169	0.0240	0.0194
p-value	0.0021	0.0119	0.0210	0.0426	0.3631	0.0851	0.6576	0.5188	0.3605	0.4589
Non-debt tax shields (EBITDA/Depreciation)	-0.0192	-0.0187	-0.0179	-0.0134	-0.0254	-0.0098	-0.0064	-0.0080	-0.0077	-0.0117
p-value	0.4634	0.4748	0.4945	0.6080	0.3319	0.7072	0.8062	0.7612	0.7690	0.6563
Profitability - Return on assets	-0.0283	-0.0216	-0.0148	0.0033	0.0142	-0.0256	0.0210	0.0209	0.0238	0.0171
p-value	0.2803	0.4094	0.5723	0.8988	0.5886	0.3277	0.4220	0.4255	0.3634	0.5138
Profitability - Return on equity	-0.0077	0.0072	0.0087	0.0156	-0.0762	-0.0068	-0.0003	-0.0034	-0.0032	-0.0087
p-value	0.7689	0.7836	0.7391	0.5528	0.0036	0.7946	0.9918	0.8982	0.9043	0.7393
Risk	-0.0032	-0.0072	-0.0097	-0.0169	-0.0145	0.0004	0.0078	0.0079	0.0088	0.0088
p-value	0.9021	0.7821	0.7121	0.5198	0.5810	0.9875	0.7650	0.7633	0.7379	0.7362
Size (Sales)	-0.0105	-0.0095	0.0198	0.0688	0.1622	-0.0669	-0.0078	-0.0124	-0.0098	-0.0137
p-value	0.6890	0.7184	0.4500	0.0086	0.0000	0.0106	0.7661	0.6353	0.7074	0.6006
Size (Total assets)	0.0264	0.0293	0.0570	0.1029	0.2038	-0.0520	0.0104	0.0067	0.0069	0.0077
p-value	0.3135	0.2641	0.0296	0.0001	0.0000	0.0470	0.6928	0.7987	0.7923	0.7682
Tangibility	-0.0421	-0.0518	-0.0668	-0.0788	-0.1368	-0.0155	0.0831	0.1049	0.1134	0.0998
p-value	0.1081	0.0479	0.0108	0.0026	0.0000	0.5536	0.0015	0.0001	0.0000	0.0001

Government ownership and risk have positive, nearly zero but statistically insignificant correlation coefficients. Barring the sizes of the coefficients, the result implies that as risk increased, government ownership also increased. Such a risk appetite is associated

with government-owned financial institutions which act in some cases as ‘funders of last resort’. The risk appetite then could be associated with negative profitability coefficients and negative dividend payout ratios. However, risk cannot be construed to mean negative returns, as there can be upside risk. Government ownership seems to be associated with the downside risk only. Government ownership variables and control variables are considered to be unrelated for the purposes of studying the effects of ownership on capital structure and can be used jointly in further analyses.

Pearson’s correlation coefficients between institutional investors and control variables and between other types of ownerships and control variables are presented in Table 5.32. Size as measured by total assets and institutional ownership at the top three shareholders level has the highest absolute correlation coefficient of -0.14 with a p-value of 0.00, which is statistically significant at the 1% level. Age and institutional ownership have a negative relationship. Hence as firm age increased, ownership by institutional investors decreased. However, the relationships are statistically insignificant. Both firm size variables are negatively related to institutional investor ownership at all levels. As firm size increased, institutional investor ownership decreased. The results are statistically significant at the 1% level.

Positive correlation coefficients are found between institutional ownership and profitability, when measured by return on equity, and between institutional investor ownership and tangibility. As return on equity and asset tangibility increased, institutional ownership also increased. Correlation coefficients are below 0.05 for most variables, coupled with insignificant relationships, leading to the conclusion that institutional investor ownership variables and control variables can be jointly used together in other analyses.

Pearson’s correlation coefficients between other ownership and control variables are the highest in absolute terms for the firm size, as measured by the total assets variable, which is -0.16 with a p-value of 0.00 at the top five shareholders level. Negative and largely statistically insignificant coefficients are observed between other ownership and age, dividend payout ratio, risk and the two size variables. Coefficients for the balance of the variables have positive and negative relationships but are statistically

insignificant. The inference is therefore made that the variables can be employed in analysing the ownership and capital structure relationship.

Table 5.32: Pearson's correlation coefficients for institutional ownership, other ownership and control variables: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Institutions Top 1 shareholder	Institutions Top 2 shareholders	Institutions Top 3 shareholders	Institutions Top 5 shareholders	Institutions Top 10 shareholders	Other Top 1 shareholder	Other Top 2 shareholders	Other Top 3 shareholders	Other Top 5 shareholders	Other Top 10 shareholders
Age	-0.0277	-0.0022	-0.0108	-0.0127	-0.0223	-0.0402	-0.0563	-0.0654	-0.0684	-0.0961
p-value	0.2902	0.9318	0.6795	0.6283	0.3939	0.1254	0.0315	0.0125	0.0089	0.0002
Dividend payout ratio	-0.0178	-0.0243	-0.0312	-0.0328	-0.0349	-0.0045	-0.0106	-0.0116	-0.0197	-0.0180
p-value	0.4964	0.3537	0.2336	0.2108	0.1833	0.8638	0.6861	0.6578	0.4525	0.4934
Growth (Sales)	0.0120	0.0073	0.0200	0.0239	0.0052	-0.0070	-0.0117	-0.0144	-0.0165	-0.0171
p-value	0.6460	0.7819	0.4452	0.3626	0.8431	0.7886	0.6566	0.5824	0.5297	0.5148
Growth (Total assets)	-0.0031	0.0050	-0.0012	-0.0036	-0.0272	-0.0050	-0.0058	-0.0091	-0.0115	-0.0144
p-value	0.9052	0.8500	0.9632	0.8906	0.2990	0.8481	0.8254	0.7287	0.6614	0.5838
Liquidity (Current ratio)	0.0296	0.0466	0.0482	0.0267	-0.0069	-0.0170	-0.0368	-0.0173	-0.0178	-0.0070
p-value	0.2587	0.0756	0.0657	0.3087	0.7911	0.5174	0.1601	0.5083	0.4972	0.7902
Liquidity (Quick ratio)	0.0205	0.0392	0.0410	0.0182	-0.0148	-0.0184	-0.0403	-0.0210	-0.0194	-0.0117
p-value	0.4339	0.1344	0.1177	0.4886	0.5715	0.4821	0.1240	0.4235	0.4593	0.6563
Non-debt tax shields (Depreciation/Total assets)	-0.0593	-0.0195	-0.0227	-0.0112	0.0013	-0.0407	-0.0336	-0.0296	-0.0311	0.0722
p-value	0.0235	0.4579	0.3860	0.6700	0.9591	0.1202	0.1991	0.2590	0.2356	0.0058
Non-debt tax shields (EBITDA/Depreciation)	0.0184	-0.0224	-0.0162	-0.0063	0.0032	-0.0028	-0.0199	-0.0202	-0.0175	-0.0143
p-value	0.4833	0.3927	0.5360	0.8096	0.9020	0.9152	0.4484	0.4413	0.5042	0.5853
Profitability - Return on assets	-0.0259	-0.0125	-0.0002	0.0108	0.0399	0.0203	-0.0077	-0.0093	0.0047	0.0057
p-value	0.3229	0.6332	0.9934	0.6804	0.1274	0.4380	0.7677	0.7220	0.8578	0.8282
Profitability - Return on equity	0.0024	0.0096	0.0083	0.0128	0.0072	0.0021	-0.1171	-0.0878	-0.0752	-0.0014
p-value	0.9264	0.7144	0.7527	0.6248	0.7824	0.9361	0.0000	0.0008	0.0040	0.9563
Risk	-0.0032	-0.0110	-0.0164	-0.0208	-0.0377	-0.0109	-0.0137	-0.0085	-0.0154	-0.0125
p-value	0.9017	0.6747	0.5325	0.4265	0.1499	0.6782	0.6012	0.7461	0.5576	0.6333
Size (Sales)	-0.0978	-0.0917	-0.0973	-0.0855	-0.0606	-0.0349	-0.0964	-0.1105	-0.1179	-0.1123
p-value	0.0002	0.0005	0.0002	0.0011	0.0207	0.1827	0.0002	0.0000	0.0000	0.0000
Size (Total assets)	-0.1238	-0.1248	-0.1371	-0.1347	-0.1306	-0.0624	-0.1210	-0.1400	-0.1629	-0.1544
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0172	0.0000	0.0000	0.0000	0.0000
Tangibility	0.0189	0.0508	0.0494	0.0417	0.0419	-0.0234	-0.0034	-0.0104	-0.0009	0.0296
p-value	0.4706	0.0525	0.0592	0.1117	0.1100	0.3725	0.8957	0.6905	0.9720	0.2583

Table 5.33 shows the correlation between ownership by the Public Investment Corporation and control variables used in studying the effects of ownership on capital structure. Both size variables have the highest correlation coefficients with ownership

by the Public Investment Corporation in the matrix. Size as measured by total assets and the Public Investment Corporation ownership at the top five shareholders level has a correlation coefficient of 0.55 and a p-value of 0.00, making it statistically significant at the 1% level. As firm size increased, ownership by the Public Investment Corporation also increased. Firm age, dividend payout ratio, both measures of profitability and tangibility have positive associations with ownership by the Public Investment Corporation. As firm age, dividend payout ratios, profitability and tangibility increased, ownership by the Public Investment Corporation also increased, with lower and in most cases statistically insignificant correlation coefficients being observed.

Table 5.33: Pearson's correlation coefficients for institutional ownership, other ownership and control variables: period 2004 to 2014

Null hypothesis: Ho: r = 0					
	Public Investment Corporation Top 1 shareholder	**Public Investment Corporation Top 2 shareholders**	**Public Investment Corporation Top 3 shareholders**	**Public Investment Corporation Top 5 shareholders**	**Public Investment Corporation Top 10 shareholders**
Age	0.0426	0.0630	0.0853	0.0985	0.0926
p-value	0.1038	0.0161	0.0011	0.0002	0.0004
Dividend payout ratio	0.0205	0.0157	0.0157	0.0241	0.0178
p-value	0.4336	0.5495	0.5503	0.3579	0.4963
Growth (Sales)	-0.0296	-0.0362	-0.0404	-0.0400	-0.0410
p-value	0.2581	0.1674	0.1235	0.1269	0.1181
Growth (Total assets)	-0.0162	-0.0218	-0.0247	-0.0314	-0.0260
p-value	0.5375	0.4050	0.3467	0.2313	0.3208
Liquidity (Current ratio)	-0.0564	-0.0663	-0.0729	-0.0824	-0.0965
p-value	0.0313	0.0114	0.0054	0.0016	0.0002
Liquidity (Quick ratio)	-0.0398	-0.0497	-0.0601	-0.0692	-0.0841
p-value	0.1286	0.0578	0.0218	0.0082	0.0013
Non-debt tax shields (Depreciation/Total assets)	-0.0091	-0.0052	-0.0016	0.0173	0.0083
p-value	0.7292	0.8437	0.9520	0.5086	0.7518
Non-debt tax shields (EBITDA/Depreciation)	-0.0166	-0.0130	-0.0044	0.0055	0.0145
p-value	0.5277	0.6196	0.8670	0.8347	0.5802
Profitability - Return on assets	0.0605	0.0640	0.0719	0.0927	0.0878
p-value	0.0209	0.0145	0.0060	0.0004	0.0008
Profitability - Return on equity	0.0313	0.0353	0.0401	0.0464	0.0488
p-value	0.2316	0.1782	0.1259	0.0764	0.0623
Risk	-0.0346	-0.0384	-0.0403	-0.0427	-0.0438
p-value	0.1871	0.1427	0.1242	0.1030	0.0945
Size (Sales)	0.3803	0.4501	0.4993	0.5341	0.5308
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Size (Total assets)	0.4082	0.4764	0.5284	0.5508	0.5457
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Tangibility	0.0371	0.0000	0.0094	0.0245	0.0168
p-value	0.1566	0.9991	0.7191	0.3494	0.5212

Negative and statistically insignificant correlation coefficients are observed between ownership by the Public Investment Corporation and the two growth ratios, the two liquidity ratios and risk. As firm growth rates, liquidity and risk increased, ownership by the Public Investment Corporation decreased.

The relationships between ownership by the Public Investment Corporation and control variables are different from those of institutional investors and government, which the Public Investment Corporation is closely associated with. The differences appear to justify the creation of the Public Investment Corporation as a unique type of ownership which is peculiar to South Africa. The study uses the Public Investment Corporation as an ownership type jointly with other control variables in the examination of the effects of ownership on capital structure.

5.4.7.3 *Pearson's correlation coefficients between capital structure and control variables*

The relationships between capital structure variables, as the dependent variables, and control variables, are examined in order to check the extent to which the variables correlate with each other. The results of the analysis are shown in Table 5.34. Pearson's correlation coefficients are small, with many of them under 0.10. Liquidity, measured by the current ratio and total debt ratio, calculated using book value, has the highest correlation coefficient of 0.38 and a p-value of 0.00, which is statistically significant at the 1% level. Given the low correlation coefficients, some of which are statistically insignificant, it is concluded that the dependent and control variables could be used in further analysis of the relationship between ownership and capital structure.

Table 5.34: Pearson's correlation coefficients between dependent (capital structure) variables and control variables: period 2004 to 2014

Null hypothesis: Ho: r = 0							
	Long-term debt ratio (BV)	**Long-term debt ratio (MV)**	**Short-term debt ratio (BV)**	**Short-term debt ratio (MV)**	**Total debt ratio (BV)**	**Total debt ratio (MV)**	**Leverage factor**
Age	-0.0555	0.0003	-0.1006	-0.0031	-0.1236	-0.0027	0.0449
p-value	0.0343	0.9912	0.0001	0.9063	0.0000	0.9191	0.0862
Dividend Payout ratio	-0.0244	-0.0054	-0.0520	-0.0537	-0.0602	-0.0477	-0.0125
p-value	0.3524	0.8371	0.0471	0.0402	0.0214	0.0687	0.6335
Growth (Sales)	-0.0129	-0.0066	0.0103	0.0013	0.0017	-0.0029	-0.0133
p-value	0.6239	0.8017	0.6942	0.9610	0.9481	0.9118	0.6124
Growth (Total assets)	0.0029	0.0185	0.0202	0.0603	0.0194	0.0610	-0.0093
p-value	0.9116	0.4813	0.4411	0.0213	0.4588	0.0199	0.7231
Liquidity (Current ratio)	-0.1327	0.0231	-0.3355	-0.1494	-0.3795	-0.1096	-0.0198
p-value	0.0000	0.3791	0.0000	0.0000	0.0000	0.0000	0.4491
Liquidity (Quick ratio)	-0.1100	0.0319	-0.2956	-0.1491	-0.3302	-0.1041	-0.0105
p-value	0.0000	0.2231	0.0000	0.0000	0.0000	0.0001	0.6889
Non-debt tax shields (Depreciation/Total assets)	0.1114	0.2448	-0.1602	-0.0529	-0.0710	0.1036	0.0073
p-value	0.0000	0.0000	0.0000	0.0435	0.0067	0.0001	0.7821
Non-debt tax shields (EBITDA/Depreciation)	-0.0502	-0.1203	-0.0119	-0.0365	-0.0421	-0.1026	-0.0284
p-value	0.0555	0.0000	0.6510	0.1637	0.1081	0.0001	0.2790
Profitability - Return on Assets	-0.0309	-0.1488	-0.0087	-0.1172	-0.0273	-0.1865	-0.0440
p-value	0.2391	0.0000	0.7401	0.0000	0.2978	0.0000	0.0928
Profitability - Return on Equity	-0.0030	-0.0406	0.0124	0.0078	0.0092	-0.0180	-0.1550
p-value	0.9091	0.1213	0.6354	0.7674	0.7263	0.4913	0.0000
Risk	-0.0234	0.0150	-0.0538	-0.0276	-0.0620	-0.0138	0.0045
p-value	0.3710	0.5659	0.0401	0.2921	0.0179	0.5991	0.8629
Size (Sales)	0.0975	-0.0397	0.1089	-0.0749	0.1575	-0.0860	-0.0274
p-value	0.0002	0.1296	0.0000	0.0042	0.0000	0.0010	0.2958
Size (Total assets)	0.2049	0.1171	-0.0992	-0.2492	0.0417	-0.1357	-0.0066
p-value	0.0000	0.0000	0.0001	0.0000	0.1111	0.0000	0.7999
Tangibility	0.2319	0.3008	-0.2844	-0.1639	-0.1047	0.0455	-0.0552
p-value	0.0000	0.0000	0.0000	0.0000	0.0001	0.0825	0.0352

BV= Book value and MV= market value

5.5 PRELIMINARY TESTS

Preliminary tests must be conducted on the data in order to obtain a clear understanding of the nature of the data before it can be further analysed. Some of these tests include the panel unit root, multicollinearity, heteroscedasticity and autocorrelation.

5.5.1 Panel unit root test

The essence of a unit root test is to examine the stationarity or non-stationarity of the individual time series. Economic variables are generally non-stationary, hence they may not be used directly in statistical analysis if the aim is to obtain a robust and stable estimate. Panel-based unit root tests have been suggested to have higher power than

unit root tests based on individual time series. The hypotheses tested are that there is autocorrelation (H_o: ρ = 1) against the alternative that there is no autocorrelation (H_a: ρ = 0). To test for stationarity of the data series, the Levin-Lin-Chu test (Levin, Lin & Chu, 2002:5) is used. For purposes of testing, there are two assumptions that can be made about the ρ. Firstly, one can assume that the persistence parameters (ρ) are common across cross-sections so that $\rho_i = \rho$ for all I, or a unit root. The Levin, Lin, and Chu test employs this assumption. The null hypothesis employed is that of a unit root. Alternatively, the persistence parameters can be allowed to vary freely across cross-sections. The Im, Pesaran and Shin, and Fisher-Augmented Dickey-Fuller and Fisher-Phillips-Perron tests are of this form. As the current study is interested in testing whether the data is stationary, results from the Levin, Lin and Chu test are used to make conclusions about the nature of the data set.

Table 5.35 shows the results of the panel unit root test. Based on the variables analysed, all are stationary assuming individual unit root and only black shareholders' ownership at the top one and top two levels, government ownership at the top one shareholder level, growth based on total assets, non-debt tax shields (earnings before interest, tax, depreciation and amortisation/depreciation) and size, based on sales, are not stationary, assuming common unit root for all cross-sections. Non-debt tax shields (earnings before interest, tax, depreciation and amortisation/depreciation) and size, based on sales, are not used in the analysis as they performed poorly in contrast to the other variables defining the same concepts.

Table 5.35: Results of the panel unit root test

	Levin, Lin & Chu statistic	Probability	Cross-sections	Observations
Black - Top one shareholder	1.3821	0.9165	5	1312
Black - Top two shareholders	8.4088	1.0000	6	1655
Government - Top one shareholder	3.5035	0.9998	3	1330
Growth - Total assets	29.0031	1.0000	8	1441
Non-debt tax shields earnings before interest and tax and depreciation and amortisation/Depreciation	6.0122	1.0000	8	1828
Size, sales	-1.6196	0.0527	8	1812
Top 10 shareholders	-7.9051	0.0000	8	1927

5.5.2 Panel cross-section dependence test

It is commonly assumed that disturbances in panel data models are cross-sectionally independent, especially when the cross-section dimension (N) is large. However, there is considerable evidence that cross-sectional dependence is often present in panel regression settings. Ignoring cross-sectional dependence in estimation can have serious consequences, with unaccounted for residual dependence resulting in estimator efficiency loss and invalid test statistics.

There are a variety of tests for cross-section dependence in the literature. EViews offers the following tests: Breusch-Pagan (1980); Pesaran (2004), scaled; Baltagi, Feng and Kao (2012), bias-corrected scaled and Pesaran (2004). The null hypothesis is that there is no cross-section dependence or no correlation in residuals. Any of the first three tests can be used to analyse the data. In the analysis of the data, there is evidence of some variables being correlated among the cross-sections. This is taken care of by using the generalised method of moments approach of estimation as it is robust to this violation.

5.5.3 Outliers

Box and whiskers plots are used to detect the presence of outliers in the data sets. Generally, 50% of the data lies between the lower and upper quartiles, with 25% lying between the minimum number and the lower quartile and the other 25% of that data lying between the upper quartile and the maximum number. The maximum number is traditionally defined as stretching 1.5 times the length of the box which holds 50% of the data. The maximum value is therefore above the upper quartile. The minimum number is also of a similar length but below the lower quartile. Data points which lie outside the maximum and the minimum points on the data box and whiskers plot are outliers or extreme values. When such outliers are close to the maximum or minimum points, they are considered to be weak outliers and can be ignored. The lengths of the upper or lower whiskers, among other measures, indicate the symmetry of the data.

5.5.4 Multicollinearity

It is one of the assumptions of regression analysis that where there are more than one independent x variable, those variables should not be associated with each other. If the degree of association between the independent variables is high, multicollinearity occurs resulting in an incorrect regression outcome. Variance inflation factors (VIF) are used to indicate multicollinearity in this study. Auxiliary regressions are created for each independent variable. Each independent variable, in turn, is made the dependent variable with the rest of the independent x variables remaining as independent variables. A coefficient of determination ($R^2_{Aux(i)}$) is calculated for each independent x variable (in separate equations). A high coefficient of determination denotes a strong association between the particular independent x variable and the rest of the independent variables. The variance inflation factor is given by the following quotient:

$$VIF_{(i)} = 1/(1 - R^2_{Aux(1)})$$

If $R^2_{Aux(i)}$ of the value of the auxiliary regression is close to zero, there is no multicollinearity and variance inflation factor equals one. If $R^2_{Aux(i)}$ is very large, multicollinearity exists and the variance inflation factor is high. Hair, Black, Babin, Anderson and Tatham (2006:230) state that a variance inflation factor of 10 should generally be the upper limit for detection of multicollinearity and they recommend that lower values should be used for smaller samples. On the other hand, Cleff (2013:139) states that the decision on the level of variance inflation factor that should be used as the cut-off point to indicate multicollinearity should be left to the researcher.

Table 5.36 shows the variance inflation factors from data used in the current study. The results in Table 5.36 are obtained on the modelling using the least squares method. The observations indicate that size based on sales, size based on total assets, liquidity based on current ratio and liquidity-quick ratio, and non-debt tax shields (earnings before interest, tax, depreciation and amortisation/depreciation) and non-debt tax shield (depreciation/total assets) are multicollinear and may not be used together in the same model. Hence the dropping of one variable from each pair did not eliminate the type of variable under consideration.

Table 5.36: Variance inflation factors

Variable	Coefficient variance	Uncentred VIF	Centred VIF
Constant	0.7153	794.8420	NA
C N Top Five shareholders	0.9819	21.2060	12.0836
Institution - Top 5 shareholder	0.2537	6.1184	3.1009
Public Investment Corporation - Top Five shareholders	1.1972	6.2888	4.2823
Family - Top Five shareholders	0.1909	9.1504	6.3314
Company - Top Five shareholders	0.3131	16.5300	11.0166
Directors - Top Five shareholders	0.0372	7.3220	4.9443
Black - Top Five shareholders	0.3725	2.3882	1.9233
Foreign - Top Five shareholders	0.4024	5.0865	2.4531
Government - Top Five shareholders	4.7590	2.1372	1.8027
Other - Top Five shareholders	0.6988	1.5339	1.3694
Size (Sales)	0.0865	4059.1590	53.6469
Size, Total assets	0.0524	2448.7520	38.8700
Tangibility	0.1081	11.8120	3.6315
Non-debt tax shields (EBITDA/Depreciation)	0.0000	4.6765	2.0489
Non-debt tax shields (Depreciation/Total assets)	6.3145	10.8460	3.2615
Risk	0.0013	2.6281	2.5978
Dividend payout ratio	0.0002	1.6386	1.5458
Age	0.0000	4.6424	1.4564
Growth - Sales	0.0001	1.5786	1.5618
Growth - Total assets	0.0040	2.2353	1.8002
Liquidity (Current ratio)	0.0085	91.9844	64.2810
Liquidity (Quick ratio)	0.0090	81.7110	68.5460
Included observations: 1488			

5.6 CONCLUSIONS FROM ANALYSIS OF CORRELATION COEFFICIENTS OF VARIABLES

Pearson's correlation coefficients for independent variables, represented by ownership and ownership concentration variables, dependent variables represented by capital structure variables, and control variables were examined above. The aim was to determine the extent to which the variables were correlated and therefore decide whether or not the variables could be used jointly in further analyses. The ownership concentration variables, as measured by the levels of total shareholders of the top one, two, three, five and 10 shareholders, were highly correlated. Hence each level of ownership was treated separately in the analyses that ensued. The Herfindahl index at a level of number of top shareholdings was also used as a measure of ownership concentration. Herfindahl indices were found to be highly correlated with each other at different levels of shareholdings. These indices at each level of shareholding were therefore used separately for further analysis to avoid problems of multicollinearity. It was also important to assess whether two types of ownership concentrations, namely

the shareholdings at different levels of number of top shareholders and the Herfindahl indices, could be used jointly. The correlation coefficient results were high and statistically significant, leading to the use of each measure of ownership concentration on its own.

Pearson's correlation coefficients for capital structure variables, which were the dependent variables, also revealed high levels of correlation, supporting the methodology that each of them should be used independently of each other. Pearson's correlation coefficients between the independent, dependent and control variables were low but statistically significant in some cases, leading to the conclusion that they would be used jointly in succeeding analyses. Where two control variables measured the same concept, one of them was eliminated so that further analyses were conducted with only one type of variable measuring one concept.

CHAPTER 6

DESCRIPTIVE STATISTICS AND CORRELATION ANALYSIS OF THE RELATIONSHIP BETWEEN OWNERSHIP AND CORPORATE PERFORMANCE

6.1 INTRODUCTION

This chapter examines the relationships between ownership and firm performance. In particular, the relationship between firm ownership regarding ownership concentration and ownership identity and its effect on how firms perform are analysed.

Measures of ownership structure in terms of ownership concentration and ownership identity and measures of firm performance, which were appropriate indicators of each of the underlying phenomenon, are identified in this chapter. The relationships between the variables are also explored. Data for the study was collected for a period of 11 years, annually for each firm, from 2004 to 2014, for 205 non-financial firms listed under eight industries on the JSE Securities Exchange. Correlation analysis was used to examine the relationships between the various variables used in the study. Pearson's correlation coefficients were used to determine the most appropriate combinations of variables of ownership and firm performance. Identification of the best combinations of variables made it possible for further analysis to be conducted on the selected variables.

This chapter is organised as follows: Section 6.2 provides a descriptive summary of the data and variables; Section 6.3 presents the descriptive statistics for ownership concentration, ownership identity and corporate performance variables; in Section 6.4, Pearson's correlation coefficients for ownership structure, control variables and corporate performance are discussed; Section 6.5 briefly describes the preliminary tests conducted on data; the final section summarises the chapter.

6.2 OWNERSHIP, FIRM PERFORMANCE AND CONTROL VARIABLES

Data used in the study is described in Section 5.2 and Table 5.1. The number of companies from each selected industry used in the study is shown in Table 5.1. Ownership structure variables, namely those measuring ownership identity and ownership concentration, were similar to those used in the analysis of the effects of ownership on capital structure. Ownership concentration was measured by the total shareholdings of the top shareholder, the top two, top three, top five and top 10 shareholders. The other measure of ownership concentration was the Herfindahl index, calculated at each of these five levels.

Five measures of firm performance were analysed in the study. These were market value added, return on assets, return on equity, economic-value added and Tobin's Q. Control variables were also used in the study, and these were firm age, risk, dividend payout ratio, tangibility, non-debt tax shield (based on depreciation/total assets or earnings before interest, tax, depreciation and amortisation/total assets), growth prospects (based on sales or total assets), liquidity (calculated as current ratio or quick ratio), size (based on sales or total assets) and total debt to total assets ratio, based on book value. The relationships between the variables were examined to determine whether further analysis could be conducted on them.

Variables which were most appropriate to the analysis of the relationship between ownership and capital structure were identified and those variables were then subject to further analysis in subsequent chapters.

6.3 DESCRIPTIVE STATISTICS FOR CORPORATE PERFORMANCE VARIABLES

Summary statistics of the variables used as proxies for ownership (ownership concentration and ownership identity) and control variables were presented in Tables 5.2 to 5.6 in Chapter 5. The same variables, with the exception of some control variables, were used in examining the effects of ownership on firm performance.

The descriptive statistics for the corporate performance variables are presented in Table 6.1. The average values of market value-added and economic value-added variables were 2.31 and -5615.09 respectively. The market value-added had a median of 1.54 indicating that most firms had a market value-added close to that value. Economic value-added variables varied significantly as reflected by the high standard deviation of 241 514.2. Yasser and Mamun (2015:170) found an average economic value-added variable of -17.65 in their Pakistani study.

Table 6.1: Descriptive statistics for the corporate performance variables

	Mean	Median	Maximum	Minimum	Standard deviation	Observations
Economic value- added	-5 615.0890	0.0132	5.4051	-10 387 919.0000	241 514.2000	1 850
Market value- added	2.3072	1.5400	589.9600	-986.0600	29.9004	1 850
Return on assets	0.0856	0.1176	2.5582	-9.9789	0.4777	1 850
Return on equity	0.0677	0.1565	20.5495	-53.8612	1.9774	1 850
Tobin's Q	1.9770	1.1500	248.2400	0.0600	7.2331	1 850

The average values of return on assets and return on equity were 8.56% and 6.77% respectively. The range for return on assets was -9997.89% to 255.82%, while the return on equity had a minimum of -5 386.12% and a maximum of 2 054.95% showing a large dispersion of values. Yasser and Mamun (2015:170) recorded average return on assets and return on equity values of 6.97% and 13.01% respectively. Isik and Soykan (2013:29) found a return on equity ratio of 6.14% while Jadoon and Bajuri (2015:204) obtained 5.01% and 12.01% for return on assets and return on equity respectively. The average value of Tobin's Q was 1.98, which was higher than the 1.27 observed by Isik and Soykan (2013:29) in Turkey and 1.03 recorded in Pakistan by Yasser and Mamun (2015:29).

6.3.1 Descriptive statistics for corporate performance by industry

Table 6.2 displays the corporate performance measures by industry. Return on assets and return on equity varied across different industries. The basic materials sector had returns on assets and equity of -10.80% and -13.45% respectively in 2004, while the telecommunications industry had 19.58% and 22.69% for the same respective ratios.

Table 6.2: Descriptive statistics for the corporate performance variables by industry: period 2004 to 2014

	Basic materials	Consumer goods	Consumer services	Healthcare	Industrials	Oil and gas	Technology	Telecommunications
Return on assets, book value	-0.1080	0.1361	0.1787	-0.0467	0.1401	-0.0646	0.1633	0.1958
Return on equity, book value	-0.1345	0.1445	0.2440	-0.4598	0.1377	-0.4779	0.1775	0.2269
Tobin's Q	2.9382	1.8400	2.5041	8.4488	1.2294	2.4795	1.3490	1.5955
Economic value-added	-0.0837	0.0058	0.0477	0.0386	-17576.8400	-0.1307	0.1137	0.0514
Market value-added	1.3946	2.1979	3.6042	16.1644	1.6555	2.1729	1.8678	2.0908

6.3.2 Descriptive statistics for corporate performance by year

Table 6.3 displays the corporate performance measures across the 11-year period. All the measures of performance experienced large variations during the period. Return on assets increased from 12.21% in 2004 to 18.10% before falling to 5.7%. A similar trend can be observed for return on equity, showing perhaps the effect of the global financial crisis. The market value-added variables remained fairly stable over the period.

Table 6.3: Descriptive statistics for corporate performance by year: period 2004 to 2014

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Return on assets, book value	0.1221	0.13505	0.0674	0.09817	0.1810	0.0961	0.1073	0.0702	0.0116	-0.0755	0.0570
Return on equity, book value	0.0075	0.1400	-0.0364	0.2710	0.0689	0.1171	0.0760	-0.1650	0.1666	0.1132	-0.0116
Tobin's Q	1.8428	3.2140	4.1573	4.1052	1.5047	1.2406	1.3595	1.5588	2.2843	1.6679	2.3292
Economic value-added	0.0161	0.0343	0.0344	-0.0040	-0.0229	-57710.67	-0.0083	-0.0120	-0.0067	-0.0158	0.0068
Market value-added	2.6219	3.6656	7.5485	-2.8255	2.0010	1.5886	1.811	4.5939	2.1120	1.8629	1.9927

6.4 CORRELATION ANALYSIS FOR OWNERSHIP AND FIRM PERFORMANCE VARIABLES

6.4.1 Pearson's correlation coefficients for firm performance variables

Given that the current study also sought to analyse the effects of ownership on firm performance, Pearson's correlation coefficients were computed for firm performance variables. These variables were economic value-added, market value-added, return on assets, return on equity and Tobin's Q. Table 6.4 shows the correlation coefficients for the firm performance variables.

Table 6.4: Pearson's correlation coefficients for firm performance variables: period 2004 to 2014

Null hypothesis: $H_o : r = 0$					
	Economic value-added	**Market value-added**	**Return on assets**	**Return on equity**	**Tobin's Q**
Economic value-added p-value	1				
Market value-added p-value	0.0032 0.9034	1			
Return on assets p-value	0.0016 0.9527	-0.1106 0.0000	1		
Return on equity p-value	0.0004 0.9870	-0.8880 0.0000	0.2374 0.0000	1	
Tobin's Q p-value	0.0146 0.5789	0.1822 0.0000	0.0571 0.0294	-0.0277 0.2903	1

The correlation coefficient between the market value-added and return on equity variables was -0.89, with a p-value of 0.00, reflecting a high degree of association between the two performance variables. The relationship was statistically significant at the 1% level. The negative correlation coefficient implied that as the market value-added variable increased, the return on equity decreased. Such a result was in line with what was expected because the return on equity, by definition, had equity as a denominator, which was conceptually similar to the concept of value, in the market value-added variable. Hence the denominator increased as the quotient decreased.

Return on equity was also statistically significantly positively correlated with the return on assets (r = 0.24 and p-value = 0.00). The two variables measured returns made from

equity or assets invested. The exact calculations differed but the general approach was similar; hence the degree of association found in those results. Pearson's correlation coefficient between the return on assets and market value-added variables was negative and statistically significant at 1% level (r = -0.11 and p-value = 0.00). The explanation for the relationship could be the same as for return on equity.

Tobin's Q had a positive and statistically significant relationship with market value-added at the 1% level (r = 0.18 and p-value = 0.00). The two variables shared the common aspect of the market value of a firm being compared with another concept such as replacement cost, as was the case with Tobin's Q, or capital contributed by investors, in the case of market value-added. The relationship between Tobin's Q and the return on assets was positive, with a low correlation coefficient, which was statistically significant at the 10% level (r = 0.06 and p-value = 0.03). Other correlation coefficients were small and statistically insignificant.

Apart from the strong association between the market value-added and return on equity variables, other correlation coefficients were small, with some being statistically significant and others being statistically insignificant.

6.4.2 Correlation analysis for concentration of ownership variables

Concentration of ownership variables used in the study were percentages of shares owned by top shareholders and the Herfindahl index. The top shareholders were the top one, two, three, five and 10 shareholders and the Herfindahl index was calculated for each corresponding level of shareholding. Pearson's correlation coefficients for the ownership concentration variables were similar to those presented in Table 5.8.

Pearson's correlation coefficients for all the variables were high and statistically significant at the 1% level, with a minimum coefficient of 0.75 and a maximum of nearly one. Pearson's correlation coefficients between the shareholding percentages of the top one, two, three, five and 10 shareholders had an even higher minimum of 0.83 and a p-value of 0.00. This result was interpreted to mean that the variables of the ownership by the top one, two, three, five and 10 shareholders had to be used separately as

independent variables and not combined in a single equation. The analysis therefore proceeded on the basis that each level of shareholding would be examined separately from the other levels.

The Herfindahl index variables constituted the second set of ownership concentration variables. The indices were calculated at the levels of the top one, two, three, five and 10 shareholders ownership percentages and results from Pearson's correlation coefficients showed that they were highly correlated, with a minimum coefficient of 0.99. An explanation for the even higher levels of correlation was that the Herfindahl indices were only calculated for any single shareholder of 5% or more. As a result, if the increase in shareholding percentage from the top one shareholder to the top two shareholders and further did not have a 5% shareholding for any new (incoming) shareholder, then the index would not change from the top one shareholder to the top two shareholders and beyond. Such an occurrence was likely given that the increase in shareholding from one level to the next was in decreasing order, thereby increasing the probability of additional individual shareholdings being lower than 5%. These results also meant that Herfindahl index variables could only be used separately due to the high levels of correlation.

Pearson's correlation coefficients between the levels of shareholdings and the Herfindahl indices at those levels were slightly smaller with a minimum coefficient of 0.75. The results meant that the measures of ownership concentration, namely the percentages of ownership at different levels of shareholding, and the Herfindahl indices at those levels could not be combined in explaining the relationships between ownership and firm performance.

6.4.3 Correlation analysis for ownership-type variables

Ownership type was divided into the following categories: black, company, directors, family, foreign, government, institutional investors, other and Public Investment Corporation. The results of the correlation analysis were examined for each of the five levels of shareholding used in the study, namely the top one, top two, top three, top five and top 10 shareholders.

6.4.3.1 *Correlation coefficients for ownership types at the top one shareholder level*

For the top one shareholder level, the highest Pearson's correlation coefficient between the ownership-type variables was between the director and family ownerships, which was positive and statistically significant at the 1% level (r = -0.35, p-value = 0.00). As director ownership increased, ownership by families increased. A possible explanation was that some directors were representing family ownerships on their boards, leading to the positive correlation between the two variables. Pearson's correlation coefficient between ownership by directors and by the Public Investment Corporation was the second highest, at -0.22, with a p-value of 0.00. As directors' ownership increased, the Public Investment Corporation ownership decreased. This result could mean that the Public Investment Corporation was not keen to invest in firms where directors were top shareholders. The sizes of the correlation coefficient were considered small.

Most Pearson's correlation coefficients at the top one shareholder level were negative. A number of variables had statistically insignificant relationships, while others had statistically significant relationships with each other. However, many correlation coefficients were low (below 10%). The extent of the relationships points to the confirmation that the types of ownerships could be used in further analysis. Pearson's correlation coefficients for these variables were similar to those shown in Table 5.9.

6.4.3.2 *Correlation coefficients for the top two shareholders*

Pearson's correlation coefficient between the top two shareholders for families and top two shareholders for directors was the largest at the top two shareholders level, at 0.38 and a p-value of 0.00, which was statistically significant at the 1% level. The second-highest absolute correlation coefficient was between ownership by the Public Investment Corporation and ownership by directors, which was negative, at -0.26 and a p-value of 0.00, making it significant at the 1% level. It appeared that directors did not prefer to own shares in companies where the Public Investment Corporation was one of the top two shareholders. The Public Investment Corporation could have been viewed as an institutional investor with a monitoring capacity, which was not desirable to directors. Table 6.5 shows the correlation coefficients of the ownership-type variables at the top two shareholders level. Pearson's correlation coefficients between other variables were low, at 10% and lower, and mainly statistically significant at the 1% and

5% levels. The correlation coefficients were low and could therefore be used jointly in the analysis of the effects of ownership on corporate performance.

Table 6.5: Pearson's correlation coefficients for ownership-type variables with firm performance as the dependent variable: period 2004 to 2014 for the top two shareholders

Null hypothesis: Ho: r = 0									
	Black: Top 2 shareholders	**Company: Top 2 shareholders**	**Directors: Top 2 shareholders**	**Family: Top 2 shareholders**	**Foreign: Top 2 shareholders**	**Government: Top 2 shareholders**	**Institutions: Top 2 shareholders**	**Other: Top 2 shareholders**	**Public Investment Corporation: Top 2 shareholders**
Black: Top 2 shareholders	1								
p-value									
Company: Top 2 shareholders	-0.0988	1							
p-value	0.0002								
Directors: Top 2 shareholders	0.0187	0.1588	1						
p-value	0.4747	0.0000							
Family: Top 2 shareholders	-0.0712	-0.0986	0.3858	1					
p-value	0.0066	0.0002	0.0000						
Foreign: Top 2 shareholders	-0.0866	-0.1483	-0.1058	-0.1118	1				
p-value	0.0009	0.0000	0.0001	0.0000					
Government: Top 2 shareholders	0.0919	0.0334	-0.0689	-0.0626	0.0225	1			
p-value	0.0004	0.2034	0.0086	0.0169	0.3911				
Institutions: Top 2 shareholders	-0.1041	-0.1110	-0.0130	-0.0967	-0.1006	-0.0741	1		
p-value	0.0001	0.0000	0.6212	0.0002	0.0001	0.0047			
Other: Top 2 shareholders	-0.0120	-0.0654	0.0301	-0.0404	-0.0581	-0.0341	0.0278	1	
p-value	0.6479	0.0126	0.2516	0.1232	0.0265	0.1941	0.2884		
Public Investment Corporation: Top 2 shareholders	-0.1139	-0.1918	-0.2585	-0.2193	-0.0566	-0.0925	-0.1314	-0.0811	1
p-value	0.0000	0.0000	0.0000	0.0000	0.0309	0.0004	0.0000	0.0020	

6.4.3.3 *Correlation coefficients for the top three shareholders*

Table 6.6 presents the correlation coefficients of the ownership-type variables at the top three shareholders level. Pearson's correlation coefficient between ownership by directors and by families was 0.41, with a p-value of 0.00.

Table 6.6: Pearson's correlation coefficients for ownership-type variables with firm performance as the dependent variable: period 204 to 2014 for the top three shareholders

Null hypothesis: Ho: r = 0									
	Black: Top 3 shareholders	**Company: Top 3 shareholders**	**Directors: Top 3 shareholders**	**Family: Top 3 shareholders**	**Foreign: Top 3 shareholders**	**Government: Top 3 shareholders**	**Institutions: Top 3 shareholders**	**Other: Top 3 shareholders**	**Public Investment Corporation: Top 3 shareholders**
Black: Top 3 shareholders	1								
p-value									
Company: Top 3 shareholders	-0.0940	1							
p-value	0.0003								
Directors: Top 3 shareholders	0.0181	0.1688	1						
p-value	0.4891	0.0000							
Family: Top 3 shareholders	-0.0745	-0.0775	0.4085	1					
p-value	0.0045	0.0031	0.0000						
Foreign: Top 3 shareholders	-0.0877	-0.1208	-0.1176	-0.1221	1				
p-value	0.0008	0.0000	0.0000	0.0000					
Government: Top 3 shareholders	0.1105	0.0218	-0.0690	-0.0650	0.0181	1			
p-value	0.0000	0.4056	0.0084	0.0132	0.4895				
Institutions: Top 3 shareholders	-0.0910	-0.1338	-0.0387	-0.1217	-0.1479	-0.0693	1		
p-value	0.0005	0.0000	0.1403	0.0000	0.0000	0.0082			
Other: Top 3 shareholders	-0.0143	-0.0833	0.0353	-0.0321	-0.0365	-0.0458	0.0548	1	
p-value	0.5844	0.0015	0.1787	0.2212	0.1640	0.0806	0.0367		
Public Investment Corporation: Top 3 shareholders	-0.1042	-0.1766	-0.2828	-0.2647	0.0149	-0.0538	-0.1363	-0.0991	1
p-value	0.0001	0.0000	0.0000	0.0000	0.5690	0.0402	0.0000	0.0002	

Ownership by directors increased with ownership by families, which was a statistically significant correlation, at the 1% level. Ownership by directors and the Public Investment Corporation had a correlation coefficient of -0.28 and a p-value of 0.00, which was significant at the 1% level. Family ownership and ownership by the Public Investment Corporation had a negative correlation coefficient, which was significant at the 1% level (r = -0.26 with a p-value of 0.00). Other correlation coefficients were smaller, signifying the lack of strong relationships between the variables. However, the small correlation coefficients were in the main statistically significant at the 1% level, while other

coefficients were statistically insignificant. The directions of the relationships were mixed, with both positive and negative coefficients. Hence it was decided that the variables at the top three shareholders level could be used in further analyses of ownership and corporate performance.

6.4.3.4 *Correlation coefficients for the top five shareholders*

At the top five shareholders ownership level, the highest and next highest Pearson's correlation coefficients were similar to the ones at the lower levels, namely ownership by directors and families being the highest and ownership by families and the Public Investment Corporation being the second highest. The correlation coefficients were slightly higher, at 0.42 and -0.31 respectively, with both being statistically significant at the 1% level, with p-values of 0.00. Directors' ownership had a statistically significant negative Pearson's correlation coefficient with the Public Investment Corporation ownership (r = -0.30, p-value 0.00). Table 6.7 presents the relationships among the ownership-type variables for the top five shareholders.

Table 6.7: Pearson's correlation coefficients for ownership-type variables with firm performance as the dependent variable: period 2004 to 2014 for the top five shareholders

Null hypothesis: Ho: r = 0									
	Black: Top 5 shareholders	**Company: Top 5 shareholders**	**Directors: Top 5 shareholders**	**Family: Top 5 shareholders**	**Foreign: Top 5 shareholders**	**Government: Top 5 shareholders**	**Institutions: Top 5 shareholders**	**Other: Top 5 shareholders**	**Public Investment Corporation: Top 5 shareholders**
Black: Top 5 shareholders	1								
p-value									
Company: Top 5 shareholders	-0.0924	1							
p-value	0.0004								
Directors: Top 5 shareholders	0.0179	0.1851	1						
p-value	0.4957	0.0000							
Family: Top 5 shareholders	-0.0644	-0.0546	0.4214	1					
p-value	0.0140	0.0371	0.0000						
Foreign: Top 5 shareholders	-0.0723	-0.1252	-0.1349	-0.1342	1				
p-value	0.0058	0.0000	0.0000	0.0000					
Government: Top 5 shareholders	0.0972	0.0198	-0.0684	-0.0679	0.0208	1			
p-value	0.0002	0.4500	0.0091	0.0095	0.4288				
Institutions: Top 5 shareholders	-0.1117	-0.1479	-0.0576	-0.1408	-0.1896	-0.0676	1		
p-value	0.0000	0.0000	0.0280	0.0000	0.0000	0.0099			
Other: Top 5 shareholders	-0.0224	-0.0710	0.0488	0.0007	-0.0501	-0.0485	-0.0485	1	
p-value	0.3935	0.0068	0.0626	0.9796	0.0562	0.0642	0.0642		
Public Investment Corporation: Top 5 shareholders	-0.0865	-0.1719	-0.2969	-0.3114	0.0620	-0.0485	-0.1028	-0.0945	
p-value	0.0010	0.0000	0.0000	0.0000	0.0179	0.0642	0.0001	0.0003	1

The directions of the relationships between the remainder of the variables remained largely the same as at the top three shareholders level. The correlation coefficients were considered to be small enough to permit the use of all nine variables as explanatory variables.

6.4.3.5 *Correlation coefficients for the top 10 shareholders*

Table 6.8 shows the correlation coefficients of ownership-type variables when the shareholdings were considered at the top 10 level.

Table 6.8: Pearson's correlation coefficients for ownership-type variables with firm performance as a dependent variable: period 2004 to 2014 for the top 10 shareholders

Null hypothesis: Ho: r = 0									
	Black: Top 10 shareholders	**Company: Top 10 shareholders**	**Directors: Top 10 shareholders**	**Family: Top 10 shareholders**	**Foreign: Top 10 shareholders**	**Government: Top 10 shareholders**	**Institutions: Top 10 shareholders**	**Other: Top 10 shareholders**	**Public Investment Corporation: Top 10 shareholders**
Black: Top 10 shareholders	1								
p-value									
Company: Top 10 shareholders	-0.1056	1							
p-value	0.0001								
Directors: Top 10 shareholders	0.0271	0.1433	1						
p-value	0.3020	0.0000							
Family: Top 10 shareholders	-0.0211	-0.0657	0.4359	1					
p-value	0.4221	0.0121	0.0000						
Foreign: Top 10 shareholders	-0.0474	-0.1323	-0.1549	-0.1985	1				
p-value	0.0704	0.0000	0.0000	0.0000					
Government: Top 10 shareholders	0.0958	-0.0008	-0.0725	-0.0757	0.0230	1			
p-value	0.0003	0.9742	0.0056	0.0039	0.3805				
Institutions: Top 10 shareholders	-0.1062	-0.1898	-0.0689	-0.1128	-0.2218	-0.0690	1		
p-value	0.0000	0.0000	0.0086	0.0000	0.0000	0.0085			
Other: Top 10 shareholders	-0.0452	-0.0456	0.0606	0.0140	-0.0048	-0.0268	0.0412	1	
p-value	0.0850	0.0821	0.0206	0.5930	0.8544	0.3073	0.1161		
Public Investment Corporation: Top 10 shareholders	-0.0968	-0.2033	-0.3038	-0.3540	0.2013	-0.0560	-0.0552	-0.1008	
p-value	0.0002	0.0000	0.0000	0.0000	0.0000	0.0328	0.0353	0.0001	1

Pearson's correlation coefficient between ownership by directors and by families was 0.44 with a p-value of 0.00 and between ownership by directors and by the Public

Investment Corporation was -0.30 with a p-value of 0.00. Public Investment Corporation ownership and family ownership had a correlation of -0.35 with a p-value of 0.00. Correlation coefficients between other ownership-type variables increased slightly but remained small enough not to affect the decision of whether the inclusion of the ownership-type variables should be changed. Incremental changes in the correlation coefficients could be attributed to the changes in the variables as the number of shareholders increased.

Black ownership had a negative association with all other ownership types except for directors and government. A possible reason for the positive association with government ownership was that government ownership included ownership by state-owned corporations such as the Industrial Development Corporation of South Africa, a development financial institution, which is, among other things, tasked with expanding the country's industrial base by funding previously disadvantaged individuals, namely black people. The positive association with directors could be that some of the directors were black. Negative associations could be due to the emotive connotations generally associated with black ownership, including re-distribution of wealth.

The main conclusion from this section was that all the ownership-type variables had low correlation coefficients but statistically significant coefficients with each other and will therefore be used as explanatory variables in further analysis. In addition, the relationships between the variables were similar at the five levels of ownership. These results confirmed the assertion that the levels of ownership must be treated independently of each other.

In addition, the relationships between the ownership-type variables when capital structure was the dependent variable and when firm performance was the dependent variable were similar. The explanation could be that the same underlying data was used to estimate the relationships, with only a few changes in data points and the changes of the dependent variables.

6.4.4 Correlation analysis for concentration of ownership and ownership-type variables

The correlation coefficients between the two independent variables, namely ownership concentration and ownership type were examined. Table 6.9 shows Pearson's correlation coefficients between the black ownership and ownership concentration variables and between company ownership and ownership concentration variables.

Table 6.9: Pearson's correlation coefficients between black ownership and ownership concentration variables and between company ownership and ownership concentration variables: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Black Top 1 share holder	**Black Top 2 share holders**	**Black Top 3 share holders**	**Black Top 5 shareholders**	**Black Top 10 shareholders**	**Company Top 1 shareholders**	**Company Top 2 shareholders**	**Company Top 3 shareholders**	**Company Top 5 shareholders**	**Company Top 10 shareholders**
Top 1 shareholder	0.1002	0.0969	0.0942	0.0879	0.0839	0.6172	0.6231	0.6344	0.6284	0.6742
p-value	0.0001	0.0002	0.0003	0.0008	0.0013	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 1 shareholder	0.0457	0.0355	0.0327	0.0250	0.0189	0.6169	0.6109	0.6180	0.6084	0.6563
p-value	0.0815	0.1762	0.2120	0.3398	0.4703	0.0000	0.0000	0.0000	0.0000	0.0000
Top 2 shareholders	0.1233	0.1320	0.1306	0.1253	0.1208	0.5675	0.6023	0.6204	0.6190	0.6884
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 2 shareholders	0.0537	0.0477	0.0450	0.0374	0.0309	0.6114	0.6195	0.6290	0.6206	0.6787
p-value	0.0405	0.0687	0.0863	0.1534	0.2392	0.0000	0.0000	0.0000	0.0000	0.0000
Top 3 shareholders	0.1242	0.1365	0.1393	0.1358	0.1352	0.5371	0.5771	0.6024	0.6050	0.6848
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 3 shareholders	0.0543	0.0493	0.0476	0.0403	0.0347	0.6090	0.6192	0.6307	0.6232	0.6844
p-value	0.0382	0.0600	0.0694	0.1240	0.1857	0.0000	0.0000	0.0000	0.0000	0.0000
Top 5 shareholders	0.1242	0.1396	0.1444	0.1441	0.1501	0.5028	0.5444	0.5741	0.5826	0.6587
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 5 shareholders	0.0539	0.0495	0.0482	0.0412	0.0363	0.6082	0.6190	0.6313	0.6247	0.6863
p-value	0.0398	0.0590	0.0661	0.1162	0.1662	0.0000	0.0000	0.0000	0.0000	0.0000
Top 10 shareholders	0.1205	0.1364	0.1412	0.1443	0.1648	0.4519	0.4917	0.5235	0.5372	0.6022
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 10 shareholders	0.0537	0.0495	0.0482	0.0412	0.0363	0.6081	0.6190	0.6313	0.6249	0.6865
p-value	0.0404	0.0590	0.0662	0.1162	0.1660	0.0000	0.0000	0.0000	0.0000	0.0000

HI - Herfindhal index calculated on individual shareholdings of 5% or more

For the black ownership and concentration of ownership variables, Pearson's correlation coefficients were positive and statistically significant, with a maximum of 0.16 and a p-value of 0.00 at the top 10 shareholders level. As the total percentage

shareholding at the 10 shareholders level increased, the number of black shareholders increased. Given the paucity of black shareholders in the South African economy in the past, it stands to reason that the black shareholding percentages would increase only when many shareholders (10) were considered, rather than a few. Apart from being statistically significant, Pearson's correlation coefficients were small and therefore, potentially, the black ownership variable could be used together with the ownership concentration variables. On the other hand, the high levels of statistical significance indicated that the correlation between the two variables could not be ignored.

Pearson's correlation coefficients between company ownership and ownership concentration variables were positive and statistically significant, with a maximum of 0.69 and a p-value of 0.00, when the Herfindahl index was used under the top 10 shareholders' scenario. The minimum correlation coefficient when companies were shareholders was 0.58 with a p-value of 0.00, which was significant at the 1% level. The shareholding for the companies was at the top five level, while the measure of ownership concentration was shareholding for the top five shareholders. High correlation coefficients indicated multicollinearity, meaning that the variables (company ownership and ownership concentration variables) could not be used together if unbiased results were to be obtained.

Pearson's correlation coefficients between ownership concentration and directors' and family ownership variables are shown in Table 6.10. The correlation coefficients between directors' ownership and ownership concentration variables were positive and statistically significant, with a maximum of 0. 28 and a p-value of 0.00 being observed for the top five shareholders and ownership by directors at that level. Increases in the top five shareholders' percentage were associated with increases in directors' shareholding, at that level. The correlation coefficients were generally low although they were significant. Therefore, the decision to include the directors' ownership variable and ownership concentration variable was a matter of judgement, given the significant but low correlations.

Table 6.10: Pearson's correlation coefficients between directors' ownership and ownership concentration variables and between family ownership and ownership concentration variables: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Directors Top 1 shareholder	**Directors Top 2 shareholders**	**Directors Top 3 shareholders**	**Directors Top 5 shareholders**	**Directors Top 10 shareholders**	**Family Top 1 shareholder**	**Family Top 2 shareholders**	**Family Top 3 shareholders**	**Family Top 5 shareholders**	**Family Top 10 shareholders**
Top 1 shareholder	0.2576	0.2576	0.2576	0.2576	0.2576	0.3718	0.3574	0.3541	0.2751	0.1220
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 1 shareholder	0.2383	0.2383	0.2383	0.2383	0.2383	0.3582	0.3264	0.3152	0.2555	0.0791
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0025
Top 2 shareholders	0.2628	0.2628	0.2628	0.2628	0.2628	0.3655	0.3811	0.3876	0.3016	0.1433
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 2 shareholders	0.2432	0.2432	0.2432	0.2432	0.2432	0.3656	0.3471	0.3388	0.2675	0.0848
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012
Top 3 shareholders	0.2765	0.2765	0.2765	0.2765	0.2765	0.3625	0.3880	0.4034	0.3185	0.1596
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 3 shareholders	0.2490	0.2490	0.2490	0.2490	0.2490	0.3679	0.3519	0.3461	0.2730	0.0882
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007
Top 5 shareholders	0.2845	0.2845	0.2845	0.2845	0.2845	0.3611	0.3974	0.4207	0.3117	0.1765
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 5 shareholders	0.2525	0.2525	0.2525	0.2525	0.2525	0.3696	0.3555	0.3513	0.2743	0.0899
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006
Top 10 shareholders	0.2747	0.2747	0.2747	0.2747	0.2747	0.3439	0.3880	0.4147	0.2905	0.1952
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 10 shareholders	0.2528	0.2528	0.2528	0.2528	0.2528	0.3697	0.3557	0.3517	0.2743	0.0900
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006

HI - Herfindhal index calculated on individual shareholdings of 5% or more

Pearson's correlation coefficients between family ownership and ownership concentration variables were positive and statistically significant, with a maximum of 0.40 and a p-value of 0.00, for family ownership and the top three shareholdings, although the correlation coefficients at the top five and top 10 shareholders levels were below 10%. These results indicated that if the top five or top 10 shareholdings were used in the analysis, the family ownership and ownership concentration variables would have the lowest correlation. Increases in shareholdings with larger numbers of shareholders were associated with lower increases in family shareholdings at those levels.

Pearson's correlation coefficients between foreign ownership and ownership concentration variables and between government ownership and ownership concentration variables are shown in Table 6.11. Foreign ownership had positive and statistically significant Pearson's correlation coefficients with ownership concentration variables. The maximum coefficient was 0.34 for the top three shareholders and the corresponding foreign shareholding at that level, with a p-value of 0.00. Increases in foreign ownership were associated with increases in ownership concentration. The relationships between the two sets of variables were statistically significant at the 1% level. The decision whether the two independent variables could be used together in equations was therefore made based on this judgement.

Government ownership had low, but mainly positive and statistically significant Pearson's correlation coefficients with ownership variables. The maximum correlation coefficient was 0.13 with a p-value of 0.00 for the top two shareholders and for the government ownership at that level. Other correlation coefficients were below 10% and a few of them were statistically insignificant. These results showed that government ownership and ownership concentration variables could be used together in further analysis.

Table 6.11: Pearson's correlation coefficients between foreign ownership and ownership concentration variables and between government ownership and ownership concentration variables: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Foreign Top 1 share holder	**Foreign Top 2 share holders**	**Foreign Top 3 shareholders**	**Foreign Top 5 shareholders**	**Foreign Top 10 shareholders**	**Government Top 1 shareholders**	**Government Top 2 shareholders**	**Government Top 3 shareholders**	**Government Top 5 shareholders**	**Government Top 10 shareholders**
Top 1 shareholder	0.3367	0.3168	0.2983	0.2751	0.1220	0.0143	0.1093	0.1051	0.1046	0.1027
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.5850	0.0000	0.0001	0.0001	0.0001
H I Top 1 shareholder	0.3268	0.3001	0.2787	0.2555	0.0791	-0.0105	0.0801	0.0740	0.0751	0.0712
p-value	0.0000	0.0000	0.0000	0.0000	0.0025	0.6879	0.0022	0.0047	0.0041	0.0065
Top 2 shareholders	0.3410	0.3378	0.3234	0.3016	0.1433	0.0251	0.1305	0.1281	0.1265	0.1265
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.3387	0.0000	0.0000	0.0000	0.0000
H I Top 2 shareholders	0.3336	0.3126	0.2916	0.2675	0.0848	-0.0073	0.0899	0.0841	0.0849	0.0814
p-value	0.0000	0.0000	0.0000	0.0000	0.0012	0.7820	0.0006	0.0013	0.0012	0.0019
Top 3 shareholders	0.3471	0.3494	0.3384	0.3185	0.1596	0.0241	0.1249	0.1240	0.1227	0.1223
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.3576	0.0000	0.0000	0.0000	0.0000
H I Top 3 shareholders	0.3378	0.3176	0.2972	0.2730	0.0882	-0.0076	0.0892	0.0837	0.0846	0.0809
p-value	0.0000	0.0000	0.0000	0.0000	0.0007	0.7710	0.0007	0.0014	0.0012	0.0020
Top 5 shareholders	0.3260	0.3335	0.3263	0.3117	0.1765	0.0143	0.1062	0.1059	0.1047	0.1049
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.5847	0.0000	0.0001	0.0001	0.0001
H I Top 5 shareholders	0.3385	0.3186	0.2982	0.2743	0.0899	-0.0082	0.0880	0.0824	0.0833	0.0795
p-value	0.0000	0.0000	0.0000	0.0000	0.0006	0.7551	0.0008	0.0016	0.0015	0.0024
Top 10 shareholders	0.2854	0.2986	0.2972	0.2905	0.1952	-0.0002	0.0801	0.0806	0.0793	0.0795
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.9936	0.0022	0.0021	0.0025	0.0024
H I Top 10 shareholders	0.3384	0.3185	0.2982	0.2743	0.0900	-0.0082	0.0879	0.0823	0.0831	0.0794
p-value	0.0000	0.0000	0.0000	0.0000	0.0006	0.7540	0.0008	0.0017	0.0015	0.0024

HI - Herfindhal index calculated on individual shareholdings of 5% or more

Pearson's correlation coefficients between institutional ownership and ownership concentration and between other types of ownerships and ownership concentration variables are displayed in Table 6.12.

Institutional ownership had low, negative, some statistically significant and other statistically insignificant Pearson's correlation coefficients with ownership concentration variables. The highest absolute correlation coefficient was -0.19, which was between the Herfindahl index for the top 10 shareholders and institutional ownership at that level. The result was statistically significant at the 1% level. As ownership concentration increased at the top 10 shareholders level, institutional ownership decreased. The

negative relationship could be due to institutional investors not wanting to co-own shares where ownership may be concentrated. Low levels of correlation and some insignificant relationships could indicate the low levels of multicollinearity between institutional ownership and ownership concentration variables. The results showed that the two types of variables could be used together in explaining the relationships between ownership and corporate performance.

Table 6.12: Pearson's correlation coefficients between institutional ownership and ownership concentration variables and between other ownership and ownership concentration variables: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Institutions Top 1 shareholder	**Institutions Top 2 shareholders**	**Institutions Top 3 shareholders**	**Institutions Top 5 shareholders**	**Institutions Top 10 shareholders**	**Other Top 1 shareholders**	**Other Top 2 shareholders**	**Other Top 3 shareholders**	**Other Top 5 shareholders**	**Other Top 10 shareholders**
Top 1 shareholder	-0.0308	-0.0268	-0.0641	-0.0917	-0.1505	-0.0105	-0.0295	-0.0361	-0.0334	-0.0321
p-value	0.2397	0.3075	0.0144	0.0005	0.0000	0.6882	0.2601	0.1684	0.2027	0.2203
H I Top 1 shareholder	-0.0509	-0.0526	-0.0911	-0.1250	-0.1819	-0.0077	-0.0362	-0.0518	-0.0554	-0.0697
p-value	0.0520	0.0449	0.0005	0.0000	0.0000	0.7681	0.1678	0.0483	0.0346	0.0078
Top 2 shareholders	-0.0155	-0.0119	-0.0499	-0.0749	-0.1376	0.0069	-0.0066	-0.0007	0.0042	0.0051
p-value	0.5552	0.6507	0.0570	0.0042	0.0000	0.7937	0.7999	0.9775	0.8721	0.8466
H I Top 2 shareholders	-0.0449	-0.0457	-0.0857	-0.1209	-0.1841	0.0007	-0.0277	-0.0385	-0.0427	-0.0589
p-value	0.0867	0.0814	0.0011	0.0000	0.0000	0.9779	0.2917	0.1416	0.1033	0.0245
Top 3 shareholders	-0.0133	-0.0120	-0.0488	-0.0688	-0.1270	0.0040	-0.0033	0.0083	0.0183	0.0261
p-value	0.6123	0.6484	0.0629	0.0086	0.0000	0.8799	0.9006	0.7519	0.4848	0.3195
H I Top 3 shareholders	-0.0450	-0.0467	-0.0871	-0.1221	-0.1860	-0.0003	-0.0272	-0.0368	-0.0398	-0.0542
p-value	0.0858	0.0748	0.0009	0.0000	0.0000	0.9914	0.2990	0.1603	0.1289	0.0386
Top 5 shareholders	-0.0036	-0.0020	-0.0353	-0.0447	-0.0889	0.0062	0.0063	0.0250	0.0433	0.0592
p-value	0.8905	0.9383	0.1778	0.0882	0.0007	0.8125	0.8099	0.3410	0.0988	0.0239
H I Top 5 shareholders	-0.0450	-0.0473	-0.0883	-0.1233	-0.1870	-0.0005	-0.0274	-0.0358	-0.0381	-0.0509
p-value	0.0858	0.0711	0.0007	0.0000	0.0000	0.9841	0.2957	0.1722	0.1467	0.0524
Top 10 shareholders	0.0154	0.0207	-0.0035	0.0036	-0.0117	0.0134	0.0252	0.0528	0.0806	0.1001
p-value	0.5571	0.4290	0.8935	0.8920	0.6545	0.6082	0.3370	0.0441	0.0021	0.0001
H I Top 10 shareholders	-0.0450	-0.0474	-0.0883	-0.1234	-0.1869	-0.0006	-0.0276	-0.0357	-0.0378	-0.0504
p-value	0.0860	0.0705	0.0007	0.0000	0.0000	0.9805	0.2932	0.1738	0.1498	0.0546

HI - Herfindhal index calculated on individual shareholdings of 5% or more

The ‘other’ ownership variable was used to accommodate any types of ownerships which could not be classified under the other eight categories, namely black, company, directors, family, foreign, government, institutions and the Public Investment Corporation. Pearson’s correlation coefficients between other types of ownerships and concentration were mainly small, negative and statistically insignificant, with an absolute maximum of 0.10 and a p-value of 0.00 for the top 10 shareholders and the other shareholdings at that level, indicating that there was no multicollinearity between this type of shareholding and ownership concentration variables.

The last relationship to be analysed between the types of ownerships and ownership concentration variables was the relationship between the Public Investment Corporation and ownership concentration variables. The Public Investment Corporation ownership and concentration of ownership variables had negative Pearson’s correlation coefficients between them, as shown in Table 6.13. Pearson’s correlation coefficients were negative, relatively small and statistically significant, with an absolute maximum coefficient of -0.23 and a p-value of 0.00 for the Herfindahl index for the top 10 shareholders and the Public Investment Corporation ownership at that level. The negative relationship could be due to the nature of the Public Investment Corporation, which is primarily a pension fund, albeit one that invests government employees’ pensions and other such funds. Secondly, the Public Investment Corporation outsources some of its funds to institutional investors, which, in turn, invest on behalf of the Public Investment Corporation. Given such a relationship, the Public Investment Corporation ownership may partly mimic the patterns followed by institutional investors. However, since the funds were also invested on behalf of government employees and the South African government, the Public Investment Corporation ownership therefore could exhibit some features of government ownership. The relatively low correlation coefficients, which were all significant, enabled the use of the Public Investment Corporation ownership variable together with ownership concentration variables in further analysis.

Table 6.13: Pearson's correlation coefficients between Public Investment Corporation ownership and ownership concentration variables: period 2004 to 2014

Null hypothesis: Ho: r = 0					
	Public Investment Corporation Top 1 shareholder	**Public Investment Corporation Top 2 shareholders**	**Public Investment Corporation Top 3 shareholders**	**Public Investment Corporation Top 5 shareholders**	**Public Investment Corporation Top 10 shareholders**
Top 1 shareholder	-0.2227	-0.2110	-0.1961	-0.2156	-0.2156
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 1 shareholder	-0.2193	-0.2040	-0.1905	-0.2086	-0.2086
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Top 2 shareholders	-0.2251	-0.2120	-0.2035	-0.2235	-0.2235
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 2 shareholders	-0.2285	-0.2140	-0.2038	-0.2229	-0.2229
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Top 3 shareholders	-0.2240	-0.2112	-0.2033	-0.2210	-0.2210
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 3 shareholders	-0.2318	-0.2176	-0.2081	-0.2272	-0.2272
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Top 5 shareholders	-0.2166	-0.2039	-0.1965	-0.2096	-0.2096
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 5 shareholders	-0.2343	-0.1875	-0.2114	-0.2307	-0.2307
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Top 10 shareholders	-0.1948	-0.2039	-0.1728	-0.1759	-0.1759
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
H I Top 10 shareholders	-0.2346	-0.1663	-0.2118	-0.2311	-0.2311
p-value	0.0000	0.0000	0.0000	0.0000	0.0000

HI - Herfindahl index calculated on individual shareholdings of 5% or more

Pearson's correlation coefficients between ownership-type and ownership concentration variables, when firm performance was the dependent variable, were generally low, except for company ownership, but statistically significant at the 1% level. Under the circumstances, the decision was made to include the two sets of variables, ownership concentration and ownership-type in the same equations in line with earlier studies and relatively low levels of multicollinearity between the variables.

The relationships between the ownership-type variables and ownership concentration variables when capital structure was the dependent variable and when firm performance was the dependent variable were very similar. The relationships were derived from data from the same sample with slight differences. Explanations of the relationships between

the variables in question therefore remained unchanged between the capital structure and firm performance variables in such cases.

6.4.5 Pearson's correlation coefficients for control variables with firm performance as the dependent variable

The control variables used in the analysis of the effects of ownership and firm performance were firm age, dividend payout ratio, firm's growth when measured by sales growth or growth in total assets, liquidity, when measured by the current ratio or the quick ratio, non-debt tax shields calculated as the ratio of depreciation to total assets, on the one hand, and earnings before interest and tax, depreciation and amortisation divided by depreciation, on the other, risk, firm size based on logarithm of sales and logarithm of total assets, tangibility and total debt ratio based on book value.

Alternative measures were used for four variables, namely firm growth, liquidity, non-debt tax shields and firm size. After the preliminary tests on the data were conducted, each variable was represented by one measure and the measure adopted was used in succeeding analyses.

Control variables discussed under the capital structure Section 5.4.7.3 were used in the examination of the effects of ownership on firm performance, with some exceptions. Firm performance was a control variable in the study of the effects of ownership on firm performance. The control variable representing firm performance was therefore not necessary because firm performance became the dependent variable in the study in this section. Instead, a control variable for leverage was required, and the total debt ratio based on book value, which was a dependent variable in the capital structure section, was used as the control variable for leverage in the firm performance section.

Pearson's correlation coefficients used in the analysis of the effects of ownership on firm performance are shown in Table 6.14. The highest Pearson's correlation coefficient was 0.99 with a p-value of 0.00, which was between the two liquidity ratios (based on current and quick ratios). The result was significant at the 1% level. As the current ratio increased, the quick ratio also increased. The relationship was expected because the

quick ratio, by definition, is a component of the current ratio. The current ratio was selected for use in subsequent analyses. The correlation coefficient between firm size variable based on sales and size based on total assets was positive, high, and statistically significant at the 1% level (r = 0.91, p-value = 0.00). The size variable based on total assets was selected for use in further analysis. Firm growth rate measures of sales and total assets had a Pearson's correlation coefficient of 0.55 and this result was statistically significant at the 1% level (p-value = 0.00). The firm growth variable based on total assets was selected.

Pearson's correlation coefficient for non-debt tax shields calculated from the ratio of depreciation to total assets and non-debt tax shields based on the ratio of earnings before interest and tax, depreciation and amortisation was low and negative but statistically significant at the 1% level (r = -0.11 with a p-value of 0.00). The non-debt tax shield variable based on the ratio of depreciation to total assets was chosen.

Tangibility had a positive and statistically significant correlation coefficient at the 1% level with non-debt tax shield variable when measured as the ratio of depreciation to total assets (r = 0.46, p-value = 0.00). Since tangibility refers to the extent to which assets are tangible or fixed in nature, and depreciation (which was used in the non-debt tax shield ratio) was calculated using the fixed assets cost as a base, these two variables were likely to be related to each other. Many correlation coefficients were below 10% and statistically insignificant. Hence the control variables were considered to be eligible for use in further analysis.

Table 6.14: Pearson's correlation coefficients for control variables with firm performance as the dependent variable: period 2004 to 2014

Null hypothesis: Ho : r = 0													
	Age	**Dividend Payout ratio**	**Growth (Sales)**	**Growth (Total assets)**	**Liquidity (Current ratio)**	**Liquidity (Quick ratio)**	**Non-debt tax shields (Depreciation /Total assets)**	**Non-debt tax shields (EBITDA/Depr eciation)**	**Risk**	**Size (Sales)**	**Size (Total assets)**	**Tangibility**	**Total debt (book value)**
Age	1												
p-value													
Dividend Payout ratio	0.0150	1											
p-value	0.5682												
Growth (Sales)	-0.0368	-0.0149	1										
p-value	0.1609	0.5709											
Growth (Total assets)	0.0116	-0.0138	0.5476	1									
p-value	0.6576	0.5985	0.0000										
Liquidity (Current ratio)	0.0064	-0.0077	0.0028	-0.0095	1								
p-value	0.8068	0.7690	0.9154	0.7171									
Liquidity (Quick ratio)	-0.0380	-0.0090	0.0052	-0.0035	0.9864	1							
p-value	0.1473	0.7318	0.8434	0.8945	0.0000								
Non-debt tax shields (Depreciation/Total assets)	0.0176	0.0238	-0.0428	-0.0521	-0.1309	-0.1151	1						
p-value	0.5014	0.3646	0.1024	0.0467	0.0000	0.0000							
Non-debt tax shields (EBITDA/Depreciation)	0.0806	0.0002	0.0406	0.0718	-0.0899	-0.0976	-0.1115	1					
p-value	0.0021	0.9945	0.1218	0.0062	0.0006	0.0002	0.0000						
Risk	0.0131	0.0049	0.0204	-0.0052	0.0202	0.0100	0.0046	-0.0073	1				
p-value	0.6177	0.8518	0.4361	0.8414	0.4401	0.7031	0.8606	0.7801					
Size (Sales)	0.2694	0.0380	0.0331	0.1087	-0.2566	-0.2669	0.0674	0.1525	-0.0845	1			
p-value	0.0000	0.1475	0.2065	0.0000	0.0000	0.0000	0.0101	0.0000	0.0013				
Size (Total assets)	0.2617	0.0297	0.0405	0.1408	-0.1418	-0.1430	0.0593	0.0964	-0.0721	0.9106	1		
p-value	0.0000	0.2575	0.1226	0.0000	0.0000	0.0000	0.0236	0.0002	0.0059	0.0000			
Tangibility	-0.0030	0.0252	-0.0234	0.0095	-0.1456	-0.1208	0.4654	-0.0865	0.0312	0.1182	0.1595	1	
p-value	0.9100	0.3371	0.3718	0.7172	0.0000	0.0000	0.0000	0.0009	0.2342	0.0000	0.0000		
Total debt (book value)	-0.0957	-0.0490	0.0009	0.0193	-0.3940	-0.3490	-0.0562	-0.0457	-0.0636	0.1981	0.0787	-0.1063	1
p-value	0.0003	0.0615	0.9725	0.4624	0.0000	0.0000	0.0320	0.0814	0.0153	0.0000	0.0026	0.0000	

6.4.6 Pearson's correlation coefficients between ownership and firm performance variables

This section analysed Pearson's correlation coefficients between ownership structure, which consisted of ownership concentration and ownership-type variables as independent variables, and firm performance variables as dependent variables.

6.4.6.1 *Pearson's correlation coefficients between ownership concentration and firm performance variables*

Ownership concentration variables used in the study were the percentage shareholdings of the top one, two, three, five and 10 shareholders and the Herfindahl indices calculated for each level of shareholding. Pearson's correlation coefficients for the ownership concentration and firm performance variables are presented in Table 6.15. The correlation coefficients between economic value-added, market value-added and return on assets and ownership concentration variables were low, positive and statistically insignificant. As ownership concentration increased, firm performance, as measured by these three variables, also increased. Correlation coefficients between return on equity and Tobin's Q and ownership concentration ratios were low, negative and statistically insignificant. As ownership concentration increased, return on equity and Tobin's Q decreased. Increases in the equity base generally would be expected to be associated with decreases in return on equity because equity is a divisor in the return on equity calculation.

The highest correlation coefficient was between return on assets and the top 10 shareholding variable at 0.08, with a p-value of 0.00, which was statistically significant at the 1% level. All other correlation coefficients were lower and statistically insignificant. The overall picture was therefore that the ownership concentration variables, as independent variables, did not vary with the corporate performance variables and therefore could be used together in analysing the effects of ownership on corporate performance.

Table 6.15: Pearson's correlation coefficients for ownership concentration and firm performance: period 2004 to 2014

Null hypothesis: Ho: r = 0					
	Economic value-added	**Market value-added**	**Return on Assets**	**Return on Equity**	**Tobin's Q**
Top 1 shareholder	0.0293	0.0350	0.0180	-0.0213	-0.0139
p-value	0.2638	0.1822	0.4915	0.4160	0.5949
H I Top 1 shareholder	0.0151	0.0250	0.0054	-0.0040	-0.0051
p-value	0.5654	0.3400	0.8372	0.8776	0.8467
Top 2 shareholders	0.0355	0.0291	0.0234	-0.0190	-0.0224
p-value	0.1754	0.2677	0.3732	0.4685	0.3932
H I Top 2 shareholders	0.0164	0.0227	0.0056	-0.0025	-0.0099
p-value	0.5308	0.3861	0.8301	0.9226	0.7052
Top 3 shareholders	0.0399	0.0285	0.0322	-0.0200	-0.0198
p-value	0.1281	0.2767	0.2191	0.4454	0.4507
H I Top 3 shareholders	0.0169	0.0226	0.0066	-0.0031	-0.0096
p-value	0.5189	0.3884	0.8002	0.9052	0.7149
Top 5 shareholders	0.0463	0.0315	0.0518	-0.0227	-0.0112
p-value	0.0773	0.2297	0.0483	0.3864	0.6708
H I Top 5 shareholders	0.0172	0.0229	0.0081	-0.0034	-0.0084
p-value	0.5129	0.3832	0.7588	0.8958	0.7484
Top 10 shareholders	0.0557	0.0321	0.0787	-0.0219	-0.0050
p-value	0.0335	0.2209	0.0027	0.4046	0.8480
H I Top 10 shareholders	0.0172	0.0228	0.0084	-0.0034	-0.0082
p-value	0.5122	0.3837	0.7502	0.8974	0.7551

HI - Herfindhal index calculated on individual shareholdings of 5% or more

6.4.6.2 *Pearson's correlation coefficients between ownership-type and firm performance variables*

Pearson's correlation coefficients pertaining to ownership-type and firm performance variables were examined for each type of shareholder, namely black, company, director, family, foreign, government, institutional, other and Public Investment Corporation ownership. Each type of ownership was analysed at the top one, two, three, four, five and 10 shareholders levels.

(a) Pearson's correlation coefficients for ownership-type variables for the top one shareholder and corporate performance variables

Table 6.16 shows the correlation coefficients between the top one shareholder and firm performance variables. Directors' ownership and Tobin's Q had the highest correlation coefficient of -0.12 with a p-value of 0.00, making the result significant at the 1% level. The next highest Pearson's correlation coefficient was 0.06 with a p-value of 0.02, which was statistically significant at the 5% level. This level was between market value-added and company ownership at the top one shareholder level. Black, foreign, government and institutional ownership had negative correlation coefficients with firm performance variables. As ownership by those types of shareholders increased, the firm performance variables decreased. The correlation coefficients were statistically insignificant. On the other hand, positive correlation coefficients were observed between firm performance variables and ownership variables such as company, director, family, other and the Public Investment Corporation ownership. As ownership by these types of shareholders increased, the firm performance variables also increased. The correlation coefficients were statistically insignificant.

Ownership by the Public Investment Corporation and firm performance variables had opposite signs of correlation coefficients from government and institutional ownership, reflecting the difference between the Public Investment Corporation ownership and government and institutional investor ownership. Most correlation coefficients were below 3% and had statistically insignificant relationships, making them ideal for use in further analysis.

Table 6.16: Pearson's correlation coefficients for ownership-type variables for the top one shareholder and firm performance variables: period 2004 to 2014

Null hypothesis: Ho: r = 0					
	Economic value added	**Market value added**	**Return on assets**	**Return on equity**	**Tobin's Q**
Black: Top 1 shareholder	0.0060	-0.0144	-0.0141	-0.0265	-0.0385
p-value	0.8204	0.5823	0.5915	0.3130	0.1422
Company: Top 1 shareholder	0.0120	0.0594	0.0127	-0.0368	0.0057
p-value	0.6477	0.0233	0.6271	0.1606	0.8284
Directors: Top 1 shareholder	0.0134	-0.0297	0.0103	0.0006	-0.1199
p-value	0.6099	0.2578	0.6945	0.9833	0
Family: Top 1 shareholder	0.0082	-0.0090	0.0312	0.0112	0.0012
p-value	0.7533	0.7318	0.2345	0.6696	0.964
Foreign: Top 1 shareholder	0.0077	-0.0064	-0.0197	0.0128	-0.0048
p-value	0.7688	0.8082	0.4524	0.6265	0.8536
Government: Top 1 shareholder	0.0026	-0.0111	-0.0284	-0.0076	-0.0462
p-value	0.9209	0.6709	0.2783	0.7733	0.0781
Institutions: Top 1 shareholder	0.0062	-0.0160	-0.0315	0.0008	-0.0450
p-value	0.8129	0.5416	0.2298	0.9758	0.0861
Other: Top 1 shareholder	0.0031	-0.0056	0.0125	0.0014	-0.0111
p-value	0.9045	0.8306	0.6328	0.9575	0.6726
Public Investment Corporation: Top 1 shareholder	0.0127	0.0017	0.0503	0.0283	0.0589
p-value	0.6273	0.9473	0.0550	0.2801	0.0246

(b) Pearson's correlation coefficients for ownership-type variables for the top two shareholders and corporate performance variables

Table 6.17 shows the correlation coefficients between the top two shareholders and firm performance variables. The marked positive and negative relationships at the top one shareholder level were more blurred at the top two shareholders level. The correlation coefficients were largely positive and negative for each type of ownership. Pearson's correlation coefficients between ownership by the Public Investment Corporation and firm performance variables were all positive and statistically insignificant, apart from the highest coefficient, which was 0.08, and had a p-value of 0.00, making it statistically significant at the 1% level. The correlation coefficient was between the Public Investment Corporation ownership and Tobin's Q. Return on equity and other shareholders had the next highest absolute correlation coefficient of -0.10 with a p-value of 0.00, which was statistically significant at the 1% level. The correlation coefficient between directors' ownership and Tobin's Q remained the highest at -0.12. Correlation coefficients between firm performance and different types of shareholders at the top two shareholders level were low and largely insignificant, making all the variables eligible for use in other analyses.

Table 6.17: Pearson's correlation coefficients for ownership-type variables for the top two shareholders and firm performance variables: period 2004 to 2014

Null hypothesis: Ho: r = 0					
	Economic value-added	**Market value-added**	**Return on assets**	**Return on equity**	**Tobin's Q**
Black: Top 2 shareholders	0.0068	-0.0161	-0.0197	-0.0262	-0.0329
p-value	0.7939	0.5392	0.4533	0.3170	0.2097
Company: Top 2 shareholders	0.0138	0.0508	0.0166	-0.0305	0.0034
p-value	0.5989	0.0525	0.5279	0.2447	0.8978
Directors: Top 2 shareholders	0.0134	-0.0297	0.0103	0.0005	-0.1199
p-value	0.6099	0.2578	0.6945	0.9833	0
Family: Top 2 shareholders	0.0100	-0.0152	0.0262	0.0063	-0.0220
p-value	0.7028	0.5632	0.3183	0.8111	0.4011
Foreign: Top 2 shareholders	0.0098	-0.0051	-0.0145	0.0270	0.0042
p-value	0.7081	0.847	0.579	0.304	0.8714
Government: Top 2 shareholders	0.0045	-0.0074	0.0175	-0.0014	-0.0234
p-value	0.8644	0.7782	0.5057	0.9566	0.3712
Institutions: Top 2 shareholders	0.0113	-0.0228	-0.0199	0.0071	-0.0592
p-value	0.6664	0.3842	0.4478	0.7852	0.0238
Other: Top 2 shareholders	0.0052	0.0730	-0.0134	-0.0980	-0.0034
p-value	0.8421	0.0053	0.6085	0.0002	0.8977
Public Investment Corporation: Top 2 shareholders	0.0154	0.0054	0.0531	0.0322	0.0806
p-value	0.558	0.836	0.0428	0.2192	0.0021

(c) Pearson's correlation coefficients for ownership-type variables for the top three shareholders and corporate performance variables

The relationships between the ownership-type variables for the top three shareholders and firm performance variables are shown in Table 6.18. Tobin's Q and ownership by the Public Investment Corporation had the second-largest Pearson's correlation coefficient at 0.08 and a p-value of 0.00, making the relationship significant at the 1% level, after the coefficient between directors' ownership and Tobin's Q. Increases in ownership by the Public Investment Corporation were associated with increases in Tobin's Q. The economic value-added variable had positive relationships with all types of ownerships, although they were all statistically insignificant. Correlations between black, government and institutional ownership were mainly negative and statistically insignificant. Increased ownership by these types of shareholders was associated with lower firm performance. The Public Investment Corporation ownership and all firm performance variables had small, positive but statistically insignificant correlation coefficients. Increased ownership by the Public Investment Corporation was associated with increased firm performance. Low correlation coefficients, which were statistically insignificant, showed that the ownership-type variables at the top three shareholders levels and corporate performance variables were unrelated and could be used together in the investigation of the effects of ownership on firm performance.

Table 6.18: Pearson's correlation coefficients for ownership-type variables for the top three shareholders and corporate performance variables: period 2004 to 2014

Null hypothesis: Ho: r = 0					
	Economic value-added	**Market value-added**	**Return on Assets**	**Return on Equity**	**Tobin's Q**
Black: Top 3 shareholders	0.0074	-0.0158	-0.0147	-0.0287	-0.0271
p-value	0.7786	0.5481	0.5750	0.2733	0.3020
Company: Top 3 shareholders	0.0149	0.0486	0.0199	-0.0277	0.0042
p-value	0.5712	0.0636	0.4489	0.2915	0.8743
Directors: Top 3 shareholders	0.0134	-0.0297	0.0103	0.0006	-0.1199
p-value	0.6099	0.2578	0.6945	0.9833	0.0000
Family: Top 3 shareholders	0.0111	-0.0077	0.0214	-0.0035	-0.0264
p-value	0.6725	0.7696	0.4138	0.8937	0.3133
Foreign: Top 3 shareholders	0.0115	-0.0047	-0.0074	0.0297	0.0100
p-value	0.6616	0.8579	0.7789	0.2566	0.7036
Government: Top 3 shareholders	0.0049	-0.0070	0.0169	-0.0046	-0.0178
p-value	0.8526	0.7903	0.5182	0.8595	0.4980
Institutions: Top 3 shareholders	0.0150	-0.0277	-0.0121	0.0046	-0.0566
p-value	0.5673	0.2914	0.6442	0.8612	0.0309
Other: Top 3 shareholders	0.0068	0.0642	-0.0158	-0.0769	-0.0013
p-value	0.7962	0.0142	0.5457	0.0033	0.9602
Public Investment Corporation: Top 3shareholders	0.0175	0.0050	0.0607	0.0370	0.0790
p-value	0.5050	0.8494	0.0205	0.1587	0.0026

(d) Pearson's correlation coefficients between top five shareholders and corporate performance variables

Correlation coefficients for ownership-type variables at the top five shareholders level and firm performance variables are shown in Table 6.19. Ownership by directors and Tobin's Q had the highest correlation coefficient of -0.12, with a p-value of 0.00. Directors' ownership data did not change with the number of shareholders under consideration but remained a fixed total for all shareholders. This difference possibly explained the lack of variation in the coefficient from one level of shareholding to the next. The correlation coefficient between the Public Investment Corporation ownership and Tobin's Q was the second highest at 0.07 with a p-value of 0.01, which was statistically significant at the 1% level. Correlation coefficients for family ownership and firm performance were mainly negative (three out of five measures), but were statistically insignificant. As family ownership increased, the firm performance decreased. Foreign ownership and firm performance variables had positive correlation coefficients, meaning that as foreign ownership increased, firm performance also increased. Economic value-added and ownership-type variables had positive relationships, while Tobin's Q had largely negative relationships with ownership-type variables, although they were statistically insignificant. The low correlation coefficients,

which were statistically insignificant, meant that the variables could be used jointly in succeeding analyses.

Table 6.19: Pearson's correlation coefficients for ownership-type variables for the top five shareholders and firm performance variables: period 2004 to 2014

Null hypothesis: Ho: r = 0					
	Economic value-added	**Market value-added**	**Return on Assets**	**Return on Equity**	**Tobin's Q**
Black: Top 5 shareholders	0.0081	0.0127	-0.0160	-0.0565	-0.0224
p-value	0.7589	0.6273	0.5410	0.0311	0.3938
Company: Top 5 shareholders	0.0159	0.0464	0.0340	-0.0247	-0.0035
p-value	0.5455	0.0767	0.1942	0.3464	0.8932
Directors: Top 5 shareholders	0.0134	-0.0297	0.0103	0.0006	-0.1199
p-value	0.6099	0.2578	0.6945	0.9833	0.0000
Family: Top 5 shareholders	0.0122	-0.0117	0.0244	-0.0043	-0.0303
p-value	0.6413	0.6562	0.3529	0.8702	0.2479
Foreign: Top 5 shareholders	0.0135	-0.0034	0.0125	0.0371	0.0153
p-value	0.6079	0.8977	0.6331	0.1569	0.5589
Government: Top 5 shareholders	0.0049	-0.0062	0.0204	-0.0042	-0.0132
p-value	0.8520	0.8142	0.4368	0.8734	0.6150
Institutions: Top 5 shareholders	0.0192	-0.0320	-0.0031	0.0094	-0.0577
p-value	0.4650	0.2216	0.9071	0.7203	0.0276
Other: Top 5 shareholders	0.0090	0.0587	-0.0050	-0.0681	0.0011
p-value	0.7313	0.0252	0.8492	0.0094	0.9664
Public Investment Corporation: Top 5 shareholders	0.0191	0.0058	0.0804	0.0429	0.0718
p-value	0.4664	0.8242	0.0021	0.1020	0.0062

(e) Pearson's correlation coefficients between ownership-type variables for the top 10 shareholders and corporate performance variables

Pearson's correlation coefficients between firm performance and types of ownership variables for the top 10 shareholders are shown in Table 6.20. The highest absolute correlation coefficient was between ownership by directors and Tobin's Q at -0.12 with a p-value of 0.00. As directors' ownership increased, firm performance as measured by Tobin's Q decreased. Institutional ownership had a positive relationship with three firm performance variables, and a negative relationship with two performance variables, which were three at the top five shareholders level, and four at the top one shareholder level. Therefore, as the number of top shareholders changed, some of the correlation coefficients changed their signs. Correlations coefficients between ownership by the Public Investment Corporation and performance variables were positive, with one being significant at the 5% level and another at the 10% level. Other coefficients were small.

Correlation coefficients between the ownership-type variables at the different levels of top shareholders and the corporate performance variables were small and mainly

statistically insignificant. Hence the conclusion was reached that all the variables will be used further to explore the effects of ownership on corporate performance.

Table 6.20: Pearson's correlation coefficients for ownership-type variables for the top 10 shareholders and firm performance variables: period 2004 to 2014

Null hypothesis: Ho: r = 0					
	Economic value-added	**Market value-added**	**Return on Assets**	**Return on Equity**	**Tobin's Q**
Black: Top 10 shareholders	0.0091	0.0245	-0.0289	-0.0765	-0.0194
p-value	0.7301	0.3497	0.2701	0.0035	0.4602
Company: Top 10 shareholders	0.0171	-0.0073	0.0340	0.0351	-0.0029
p-value	0.5150	0.7821	0.1948	0.1802	0.9128
Directors: Top 10 shareholders	0.0134	-0.0297	0.0103	0.0006	-0.1199
p-value	0.6099	0.2578	0.6945	0.9833	0.0000
Family: Top 10 shareholders	0.0136	-0.0146	0.0165	-0.0050	-0.0308
p-value	0.6050	0.5777	0.5295	0.8476	0.2401
Foreign: Top 10 shareholders	0.0184	0.0910	0.0240	-0.0621	0.0883
p-value	0.4831	0.0005	0.3609	0.0178	0.0007
Government: Top 10 shareholders	0.0052	-0.0065	0.0132	-0.0088	-0.0122
p-value	0.8442	0.8028	0.6145	0.7368	0.6413
Institutions: Top 10 shareholders	0.0245	-0.0172	0.0242	0.0037	-0.0922
p-value	0.3500	0.5127	0.3563	0.8875	0.0004
Other: Top 10 shareholders	0.0098	-0.0128	-0.0015	-0.0034	-0.0214
p-value	0.7084	0.6264	0.9531	0.8965	0.4146
Public Investment Corporation: Top 10 shareholders	0.0205	0.0036	0.0750	0.0451	0.0759
p-value	0.4346	0.8909	0.0042	0.0856	0.0038

6.4.7 Pearson's correlation coefficients between control variables and ownership and between control variables and firm performance

The associations between independent (ownership concentration and ownership-type) variables and control variables and between firm performance variables and control variables were examined to determine the extent of multicollinearity between the variables.

6.4.7.1 Pearson's correlation coefficients between ownership concentration and control variables with corporate performance as the dependent variable

Pearson's correlation coefficients for ownership concentration and control variables are presented in Table 6.21. Size, as measured by total assets, had the highest absolute correlation coefficient with the top 10 shareholdings variable at -0.29 and a p-value of 0.00, which was significant at the 1% level. As firm size increased, ownership concentration decreased. The relationship held for all ownership concentration

variables. The association could be due to the increased equity commitments that had to be honoured as firms grew. With limited income as well as portfolio diversification and single obligor limits for institutions and other organisations, the additional equity calls could only be followed through by a larger pool of investors, leading to a dispersed shareholding. However, the coefficient for growth, when measured by sales, was positive, although statistically insignificant.

Age and ownership concentration variables had positive correlation coefficients, with the highest at 0.12 and a p-value of 0.00. The coefficient was statistically significant at the 1% level. As firm age increased, the ownership concentration also increased. Dividend payout ratio had positive relationships with levels of shareholding, which were statistically not significant but positive and statistically significant correlation coefficients with the Herfindahl indices at the 1% level.

Non-debt tax shields had mixed relationships and statistically insignificant relationships with ownership concentration variables being positive when the depreciation to total assets was used and negative when the earnings before interest tax and depreciation to depreciation ratio was used. The correlation coefficients between the control variables and ownership concentration variables were low, though statistically significant at the 1% level in some cases, making it possible for them to be used together in examining the effects of ownership on corporate performance.

Table 6.21: Pearson's correlation coefficients for ownership concentration and control variables with firm performance as the dependent variable: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Top 1 shareholder	**Top 2 shareholders**	**Top 3 shareholders**	**Top 5 shareholders**	**Top 10 shareholders**	**H I Top 1 shareholder**	**H I Top 2 shareholders**	**H I Top 3 shareholders**	**H I Top 5 shareholders**	**H I Top 10 shareholders**
Age	0.0975	0.0794	0.0562	0.0182	-0.0201	0.1158	0.1114	0.1059	0.1012	0.1007
p-value	0.0002	0.0024	0.0319	0.4885	0.4425	0.0000	0.0000	0.0001	0.0001	0.0001
Dividend Pay-out ratio	0.0692	0.0465	0.0364	0.0249	0.0174	0.1019	0.0936	0.0911	0.0892	0.0892
p-value	0.0082	0.0761	0.1652	0.3425	0.5079	0.0001	0.0003	0.0005	0.0007	0.0007
Growth (Sales)	0.0128	0.0063	0.0053	0.0018	-0.0041	0.0108	0.0098	0.0101	0.0101	0.0101
p-value	0.6253	0.8091	0.8400	0.9457	0.8761	0.6814	0.7092	0.6991	0.7009	0.7013
Growth (Total assets)	-0.0301	-0.0367	-0.0428	-0.0428	-0.0506	-0.0177	-0.0192	-0.0189	-0.0187	-0.0187
p-value	0.2518	0.1613	0.1029	0.1029	0.0536	0.4999	0.4647	0.4708	0.4767	0.4758
Liquidity (Current ratio)	0.0327	0.0373	0.0362	0.0215	-0.0044	0.0409	0.0448	0.0474	0.0475	0.0476
p-value	0.2120	0.1547	0.1675	0.4129	0.8667	0.1188	0.0875	0.0709	0.0700	0.0697
Liquidity (Quick ratio)	0.0011	0.0029	0.0037	-0.0087	-0.0325	0.0095	0.0113	0.0140	0.0142	0.0143
p-value	0.9656	0.9111	0.8886	0.7402	0.2146	0.7169	0.6652	0.5922	0.5870	0.5867
Non-debt tax shields (Depreciation/ Total assets)	0.0586	0.0259	0.0161	0.0083	0.0032	0.0644	0.0522	0.0493	0.0470	0.0467
p-value	0.0254	0.3225	0.5393	0.7519	0.9018	0.0140	0.0464	0.0600	0.0728	0.0748
Non-debt tax shields (EBITDA/Depreciation)	-0.0316	-0.0435	-0.0513	-0.0545	-0.0577	-0.0105	-0.0151	-0.0172	-0.0172	-0.0172
p-value	0.2278	0.0968	0.0504	0.0377	0.0277	0.6894	0.5637	0.5125	0.5115	0.5129
Risk	-0.0136	-0.0213	-0.0261	-0.0353	-0.0496	-0.0002	-0.0013	-0.0015	-0.0019	-0.0019
p-value	0.6048	0.4157	0.3203	0.1783	0.0585	0.9943	0.9601	0.9545	0.9428	0.9415
Size (Sales)	-0.1200	-0.1555	-0.1833	-0.2070	-0.2188	-0.0779	-0.0934	-0.1019	-0.1067	-0.1071
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0029	0.0004	0.0001	0.0000	0.0000
Size (Total assets)	-0.1508	-0.1919	-0.2262	-0.2610	-0.2918	-0.0949	-0.1117	-0.1213	-0.1265	-0.1269
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0000
Tangibility	-0.0036	-0.0450	-0.0631	-0.0846	-0.1053	0.0303	0.0151	0.0100	0.0064	0.0060
p-value	0.8896	0.0857	0.0160	0.0012	0.0001	0.2477	0.5642	0.7026	0.8061	0.8200
Total debt ratio (Book Value)	-0.1523	-0.1383	-0.1277	-0.1063	-0.0751	0.0303	0.0151	0.0100	0.0064	0.0060
p-value	0.0000	0.0000	0.0000	0.0000	0.0041	0.2477	0.5642	0.7026	0.8061	0.8200

HI - Herfindhal index calculated on individual shareholdings of 5% or more

6.4.7.2 *Pearson's correlation coefficients between ownership-type and control variables with firm performance as the dependent variable*

The types of ownerships identified in this study were black, company, directors, family, foreign, government, institutions, other and the Public Investment Corporation. The extent to which these variables were associated with control variables was analysed. Table 6.22 shows the correlation coefficients between black ownership at different levels of ownership and control variables and between company ownership at different levels of ownership and control variables.

Pearson's correlation coefficients between black ownership and control variables were highest, in absolute terms, between tangibility and black ownership at the top 10 shareholders level. The correlation coefficient was -0.15 with a p-value of 0.00, making it significant at the 1% level. Increases in tangibility were associated with decreases in black ownership at the top 10 shareholders level. Both measures of liquidity and risk had small, positive, but statistically insignificant correlation coefficients with black ownership. As firm liquidity increased, black ownership increased. In the same vein, as risk increased, black ownership also increased. Liquidity could have had a positive association due to the way some black ownership structures were funded. They were funded using preference shares in a similar fashion to debt funding, requiring companies in which black ownership stakes were being funded to have the necessary cash.

The positive association between risk and black ownership could have been due to the fact that black shareholders generally did not have the funding to pick and choose which entities to buy from but took whatever was available. Companies which had high risk would perhaps seek black investors as a way of reducing the current shareholders' risk exposure. The other correlation coefficients were negative, low and statistically insignificant, making them eligible for the use in the analysis of the effects of ownership on corporate performance.

Pearson's correlation coefficients between company ownership and control variables were smaller than 0.05 and largely statistically insignificant. The highest absolute correlation coefficient was -0.11, which was between size, as measured by total assets and company ownership at the top 10 shareholders level. Age, non-debt tax shields and tangibility had small, positive and statistically insignificant coefficients. As firm age and tangibility increased, corporate ownership also increased. The association could be due to investee firms acquiring more resources as they grew, and companies having the means to follow up on their rights. Since the other variables were small and insignificant, company ownership and control variables could be used jointly in analysing the effects of ownership on firm performance.

Table 6.22: Pearson's correlation coefficients for black ownership, company ownership and control variables with firm performance as the dependent variable: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Black Top 1 shareholder	**Black Top 2 shareholders**	**Black Top 3 shareholders**	**Black Top 5 shareholders**	**Black Top 10 shareholders**	**Company Top 1 shareholders**	**Company Top 2 shareholders**	**Company Top 3 shareholders**	**Company Top 5 shareholders**	**Company Top 10 shareholders**
Age	0.0051	0.0176	-0.0028	-0.0114	-0.0473	0.0820	0.0625	0.0624	0.0605	0.1072
p-value	0.8462	0.5018	0.9162	0.6635	0.0713	0.0017	0.0172	0.0172	0.0210	0.0000
Dividend Pay-out ratio	-0.0146	-0.0025	-0.0042	-0.0012	-0.0053	-0.0097	-0.0110	-0.0129	-0.0142	-0.0152
p-value	0.5766	0.9240	0.8736	0.9624	0.8404	0.7105	0.6738	0.6229	0.5877	0.5623
Growth (Sales)	-0.0091	-0.0068	-0.0049	-0.0056	-0.0117	-0.0245	-0.0162	-0.0162	-0.0166	-0.0155
p-value	0.7295	0.7967	0.8515	0.8319	0.6558	0.3501	0.5371	0.5369	0.5272	0.5558
Growth (Total assets)	-0.0101	-0.0111	-0.0129	-0.0140	-0.0137	-0.0204	-0.0236	-0.0192	-0.0187	-0.0103
p-value	0.6999	0.6731	0.6239	0.5942	0.6024	0.4363	0.3686	0.4635	0.4760	0.6942
Liquidity (Current ratio)	0.0203	0.0117	0.0123	0.0136	0.0078	0.0055	0.0212	0.0196	0.0090	0.0258
p-value	0.4384	0.6557	0.6381	0.6046	0.7668	0.8353	0.4181	0.4559	0.7301	0.3245
Liquidity (Quick ratio)	0.0259	0.0200	0.0229	0.0262	0.0212	-0.0218	-0.0100	-0.0104	-0.0202	0.0031
p-value	0.3227	0.4450	0.3831	0.3185	0.4180	0.4061	0.7023	0.6926	0.4406	0.9053
Non-debt tax shields (Depreciation/Total assets)	-0.0198	-0.0248	-0.0225	-0.0224	-0.0260	0.0099	-0.0099	-0.0066	0.0028	0.0005
p-value	0.4500	0.3448	0.3906	0.3920	0.3212	0.7070	0.7069	0.8000	0.9159	0.9853
Non-debt tax shields (EBITDA/Depreciation)	-0.0197	-0.0198	-0.0471	-0.0498	-0.0363	0.0055	0.0055	0.0024	0.0003	-0.0061
p-value	0.4520	0.4506	0.0722	0.0574	0.1658	0.8345	0.8349	0.9259	0.9898	0.8176
Risk	0.0001	0.0010	0.0027	0.0020	0.0072	0.0056	0.0043	0.0020	-0.0065	-0.0061
p-value	0.9965	0.9707	0.9181	0.9395	0.7851	0.8320	0.8692	0.9402	0.8034	0.8163
Size (Sales)	-0.0436	-0.0572	-0.0706	-0.0785	-0.1124	0.0088	-0.0115	-0.0297	-0.0328	-0.0844
p-value	0.0960	0.0291	0.0070	0.0027	0.0000	0.7363	0.6601	0.2567	0.2116	0.0013
Size (Total assets)	0.0005	-0.0096	-0.0218	-0.0261	-0.0609	-0.0107	-0.0347	-0.0521	-0.0588	-0.1076
p-value	0.9847	0.7132	0.4059	0.3199	0.0201	0.6821	0.1861	0.0468	0.0249	0.0000
Tangibility	-0.0952	-0.1234	-0.1277	-0.1361	-0.1464	0.0094	-0.0016	0.0023	0.0092	0.0106
p-value	0.0003	0.0000	0.0000	0.0000	0.0000	0.7207	0.9507	0.9300	0.7258	0.6848
Total debt ratio (Book values)	-0.0987	-0.0835	-0.0800	-0.0712	-0.0651	-0.0684	-0.0892	-0.0876	-0.0747	-0.0991
p-value	0.0002	0.0014	0.0023	0.0066	0.0130	0.0090	0.0007	0.0008	0.0043	0.0002

Table 6.23 presents Pearson's correlation coefficients between directors' ownership and control variables and between family ownership and control variables. Directors' ownership was measured across the total shareholding of the company rather than at

the top one to top 10 shareholders levels. Directors' ownership variables did not vary with the changes in the level of shareholding under consideration. The highest absolute correlation coefficient was between directors' ownership and the size variable, when measured using total assets, at -0.36 with a p-value of 0.00, which was statistically significant at the 1% level. Increases in firm size, measured using total assets, were associated with decreases in directors' shareholdings. A possible reason for such a negative association could be the limited wealth that directors had as individuals. Hence as the companies grew, their limited wealth inhibited them from providing further funding in terms of equity to the bigger corporation, leading to the dilution of their shareholdings. In addition, directors' ownership had negative correlation coefficients with firm age, risk, tangibility and total debt ratio based on book value. As firm age, risk, tangibility and total debt increased, the directors' shareholdings decreased. Age and tangibility could be indirectly related to firm size. Risk and total debt could be due to the possibility of loss of one's wealth on the part of the directors and possible aversion to monitoring by lenders respectively. Correlation coefficients for other variables were below 0.05 and statistically insignificant. Hence all the variables could be used in further analysis.

Family ownership and the size variable, based on total assets, had a correlation coefficient of -0.45 with a p-value of 0.00, making it statistically significant at the 1% level. As firm size increased, family ownership decreased. Such an association could be due to the 'limited resources' argument that families had limited wealth and could own firms up to a certain level of shareholding, beyond which they could not afford. Hence their shareholdings would decline, in relative terms. Age, risk, firm size and tangibility also had negative correlation coefficients with family ownership. The correlation coefficients were split between statistically significant and insignificant ones.

Family ownership had mainly low, positive and statistically insignificant relationships with the long-term debt ratio. Family ownership increased with debt ratio. A possible explanation for such associations was that the families did not wish to dilute their shareholdings and therefore opted to use debt for funding and maintain control of their firms. The correlation coefficients between control variables and family ownership were low, leading to the conclusion that the variables could be used jointly in succeeding analyses.

Table 6.23: Pearson's correlation coefficients for directors' ownership, family ownership and control variables with firm performance as the dependent variable: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Directors Top 1 shareholder	**Directors Top 2 shareholders**	**Directors Top 3 shareholders**	**Directors Top 5 shareholders**	**Directors Top 10 shareholders**	**Family Top 1 shareholders**	**Family Top 2 shareholders**	**Family Top 3 shareholders**	**Family Top 5 shareholders**	**Family Top 10 shareholders**
Age	-0.0102	-0.0102	-0.0102	-0.0102	-0.0102	-0.1097	-0.1306	-0.1458	-0.1784	-0.1764
p-value	0.6979	0.6979	0.6979	0.6979	0.6979	0.0000	0.0000	0.0000	0.0000	0.0000
Dividend Pay-out ratio	0.0005	0.0005	0.0005	0.0005	0.0005	0.1149	0.0839	0.0661	0.0487	0.0443
p-value	0.9862	0.9862	0.9862	0.9862	0.9862	0.0000	0.0014	0.0116	0.0634	0.0914
Growth (Sales)	0.0151	0.0151	0.0151	0.0151	0.0151	0.0672	0.0527	0.0471	0.0429	0.0398
p-value	0.5649	0.5649	0.5649	0.5649	0.5649	0.0103	0.0445	0.0727	0.1016	0.1289
Growth (Total assets)	-0.0148	-0.0148	-0.0148	-0.0148	-0.0148	-0.0054	-0.0095	-0.0106	-0.0126	-0.0104
p-value	0.5730	0.5730	0.5730	0.5730	0.5730	0.8360	0.7163	0.6866	0.6297	0.6906
Liquidity (Current ratio)	0.0897	0.0897	0.0897	0.0897	0.0897	0.0144	0.0088	0.0148	0.0099	-0.0002
p-value	0.0006	0.0006	0.0006	0.0006	0.0006	0.5834	0.7362	0.5724	0.7069	0.9928
Liquidity (Quick ratio)	0.0597	0.0597	0.0597	0.0597	0.0597	0.0059	-0.0036	0.0023	-0.0022	-0.0114
p-value	0.0227	0.0227	0.0227	0.0227	0.0227	0.8230	0.8918	0.9310	0.9335	0.6642
Non-debt tax shields (Depreciation/ Total assets)	0.0386	0.0386	0.0386	0.0386	0.0386	0.0857	0.0499	0.0323	0.0084	-0.0001
p-value	0.1411	0.1411	0.1411	0.1411	0.1411	0.0011	0.0572	0.2181	0.7477	0.9955
Non-debt tax shields (EBITDA/Depreciation)	-0.0036	-0.0036	-0.0036	-0.0036	-0.0036	-0.0338	-0.0338	-0.0303	-0.0291	-0.0338
p-value	0.8895	0.8895	0.8895	0.8895	0.8895	0.1979	0.1978	0.2475	0.2676	0.1976
Risk	-0.0153	-0.0153	-0.0153	-0.0153	-0.0153	-0.0035	-0.0081	-0.0089	-0.0115	-0.0146
p-value	0.5587	0.5587	0.5587	0.5587	0.5587	0.8926	0.7577	0.7352	0.6611	0.5776
Size (Sales)	-0.2837	-0.2837	-0.2837	-0.2837	-0.2837	-0.2314	-0.2636	-0.2951	-0.3264	-0.3452
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Size (Total assets)	-0.3629	-0.3629	-0.3629	-0.3629	-0.3629	-0.3072	-0.3537	-0.3870	-0.4208	-0.4470
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tangibility	-0.0512	-0.0512	-0.0512	-0.0512	-0.0512	0.0163	-0.0224	-0.0472	-0.0629	-0.0695
p-value	0.0506	0.0506	0.0506	0.0506	0.0506	0.5341	0.3938	0.0718	0.0163	0.0080
Total debt ratio (Book ales)	-0.0641	-0.0641	-0.0641	-0.0641	-0.0641	-0.0192	0.0125	0.0172	0.0328	0.0575
p-value	0.0144	0.0144	0.0144	0.0144	0.0144	0.4632	0.6343	0.5122	0.2106	0.0281

BV= Book value and MV= market value

Pearson's correlation coefficients for foreign ownership and control variables and government ownership and control variables are shown in Table 6.24. The highest correlation coefficient was between foreign ownership at the top 10 shareholders level and firm size, as measured by total assets, at 0.17 with a p-value of 0.00. The relationship was statistically significant at the 1% level. As firm size increased, foreign ownership also increased. This association was true from the top two shareholders to the top 10 shareholders. Risk and total debt ratio had negative correlation coefficients with foreign ownership. Correlation coefficients between risk and foreign ownership were statistically insignificant, while those between the total debt ratio and foreign

ownership were statistically significant at the 10% level. As the total ratio increased, foreign ownership decreased.

Age, dividend payout ratio and liquidity had positive correlation coefficients with foreign shareholdings. As firm age increased, foreign ownership increased. Foreign investors probably preferred to invest in firms which had a track record. In addition, foreign ownership was positively associated with firms which not only had high dividend payout ratios but also had high liquidity ratios, presumably to enable them to repatriate profits.

Tangibility and government ownership at the top five shareholders level had the highest correlation coefficient of 0.11 and a p-value of 0.00, making it significant at the 1% level. Government ownership and growth had negative correlation coefficients, which meant that increases in government ownership were associated with decreases in firm growth. The role of government-owned financial institutions such as the Industrial Development Corporation, which invested in strategic industrial firms, even if they were not growing, could explain the association.

Government ownership and risk had positive and nearly zero but statistically insignificant correlation coefficients. The result implied that as risk increased, government ownership also increased. Government and government-owned enterprises' quest to invest in a counter-cyclical fashion could explain the association. Pearson's correlation coefficients between government ownership and control variables were mainly below 0.05 and statistically insignificant. Government ownership variables and control variables were considered to be unrelated for the purposes of studying the effects of ownership on corporate performance and could be used jointly in further analyses.

Table 6.24: Pearson's correlation coefficients for foreign ownership, government ownership and control variables with firm performance as the dependent variable: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Foreign Top 1 shareholder	**Foreign Top 2 shareholders**	**Foreign Top 3 shareholders**	**Foreign Top 5 shareholders**	**Foreign Top 10 shareholders**	**Government Top 1 shareholder**	**Government Top 2 shareholders**	**Government Top 3 shareholders**	**Government Top 5 shareholders**	**Government Top 10 shareholders**
Age	0.1333	0.1408	0.1434	0.1386	0.0335	0.0435	0.0332	0.0323	0.0217	0.0337
p-value	0.0000	0.0000	0.0000	0.0000	0.2020	0.0971	0.2056	0.2179	0.4082	0.1985
Dividend Pay-out ratio	0.0060	0.0030	0.0101	0.0146	0.0162	-0.0131	-0.0041	-0.0035	-0.0024	-0.0036
p-value	0.8196	0.9100	0.7014	0.5766	0.5377	0.6163	0.8745	0.8924	0.9267	0.8898
Growth (Sales)	0.0024	-0.0027	-0.0064	-0.0110	-0.0042	-0.0093	-0.0076	-0.0088	-0.0087	-0.0093
p-value	0.9280	0.9177	0.8083	0.6741	0.8740	0.7227	0.7708	0.7383	0.7415	0.7230
Growth (Total assets)	0.0058	0.0017	-0.0015	-0.0069	-0.0112	-0.0081	-0.0099	-0.0107	-0.0105	-0.0108
p-value	0.8254	0.9469	0.9555	0.7930	0.6680	0.7588	0.7060	0.6847	0.6895	0.6803
Liquidity (Current ratio)	0.0338	0.0239	0.0198	0.0149	0.0133	0.0115	0.0068	0.0034	-0.0002	0.0045
p-value	0.1970	0.3622	0.4507	0.5694	0.6128	0.6620	0.7945	0.8982	0.9933	0.8633
Liquidity (Quick ratio)	0.0288	0.0229	0.0195	0.0145	0.0085	0.0052	-0.0130	-0.0158	-0.0187	-0.0147
p-value	0.2719	0.3836	0.4569	0.5797	0.7445	0.8421	0.6199	0.5462	0.4760	0.5758
Non-debt tax shields (Depreciation/ Total assets)	0.0385	0.0261	0.0193	0.0108	-0.0321	-0.0430	0.0160	0.0217	0.0283	0.0228
p-value	0.1417	0.3200	0.4627	0.6793	0.2207	0.1009	0.5425	0.4083	0.2800	0.3842
Non-debt tax shields (EBITDA/Depreciation)	-0.0135	-0.0129	-0.0121	-0.0066	-0.0215	-0.0107	-0.0080	-0.0096	-0.0093	-0.0132
p-value	0.6080	0.6216	0.6459	0.8007	0.4116	0.6845	0.7612	0.7135	0.7232	0.6149
Risk	-0.0095	-0.0131	-0.0159	-0.0236	-0.0201	0.0008	0.0085	0.0086	0.0094	0.0089
p-value	0.7164	0.6175	0.5441	0.3682	0.4437	0.9762	0.7462	0.7429	0.7202	0.7349
Size (Sales)	-0.0403	-0.0353	-0.0043	0.0453	0.1261	-0.0665	-0.0038	-0.0083	-0.0055	-0.0090
p-value	0.1245	0.1779	0.8706	0.0842	0.0000	0.0111	0.8836	0.7531	0.8346	0.7317
Size (Total assets)	-0.0045	0.0046	0.0327	0.0765	0.1713	-0.0462	0.0183	0.0154	0.0158	0.0172
p-value	0.8652	0.8598	0.2124	0.0035	0.0000	0.0778	0.4848	0.5560	0.5470	0.5123
Tangibility	0.0034	-0.0111	-0.0249	-0.0350	-0.0981	-0.0165	0.0808	0.1023	0.1111	0.0992
p-value	0.8965	0.6719	0.3419	0.1824	0.0002	0.5301	0.0020	0.0001	0.0000	0.0001
Total debt ratio (Book values)	-0.0931	-0.0698	-0.0638	-0.0611	-0.0477	-0.0287	-0.0630	-0.0609	-0.0550	-0.0671
p-value	0.0004	0.0077	0.0149	0.0196	0.0690	0.2745	0.0162	0.0201	0.0359	0.0104

Pearson's correlation coefficients between instuitional investors and control variables and between other types of ownerships and control variables are presented in Table 6.25. Size as measured by total assets and institutional ownership at the top five shareholders level had the highest absolute correlation coefficient of -0.12 with a p-value of 0.00, which was statistically significant at the 1% level. Therefore, as size measured by total assets increased, institutional ownership decreased. Both size variables had negative relationships with institutional ownership, and the correlation coefficients were statistically significant at the 1% level. Institutional ownership had a negative and statistically insignificant association with the dividend payout ratio. As

dividend payout ratio increased, institutional ownership decreased. A possible explanation could be that the institutional investors preferred long-term growth through capital appreciation rather than cash payouts as dividends. The correlation coefficients between risk and institutional ownership were low, negative and statistically insignificant. Institutional investor ownership decreased as risk increased. The reason for this relationship could be risk aversion on the part of institutional investors.

Positive correlation coefficients were found between institutional ownership and tangibility. As asset tangibility increased, institutional ownership also increased. Institutional investors preferred to own shares in firms which had tangible assets, which appeared to be a lender-type perspective. Correlation coefficients were below 0.05 for most variables, coupled with insignificant relationships, leading to the conclusion that institutional investor ownership variables and control variables could be jointly used in other analyses.

Pearson's correlation coefficients between other ownership and control variables were highest in absolute terms for firm size, as measured by the total assets variable, which was -0.16 with a p-value of 0.00, at the top five shareholder level. Negative and statistically significant correlation coefficients were found between other ownership and the two size variables and the relationships were statistically significant. Negative and largely statistically insignificant coefficients were observed between other ownership and age, dividend payout ratio, growth, risk, and tangibility variables. Coefficients for the balance of the variables had positive and negative relationships but were statistically insignificant. The inference was therefore made that the variables could be employed in analysing the ownership and corporate performance relationship.

Table 6.25: Pearson's correlation coefficients between institutional ownership, other ownership and control variables with firm performance as the dependent variable: period 2004 to 2014

Null hypothesis: Ho: r = 0										
	Institutions Top 1 shareholder	**Institutions Top 2 shareholders**	**Institutions Top 3 shareholders**	**Institutions Top 5 shareholders**	**Institutions Top 10 shareholders**	**Other Top 1 shareholders**	**Other Top 2 shareholders**	**Other Top 3 shareholders**	**Other Top 5 shareholders**	**Other Top 10 shareholders**
Age	-0.0211	0.0049	0.0001	-0.0015	-0.0115	-0.0477	-0.0603	-0.0690	-0.0698	-0.0909
p-value	0.4201	0.8531	0.9967	0.9558	0.6599	0.0686	0.0214	0.0084	0.0077	0.0005
Dividend Pay-out ratio	-0.0192	-0.0243	-0.0312	-0.0304	-0.0335	-0.0048	-0.0106	-0.0105	-0.0187	-0.0165
p-value	0.4650	0.3539	0.2335	0.2465	0.2014	0.8558	0.6867	0.6891	0.4750	0.5300
Growth (Sales)	0.0112	0.0056	0.0178	0.0214	0.0021	-0.0073	-0.0126	-0.0155	-0.0177	-0.0184
p-value	0.6703	0.8312	0.4972	0.4137	0.9358	0.7813	0.6323	0.5554	0.5006	0.4838
Growth (Total assets)	-0.0041	0.0032	-0.0035	-0.0058	-0.0298	-0.0048	-0.0061	-0.0093	-0.0118	-0.0155
p-value	0.8758	0.9032	0.8943	0.8258	0.2553	0.8538	0.8149	0.7228	0.6526	0.5539
Liquidity (Current ratio)	0.0171	0.0349	0.0317	0.0083	-0.0230	0.0310	0.0182	0.0261	0.0197	-0.0174
p-value	0.5154	0.1830	0.2272	0.7519	0.3796	0.2368	0.4889	0.3194	0.4537	0.5075
Liquidity (Quick ratio)	0.0085	0.0283	0.0250	0.0010	-0.0295	0.0345	0.0196	0.0272	0.0220	-0.0209
p-value	0.7452	0.2800	0.3414	0.9704	0.2606	0.0345	0.4548	0.3005	0.4017	0.4255
Non-debt tax shields (Depreciation/ Total assets)	-0.0493	-0.0081	-0.0071	0.0051	0.0195	-0.0535	-0.0476	-0.0423	-0.0403	0.0765
p-value	0.0599	0.7576	0.7857	0.8451	0.4575	0.0411	0.0696	0.1070	0.1247	0.0035
Non-debt tax shields (EBITDA/Depreciation)	0.0150	-0.0211	-0.0169	-0.0093	-0.0021	0.0257	0.0024	-0.0010	-0.0011	-0.0164
p-value	0.5675	0.4218	0.5190	0.7241	0.9352	0.3266	0.9257	0.9683	0.9666	0.5329
Risk	-0.0027	-0.0102	-0.0147	-0.0181	-0.0343	-0.0103	-0.0124	-0.0085	-0.0144	-0.0120
p-value	0.9181	0.6964	0.5746	0.4907	0.1912	0.6960	0.6357	0.7467	0.5829	0.6463
Size (Sales)	-0.0948	-0.0913	-0.0952	-0.0878	-0.0677	-0.0679	-0.1259	-0.1406	-0.1447	-0.1158
p-value	0.0003	0.0005	0.0003	0.0008	0.0098	0.0095	0.0000	0.0000	0.0000	0.0000
Size (Total assets)	-0.1090	-0.1082	-0.1162	-0.1174	-0.1138	-0.0794	-0.1259	-0.1450	-0.1613	-0.1460
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0024	0.0000	0.0000	0.0000	0.0000
Tangibility	0.0251	0.0540	0.0530	0.0394	0.0415	-0.0448	-0.0270	-0.0310	-0.0191	0.0250
p-value	0.3384	0.0394	0.0433	0.1327	0.1135	0.0874	0.3028	0.2366	0.4660	0.3405
Total debt ratio (Book values)	0.0204	-0.0156	-0.0159	0.0011	0.0195	-0.0079	0.0153	0.0088	-0.0071	0.0118
p-value	0.4357	0.5531	0.5444	0.9664	0.4582	0.7641	0.5594	0.7370	0.7854	0.6531

Correlation coefficients between ownership by the Public Investment Corporation and control variables used in studying the effects of ownership on firm performance are presented in Table 6.26. Both size variables had the highest correlation coefficients with ownership by the Public Investment Corporation. Size as measured by total assets and the Public Investment Corporation ownership at the top five shareholders level had a correlation coefficient of 0.56 and a p-value of 0.00, making it statistically significant at the 1% level. Ownership by the Public Investment Corporation increased as firm size increased. Firm age, dividend payout ratio, tangibility and total debt ratio had positive associations with ownership by the Public Investment Corporation. As firm age, dividend payout ratios, and tangibility and total debt ratio increased, the ownership by the Public

Investment Corporation also increased, with small, and in most cases, statistically insignificant correlation coefficients being observed. The Public investment Corporation appeared to prefer owning shares in mature, leveraged companies with strong asset bases and high dividend payout ratios.

Table 6.26: Pearson's correlation coefficients for the Public Investment Corporation and control variables with firm performance as the dependent variable: period 2004 to 2014

Null hypothesis: Ho: r = 0					
	Public Investment Corporation Top 1 shareholder	**Public Investment Corporation Top 2 shareholders**	**Public Investment Corporation Top 3 shareholders**	**Public Investment Corporation Top 5 shareholders**	**Public Investment Corporation Top 10 shareholders**
Age	0.0590	0.0787	0.0977	0.1116	0.1060
p-value	0.0244	0.0026	0.0002	0.0000	0.0001
Dividend Pay-out ratio	0.0420	0.0379	0.0404	0.0402	0.0336
p-value	0.1094	0.1484	0.1238	0.1249	0.2005
Growth (Sales)	-0.0305	-0.0369	-0.0410	-0.0406	-0.0418
p-value	0.2455	0.1593	0.1181	0.1219	0.1112
Growth (Total assets)	-0.0229	-0.0229	-0.0257	-0.0324	-0.0272
p-value	0.3823	0.3823	0.3278	0.2168	0.2991
Liquidity (Current ratio)	-0.0636	-0.0746	-0.0823	-0.0928	-0.1078
p-value	0.0152	0.0044	0.0017	0.0004	0.0000
Liquidity (Quick ratio)	-0.0498	-0.0605	-0.0718	-0.0820	-0.0976
p-value	0.0577	0.0209	0.0061	0.0017	0.0002
Non-debt tax shields (Depreciation/Total assets)	0.0030	0.0036	0.0052	0.0259	0.0201
p-value	0.9101	0.8903	0.8415	0.3235	0.4433
Non-debt tax shields (EBITDA/Depreciation)	-0.0210	-0.0179	-0.0095	-0.0003	0.0080
p-value	0.4242	0.4961	0.7170	0.9914	0.7595
Risk	-0.0328	-0.0362	-0.0381	-0.0403	-0.0414
p-value	0.2106	0.1672	0.1466	0.1246	0.1139
Size (Sales)	0.4043	0.4743	0.5224	0.5591	0.5566
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Size (Total assets)	0.4234	0.4891	0.5367	0.5604	0.5571
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Tangibility	0.0318	-0.0017	0.0096	0.0260	0.0219
p-value	0.2259	0.9469	0.7153	0.3222	0.4044
Total debt ratio (Book values)	0.0535	0.0680	0.0597	0.0754	0.0877
p-value	0.0413	0.0095	0.0228	0.0040	0.0008

Negative and statistically insignificant correlation coefficients were observed between ownership by the Public Investment Corporation and the two growth ratios, the two liquidity ratios and risk. As firm growth rates, liquidity and risk increased, ownership by the Public Investment Corporation decreased.

The relationships between ownership by the Public Investment Corporation and control variables when firm performance was the dependent variable, were different from those of institutional investors and government, which the Public Investment Corporation was closely associated with. The differences in relationships appeared to justify the creation

of the Public Investment Corporation as a unique type of ownership, which was peculiar to South Africa. The study used the Public Investment Corporation as an ownership-type variable jointly with other control variables in analysing the effects of ownership on corporate performance.

6.4.7.3 Pearson's correlation coefficients between firm performance and control variables

The relationships between firm performance variables, as the dependent variables, and control variables, were examined in order to determine whether or not they were closely related. The results of the analysis are shown in Table 6.27. Risk and economic value-added variables had a high, positive and statistically significant relationship at the 1% level. The coefficient was -0.98 with a p-value of 0.00. As risk increased, economic value-added decreased. Although this relationship was comprehensible in terms of the direction of the relationship, the size of the correlation coefficient was very high. These two variables were so closely associated that the addition of one of them in the presence of the other would not add any explanatory power. All other coefficients between risk and firm performance variables were mainly small, negative and statistically insignificant. Firm growth, based on sales and dividend payout ratio, had small correlation coefficients with corporate performance variables but the relationships were statistically insignificant. Increases in dividend payout ratios and sales were associated with increases in corporate performance variables. Given the low correlation coefficients, which were statistically insignificant, with the exception of that for risk, it was concluded that the dependent (corporate performance) and control variables could be used in further analysis of the relationship between ownership and corporate performance.

Table 6.27: Pearson's correlation coefficients between dependent (firm performance) variables and control variables: period 2004 to 2014

Null hypothesis: Ho: r = 0					
	Economic value-added	**Market value-added**	**Return on Assets**	**Return on Equity**	**Tobin's Q**
Age	-0.0306	-0.0116	0.0417	0.0295	-0.0712
p-value	0.2433	0.6573	0.1118	0.2599	0.0065
Dividend Pay-out ratio	0.0038	-0.0019	0.0185	0.0113	0.0063
p-value	0.8857	0.9431	0.4817	0.6654	0.8105
Growth (Sales)	0.0102	0.0025	0.0445	0.0149	0.0292
p-value	0.6975	0.9254	0.0898	0.5688	0.2649
Growth (Total assets)	0.0094	-0.0052	0.0173	0.0102	-0.0002
p-value	0.7202	0.8425	0.5097	0.6973	0.9928
Liquidity (Current ratio)	-0.0072	-0.0187	-0.0322	0.0024	0.0523
p-value	0.7837	0.4752	0.2200	0.9285	0.0462
Liquidity (Quick ratio)	0.0025	-0.0122	-0.0369	-0.0020	0.0689
p-value	0.9244	0.6432	0.1589	0.9393	0.0085
Non-debt tax shields (Depreciation/Total assets)	0.0132	-0.0296	-0.0567	0.0191	-0.0876
p-value	0.6158	0.2587	0.0306	0.4658	0.0008
Non-debt tax shields (EBITDA/Depreciation)	0.0011	-0.0276	0.1832	0.0903	0.0204
p-value	0.9654	0.2933	0.0000	0.0006	0.4377
Risk	-0.9781	0.0057	-0.0306	-0.0137	-0.0087
p-value	0.0000	0.8273	0.2433	0.6018	0.7398
Size (Sales)	0.0430	-0.0825	0.2844	0.1745	-0.0429
p-value	0.1008	0.0016	0.0000	0.0000	0.1017
Size (Total assets)	0.0453	-0.0410	0.1424	0.1026	0.0020
p-value	0.0843	0.1176	0.0000	0.0001	0.9386
Tangibility	-0.0360	-0.0357	0.0580	0.0473	-0.0565
p-value	0.1693	0.1733	0.0270	0.0712	0.0311
Total debt (Book Value)	0.0382	0.0027	-0.0234	0.0065	-0.0278
p-value	0.1455	0.9173	0.3729	0.8045	0.2891

6.5 PRELIMINARY TESTS

Panel unit root tests, panel cross-section dependence tests, treatment of outliers and tests for multicollinearity (variance inflation factors) were discussed in Section 5.6 in Chapter 5. Panel unit root tests results for the corporate performance variables are shown in Table 6.28 below, which indicate that the unit root is stationary.

Table 6.28: Results of the panel unit root test for corporate performance variables

Variable	**Levin, Lin & Chiu t-statistic**	**Probability**	**Cross-sections**	**Observations**
Economic value-added	-30.3363	0.0000	8	1 827
Market value-added	-31.6569	0.0000	8	1 905
Return on assets	-32.1718	0.0000	8	1 916
Return on equity	-41.6099	0.0000	8	1 918
Tobin's Q	-27.8892	0.0000	8	1 909

6.6 CONCLUSIONS FROM ANALYSIS OF CORRELATION COEFFICIENTS OF VARIABLES

Pearson's correlation coefficients for independent variables, represented by ownership-type and ownership concentration variables, dependent variables represented by corporate performance variables, and control variables were examined above. The aim was to determine the extent to which the variables were correlated and therefore decide whether or not the variables could be used jointly in further analyses. Ownership concentration variables, as measured by the levels of total shareholdings of the top one, two, three, five and 10 shareholders, were highly correlated. Consequently, each level of ownership was treated separately in subsequent analyses. The Herfindahl index associated with a number of top shareholdings was also used as a measure of ownership concentration. Herfindahl indices were found to be highly correlated with each other at different levels of shareholdings. These indices at each level of shareholding were therefore used separately for further analysis to avoid problems of multicollinearity. It was also important to assess whether two types of ownership concentrations, namely the shareholdings at different levels and the Herfindahl indices, could be used jointly. The correlation coefficient results were high and statistically significant, leading to the separate use of each measure of ownership concentration.

Pearson's correlation coefficients for corporate performance variables, which were the dependent variables, also revealed high levels of correlation, supporting the methodology that each of them should be used independently of each other. Pearson's correlation coefficients between the independent, dependent and control variables were low, but statistically significant in some cases, leading to the conclusion that they could be used jointly in succeeding analyses. Where two control variables measured the same concept, one of them was eliminated so that further analyses were conducted with only one type of variable measuring one concept. The correlation coefficient between risk, a control variable, and economic value-added, a dependent variable, was very high. However, the risk variable was in the equation in which economic value-added was the dependent variable and the results must be interpreted with this fact in mind. Chapter 8 discusses the results of the analyses of the effects of ownership on corporate performance.

CHAPTER 7

THE EFFECTS OF OWNERSHIP ON CAPITAL STRUCTURE - RESULTS

7.1 INTRODUCTION

This chapter presents the findings from the models that were run in relation to the effects of ownership on capital structure. The descriptive statistics and correlation results related to this chapter were discussed in Chapter 5. Results from Chapter 5 were taken into account in building the models which were tested and discussed in this chapter. In relation to ownership concentration, it was found that the two measures of ownership concentration, namely the Herfindahl index and the total shareholdings of the top shareholders, were statistically significantly correlated. As a result, the models were constructed by separating the two measures of ownership concentration. One set of models therefore used the Herfindahl index as a measure of ownership concentration while another set used the sum of the top shareholdings. The Herfindahl index models were considered at different levels of top shareholdings only in order for the results to be directly comparable. Results for the other measure of concentration, which was the sum of top shareholdings, were not reported but are available on request.

In line with the additional finding in Chapter 5, namely that the sums of the shareholdings at different shareholdings were statistically significantly correlated, the models accommodated only one level of shareholding at a time. The five sets of shareholdings from top one to top 10 were therefore separated.

The effects of different types of ownerships, namely black, company, directors, family, foreign, government, institutional investors, other types of ownerships and the Public Investment Corporation on capital structure were examined. Capital structure was measured by long-term debt ratios, short-term debt ratios and total debt ratios based on book and market values, and the leverage factors.

Ownership-type variables were modelled together as they generally had low correlation coefficients with each other. Control variables had low correlation coefficients with each other and were modelled jointly. For control variables which had alternative measures of the same phenomenon such as growth, the alternative measures were dropped.

Methods used to analyse the relationships were the fixed effects and generalised methods of moments. Different methods were used for robustness and the generalised method of moments models were employed to resolve unobserved heterogeneity and endogeneity problems.

Section 7.2 examines the effects of ownership on firm performance using the fixed effects and generalised method of moments models at the top one shareholder level. Sections 7.3, 7.4, 7.5 and 7.6 analyse the effects of ownership on capital structure for the top two, three, five and 10 shareholder levels respectively. Section 7.7 concludes.

7.2 EFFECTS OF OWNERSHIP ON CAPITAL STRUCTURE: THE TOP ONE SHAREHOLDER, HERFINDAHL INDICES USING THE FIXED EFFECTS METHOD AND THE GENERALISED METHOD OF MOMENTS APPROACHES

The study did not use pooled ordinary least squares regression analysis to study the effects of ownership on capital structure due to questions about the consistency and efficiency of the method when used to analyse panel data (Baltagi, 2005:4). The method is associated with the problems of not taking account of unobserved effects and individual effects. The random effects and fixed effects models were considered to deal with the issues of unobserved heterogeneity. The analysis using least squares regression was all done using the fixed effects model. Data collected was an unbalanced panel, hence the random effects model could not be used.

7.2.1 Fixed effects models: the top one shareholder, types of shareholders and capital structure

Table 7.1 shows the results of the fixed effects regression analysis of the effects of ownership on capital structure with the Herfindahl index of the top one shareholder as a measure of ownership concentration. Seven models, one for each dependent variable, were analysed. The results indicate that ownership concentration as measured by the Herfindahl index at the top one shareholder level had a statistically significant negative effect at the 1% level, with six of the seven measures of leverage. The coefficients varied from -0.10 for long-term debt ratio based on market value to -0.54 for total debt ratio based on book value. This means that for a 1% increase in the Herfindahl index, the long-term ratio based on book value decreased by 0.54 %. The leverage factor had a positive and statistically significant effect at the 5% level, in contrast to all the other variables.

Positive and statistically significant effects were found between capital structure and institutional, the Public Investment Corporation, family, company, directors', foreign, government and other ownerships. The coefficients were statistically significant at the 1% level. Ownership by institutional investors had positive effects on the long-term debt at book value, (0.27), total debt at book value (0.40), long-term debt at market value (0.21) and total debt at market value variables (0.26). The leverage factor had a negative coefficient. The coefficients for ownership by the Public Investment Corporation were positive under the short-term debt at book value ratio (0.31), total debt at book value ratio (0.27) and leverage factor ratio (5.68). Long-term debt at market value and total debt at market value ratios had negative coefficients with ownership by the Public Investment Corporation. Coefficients for family ownership had positive effects on the short-term debt at book value ratio (0.33), total debt at book value ratio (0.36) and short-term debt at market value ratio (0.16). The coefficient for family ownership had a negative effect on the leverage factor.

Coefficients for company ownership had positive effects on the short-term debt at book value (0.25) and total debt at book value (0.26) variables, while the effect on the

leverage factor was negative. Directors' ownership had positive coefficients against both long-term debt ratios, short-term debt at market value ratio and total debt at market value ratio. Foreign ownership had positive effects on the long-term debt variables of 0.06 (book value) and 0.11 (market value), reflecting foreign investors' appetite for long-term debt. Government ownership's coefficients were positive for the long-term ratio (0.44 book value and 0.95 market value) and the total debt at market value variable (0.74), a result similar to foreign ownership. The leverage factor had negative coefficients with foreign and government ownership. Government ownership had positive effects on long-term measures of leverage and negative effects on short-term measures of leverage, showing that the government had a preference for firms with debt, which had long as opposed to short tenors. The government's intention to have a long-term perspective could explain such a result. In addition, short-term debt at book value also had a negative relationship with government ownership. Other shareholders ownership had positive coefficients with both short-term debt measures and the total debt at book value variable.

Measures of capital structure were statistically significantly negatively related to black ownership mainly at the 1% and 5% levels. Specifically, both short-term debt variables, total debt at book value and leverage factor measures had negative coefficients with black ownership. The manner in which black ownership was generally funded, mainly as preference shares and debt, could partly explain the negative relationship.

The Public Investment Corporation ownership had a negative effect on long-term measures of leverage and a positive effect on short-term measures. The relationships were statistically significant at the 1% and 5% levels whereas others were statistically insignificant. Preference for short-term leverage could be a reflection of a preference for short-term results from the Public Investment Corporation.

For control variables, size and growth had positive effects on leverage variables, while profitability, tangibility, non-debt tax shields, risk, dividend payout ratio, firm age, and liquidity had mainly negative effects. The size variable had positive coefficients with all the dependent variables except for short-term variables where there were negative effects. The coefficients were statistically significant at the 1% level. The growth variable had positive coefficients with the long-term debt at market value variable (0.00) and total

debt at market value ratio (0.00), although the coefficients were small. Profitability had negative coefficients with four leverage measures, tangibility with three, non-debt tax shields with four leverage measures, risk and dividend payout ratio with three, firm age with five leverage variables and liquidity with four leverage variables.

Due to their sizes, large companies are able to attract debt. Profitable companies may use their retained earnings to finance their operations instead of raising debt, leading to the negative effect. Firms with high risk may find it difficult to raise debt due to the perceived lack of security. Old firms may have low leverage as a result of their assets having been paid off in the past and not requiring additional debt. Liquid firms may use their cash flows to finance their operations in preference to borrowing, leading to low leverage.

The adjusted coefficient of determination (R^2) of the models with capital structure variables were from about 25% to just under 90%, which was low at the lower end, showing low explanatory power but high at the higher end, denoting that the models explained the effects of ownership on capital structure to varying degrees. Models with coefficients above 60% were long-term debt ratio at book and market values and leverage factor. The Durbin-Watson test statistics for serial correlation were far below two, with maximum at 0.97, indicating that there could be some serial correlation. The F-tests for all the models had p-values of zero, making the relationships statistically significant at the 1% level and reflecting that the models fitted well.

Table 7.1: Effects of ownership on capital structure using the fixed effects model at the top one shareholder level

Dependent Variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage Factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Constant	-0.1363	***	0.5139	***	0.3252	***	2.1408	***	-0.0986	***	0.3886	***	0.2770	***
	(0.0078)		(0.0255)		(0.0314)		(0.3501)		(0.0118)		(0.0243)		(0.0212)	
Concentration														
H I Top One shareholder	-0.1448	***	-0.4652	***	-0.5364	***	2.5829	**	-0.1054	***	-0.2131	***	-0.1483	*
	(0.0353)		(0.0817)		(0.0810)		(1.1201)		(0.0415)		(0.0706)		(0.0894)	
Shareholder Type														
Institution- Top One shareholder	0.2701	***	0.1111		0.3996	***	-1.6494	*	0.2128	***	0.1165		0.2612	***
	(0.0343)		(0.0782)		(0.0825)		(1.0003)		(0.0357)		(0.0769)		(0.0935)	
Public Investment Corporation- Top One shareholder	-0.0253		0.3130	***	0.2704	***	5.6852	***	-0.0781	**	0.0003		-0.3518	***
	(0.0210)		(0.0817)		(0.0918)		(0.8554)		(0.0394)		(0.0681)		(0.0780)	
Family - Top One shareholder	0.0213		0.3344	***	0.3621	***	-3.3068	***	0.0348		0.1650	***	0.0794	
	(0.0245)		(0.0526)		(0.0536)		(0.7842)		(0.0257)		(0.0476)		(0.0581)	
Company- Top One shareholder	-0.0010		0.2553	***	0.2651	***	-2.5460	***	0.0145		0.0721		-0.0987	
	(0.0226)		(0.0584)		(0.0599)		(0.6700)		(0.0297)		(0.0507)		(0.0678)	
Directors-Top One shareholder	0.0292	***	-0.0290	***	0.0015		-0.5173	***	0.0347	***	0.0924	***	0.1375	***
	(0.0036)		(0.0097)		(0.0119)		(0.1644)		(0.0036)		(0.0083)		(0.0110)	
Black- Top One shareholder	-0.0189		-0.1696	**	-0.2496	***	-3.3061	***	0.2133	***	-0.1603	***	-0.1053	
	(0.0179)		(0.0799)		(0.0820)		(1.0278)		(0.0290)		(0.0492)		(0.0670)	
Foreign- Top One shareholder	0.0635	***	0.0461		0.0922		-1.9254	**	0.1069	***	0.0011		-0.0801	
	(0.0198)		(0.0546)		(0.0634)		(0.8559)		(0.0306)		(0.0539)		(0.0664)	
Government - Top One shareholder	0.4470	***	-0.5070	***	-0.2204		-5.1169	***	0.9466	***	-0.0793		0.7361	***
	(0.1371)		(0.1880)		(0.1652)		(0.6157)		(0.1959)		(0.1448)		(0.1419)	
Other - Top One shareholder	-0.0398		0.3098	***	0.3583	***	-1.9054		0.1029		0.2527	*	0.0840	
	(0.0655)		(0.0976)		(0.1128)		(1.3831)		(0.0971)		(0.1396)		(0.1876)	

Table 7.1 *continued*: Effects of ownership on capital structure using the fixed effects model at the top one shareholder level

Dependent Variable		Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage Factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Control Variables															
Size, Total assets		0.0378	***	-0.0155	***	0.0340	***	0.2246	***	0.0247	***	-0.0260	***	0.0100	***
		(0.0013)		(0.0041)		(0.0046)		(0.0494)		(0.0018)		(0.0036)		(0.0031)	
Profitability		0.0004		-0.1236	***	-0.1502	***	-0.1654	**	-0.0678	***	0.0020		-0.0047	
		(0.0028)		(0.0071)		(0.0109)		(0.0813)		(0.0065)		(0.0036)		(0.0057)	
Tangibility		-0.0001		-0.0001		-0.0002		-0.0049	**	0.1736	***	-0.0004	***	-0.0006	***
		(0.0001)		(0.0001)		(0.0002)		(0.0021)		(0.0069)		(0.0001)		(0.0002)	
Non-debt tax shields		0.7466	***	-0.9062	***	-0.4801	***	-9.3218	***	0.6760	***	-0.1759	*	0.9511	***
		(0.0369)		(0.0601)		(0.0986)		(1.3428)		(0.0528)		(0.0968)		(0.1138)	
Risk		0.0026		-0.0439	***	-0.0467	***	-0.1069		0.0286	***	-0.0283	***	-0.0162	
		(0.0045)		(0.0117)		(0.0134)		(0.1428)		(0.0091)		(0.0109)		(0.0136)	
Dividend Pay-out Ratio		-0.0005		-0.0008		-0.0024	*	-0.0078		0.0001		-0.0023	***	-0.0016	**
		(0.0004)		(0.0012)		(0.0013)		(0.0089)		(0.0005)		(0.0006)		(0.0007)	
Age		-0.0009	***	-0.0003	**	-0.0010	***	-0.0307	***	-0.0003	***	0.0007	***	0.0003	**
		(0.0000)		(0.0001)		(0.0001)		(0.0011)		(0.0001)		(0.0001)		(0.0001)	
Growth - Total Assets		-0.0004		0.0003		-0.0001		-0.0278	***	0.0028	***	-0.0001		0.0021	**
		(0.0003)		(0.0006)		(0.0006)		(0.0098)		(0.0007)		(0.0006)		(0.0009)	
Liquidity		-0.0001		-0.0025	***	-0.0029	***	-0.0044		0.0000		-0.0013	***	-0.0011	***
		(0.0001)		(0.0004)		(0.0005)		(0.0038)		(0.0001)		(0.0003)		(0.0003)	
Weighted Statistics															
R-squared		0.8663		0.4045		0.2494		0.8991		0.6713		0.4396		0.5316	
Adjusted R-squared		0.8647		0.3972		0.2402		0.8979		0.6671		0.4328		0.5259	
S.E. of regression		0.1361		0.2897		0.3097		32.7129		0.1223		0.1767		0.2200	
F-statistic		528.3240		55.4114		27.1013		727.2790		160.0166		64.0061		92.6038	
Prob(F-statistic)		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
Mean dependent var		0.2941		1.2244		0.9662		34.8093		0.2386		0.3610		0.6484	
S.D. dependent var		2.5924		17.9611		1.9309		173.4518		0.3920		0.4792		2.7386	
Sum squared residual		28.6979		130.1064		148.6196		1658712.0000		22.2734		48.3882		75.0218	
Durbin-Watson statistic		0.5476		0.3822		0.3556		0.9743		0.5508		0.4414		0.4599	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindhal Index

7.2.2 Generalised method of moments model without a lag and generalised method of moments model with a lagged dependent variable: the top one, two, three, five and 10 shareholders and capital structure

The generalised method of moments model without a lag variable of the dependent variable was used to analyse the effects of ownership on capital structure. The generalised method of moments model with a lagged dependent variable was also used in the analysis of the effects of ownership on capital structure. The Herfindahl index was used as a measure of ownership concentration and the types of ownerships and control variables remained the same as for the fixed effects method. Capital structure was measured by the seven variables, namely the long-term debt ratios, the short-term debt ratios and the total debt ratios based on book value and market value, and the leverage factor. Each model was run at the top one, two, three, five and 10 shareholders levels. For the generalised method of moments model without a lagged dependent variable, and for all the capital structure variables, the results for the top one, two, three, five and 10 shareholders, as reflected by the p-values and J-statistics, were all not statistically significant. The same results were obtained under the generalised method of moments model for all the capital structure variables at the different shareholders levels, using the p-values and J-statistics. These results meant that the models did not fit well. Therefore, these results were not considered in making conclusions about the effects of ownership on capital structure.

The results of the two models at each shareholder level are shown as Appendix 1 to 10 as follows:

- Appendix 7.1: The effects of ownership on capital structure using the generalised method of moments model without a lag at the top one shareholder level.
- Appendix 7.2: The effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top one shareholder level.
- Appendix 7.3: The effects of ownership on capital structure using the generalised method of moments model without a lag at the top two shareholders level.

- Appendix 7.4: The effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top two shareholders level.
- Appendix 7.5: The effects of ownership on capital structure using the generalised method of moments model without a lag at the top three shareholders level.
- Appendix 7.6: The effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top three shareholders level.
- Appendix 7.7: The effects of ownership on capital structure using the generalised method of moments model without a lag at the top five shareholders level.
- Appendix 7.8: The effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top five shareholders level.
- Appendix 7.9: The effects of ownership on capital structure using the generalised method of moments model without a lag at the top 10 shareholders level.
- Appendix 7.10: The effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top 10 shareholders level.

7.3 EFFECTS OF OWNERSHIP ON CAPITAL STRUCTURE: THE TOP TWO SHAREHOLDERS, HERFINDAHL INDICES USING THE FIXED EFFECTS MODEL

After comparing the regression results at the top one shareholder level, ownership by the top two shareholders and its effects on capital structure variables were considered. The Herfindahl index at the top two shareholders level was used as a measure of ownership concentration and the variables for ownership types were also considered for the top two shareholders. Control variables and dependent variables or capital structure variables were unchanged.

Results of the fixed effects regression analysis of the effects of ownership on capital structure with the Herfindahl index of the top two shareholders as the measure of ownership concentration are shown in Table 7.2. Seven models, one for each

dependent variable, were analysed. Similar results were obtained for ownership concentration as measured by the Herfindahl index at the level of the top two shareholders for the fixed effects model, namely a statistically significant negative relationship at the 1% level. As ownership concentration increased, leverage decreased. The leverage factor had a positive and statistically significant effect at the1% level, in contrast to all the other variables.

Positive and statistically significant effects, similar to those under the fixed effects method for the one shareholder level, were observed for ownership by institutions, families, companies, directors, foreigners and other shareholders. Foreign ownership had positive and statistically significant coefficients with debt ratios based on book value and negative but statistically insignificant coefficients with some ratios based on market value. For these variables, leverage increased as the shareholdings of these types of ownerships increased. Results for black ownership remained negative, and were similar to those obtained under the one shareholder scenario for the fixed effects method. Coefficients for ownership by the Public Investment Corporation and government were negative and had statistically significant coefficients with capital structure variables at the 1% level. Leverage factor, long-term and total debt ratios at market values had negative coefficients for ownership by the Public Investment Corporation, while two dependent variables had positive coefficients. Negative coefficients for government ownership were observed for the short-term and long-term debt at book value and leverage factor variables with two other capital structure measures showing the opposite sign. Therefore, as black, Public Investment Corporation and government ownership increased, leverage decreased.

For control variables, results were similar to those obtained under the top one shareholder level for the fixed effects model. Coefficients for size and growth were positive, whereas those for profitability, tangibility, non-debt tax shields, risk, dividend payout ratio, firm age and liquidity were negative.

Table 7.2: Effects of ownership on capital structure using the fixed effects model at the top two shareholders level

Dependent variable	Long-term debt ratio, book value		Short-term debt ratio, book value		Total debt ratio, book value		Leverage factor		Long-term debt ratio, market value		Short-term debt ratio, market value		Total debt ratio, market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Constant	-0.1611	***	0.5158	***	0.3131	***	1.3023	***	-0.1122	***	0.3661	***	0.2488	***
	(0.0115)		(0.0214)		(0.0326)		(0.2769)		(0.0124)		(0.0253)		(0.0173)	
Concentration														
H I Top Two shareholders	-0.1877	***	-0.3872	***	-0.5046	***	5.5570	***	-0.1069	***	-0.2097	***	-0.1846	***
	(0.0283)		(0.0516)		(0.0652)		(0.7094)		(0.0303)		(0.0504)		(0.0519)	
Shareholder type														
Institution - Top Two shareholders	0.1801	***	0.0694		0.2192	***	-3.7187	***	0.1912	***	0.0979	*	0.2193	***
	(0.0347)		(0.0473)		(0.0724)		(0.5626)		(0.0236)		(0.0586)		(0.0669)	
Public Investment Corporation - Top Two shareholders	-0.0472		0.4666	***	0.3459	***	-6.4796	***	-0.1705	***	-0.0756		-0.3624	***
	(0.0295)		(0.0657)		(0.0835)		(0.6023)		(0.0316)		(0.0580)		(0.0680)	
Family - Top Two shareholders	0.0659	***	0.3195	***	0.3655	***	-5.1206	***	0.0517	***	0.2050	***	0.1465	***
	(0.0205)		(0.0310)		(0.0438)		(0.5391)		(0.0170)		(0.0353)		(0.0335)	
Company - Top Two shareholders	0.0430	***	0.2080	***	0.2092	***	-4.5904	***	0.0195		0.0671	**	-0.0314	
	(0.0173)		(0.0367)		(0.0452)		(0.4660)		(0.0149)		(0.0341)		(0.0417)	
Directors - Top Two shareholders	0.0246	***	-0.0335	***	-0.0050		0.1496		0.0323	***	0.0845	***	0.1335	***
	(0.0052)		(0.0085)		(0.0121)		(0.1529)		(0.0029)		(0.0080)		(0.0106)	
Black - Top Two shareholders	0.0051		-0.1095	**	-0.0892		-4.7611	***	0.1918	***	-0.1889	***	-0.1278	***
	(0.0213)		(0.0568)		(0.0635)		(0.5679)		(0.0244)		(0.0375)		(0.0512)	
Foreign - Top Two shareholders	0.0640	***	0.0647	*	0.1250	***	-3.5075	***	0.0902	***	-0.0048		-0.0148	
	(0.0182)		(0.0341)		(0.0489)		(0.5329)		(0.0209)		(0.0352)		(0.0379)	
Government - Top Two shareholders	0.0987		-0.3251	***	-0.3403	***	-7.9599	***	0.5544	***	0.0143		0.7563	***
	(0.1013)		(0.0441)		(0.1198)		(0.4613)		(0.0492)		(0.0827)		(0.0757)	
Other - Top Two shareholders	0.0820		0.1967	***	0.3305	***	-2.7354	**	0.2030	***	0.1424		0.2061	
	(0.0555)		(0.0696)		(0.0751)		(1.3958)		(0.0717)		(0.1030)		(0.1293)	

Table 7.2 *(continued)*: Effects of ownership on capital structure using the fixed effects model at the top two shareholders level

Dependent variable	Long-term debt ratio, book value		Short-term debt ratio, book value		Total debt ratio, book value		Leverage factor		Long-term debt ratio, market value		Short-term debt ratio, market value		Total debt ratio, market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Control variables														
Size, total assets	0.0413	***	-0.0179	***	0.0350	***	0.3508	***	0.0276	***	-0.0213	***	0.0158	***
	(0.0019)		(0.0036)		(0.0051)		(0.0338)		(0.0019)		(0.0036)		(0.0030)	
Profitability - Return on assets	0.0001		-0.1254	***	-0.1432	***	-0.2100	***	-0.0681	***	0.0023		-0.0040	
	(0.0029)		(0.0063)		(0.0124)		(0.0648)		(0.0063)		(0.0035)		(0.0056)	
Tangibility	-0.0001		0.0000		-0.0002		-0.0047	**	0.1583	***	-0.0004	***	-0.0006	***
	(0.0001)		(0.0001)		(0.0001)		(0.0020)		(0.0067)		(0.0001)		(0.0002)	
Non-debt tax shield	0.6991	***	-0.9021	***	-0.6497	***	-14.9788	***	0.6552	***	-0.2720	***	0.6733	***
	(0.0471)		(0.0538)		(0.1114)		(1.1025)		(0.0568)		(0.0940)		(0.1009)	
Risk	0.0014		-0.0422	***	-0.0475	***	0.0053		0.0251	***	-0.0284	***	-0.0156	
	(0.0045)		(0.0121)		(0.0139)		(0.1414)		(0.0089)		(0.0109)		(0.0137)	
Dividend payout ratio	-0.0004		-0.0016		-0.0023	*	-0.0144	**	0.0001		-0.0022	***	-0.0015	**
	(0.0004)		(0.0011)		(0.0013)		(0.0064)		(0.0005)		(0.0006)		(0.0007)	
Age	-0.0009	***	-0.0002		-0.0010	***	-0.0134	***	-0.0004	***	0.0006	***	0.0001	
	(0.0001)		(0.0001)		(0.0002)		(0.0014)		(0.0001)		(0.0001)		(0.0001)	
Growth - Total assets	-0.0002		0.0003		0.0000		-0.0413	***	0.0029	***	-0.0003		0.0014	*
	(0.0003)		(0.0006)		(0.0006)		(0.0088)		(0.0008)		(0.0006)		(0.0008)	
Liquidity	-0.0002	*	-0.0024	***	-0.0029	***	-0.0006		-0.0001		-0.0013	***	-0.0013	***
	(0.0001)		(0.0004)		(0.0005)		(0.0035)		(0.0001)		(0.0003)		(0.0003)	
Weighted statistics														
R-squared	0.7348		0.7763		0.2650		0.4916		0.8519		0.3856		0.7880	
Adjusted R-squared	0.7315		0.7735		0.2560		0.4854		0.8500		0.3780		0.7854	
S.E. of regression	0.1355		0.2897		0.3083		29.3827		0.1223		0.1768		0.2205	
F-statistic	225.8808		283.0825		29.4123		78.8904		450.8995		51.1909		303.2804	
Prob (F-statistic)	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
Mean dependent var	0.2937		0.9533		0.9490		33.3471		0.2440		0.3604		0.6818	
S.D. dependent var	3.7760		4.2071		1.4306		140.8949		0.4991		0.4576		3.0380	
Sum squared residual	28.4437		130.0843		147.2900		1338182.0000		22.2581		48.4237		75.3614	
Durbin-Watson statistic	0.5529		0.3707		0.3579		1.1526		0.5464		0.4474		0.4519	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

The adjusted coefficient of determination (R^2) of the models was from about 26% to 85%. Capital structure models with coefficients greater than 60% had long-term debt ratio at book and market values, short-term debt ratio at book value and total debt ratio at market value as dependent variables. The Durbin-Watson test statistics for serial correlation (maximum of 1.15 for leverage factor), and F-statistics were similar to those obtained under the fixed effects top one shareholder scenario, showing a good fit.

7.4 EFFECTS OF OWNERSHIP ON CAPITAL STRUCTURE: THE TOP THREE SHAREHOLDERS, HERFINDAHL INDICES USING THE FIXED EFFECTS MODEL

The Herfindahl index for the top three shareholders was used as a measure of ownership concentration and the variables for ownership types were also considered for the top three shareholders at the next level of analysis. All other variables remained unchanged. The fixed effects model was used.

Table 7.3 displays the results of the fixed effects regression analysis of the effects of ownership on capital structure with the Herfindahl index of the top three shareholders as the measure of ownership concentration. Coefficients for ownership concentration variables remained statistically significantly negative, similar to the top two shareholders level for the fixed effects model. Ownership by institutions, families, companies, directors, foreigners and other shareholders remained with their positive coefficients against capital structure variables. Coefficients for government ownership turned indeterminate, from being negative. Coefficients for the Public Investment Corporation and black ownership remained negative. The relationship between government ownership and capital structure was mixed, with three models showing positive coefficients and three showing negative coefficients. Both sets of coefficients were statistically significant at the 1% level. Hence the relationship between government ownership and capital structure at this level of ownership was indeterminate.

For control variables, the relationships obtained at the top two shareholders level remained unchanged.

Table 7.3: Effects of ownership on capital structure using the fixed effects model at the top three shareholders level

Dependent variable	Long-term debt ratio, book value		Short-term debt ratio, book value		Total debt ratio, book value		Leverage factor		Long-term debt ratio, market value		Short-term debt ratio, market value		Total debt ratio, market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Constant	-0.1694	***	0.5041	***	0.2833	***	2.5841	***	-0.0989	***	0.3588	***	0.2037	***
	(0.0127)		(0.0201)		(0.0332)		(0.2746)		(0.0123)		(0.0269)		(0.0195)	
Concentration														
H I Top Three shareholders	-0.1701	***	-0.3709	***	-0.4554	***	5.0976	***	-0.0635	**	-0.1991	***	-0.2620	***
	(0.0241)		(0.0317)		(0.0504)		(0.5867)		(0.0276)		(0.0460)		(0.0538)	
Shareholder Type														
Institution - Top Three shareholders	0.2472	***	0.0399		0.2323	***	-2.0355	***	0.1171	***	0.0888	*	0.2754	***
	(0.0254)		(0.0366)		(0.0495)		(0.5885)		(0.0268)		(0.0531)		(0.0554)	
Public Investment Corporation- Top Three shareholders	-0.1373	***	0.4424	***	0.2734	***	-6.2863	***	-0.2791	***	0.0178		-0.3535	***
	(0.0312)		(0.0608)		(0.0713)		(0.7207)		(0.0296)		(0.0623)		(0.0649)	
Family - Top Three shareholders	0.0615	***	0.2949	***	0.3295	***	-4.7594	***	0.0041		0.2050	***	0.1904	***
	(0.0170)		(0.0225)		(0.0320)		(0.4143)		(0.0149)		(0.0260)		(0.0349)	
Company - Top Three shareholders	0.0264	*	0.1938	***	0.1689	***	-4.5237	***	-0.0251	*	0.0634	**	0.0102	
	(0.0142)		(0.0190)		(0.0315)		(0.3634)		(0.0153)		(0.0313)		(0.0396)	
Directors - Top Three shareholders	0.0202	***	-0.0296	***	-0.0019		0.0407		0.0321	***	0.0836	***	0.1272	***
	(0.0054)		(0.0083)		(0.0107)		(0.1353)		(0.0030)		(0.0079)		(0.0107)	
Black - Top Three shareholders	0.0005		-0.0724		-0.0652		-4.2169	***	0.1276	***	-0.1711	***	-0.0923	*
	(0.0198)		(0.0514)		(0.0594)		(0.5040)		(0.0229)		(0.0366)		(0.0503)	
Foreign - Top Three shareholders	0.0634	***	0.0578	**	0.1066	***	-3.2959	***	0.0471	***	-0.0017		0.0316	
	(0.0146)		(0.0273)		(0.0400)		(0.4302)		(0.0177)		(0.0337)		(0.0345)	
Government - Top Three shareholders	0.2676	***	-0.4269	***	-0.3648	***	-6.9208	***	0.5185	***	-0.0679		0.7355	***
	(0.0844)		(0.0278)		(0.1253)		(0.5643)		(0.0460)		(0.0804)		(0.0711)	
Other - Top Three shareholders	0.0454		0.1365	***	0.3143	***	-0.5729		0.1420	***	0.2181	***	0.2632	**
	(0.0484)		(0.0542)		(0.0857)		(1.0345)		(0.0536)		(0.0817)		(0.1177)	

Table 7.3 ***(continued): Effects of ownership on capital structure using the fixed effects model at the top three shareholders level***

Dependent variable	Long-term debt ratio, book value		Short-term debt ratio, book value		Total debt ratio, book value		Leverage factor		Long-term debt ratio, market value		Short-term debt ratio, market value		Total debt ratio, market value	
	Model 1		**Model 2**		**Model 3**		**Model 4**		**Model 5**		**Model 6**		**Model 7**	
Control variables														
Size, total assets	0.0421	***	-0.0171	***	0.0375	***	0.1031	***	0.0267	***	-0.0212	***	0.0197	***
	(0.0020)		(0.0034)		(0.0051)		(0.0402)		(0.0019)		(0.0039)		(0.0029)	
Profitability - Return on assets	-0.0006		-0.1289	***	-0.1426	***	0.0556		-0.0589	***	0.0017		-0.0049	
	(0.0030)		(0.0065)		(0.0123)		(0.0671)		(0.0058)		(0.0036)		(0.0056)	
Tangibility	-0.0001		0.0000		-0.0002		-0.0042	***	0.1513	***	-0.0004	***	-0.0006	***
	(0.0001)		(0.0001)		(0.0001)		(0.0016)		(0.0044)		(0.0001)		(0.0002)	
Non-debt tax shield	0.7053	***	-0.8937	***	-0.4173	***	-11.0633	***	0.7168	***	-0.2539	***	0.8490	***
	(0.0451)		(0.0537)		(0.0743)		(1.0818)		(0.0546)		(0.0963)		(0.0904)	
Risk	0.0018		-0.0385	***	-0.0487	***	-0.1273		0.0266	***	-0.0273	***	-0.0117	
	(0.0045)		(0.0120)		(0.0137)		(0.1354)		(0.0088)		(0.0109)		(0.0138)	
Dividend payout ratio	-0.0004		-0.0012		-0.0023	*	-0.0111	**	0.0002		-0.0022	***	-0.0015	**
	(0.0004)		(0.0011)		(0.0013)		(0.0055)		(0.0005)		(0.0006)		(0.0007)	
Age	-0.0009	***	-0.0001		-0.0010	***	-0.0084	***	-0.0003	***	0.0006	***	0.0003	**
	(0.0001)		(0.0001)		(0.0002)		(0.0016)		(0.0001)		(0.0001)		(0.0001)	
Growth - Total assets	-0.0003		0.0002		0.0000		-0.0283	***	0.0028	***	-0.0003		0.0014	*
	(0.0004)		(0.0006)		(0.0006)		(0.0086)		(0.0008)		(0.0006)		(0.0007)	
Liquidity	-0.0002	*	-0.0022	***	-0.0029	***	-0.0048		-0.0001		-0.0013	***	-0.0012	***
	(0.0001)		(0.0004)		(0.0005)		(0.0037)		(0.0001)		(0.0003)		(0.0003)	
Weighted statistics														
R-squared	0.4373		0.8198		0.5005		0.3740		0.8218		0.4947		0.8232	
Adjusted R-squared	0.4304		0.8176		0.4944		0.3664		0.8195		0.4885		0.8211	
S.E. of regression	0.1352		0.2902		0.3091		27.7892		0.1221		0.1762		0.2197	
F-statistic	63.3576		371.0444		81.7385		48.7488		361.3328		79.8619		379.8996	
Prob (F-statistic)	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
Mean dependent var	0.1957		1.0770		1.4970		60.5443		0.2542		0.3665		0.6901	
S.D. dependent var	0.4289		6.5962		18.4496		1270.2050		0.8176		0.6249		2.8961	
Sum squared residual	28.3133		130.5185		148.1221		1196970		22.2096		48.1484		74.7901	
Durbin-Watson statistic	0.5402		0.3719		0.3541		1.1691		0.5556		0.4494		0.4536	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

The adjusted coefficient of determination (R^2) of the models was from about 43% to 82%. Capital structure models with coefficients greater than 60% had short-term debt ratio at book value, long-term debt ratio at market value and total debt ratio at market value as dependent variables. The Durbin-Watson test statistics for serial correlation had a maximum of 1.17 across the models, which is lower than two, indicating the possible presence of serial correlation. The p-values for F-statistics were zero, indicating a good fit.

7.5 EFFECTS OF OWNERSHIP ON CAPITAL STRUCTURE: THE TOP FIVE SHAREHOLDERS, HERFINDAHL INDICES USING THE FIXED EFFECTS MODEL

The Herfindahl index for the top five shareholders was also used as a measure of ownership concentration and the variables for ownership types were also considered for the top five shareholders. All other variables remained unchanged. The analysis was conducted using the fixed effects model.

Table 7.4 shows the results of the fixed effects regression analysis of the effects of ownership on capital structure with the Herfindahl index of the top five shareholders as a measure of ownership concentration. Coefficients for ownership concentration variables were statistically significantly negative as under the level of three shareholders in the fixed effects model. Positive and statistically significant regression coefficients between capital structure variables and ownership by institutions, families, companies, directors, foreigners and other shareholders were unchanged. Coefficients for ownership by black people and the Public Investment Corporation were negative. The relationship between government ownership and capital structure became marginally positive.

For control variables, there was no change from the results obtained for the fixed effects model at the top three shareholders level.

Table 7.4: Effects of ownership on capital structure using the fixed effects model at the top five shareholders level

Dependent variable	Long-term debt ratio, book value		Short-term debt ratio, book value		Total debt ratio, book value		Leverage factor		Long-term debt ratio, market value		Short-term debt ratio, market value		Total debt ratio, market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Constant	-0.1865	***	0.4946	***	0.2665	***	2.1811	***	-0.1069	***	0.3613	***	0.1738	***
	(0.0132)		(0.0212)		(0.0333)		(0.3517)		(0.0121)		(0.0273)		(0.0249)	
Concentration														
H I Top Five shareholders	-0.1526	***	-0.4239	***	-0.5233	***	3.8205	***	-0.0455	**	-0.2029	***	-0.2642	***
	(0.0208)		(0.0308)		(0.0427)		(0.5114)		(0.0209)		(0.0396)		(0.0504)	
Shareholder type														
Institution - Top Five shareholders	0.1885	***	0.1001	***	0.2289	***	-2.7061	***	0.0849	***	0.1347	***	0.3053	***
	(0.0191)		(0.0285)		(0.0519)		(0.4666)		(0.0227)		(0.0440)		(0.0468)	
Public Investment Corporation - Top Five shareholders	-0.1930	***	0.6540	***	0.4157	***	-0.9419	*	-0.3273	***	0.0861		-0.4264	***
	(0.0304)		(0.0623)		(0.0624)		(0.5334)		(0.0274)		(0.0608)		(0.0720)	
Family - Top Five shareholders	0.0653	***	0.3461	***	0.3891	***	-3.9589	***	0.0035		0.1910	***	0.1903	***
	(0.0129)		(0.0218)		(0.0278)		(0.4010)		(0.0076)		(0.0219)		(0.0314)	
Company - Top Five shareholders	0.0131		0.2538	***	0.2427	***	-3.3856	***	-0.0371	***	0.0784	***	0.0085	
	(0.0117)		(0.0181)		(0.0266)		(0.3107)		(0.0116)		(0.0272)		(0.0347)	
Directors - Top Five shareholders	0.0160	***	-0.0351	***	-0.0218	*	0.1467		0.0314	***	0.0846	***	0.1285	***
	(0.0056)		(0.0092)		(0.0118)		(0.1185)		(0.0030)		(0.0080)		(0.0108)	
Black - Top Five shareholders	-0.0118		-0.0169		-0.0229		-4.3505	***	0.1288	***	-0.1372	***	-0.0929	**
	(0.0170)		(0.0449)		(0.0484)		(0.5092)		(0.0211)		(0.0320)		(0.0456)	
Foreign - Top Five shareholders	0.0295	***	0.1139	***	0.1206	***	-2.4630	***	0.0237		0.0031		0.0307	
	(0.0116)		(0.0222)		(0.0348)		(0.3689)		(0.0149)		(0.0295)		(0.0342)	
Government - Top Five shareholders	0.2998	***	-0.3851	***	-0.2973	**	-7.6432	***	0.5482	***	-0.0343		0.7304	***
	(0.0749)		(0.0553)		(0.1374)		(0.4728)		(0.0392)		(0.0804)		(0.0553)	
Other - Top Five shareholders	0.0094		0.1166	**	0.2318	***	1.6811	**	0.1418	***	0.1099		0.1847	**
	(0.0376)		(0.0518)		(0.0697)		(0.7393)		(0.0466)		(0.0777)		(0.0888)	

Table 7.4 *(continued)*: Effects of ownership on capital structure using the fixed effects model at the top five shareholders level

Dependent variable	Long-term debt ratio, book value		Short-term debt ratio, book value		Total debt ratio, book value		Leverage factor		Long-term debt ratio, market value		Short-term debt ratio, market value		Total debt ratio, market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Control variables														
Size, total assets	0.0457	***	-0.0197	***	0.0354	***	0.2331	***	0.0286	***	-0.0231	***	0.0232	***
	(0.0021)		(0.0037)		(0.0050)		(0.0453)		(0.0019)		(0.0039)		(0.0039)	
Profitability - return on assets	0.0013		-0.1348	***	-0.1432	***	-0.0991		-0.0571	***	0.0011		-0.0061	
	(0.0029)		(0.0053)		(0.0116)		(0.0742)		(0.0053)		(0.0037)		(0.0057)	
Tangibility	-0.0001		0.0000		-0.0001		-0.0050	*	0.1550	***	-0.0004	***	-0.0005	***
	(0.0001)		(0.0001)		(0.0001)		(0.0029)		(0.0062)		(0.0001)		(0.0002)	
Non-debt tax shield	0.6251	***	-0.9075	***	-0.3578	***	-20.8247	***	0.6288	***	-0.2782	***	0.9247	***
	(0.0382)		(0.0648)		(0.0860)		(0.9667)		(0.0569)		(0.0987)		(0.0931)	
Risk	0.0023		-0.0354	***	-0.0415	***	-0.2602		0.0231	***	-0.0257	**	-0.0107	
	(0.0047)		(0.0116)		(0.0131)		(0.1711)		(0.0088)		(0.0107)		(0.0139)	
Dividend payout ratio	-0.0004		-0.0015		-0.0021	*	-0.0108		0.0002		-0.0021	***	-0.0013	**
	(0.0004)		(0.0012)		(0.0013)		(0.0080)		(0.0005)		(0.0006)		(0.0006)	
Age	-0.0008	***	-0.0001		-0.0007	***	-0.0028	**	-0.0003	***	0.0006	***	0.0002	
	(0.0001)		(0.0001)		(0.0002)		(0.0013)		(0.0001)		(0.0001)		(0.0002)	
Growth - Total Assets	-0.0004		0.0004		0.0000		-0.0377	***	0.0030	***	-0.0002		0.0014	**
	(0.0004)		(0.0006)		(0.0006)		(0.0097)		(0.0007)		(0.0006)		(0.0007)	
Liquidity	-0.0001		-0.0022	***	-0.0027	***	-0.0066	*	-0.0001		-0.0012	***	-0.0011	***
	(0.0001)		(0.0004)		(0.0005)		(0.0040)		(0.0001)		(0.0003)		(0.0003)	
Weighted statistics														
R-squared	0.5615		0.5073		0.3876		0.5832		0.7367		0.4398		0.7245	
Adjusted R-squared	0.5562		0.5013		0.3801		0.5781		0.7334		0.4330		0.7211	
S.E. of regression	0.1360		0.2897		0.3084		31.6243		0.1225		0.1766		0.2192	
F-statistic	104.4096		84.0058		51.6387		114.1372		219.3073		64.0532		214.5082	
Prob(F-statistic)	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
Mean dependent var	0.2134		0.8383		1.0198		34.8004		0.2507		0.3619		0.7863	
S.D. dependent var	0.6968		1.7185		2.5779		112.7571		0.7149		0.5078		7.2201	
Sum squared residual	28.6291		130.1067		147.3982		1 550 151.0		22.3623		48.3417		74.4738	
Durbin-Watson statistic	0.5420		0.3766		0.3517		1.2148		0.5721		0.4521		0.4525	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

The adjusted coefficients of determination (R^2) of the capital structure models were from 38% to 72%. Models with coefficients greater than 60% had long-term ratio and total debt ratio at market value as dependent variables, reflecting weak explanatory power of the independent variables for most of the models. Durbin-Watson test statistics had a maximum of 1.21 for the model with the leverage factor variable, reflecting the possibility of serial correlation. The p-values for F-statistics were zero for all models, indicating a good fit.

7.6 EFFECTS OF OWNERSHIP ON CAPITAL STRUCTURE: THE TOP 10 SHAREHOLDERS, HERFINDAHL INDEX USING THE FIXED EFFECTS MODEL

The Herfindahl index for the top 10 shareholders was used as the highest measure of ownership concentration. The variables for ownership types were considered for the top 10 shareholders. All other variables remained unchanged and the fixed effects model was used in the analysis of the effects of ownership on capital structure.

Table 7.5 shows the results of the fixed effects regression analysis when considering the effects of ownership on capital structure and the Herfindahl index of the top 10 shareholders was a measure of ownership concentration. Coefficients for ownership concentration variables remained statistically significantly negative as under the level of the top five shareholders in the fixed effects model. Positive and statistically significant regression coefficients between capital structure variables and ownership by institutions, families, directors and other shareholders remained unchanged. Coefficients for ownership by companies, foreigners and government changed from positive to negative. Four dependent variables had negative coefficients for company ownership, three for foreign ownership (against one capital structure variable with a positive coefficient), whereas government had the same number of dependent variables with opposite signs but the difference was in the level of significance. Coefficients for ownership by the Public Investment Corporation were mixed with three sets of capital structure variables on the positive and negative sides, which were statistically significant at the 1% level. Black ownership's negative coefficients did not change.

Table 7.5: Effects of ownership on capital structure using the fixed effects model at the top 10 shareholders level

Dependent variable	Long-term debt ratio, book value		Short-term debt ratio, book value		Total debt ratio, book value		Leverage factor		Long-term debt ratio, market value		Short-term debt ratio, market value		Total debt ratio, market value	
	Model 1		**Model 2**		**Model 3**		**Model 4**		**Model 5**		**Model 6**		**Model 7**	
Constant	-0.1467	***	0.4498	***	0.1960	***	7.3608	***	-0.0979	***	0.3376	***	0.2036	
	(0.0101)		(0.0271)		(0.0368)		(0.2835)		(0.0130)		(0.0269)		(0.0277)	
Concentration														
H I Top 10 shareholders	-0.0821	***	-0.3547	***	-0.4854	***	6.2931	***	0.0015		-0.1176	***	-0.1395	
	(0.0176)		(0.0263)		(0.0390)		(0.4097)		(0.0164)		(0.0351)		(0.0481)	
Shareholder type														
Institution - Top 10 shareholders	0.0851	***	0.1490	***	0.2020	***	-2.9072	***	0.0719	***	0.1808	***	0.3001	
	(0.0131)		(0.0299)		(0.0439)		(0.3440)		(0.0095)		(0.0367)		(0.0379)	
Public Investment Corporation- Top 10 shareholders	-0.1208	***	0.6258	***	0.4564	***	6.0891	***	-0.3525	***	0.0549		-0.3635	
	(0.0280)		(0.0606)		(0.0684)		(0.8315)		(0.0253)		(0.0465)		(0.0630)	
Family - Top 10 shareholders	0.0545	***	0.3577	***	0.4306	***	-6.8383	***	-0.0267	***	0.1538	***	0.1482	
	(0.0087)		(0.0214)		(0.0286)		(0.2504)		(0.0098)		(0.0188)		(0.0274)	
Company - Top 10 shareholders	-0.0308	***	0.2159	***	0.2268	***	-5.6788	***	-0.0585	***	0.0216		-0.0492	
	(0.0105)		(0.0163)		(0.0248)		(0.2607)		(0.0088)		(0.0229)		(0.0300)	
Directors - Top 10 shareholders	0.0027		-0.0419	***	-0.0282	**	-0.3771	***	0.0304	***	0.0818	***	0.1172	
	(0.0052)		(0.0099)		(0.0117)		(0.1003)		(0.0029)		(0.0072)		(0.0105)	
Black - Top 10 shareholders	-0.0259	**	-0.0477		-0.0564		-6.1995	***	0.0953	***	-0.2148	***	-0.1473	
	(0.0123)		(0.0432)		(0.0492)		(0.5437)		(0.0209)		(0.0300)		(0.0406)	
Foreign - Top 10 shareholders	-0.0016		0.0442		0.1094	***	-6.8840	***	0.0027		-0.1022	***	-0.0936	
	(0.0077)		(0.0274)		(0.0331)		(0.4006)		(0.0116)		(0.0250)		(0.0317)	
Government - Top 10 shareholders	0.1742	**	-0.3093	***	-0.3518	***	-6.5020	***	0.5437	***	-0.0780		0.6187	
	(0.0849)		(0.0500)		(0.1229)		(0.9542)		(0.0442)		(0.0790)		(0.0723)	
Other - Top 10 shareholders	0.0213		0.0728	*	0.2063	***	6.3877	***	0.1570	***	0.1254	**	0.2030	
	(0.0385)		(0.0396)		(0.0632)		(1.0652)		(0.0165)		(0.0623)		(0.0873)	

Table 7.5 *(continued)*: Effects of ownership on capital structure using the fixed effects model at the top 10 shareholders level

Dependent variable	Long-term debt ratio, book value		Short-term debt ratio, book value		Total debt ratio, book value		Leverage factor		Long-term debt ratio, market value		Short-term debt ratio, market value		Total debt ratio, market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Control variables														
Size, total assets	0.0402	***	-0.0150	***	0.0432	***	-0.2538	***	0.0286	***	-0.0180	***	0.0197	
	(0.0019)		(0.0042)		(0.0055)		(0.0432)		(0.0018)		(0.0037)		(0.0043)	
Profitability - Return on assets	0.0004		-0.1365	***	-0.1490	***	-0.1238		-0.0595	***	0.0007		-0.0057	
	(0.0027)		(0.0051)		(0.0119)		(0.0814)		(0.0055)		(0.0036)		(0.0054)	
Tangibility	-0.0001		0.0000		-0.0001		-0.0088	**	0.1705	***	-0.0004	***	-0.0005	
	(0.0001)		(0.0001)		(0.0001)		(0.0039)		(0.0046)		(0.0001)		(0.0001)	
Non-debt tax shield	0.5748	***	-0.9479	***	-0.5395	***	-37.4006	***	0.5210	**	-0.2949	***	0.8073	
	(0.0370)		(0.0677)		(0.1173)		(1.3025)		(0.0474)		(0.0893)		(0.1102)	
Risk	0.0023		-0.0307	***	-0.0332	***	-0.8282	***	0.0182	**	-0.0263	***	-0.0120	
	(0.0048)		(0.0113)		(0.0131)		(0.1892)		(0.0087)		(0.0106)		(0.0145)	
Dividend payout ratio	-0.0006		-0.0019		-0.0021	*	-0.0051		0.0001		-0.0020	***	-0.0012	
	(0.0004)		(0.0013)		(0.0012)		(0.0094)		(0.0005)		(0.0005)		(0.0006)	
Age	-0.0007	***	-0.0001		-0.0006	***	-0.0230	***	-0.0003	***	0.0006	***	0.0002	
	(0.0000)		(0.0001)		(0.0002)		(0.0013)		(0.0001)		(0.0001)		(0.0001)	
Growth - Total assets	-0.0005		0.0002		-0.0003		-0.0263	**	0.0046	***	-0.0002		0.0013	
	(0.0004)		(0.0006)		(0.0006)		(0.0113)		(0.0005)		(0.0006)		(0.0008)	
Liquidity	-0.0001		-0.0024	***	-0.0026	***	-0.0005		0.0000		-0.0012	***	-0.0009	
	(0.0001)		(0.0004)		(0.0005)		(0.0046)		(0.0001)		(0.0003)		(0.0002)	
Weighted statistics														
R-squared	0.6773		0.5743		0.3140		0.9608		0.7636		0.6215		0.4640	
Adjusted R-squared	0.6733		0.5691		0.3056		0.9603		0.7606		0.6169		0.4574	
S.E. of regression	0.1358		0.2884		0.3066		36.5282		0.1236		0.1757		0.2176	
F-statistic	171.1088		110.0725		37.3368		1997.5570		253.1592		133.9618		70.6091	
Prob(F-statistic)	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
Mean dependent var	0.2214		0.8153		0.9504		41.6308		0.2666		0.3965		0.6006	
S.D. dependent var	0.8065		1.7332		1.3352		287.1052		0.6206		1.0890		1.5614	
Sum squared residual	28.5825		128.9527		145.7050		2068175.0000		22.7599		47.8452		73.4140	
Durbin-Watson statistic	0.5414		0.3685		0.3626		0.8741		0.5616		0.4598		0.4583	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

It appeared that the consistently positive relationships observed for company and foreign ownership changed to negative as the number of shareholders increased from five to 10. The monitoring effect of these shareholders could be diluted as the number of shareholders under consideration increased. This could imply that these types of shareholders had a different effect on capital structure when they had relatively large shareholdings in relation to the rest of the other top shareholders.

For control variables, the results were unchanged from those obtained at the top five shareholders level for the fixed effects model. The coefficients for size and growth were positive, whereas the coefficients for the rest of the control variables were negative. The adjusted coefficients of determination (R^2) of the capital structure models were from 31% to 96%. Capital structure models which had coefficients greater than 60% had long-term debt ratio at book and market values, leverage factor and short-term debt ratio at market value, as dependent variables, reflecting the substantial explanatory power of the independent variables. The Durbin-Watson test statistics for serial correlation were between 0.36 and 0.87, which could reflect serial correlation. The p-values for F-statistics were zero, indicating a good fit across all models.

7.7 CONCLUSION

The effects of ownership on capital structure were analysed using the fixed effects model, the generalised method of moments model without a lagged variable and the generalised method of moments model with a lagged dependent variable. The analyses were carried out at the top one, two, three, five and top 10 shareholders levels, using the Herfindahl index as a measure of ownership concentration.

For the fixed effects model, all the capital structure variables or dependent variables, namely long-term, short-term and total debt ratios based on book and market values and the leverage factor, had statistically significant results from the top one to the top 10 shareholders levels. Hence all the results for this model are taken into account in arriving at the conclusions. Both generalised method of moments models (without a lagged dependent variable and with a lagged dependent variable) had statistically insignificant results at all levels of ownership. The results of these models are excluded from further consideration and are not used in reaching conclusions. The results are summarised in Chapter 9.

CHAPTER 8

THE EFFECTS OF OWNERSHIP ON CORPORATE PERFORMANCE - RESULTS

8.1 INTRODUCTION

The results from the models that were run to analyse the effects of ownership on firm performance are described in this chapter. Descriptive statistics and correlation results related to this chapter were discussed in Chapter 6. Results from the analysis of the correlations in Chapter 6 were used in building the relevant models. The two measures of ownership concentration, the Herfindahl index and the total shareholdings of the top shareholders, were found to be statistically significantly correlated. The two measures could not be used together in the models, leading to two sets of models. One set of models used the Herfindahl index as a measure of ownership concentration while another set used the sum of the top shareholdings. The Herfindahl index models were considered at different levels of top shareholdings only in order for the results to be directly comparable. Another set of models used the total shareholdings for the top one, two, three, five and 10 shareholders as measures of ownership concentration, but is not reported on and the results are available on request.

In line with the additional finding in Chapter 6, namely that the sums of the shareholdings at different shareholdings were statistically significantly correlated, the models accommodated only one level of shareholding at a time. Hence five sets of shareholdings, from the top one to the top 10, were modelled separately.

The effects on corporate performance of different types of ownerships, namely black, company, directors, family, foreign, government, institutional investors, other types of ownerships and the Public Investment Corporation were investigated. Return on assets based on book value, return on equity based on book value, Tobin's Q ratio, economic value-added and market value-added were used as corporate performance measures.

The results from Chapter 6 also indicated that there were low correlations between the types of ownerships. As a result, the ownership-type variables were modelled together. Similarly, control variables had low correlation coefficients with each other and were modelled jointly. Where there were alternative measures for the same type of variable, such as growth, only one of the measures was adopted.

Due to the nature of the data, the analysis used the fixed effects model and generalised method of moments models, one without a lag of the dependent variable, and another with a lagged dependent variable. Different methods were used for robustness and the generalised method of moments models were employed to resolve unobserved heterogeneity and endogeneity problems.

Section 8.2 examines the effects of ownership on corporate performance using the fixed effects and generalised method of moments models at the top one shareholder level. Sections 8.3, 8.4, 8.5 and 8.6 analyse the effects of ownership on capital structure for the top two, three, five and 10 shareholder levels respectively. Section 8.7 concludes.

8.2 EFFECTS OF OWNERSHIP ON CORPORATE PERFORMANCE: THE TOP ONE SHAREHOLDER, HERFINDAHL INDICES USING THE FIXED EFFECTS METHOD AND THE GENERALISED METHOD OF MOMENTS MODELS

Pooled ordinary least regression analysis was not used to study the effects of ownership on firm performance due to questions about the consistency and efficiency of the method when used to analyse panel data (Baltagi, 2005:4). The method is also associated with the problem of not taking account of unobserved effects and individual effects. The random effects and fixed effects models were considered to deal with the issues of unobserved heterogeneity.

The analysis using least squares was conducted following the fixed effects model. Data collected was an unbalanced panel, hence the random effects model could not be used.

8.2.1 Fixed effects models: the top one shareholder, types of shareholders and corporate performance

The results of the fixed effects regression analysis of the effects of ownership on firm performance with the Herfindahl index of the top one shareholder as a measure of ownership concentration are shown in Table 8.1. Five models, one for each dependent variable, were analysed, with each measure of performance as the dependent variable. The results indicated that ownership concentration as measured by the Herfindahl index at the top one shareholder level had a statistically significant positive relationship for three of the five performance models. The concentration of ownership coefficients were positive and statistically significant at the 1% level for the return on equity, Tobin's Q and market value-added variables, while for the economic value-added variable, the coefficient was positive but not statistically significant. The coefficients varied from 1.02 for return on equity variable to 3.86 for Tobin's Q variable and 2 190.45 for the economic value-added variable. The concentration of ownership coefficient was negative and statistically significant at the 1% level for the return on assets ratio. The result was interpreted to mean that for a 1% increase in the Herfindahl index, Tobin's Q ratio increased by 3.8%, while the return on assets decreased by 0.63%.

Positive coefficients were observed between types of ownerships and firm performance in a minority of cases at the top one shareholder level. Specifically, the coefficient for institutional ownership was 0.48 for the return on assets model; for the Public Investment Corporation, it was 0.20 for the return on assets variable and 2.48 for Tobin's Q. Family shareholders had a coefficient of 0.82 for the return on assets measure, while company ownership had a coefficient of 0.27 for the same variable. Directors' ownership had a positive coefficient for the return on equity variable (0.13). Black ownership had a positive coefficient for the return on assets variable (0.42) while foreign ownership also had a positive effect on the same variable (0.31). These coefficients were statistically significant at the 1% and 5% levels.

Most coefficients for most of the ownership-type variables (institutions, the Public Investment Corporation, family, company, directors, black, foreign and government) were negative and statistically significant at the 1% level. Institutional ownership had

negative coefficients with the return on equity (-1.26), Tobin's Q (-5.07), economic value-added (-1233.60) and market value-added (-3.10) variables. The Public Investment Corporation's coefficients were -0.88 for return on equity, -377.36 for economic value-added and -3.95 for market value-added variables. Family ownership had negative coefficients with the return on equity (-0.44), Tobin's Q (-1.70) the market value-added variables (-1 970.21). For company ownership, the coefficients were -0.90 (return on equity), -1.75 (Tobin's Q) and -1 219.06 (economic value-added). Coefficients for directors' ownership were -0.42 for Tobin's Q and -0.68 for market value-added measures. Black ownership had negative coefficients with return on equity (-1.07), Tobin's Q (-0.91) and market value-added variables (-2.31). Foreign shareholders' negative coefficients were -0.58 against return on equity, -1.78 for Tobin's Q and -2.52 for the market value-added variables. Government had negative coefficients for all performance variables but the statistically significant ones were -0.82 (return on equity), -5.09 (Tobin's Q) and -7.91 (market value-added).

Coefficients for other shareholders were equally positive and negative. Return on assets and market value-added had positive coefficients of 0.77 and 12.37 **r**espectively, while the return on equity and Tobin's Q models had negative coefficients of -0.62 and -5.47 respectively. The coefficients were statistically significant at the 1% level. These results implied that the types of ownerships identified in this study had negative effects on firm performance at the top one shareholder level. As ownership by these types of shareholders increased, corporate performance decreased.

For control variables, size, dividend payout ratio and growth had positive coefficients with firm performance, which were statistically significant at the 1% level. The positive coefficients for the size variable were 0.09 for the return on assets, 0.10 for the return on equity and 0.91 for the market value-added. The size variable had negative coefficients under the Tobin's Q and economic value-added of -0.35 and -271.37 respectively. Dividend payout ratio had positive coefficients of 0.02 and 0.03 for the Tobin's Q and market value-added variables respectively, while all other coefficients were not statistically significant. Growth's only two statistically significant coefficients for economic value-added and market value-added were positive, with values of 163.23 and 0.05 respectively. Bigger firms, firms with larger fixed asset bases and firms with higher growth rates were associated with better performance.

Negative coefficients between control variables and performance variables were observed for non-debt tax shields, risk and firm age, which were statistically significant at the 1% level**.** Non-debt tax shields' negative coefficients were for return on assets (-1.11), return on equity (-0.15), Tobin's Q (-5.01) and market value-added (-26.81). The only positive non-debt tax shield coefficient was for economic value-added and was not statistically significant. Coefficients for risk were negative for return on assets (-0.09), economic value-added (-7 866.60) and market value-added (-1.77). The positive and statistically significant coefficient for risk, at the 1% level, was for Tobin's Q (0.79). Firm age had negative and statistically significant effects on return on equity (-0.00) and economic value-added (-4.42), while the positive and statistically significant coefficient at the 1% level was 0.00, for return on assets. Firms with higher risk, for instance, were associated with lower performance.

Coefficients for tangibility, liquidity and total debt ratio were mixed. Positive and statistically significant coefficients for tangibility were 0.05 for the Tobin's Q model and 0.02 for market value-added. Negative coefficients for tangibility were -0.00 for return on assets and -0.00 for the return on equity. The coefficients were statistically significant at the 1% level. Liquidity had two statistically significant coefficients at the 5% levels, namely -0.00 for the return on assets and 0.00 for Tobin's Q. Total debt ratio had statistically significant coefficients at the 1% level, with coefficients against return on equity (0.03) and Tobin's Q (3.82) being positive and those for return on assets (-0.62) and market value-added (-2.41) being negative.

The adjusted coefficients of determination (R^2) of the corporate performance models were from 55% to just below 95%, showing significant explanatory power by the independent variables, because they were 60% and higher. The adjusted coefficient of determination for the model with economic value-added as the dependent variable was -0.00%, showing no explanatory power of the independent variables. The Durbin-Watson test statistics for serial correlation were far below two, with a range of 0.60 to 1.17, indicating that there could be serial correlation. The F-tests for the models had p-values of zero, making the relationships statistically significant at the 1% level and reflecting that the models fitted well. The p-value for the model with the economic value-

added variable was not statistically significant and hence the results of this model were not considered in reaching conclusions.

Table 8.1: Effects of ownership on corporate performance using the fixed effects model at the top one shareholder level

Dependent variable	Return on assets, book value		Return on equity, book value		Tobin's Q		Economic value-added		Market value-added	
Constant	-0.1765 (0.0316)	***	-0.4473 (0.0298)	***	2.1423 (0.2158)	***	2387.8190 (851.5602)	***	-1.6577 (0.2212)	***
Concentration										
H I Top One shareholder	-0.6328 (0.1118)	***	1.0194 (0.0995)	***	3.8557 (0.7840)	***	2190.4550 (1749.2630)		3.0605 (0.8140)	***
Shareholder type										
Institution - Top One shareholder	0.4844 (0.1014)	***	-1.2583 (0.1185)	***	-5.0743 (0.7145)	***	-1233.6000 (1593.5710)		-3.1006 (0.4637)	***
Public Investment Corporation - Top One shareholder	0.2040 (0.0912)	**	-0.8828 (0.0695)	***	2.4795 (0.5874)	***	-377.3602 (1368.5820)		-3.9498 (0.6171)	***
Family - Top One shareholder	0.8211 (0.0810)	***	-0.4453 (0.0627)	***	-1.6967 (0.5265)	***	-1970.2110 (1067.4880)	*	-0.8221 (0.6860)	
Company - Top One shareholder	0.2754 (0.0722)	***	-0.8998 (0.0608)	***	-1.7550 (0.5604)	***	-1219.0630 (1036.4010)		0.6329 (0.4945)	
Directors - Top One shareholder	0.0223 (0.0152)		0.1317 (0.0139)	***	-0.4194 (0.0981)	***	-212.5621 (155.4254)		-0.6848 (0.1081)	***
Black - Top One shareholder	0.4249 (0.0807)	***	-1.0751 (0.0611)	***	-0.9071 (0.5776)		-1203.8810 (1144.0980)		-2.3146 (0.5303)	***
Foreign - Top One shareholder	0.3074 (0.0821)	***	-0.5763 (0.0682)	***	-1.7891 (0.4907)	***	-1679.2970 (1288.6810)		-2.5165 (0.5805)	***
Government - Top One shareholder	-0.2676 (0.1665)		-0.8206 (0.0577)	***	-5.0884 (1.0337)	***	-1286.0630 (2394.6910)		-7.9073 (1.1165)	***
Other - Top One shareholder	0.7780 (0.1333)	***	-0.6244 (0.1853)	***	-5.4711 (1.4355)	***	-573.9874 (11392.3400)		12.3734 (1.0234)	***
Control variables										
Size, total assets	0.0877 (0.0051)	***	0.1000 (0.0046)	***	-0.3515 (0.0334)	***	-271.3716 (104.8622)	***	0.9089 (0.0364)	***
Tangibility	-0.0006 (0.0002)	***	-0.0004 (0.0000)	***	0.0499 (0.0019)	***	0.8458 (1.4271)		0.0182 (0.0003)	***
Non-debt tax shield	-1.1139 (0.1339)	***	-0.1534 (0.0893)	*	-5.0103 (0.7107)	***	1957.7720 (1964.4420)		-26.8117 (1.2185)	***
Risk	-0.0912 (0.0203)	***	-0.0028 (0.0109)		0.7897 (0.1760)	***	-7866.5990 (2095.4450)	***	-1.7718 (0.1989)	***
Dividend payout ratio	-0.0002 (0.0015)		0.0010 (0.0017)		0.0220 (0.0113)	**	6.2270 (22.3123)		0.0288 (0.0066)	***
Age	0.0007 (0.0001)	***	-0.0004 (0.0002)	***	0.0006 (0.0008)		-4.4259 (2.4447)	*	0.0017 (0.0011)	
Growth - Total assets	0.0015 (0.0010)		-0.0009 (0.0009)		0.0025 (0.0059)		163.2309 (72.5182)	**	0.0500 (0.0107)	***
Liquidity	-0.0010 (0.0005)	**	-0.0002 (0.0004)		0.0036 (0.0017)	**	1.1072 (6.6866)		-0.0047 (0.0043)	
Total debt ratio - Book value	-0.6252 (0.0184)	***	0.0339 (0.0086)	***	3.8253 (0.1343)	***	-341.3041 (231.6098)		-2.4125 (0.1050)	***
Weighted statistics										
R-squared	0.7307		0.547664		0.593384		0.009309		0.95539	
Adjusted R-squared	0.7274		0.542119		0.588393		-0.00324		0.954842	
S.E. of regression	0.7221		1.468023		4.05717		20405.33		22.00131	
F-statistic	221.3523		98.77137		118.8963		0.74184		1744.874	
Prob (F-statistic)	0.0000		0.0000		0.0000		0.7773		0.0000	
Mean dependent var	0.5278		1.581046		5.848445		-522.2459		38.51328	
S.D. dependent var	1.5737		6.410655		30.19706		20365.66		189.0776	
Sum squared residual	808.2495		3340.393		25481.06		625,000,000,000		749321.6	
Durbin-Watson statistic	0.6867		0.837354		0.76315		1.166035		0.609641	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

8.2.2 Generalised method of moments model without a lag: the top one shareholder and corporate performance

The generalised method of moments model without a lag variable of the dependent variable was used to analyse the effects of ownership on firm performance. The Herfindahl index was used as the measure of ownership concentration, while the types of ownerships and control variables remained the same as for the fixed effects method. Firm performance was measured by the five variables, leading to five models, which were named after the dependent variables used in the models.

Table 8.2 shows the results of the generalised method of moments model without a lagged dependent variable regression analysis of the effects of ownership on firm performance when the Herfindahl index of the top one shareholder was a measure of ownership concentration. Ownership concentration as measured by the Herfindahl index at the top one shareholder level had positive coefficients in four of the five models, and a statistically significant coefficient for return on equity at the 1% level. The coefficients for ownership concentration for the return on assets, Tobin's Q and economic value-added were positive but not statistically significant, while that for market value-added was negative and statistically significant at the 1% level. A 1% increase in the Herfindahl index led to a 10.91% increase in return on equity, while market value-added decreased by 64.31%. The effects of ownership concentration on firm performance were therefore mixed because the only two statistically significant coefficients were positive and negative.

Government ownership had four positive but statistically insignificant coefficients in performance models except for the return on assets variable where the coefficient was significant at the 5% level. These positive effects were observed for return on assets, Tobin's Q, economic value-added and market value-added measures. The coefficient was negative for return on equity but the result was not statistically significant. Coefficients for other shareholders were positive for Tobin's Q (83.60) and market value-added (49.64) and were statistically significant at the 1% level. The other shareholders

ownership model had a negative and statistically significant coefficient of -11.18 at the same level with return on equity.

Table 8.2: Effects of ownership on corporate performance using the generalised method of moments model without a lag at the top one shareholder level

Dependent variable	Return on assets, book value		Return on equity, book value		Tobin's Q		Economic value-added		Market value-added	
Constant	1.3311	***	-1.5251	***	15.5063	***	-0.7426	***	-4.2781	**
	(0.2535)		(0.2710)		(4.9055)		(0.0362)		(1.7959)	
Concentration										
H I Top One shareholder	1.1909		10.9150	***	9.3445		0.5762		-64.3097	***
	(0.8618)		(1.5646)		(6.3774)		(0.4168)		(9.7641)	
Shareholder type										
Institution - Top One shareholder	-0.7674		-6.5057	***	-8.6715	*	-0.2892		32.4660	***
	(0.6294)		(1.0013)		(4.5668)		(0.2643)		(6.0593)	
Public Investment Corporation - Top One shareholder	-0.3894		-7.8856	***	1.8833		-0.6468	***	30.0985	***
	(0.6635)		(0.9276)		(2.9915)		(0.2070)		(7.0323)	
Family - Top One shareholder	-1.2192	*	-9.2226	***	-7.7839		-0.4810	*	52.7373	***
	(0.7260)		(1.4823)		(5.6068)		(0.2591)		(6.5321)	
Company - Top One shareholder	-0.6152		-9.1143	***	-3.6384		-0.6975	***	52.2654	***
	(0.5903)		(1.0032)		(3.3732)		(0.2472)		(6.8029)	
Directors - Top One shareholder	-0.3458		0.1287		-7.1619	***	0.3290	***	-0.8873	
	(0.2367)		(0.1043)		(1.2953)		(0.0349)		(0.9729)	
Black - Top One shareholder	-0.2244		2.1346		-16.3308	***	-0.2186		65.1678	***
	(0.5429)		(6.1054)		(4.2929)		(0.1798)		(25.5049)	
Foreign - Top One shareholder	-0.7796		-6.8748	***	-6.6526		-0.3235		32.1070	***
	(0.6075)		(0.7209)		(4.3202)		(0.2758)		(5.9781)	
Government - Top One shareholder	8.6717	**	-5.0748		57.4014		2.0097		60.6913	
	(4.0920)		(5.2175)		(82.9035)		(3.1180)		(111.7168)	
Other - Top One shareholder	-5.7147		-11.1834	***	83.6007	*	-0.0239		49.6446	***
	(4.7207)		(2.3711)		(49.9061)		(0.4443)		(5.4116)	
Control variables										
Size, total assets	0.0668	**	0.4306	***	-1.5663	***	0.0788	***	0.4854	**
	(0.0279)		(0.0508)		(0.4633)		(0.0060)		(0.2408)	
Tangibility	-1.1908	***	0.4299	***	-6.5561	**	0.2116	***	-15.6869	***
	(0.2503)		(0.1476)		(3.2073)		(0.0545)		(1.9465)	
Non-debt tax shield	-2.1558	***	-2.8573	**	7.2893		1.0486	***	-25.3537	
	(0.7533)		(1.4345)		(5.8410)		(0.1505)		(16.0123)	
Risk	0.6585	***	-0.4837		5.9969	**	-0.2014	***	-1.7165	
	(0.0885)		(0.3095)		(2.8316)		(0.0204)		(2.1824)	
Dividend payout ratio	-0.0028		0.0025	***	0.0042		0.0000		-0.0251	
	(0.0025)		(0.0010)		(0.0099)		(0.0021)		(0.0262)	
Age	-0.0212	***	-0.0056	***	-0.0865	***	0.0060	***	0.0619	***
	(0.0041)		(0.0010)		(0.0274)		(0.0004)		(0.0128)	
Growth - Total assets	-0.0243		-0.0094		0.5142	*	0.0220	***	-2.0595	***
	(0.0180)		(0.0153)		(0.2790)		(0.0089)		(0.5218)	
Liquidity	0.0002		0.0028	**	-0.0391	*	0.0004	**	-0.0054	
	(0.0021)		(0.0014)		(0.0228)		(0.0002)		(0.0083)	
Total debt ratio - Book value	-1.2829	***	-0.6579	***	2.2167	***	-0.0149		8.4657	***
	(0.2502)		(0.0780)		(0.4716)		(0.0298)		(2.5641)	
Weighted statistics										
R-squared	-1.0188		0.9878		-0.1098		0.9086		0.5403	
Adjusted R-squared	-1.0535		0.9876		-0.1289		0.9070		0.5324	
S.E. of regression	0.7370		1.9272		5.5257		0.2927		14.4292	
Durbin-Watson stat	0.3431		0.4386		0.4799		0.3222		0.3651	
Mean dependent var	0.2958		-0.5439		3.5654		-0.0123		11.1715	
S.D. dependent var	1.5042		50.4222		9.6028		0.9614		43.9104	
Sum squared resid	599.6150		4100.4460		33647.3100		92.1814		229436.9000	
J-statistic	47.2840		15.8803		23.4620		9.9452		14.7565	
Prob(J-statistic)	0.0003		0.6653		0.2176		0.9543		0.7379	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Ownership by institutions, the Public Investment Corporation, families and companies all had negative and statistically significant relationships in firm performance models, mainly at the 1% level. Coefficients for ownership by institutions, for instance, were negative for return on equity (-6.51) and Tobin's Q (-8.67), but positive for market value-added (32.47). An increase in percentage shareholdings for these ownership types led to a decrease in corporate performance. Coefficients for ownership by directors, black people and foreigners had mixed signs, with one variable each on the opposite sign and at the same level of statistical significance (1%). It means that a change in percentage of ownership in these types of shareholders could equally lead to either an increase or a decrease in corporate performance. A 1% increase in government ownership was associated with an 8.67% increase in return on assets. For the types of ownerships with negative coefficients, corporate performance decreased as level of shareholding of those types of ownerships increased.

Control variables which had positive coefficients with performance variables were size, risk, dividend payout ratio, growth and liquidity. The coefficients were statistically significant at the 1% level for all the variables except for liquidity, which was statistically significant at the 5% level. Increases in these variables were associated with increases in firm performance. Larger firms were expected to be more profitable, probably due to economies of scale. Negative coefficients were observed for tangibility, non-debt tax shields and firm age. Corporate performance decreased with increases in these variables. Older firms were worse performers than younger ones and firms with more tangible assets performed worse than those with fewer tangible assets. A possible cause could be an economic downturn during the period of analysis, leading to lower capacity utilisation. Coefficients for total debt ratio were mixed, with two sets of dependent variables showing positive results and two other showing negative results and these were statistically significant at the 1% level. The adjusted coefficients of determination (R^2) of the corporate performance models were 99% for the one with the return on equity, 91% for the one with economic value-added and 54% for the one with market value-added. Coefficients which were larger than 60% indicated that the independent variables explained large portions of the dependent variables. The corporate performance models with return on assets and Tobin's Q had negative coefficients of -1.05 and -0.13 respectively, showing that the models fit the data poorly.

The Durbin-Watson test statistics were between 0.32 and 0.48, which were much lower than two, indicating the potential presence of serial correlation. The p-values of the J-statistics were statistically significant at the 1% level for the return on assets model, while the rest of the models were not statistically significant, showing that the models did not fit well. The summary results showed that the generalised method of moments model without a lag did not appear to be appropriate for measuring the effects of ownership on firm performance at the 1% level, except for the return on assets model.

8.2.3 Generalised method of moments model with a lag: the top one shareholder and corporate performance

The generalised method of moments model with a lagged dependent variable was used to analyse the effects of ownership on firm performance. The Herfindahl index was used as the measure of ownership concentration and the types of shareholders and control variables remained the same as for the fixed effects method. Firm performance was measured by the five variables, leading to five models, which were named after the dependent variables used in the models.

Table 8.3 shows the results of the regression analysis using the generalised method of moments model with a lagged dependent variable of the effects of ownership on firm performance when the Herfindahl index of the top one shareholder was a measure of ownership concentration. The lagged variable of each of the firm performance variables was included as an explanatory variable. A one-period lag was used in the analysis, in line with previous studies. The lagged variables in three of the five performance models, namely those with return on equity, economic value-added and market value-added, had a positive effect and the coefficient with economic value-added was statistically significant at the 1% level. The lagged variable had negative coefficients for return on assets and Tobin's Q, with the former being statistically significant at the 1% level. An increase of 1% in the lagged variable led to a 0.47% increase in economic value-added and a decrease of 0.46% in return on assets. The statistical significance of the coefficients associated with the lagged variables and their magnitudes indicated that the addition of these variables was useful to explain the effects of ownership on firm performance. The effect of the lagged variable on firm performance was mixed, with one positive and one negative coefficient.

Table 8.3: Effects of ownership on corporate performance using the generalised method of moments model with a lagged dependent variable at the top one shareholder level

Dependent variable	Return on assets, book value		Return on equity, book value		Tobin's Q		Economic value-added		Market value-added	
Constant	-2.4890 (0.2826)	***	-1.5967 (0.3897)	***	-0.1795 (2.1821)		-0.5863 (0.1160)	***	-2.1555 (3.4130)	
Dependent variable (-1)	-0.4584 (0.0199)	***	0.2380 (0.1559)		-0.5088 (0.8926)		0.4738 (0.0517)	***	0.2799 (0.1782)	
Concentration										
H I Top One shareholder	2.0252 (1.3276)		9.3744 (1.3139)	***	-11.9159 (6.0938)	**	-0.3849 (0.3015)		-4.4556 (8.3062)	
Shareholder type										
Institution - Top One shareholder	-0.2774 (0.6832)		-5.3744 (0.8205)	***	6.4331 (4.8001)		0.1117 (0.2084)		-1.2760 (4.6948)	
Public Investment Corporation - Top One shareholder	-2.7899 (0.6981)	***	-6.9667 (0.9926)	***	-2.0320 (6.0670)		-0.0050 (0.1742)		-10.1881 (4.1364)	***
Family - Top One shareholder	-1.8336 (0.7615)	**	-7.7466 (0.8763)	***	14.4106 (5.6413)	***	0.1360 (0.2282)		-3.2940 (5.7989)	
Company- Top One shareholder	-1.6951 (0.6602)	***	-7.6828 (0.7612)	***	5.9615 (4.2769)		-0.0375 (0.2153)		1.7426 (6.1459)	
Directors -Top One shareholder	1.2364 (0.1640)	***	0.1873 (0.7600)		-2.9648 (0.9623)	***	0.2752 (0.0760)	***	-1.6739 (0.2535)	***
Black- Top One shareholder	0.9176 (0.6853)		3.6813 (4.0228)		7.8052 (3.9268)	**	0.1607 (0.1990)		-22.0484 (13.1912)	*
Foreign - Top One shareholder	-1.2276 (0.7239)	*	-5.7272 (0.9273)	***	2.7698 (3.8679)		0.3905 (0.2066)	*	-2.7882 (5.2124)	
Government - Top One shareholder	-38.5169 (27.8432)		-0.9315 (3.5720)		0.4738 (8.8881)		4.2341 (2.7611)		-13.1799 (4.5366)	***
Other - Top One shareholder	-3.9108 (0.9560)	***	-8.0158 (1.6147)	***	39.3521 (29.2012)		0.6939 (0.3106)	**	1.5971 (11.2235)	
Control variables										
Size, total assets	0.5723 (0.0568)	***	0.4474 (0.0884)	***	0.5596 (0.7454)		0.0491 (0.0135)	***	1.3059 (0.5778)	**
Tangibility	-0.2496 (0.0701)	***	0.5093 (0.1157)	***	3.1643 (1.5853)	**	0.2666 (0.0714)	***	1.2036 (0.6662)	*
Non-debt tax shields	-0.7805 (0.6760)		-5.3128 (1.8792)	***	-13.2157 (8.8753)		0.0211 (0.4325)		-5.8689 (3.8984)	
Risk	-0.2030 (0.1690)		0.2457 (0.4133)		0.1443 (1.1237)		-0.1327 (0.0821)		-0.3193 (0.5595)	
Dividend payout ratio	-0.0024 (0.0032)		0.0008 (0.0016)		-0.0034 (0.0176)		-0.0024 (0.0014)	*	-0.0070 (0.0122)	
Age	-0.0056 (0.0017)	***	-0.0043 (0.0027)		-0.0335 (0.0379)		0.0041 (0.0007)	***	-0.0337 (0.0055)	***
Growth - Total assets	-0.0676 (0.0226)	***	-0.0221 (0.0084)	***	0.0067 (0.0193)		0.0029 (0.0088)		-0.2397 (0.1685)	
Liquidity	0.0001 (0.0012)		0.0011 (0.0011)		-0.0630 (0.0318)	**	0.0003 (0.0001)	**	-0.0376 (0.0242)	
Total debt ratio - Book value	-1.6889 (0.2554)	***	-1.0372 (0.1377)	***	-1.0664 (0.8439)		0.0882 (0.0325)	***	-4.8001 (0.7592)	***
Weighted statistics										
R-squared	0.5831		0.1913		-0.7729		0.9339		0.4163	
Adjusted R-squared	0.5755		0.1766		-0.8051		0.9327		0.4057	
S.E. of regression	0.8903		1.8565		4.5060		0.2441		12.0283	
Durbin-Watson stat	0.4701		0.4871		0.5126		0.4916		0.8213	
Mean dependent var	0.2950		0.5639		2.8772		-0.0176		12.4706	
S.D. dependent var	1.3574		2.2993		8.3216		0.9904		30.9396	
Sum squared resid	874.3643		3801.3900		22334.6900		64.0522		159148.5000	
J-statistic	7.7599		11.5678		21.5760		12.3688		23.0003	
Prob(J-statistic)	0.9820		0.8687		0.2514		0.8276		0.1906	
Observations	1124		1124		1122		1096		1122	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Ownership concentration as measured by the Herfindahl index at the top one shareholder level had negative coefficients in three of the five corporate performance models, namely those which had Tobin's Q, economic value-added and market value-added as dependent variables. Only the coefficient against Tobin's Q was statistically significant at the 5% level. For return on equity, the ownership concentration coefficient was positive and statistically significant at the 1% level. Due to the differences in the levels of significance, the effect of ownership concentration on firm performance was marginally positive. The coefficient where return on assets was the dependent variable was also positive but was not statistically significant. A 1% increase in the Herfindahl index led to a 9.37% increase in return on equity, while Tobin's Q decreased by 11.91%.

Firm performance was positively affected by black ownership. Black ownership had a positive coefficient with Tobin's Q model (7.80) and a negative coefficient with market value-added (-22.05). The former coefficient was statistically significant at the 5% level and the latter was statistically significant at the 10% level, leading to a marginally positive effect. Negative effects were observed between firm performance and ownership by institutions, the Public Investment Corporation, families, companies, foreigners, government and other shareholders. Coefficients for these variables were statistically significant at the top 1%, 5% and 10% levels. An increase in these variables was associated with a decrease in firm performance. A 1% increase in government ownership was associated with a 13.18% decrease in firm performance for the market value-added variable. A 1% increase in the Public Investment Corporation ownership was associated with a 2.79% decrease in return on assets, a 6.97% decrease in return on equity and a 10.19% reduction in market value-added. Directors' ownership had a mixed effect on firm performance. For two corporate performance variables (return on assets ratio based on book value and economic value-added), there were positive coefficients, whereas there were negative coefficients for Tobin's Q and market-value added. Coefficients for the four variables were statistically significant at the 1% level.

Control variables which had positive coefficients with performance variables were size and tangibility. Size and tangibility's coefficients were statistically significant at the 1%, 5% and 10% levels. An increase in these control variables was associated with an increase in corporate performance. Larger firms and firms with large fixed assets balances were expected to perform better. Negative coefficients were observed for non-

debt tax shields, dividend payout ratio, firm age, growth and total debt ratio, meaning that increases in these variables were associated with decreases in corporate performance. Risk did not have a statistically significant effect on firm performance. Liquidity had mixed effects on firm performance, with a positive effect on economic value-added (0.00) and a negative effect on Tobin's Q (-0.06). The coefficients were statistically significant at the 5% level, but were small in magnitude. The adjusted coefficients of determination (R^2) of the corporate performance models varied from 19% when return on equity was the dependent variable to 93% for the economic value-added. The adjusted coefficient of determination where the return on assets ratio was the dependent variable was 58%, almost at the 60% level. The corporate performance model with Tobin's Q had a negative coefficient of -0.81 indicating that the model fitted the data poorly. The Durbin-Watson test statistics were between 0.47 and 0.82, and were lower than two, denoting the potential presence of serial correlation. The p-values of the J-statistics for all five firm performance models were not statistically significant showing that the models did not fit well. The summary results showed that the generalised method of moments model with a lagged dependent variable did not appear to be appropriate for measuring the effects of ownership on firm performance at the 1% level.

8.3 EFFECTS OF OWNERSHIP ON CORPORATE PERFORMANCE: THE TOP TWO SHAREHOLDERS, HERFINDAHL INDICES USING THE FIXED EFFECTS MODEL AND GENERALISED METHOD OF MOMENTS MODELS

After comparing the regression results at the top one shareholder level, ownership by the top two shareholders and its effects on firm performance variables were considered. The Herfindahl index at the top two shareholders level was used as a measure of ownership concentration and the variables for ownership types were also considered for the top two shareholders. Control variables and dependent variables or firm performance variables remained unchanged.

8.3.1 Fixed effects model: the top two shareholders, types of shareholders and corporate performance

Table 8.4 shows the results of the fixed effects regression analysis of the effects of ownership on firm performance with the Herfindahl index of the top two shareholders as a measure of ownership concentration. The results indicate that ownership concentration as measured by the Herfindahl index at the top two shareholders level had a statistically significant positive effect for two of the five performance models, almost similar to the results obtained for the top one shareholder scenario for the fixed effects model. Ownership concentration's coefficients remained statistically significant at the 1% level for the Tobin's Q and market value-added variables but were positive but not statistically significant with the economic value-added, as before. The coefficients were 3.50 for the Tobin's Q model, down from 3.86 and 5.05 for the market value-added model, up from 3.06, and 1 822.34 for economic value-added. The coefficient retained a negative and statistically significant relationship at the 1% level for return on assets. Ownership concentration's coefficient with return on equity became negative, having been positive at the top one shareholder level, but was not statistically significant. The result meant that for a 1% increase in the Herfindahl index, Tobin's Q ratio increased by 3.4% and the return on assets fell by 0.74%.

Positive coefficients were observed between types of ownerships and firm performance at the top two shareholders level. Other shareholders ownership had positive coefficients, which were statistically significant at the 1% level, having been mixed at the one shareholder level under the fixed effects method. The coefficients were 0.36 with return on assets and 21.34 with the market value-added, whereas it was -1.69 with return on equity.

The coefficients for ownership by institutions, the Public Investment Corporation, families, companies, directors, black people and government remained negative and statistically significant at the 1% level. In particular, the coefficients for institutional ownership with return on equity (-0.57), Tobin's Q (-4.71) and market value-added (-2.43) were negative while positive with return on assets (0.38). The Public Investment

Corporation ownership coefficients were -0.14 for return on equity, and -7.18 for market value-added and 1.92 for Tobin's Q. Coefficients for family ownership were -2.11 for Tobin's Q, -1 545.89 for economic value-added and -2.82 for market value-added. The coefficients for company ownership with Tobin's Q and market value-added were -1.40 and -1.22 respectively, for return on assets, the coefficient was 0.35. Ownership by directors' coefficients were -0.25 in the corporate performance model with Tobin's Q, -0.95 with market value-added and 0.10 with return on equity. Black ownership's coefficients were -0.42 and -4.08 for return on equity and market value-added respectively, and 0.34 for return on assets. All statistically significant state ownership coefficients were negative, namely -0.14 with return on equity, -2.90 with Tobin's Q and -9.63 with the market value-added, showing an adverse effect of state ownership on firm performance. Coefficients for foreign ownership were mixed at the top two shareholders level, with Tobin's Q and market value-added variables showing negative coefficients of -1.21 and -5.06 respectively and return on assets and return on equity variables showing positive coefficients of 0.44 and 0.20 respectively.

For control variables, the coefficients for size, tangibility, dividend payout ratio and growth remained positive as was the case at the top one shareholder level. Coefficients for size, tangibility and growth were statistically significant at the 10% level, while that for dividend payout ratio was statistically significant at the 1% level. Negative coefficients with performance variables were observed for non-debt tax shields, risk, firm age, liquidity and total debt ratio, which were statistically significant at the 1% level, as was the case at the one shareholder level under the fixed effects model.

The adjusted coefficients of determination (R^2) of the corporate performance models were from 65% to 89%, except for the coefficient of determination for the model with economic value-added, which was -0.00%. The explanatory variables explained a significant portion of the dependent variables because they were greater than 60% in all the corporate performance models except where economic value-added was the dependent variable, where they had no explanatory power. The Durbin-Watson test statistics for serial correlation were far below two, with a range of 0.61 to 0.76, excluding economic value-added, which was at 1.17, indicating that there could be serial correlation. The F-tests for the models had p-values of zero, making the relationships statistically significant at the 1% level and reflecting that the models fitted well. The p-

value for corporate model with economic value-added model remained not statistically significant and hence that model's results were dropped when making conclusions.

Table 8.4: Effects of ownership on corporate performance using the fixed effects model at the top two shareholders level

Dependent variable	Return on assets, book value		Return on equity, book value		Tobin's Q		Economic value-added		Market value-added	
Constant	-0.2552 (0.0344)	***	-0.4416 (0.0357)	***	2.3901 (0.2239)	***	2334.2610 (949.5868)	***	-2.8807 (0.2652)	***
Concentration										
H I Top Two shareholders	-0.7386 (0.0881)	***	-0.0599 (0.0713)		3.4958 (0.5492)	***	1822.3410 (1374.9240)		5.0515 (0.7768)	***
Shareholder type										
Institution - Top Two shareholders	0.3762 (0.0827)	***	-0.5737 (0.0501)	***	-4.7057 (0.5492)	***	-1211.3800 (1031.3380)		-2.4296 (0.3789)	***
Public Investment Corporation - Top Two shareholders	0.0389 (0.0886)		-0.1359 (0.0552)	***	1.9161 (0.5055)	***	381.1499 (1171.3800)		-7.1776 (0.4504)	***
Family - Top Two shareholders	0.7046 (0.0559)	***	0.1863 (0.0361)	***	-2.1102 (0.3368)	***	-1545.8910 (863.8779)	*	-2.8175 (0.4955)	***
Company - Top Two shareholders	0.3521 (0.0581)	***	-0.0612 (0.0457)		-1.4013 (0.3405)	***	-747.4834 (765.0588)		-1.2168 (0.3669)	***
Directors - Top Two shareholders	0.0053 (0.0149)		0.0989 (0.0134)	***	-0.2460 (0.0996)	***	-191.4336 (146.0399)		-0.9535 (0.1088)	***
Black - Top Two shareholders	0.3389 (0.0673)	***	-0.4197 (0.0462)	***	-0.4391 (0.5258)		-862.4080 (957.4039)		-4.0844 (0.3081)	***
Foreign - Top Two shareholders	0.4432 (0.0538)	***	0.1997 (0.0389)	***	-1.2067 (0.3479)	***	-1129.3560 (961.1775)		-5.0617 (0.3859)	***
Government - Top Two shareholders	-0.0798 (0.1528)		-0.1442 (0.0489)	***	-2.8971 (0.3630)	***	658.8236 (2322.4530)		-9.6348 (1.0207)	***
Other - Top Two shareholders	0.3559 (0.0669)	***	-1.6910 (0.2234)	***	0.2241 (1.0565)		1302.8950 (4079.2850)		21.3429 (0.6671)	***
Control variables										
Size, total assets	0.0958 (0.0053)	***	0.1019 (0.0053)	***	-0.3574 (0.0352)	***	-264.8658 (118.0131)	**	1.2831 (0.0424)	***
Tangibility	-0.0007 (0.0001)	***	-0.0004 (0.0003)		0.0498 (0.0017)	***	1.2253 (6.0376)		0.0171 (0.0021)	***
Non-debt tax shield	-0.8595 (0.1222)	***	-0.0937 (0.1030)		-4.6899 (0.5528)	***	745.7167 (2034.0600)		-37.2707 (0.9313)	***
Risk	0.0611 (0.0142)	***	0.0064 (0.0059)		0.1092 (0.1567)		-9212.6310 (2264.4690)	***	-1.1253 (0.2824)	***
Dividend payout ratio	0.0001 (0.0015)		-0.0012 (0.0015)		0.0206 (0.0113)	*	8.2966 (24.5192)		0.0242 (0.0174)	
Age	-0.0006 (0.0002)	***	-0.0013 (0.0001)	***	0.0009 (0.0010)		-3.7029 (2.2959)		0.0054 (0.0012)	***
Growth - Total assets	-0.0022 (0.0008)	***	0.0021 (0.0007)	***	-0.0010 (0.0049)		178.8750 (75.1667)	**	0.0133 (0.0114)	
Liquidity	-0.0006 (0.0005)		0.0004 (0.0005)		0.0044 (0.0020)	**	1.1792 (6.7494)		-0.0132 (0.0051)	***
Total debt ratio - Book value	-0.5385 (0.0189)	***	-0.0463 (0.0087)	***	3.5621 (0.1335)	***	-295.6279 (198.4363)		-3.4659 (0.0889)	***
Weighted statistics										
R-squared	0.6622		0.8516		0.6487		0.0109		0.8874	
Adjusted R-squared	0.6581		0.8498		0.6444		-0.0016		0.8860	
S.E. of regression	0.6828		1.4884		3.9570		20373.8900		24.5611	
F-statistic	159.9394		468.2627		150.4620		0.8712		641.9200	
Prob(F-statistic)	0.0000		0.0000		0.0000		0.6199		0.0000	
Mean dependent var	0.5207		6.8797		5.5073		-521.8248		44.1210	
S.D. dependent var	1.6079		180.2747		12.7905		20350.7800		378.1260	
Sum squared residual	722.6669		3433.7590		24238.5500		623,000,000,000		933828.10	
Durbin-Watson statistic	0.6644		0.8480		0.7354		1.1690		0.5565	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

8.3.2 Generalised method of moments model without a lag: the top two shareholders and corporate performance

The generalised method of moments model without a lagged variable of the dependent variable was used to analyse the effects of ownership on firm performance at the top two shareholders level. The Herfindahl index was used as a measure of ownership concentration while the types of ownerships and control variables remained the same under the same method at the top one shareholder level. Firm performance was measured by the five variables, leading to five models, which were named after the dependent variables used in the models.

Results of the generalised method of moments model without a lagged dependent variable regression analysis of the effects of ownership on firm performance when the Herfindahl index of the top two shareholders was a measure of ownership concentration are shown in Table 8.5. Ownership concentration as measured by the Herfindahl index at the top two shareholders level had positive coefficients in three of the five corporate performance models, namely those with return on assets, return on equity and Tobin's Q variables. The levels of significance for the models were 5%, 10% and 1% respectively. Ownership concentration had negative coefficients in the economic value-added and market value-added and the coefficients were statistically significant in the latter model. A 1% increase in the Herfindahl index led to a 28.92% increase in Tobin's Q, while market value-added decreased by 14.31%.

Government ownership had three positive and statistically insignificant coefficients in the performance models except for the return on assets variable where the coefficients were significant at the 1% level. These positive effects were observed for return on assets, return on equity and Tobin's Q measures. Coefficients for government ownership were negative for economic value-added and market value-added, and the coefficients were statistically significant at the 1% level for market value-added and not statistically significant for the economic value-added. Therefore, government ownership had a positive effect on firm performance. Coefficients for other shareholders ownership were positive for three dependent variables (return on equity, Tobin's Q and economic value-added) and negative for the return on assets and market value-added. The

coefficient for return on equity was statistically significant at the 1% level, while all other coefficients were not statistically significant, resulting in a positive effect.

Table 8.5: Effects of ownership on corporate performance using the generalised method of moments model without a lag at the top two shareholders level

Dependent variable	Return on assets, book value		Return on equity, book value		Tobin's Q		Economic value-added		Market value-added	
Constant	0.7397	***	0.2521	*	26.2493	***	-0.6602	***	-19.9531	***
	(0.2974)		(0.1428)		(5.4825)		(0.0910)		(2.8192)	
Concentration										
H I Top Two shareholders	1.6156	**	1.1909	*	28.9170	***	-0.1857		-14.4245	***
	(0.7002)		(0.7109)		(7.8284)		(0.2071)		(4.8341)	
Shareholder type										
Institution - Top Two shareholders	-1.6690	***	-1.0988	**	-22.4343	***	0.1626		17.0502	***
	(0.4490)		(0.5084)		(5.3178)		(0.1296)		(5.2504)	
Public Investment Corporation - Top Two shareholders	-1.9933	***	0.0595		-3.7280	**	0.0613		-1.3139	
	(0.5467)		(0.3513)		(1.6396)		(0.0742)		(5.9620)	
Family - Top Two shareholders	-1.4907	***	-1.2708	**	-16.4857	***	0.1762		13.8779	***
	(0.4863)		(0.5551)		(6.2349)		(0.1290)		(4.6287)	
Company - Top Two shareholders	-1.0279	***	-1.8811	***	-11.6247	***	0.0042		24.0004	***
	(0.4185)		(0.6099)		(3.2413)		(0.0876)		(3.8164)	
Directors -Top Two shareholders	-0.2414		0.2340		-8.4488	***	0.2030	***	-1.0220	
	(0.2049)		(0.1726)		(1.4238)		(0.0456)		(1.4077)	
Black - Top Two shareholders	-1.1718	***	2.3160	***	-22.1447	***	0.1723	*	-26.3447	***
	(0.4700)		(0.6437)		(4.1659)		(0.0905)		(6.5598)	
Foreign - Top Two shareholders	-0.8207	**	-0.0145		-16.4117	***	0.1574	*	11.2434	***
	(0.4050)		(0.4095)		(4.4839)		(0.0930)		(2.5903)	
Government - Top Two shareholders	3.6395	***	1.6040		45.1916		-0.1311		-33.5014	**
	(0.8980)		(6.8841)		(31.4167)		(0.1984)		(16.9887)	
Other - Top Two shareholders	-0.4722		1.8605	***	26.2862		0.3258		-9.0469	
	(0.8926)		(0.6241)		(25.6233)		(0.2636)		(8.8212)	
Control variables										
Size, total assets	0.1665	***	0.0142		-1.9954	***	0.0653	***	2.9748	***
	(0.0378)		(0.0237)		(0.5381)		(0.0108)		(0.4406)	
Tangibility	-0.9183	***	0.9206	***	-17.5943	***	0.2821	***	-6.9444	***
	(0.2220)		(0.1747)		(2.8262)		(0.0458)		(1.1432)	
Non-debt tax shield	-3.0242	***	-3.0911	***	-17.6201	***	0.5615	***	4.3443	
	(0.8172)		(0.5639)		(5.9492)		(0.2127)		(6.9235)	
Risk	0.9775	***	0.1605		2.2561		-0.2143	***	0.6669	
	(0.0610)		(0.1486)		(1.6452)		(0.0303)		(0.8610)	
Dividend payout ratio	-0.0035		-0.0013		-0.0062		-0.0010		-0.0186	
	(0.0025)		(0.0024)		(0.0172)		(0.0015)		(0.0194)	
Age	-0.0213	***	-0.0082	***	-0.1692	***	0.0039	***	0.0320	***
	(0.0039)		(0.0020)		(0.0283)		(0.0004)		(0.0095)	
Growth - Total assets	-0.0157		-0.0063	**	-0.0649		0.0190	**	0.0176	
	(0.0124)		(0.0026)		(0.3009)		(0.0087)		(0.4632)	
Liquidity	-0.0019	**	-0.0008		-0.0202	*	0.0005	**	0.0068	
	(0.0009)		(0.0008)		(0.0118)		(0.0002)		(0.0102)	
Total debt ratio - Book value	-1.2062	***	-0.1758		1.3898		0.0015		4.4376	***
	(0.2423)		(0.1472)		(0.8587)		(0.0239)		(0.7621)	
Weighted statistics										
R-squared	0.7871		0.3587		0.0138		0.9783		0.6340	
Adjusted R-squared	0.7835		0.3477		-0.0032		0.9780		0.6277	
S.E. of regression	0.7069		1.1950		7.3341		0.2436		13.4596	
Durbin-Watson stat	0.3483		0.9349		0.3081		0.4481		0.4319	
Mean dependent var	0.3680		0.6437		3.4594		-0.0377		11.3971	
S.D. dependent var	3.1262		1.9699		10.7058		1.7114		38.0596	
Sum squared resid	551.6037		1576.6530		59274.8600		63.8499		199638.5000	
J-statistic	41.2091		40.8498		43.2554		12.7807		32.5455	
Prob(J-statistic)	0.0023		0.0025		0.0012		0.8496		0.0271	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Coefficients for ownership by institutions, the Public Investment Corporation, families, companies, black people and foreigners had negative effects on the corporate performance models. For each of these types of shareholders, there were more negative and statistically significant coefficients than positive ones. The coefficients were statistically significant, mainly at the 1% and 5% levels. Increased ownership percentages by these types of shareholders were associated with reduced corporate performance. Directors' ownership had mixed effects on corporate performance. It had coefficients of 0.20 and -8.45 with economic value-added and Tobin's Q respectively. Both coefficients were statistically significant at the 1% per cent level. A 1% increase in government ownership was associated with a 3.64% increase in return on assets and a 33.50 reduction in market value-added.

The control variable which remained with positive coefficients from the top one shareholder level was size and it was significant at the top 1% level. Negative coefficients for tangibility, non-debt tax shields, age of the firm and liquidity were observed, with most of them unchanged from the top two shareholders level under this method of analysis. Coefficients for variables were statistically significant at the 1% level. Therefore, increases in these control variables were associated with decreases in corporate performance. The coefficients for dividend payout ratio were statistically insignificant, which meant that they did not add any explanatory power to the relationship between ownership and firm performance at this level of shareholding under the generalised method of moments model. Mixed results were obtained between corporate performance and risk, growth and total debt ratio. All three control variables had equally statistically significant coefficients for two dependent variables each, one positive and the other negative. These results implied that, among other things, firms with high liquidity were associated with lower levels of performance.

The adjusted coefficients of determination (R^2) for corporate performance models were 78% where return on assets was the dependent variable, 35% for return on equity, 97% for the economic value-added model and 62% for the market value-added. The model with return on equity had the weakest relationship, because it was below 60%. The coefficient for the corporate performance model with Tobin's Q was negative, at -0.00 indicating that the model fitted the data poorly. The Durbin-Watson test statistics were

between 0.30 and 0.93, which were much lower than two, indicating the potential presence of serial correlation. The p-values of the J-statistics were statistically significant at the 1% level for corporate performance models with return on assets, return on equity and Tobin's Q, and at 5% for the one with the market value-added model, while they were not statistically significant for the model with economic value-added, showing that the model did not fit well. The summary results showed that the generalised method of moments model without a lagged dependent variable did not appear to be appropriate for measuring the effects of ownership on firm performance for the economic value-added variable.

8.3.3 Generalised method of moments model with a lag: the top two shareholders and corporate performance

The generalised method of moments model with a lagged dependent variable was used to analyse the effects of ownership on firm performance at the top two shareholders level. The Herfindahl index was used as a measure of ownership concentration and the types of shareholders and control variables remained the same under the same analytical method at the top one shareholder level. Firm performance was measured by the five variables, leading to five models, which were named after the dependent variables used in the models.

The results of the regression analysis using the generalised method of moments model with a lagged dependent variable of the effects of ownership on firm performance with the Herfindahl index of the top two shareholders as a measure of ownership concentration are shown in Table 8.6. The one-period lagged variable of each of the firm performance variables was included as an explanatory variable. The lagged variables in two of the five performance models, with Tobin's Q and economic value-added had positive effects, which were statistically significant at the 1% level. Coefficients of the lagged variables were negative with return on assets (-0.47), return on equity (-0.53) and market value-added dependent variables (-0.88), which were statistically significant at the 1% level. Overall, the lagged variable therefore had a negative effect on corporate performance variables. An increase of 1% in the lagged variable led to a 0.47% decrease in return on assets, a 0.88% decrease in market value-added and a 1.03% increase in Tobin's Q. The statistical significance of the coefficients

associated with the lagged variables and their magnitudes indicated that the addition of these variables was useful in explaining the effects of ownership on firm performance.

Table 8.6: Effects of ownership on corporate performance using the generalised method of moments model with a lagged dependent variable at the top two shareholders level

Dependent variable	Return on assets, book value		Return on equity, book value		Tobin's Q		Economic value-added		Market value-added	
Constant	-2.3114	***	0.6872	*	2.2163	*	-0.7445	***	-36.8561	***
	(0.2815)		(0.3595)		(1.2882)		(0.1190)		(6.8908)	
Dependent variable (-1)	-0.4656	***	-0.5283	***	1.0344	***	0.4132	***	-0.8836	**
	(0.0136)		(0.0865)		(0.3675)		(0.0422)		(0.3639)	
Concentration										
H I Top Two shareholders	0.8926		6.4422	***	-1.5354		-0.4614		-50.0731	***
	(0.7346)		(1.0607)		(1.7915)		(0.2557)		(6.8443)	
Shareholder type										
Institution - Top Two shareholders	0.4153		-5.1499	***	1.3853		0.4109	***	25.3188	***
	(0.4835)		(0.7879)		(2.0991)		(0.1639)		(8.6427)	
Public Investment Corporation - Top Two shareholders	-1.2903	***	-2.9628	***	7.5856	***	0.2064		-3.0828	
	(0.3965)		(0.6092)		(2.4474)		(0.1688)		(4.2095)	
Family - Top Two shareholders	-0.5484		-5.3210	***	2.0793		0.2676		31.8415	***
	(0.3801)		(0.5428)		(1.5065)		(0.1769)		(6.5496)	
Company - Top Two shareholders	-0.5630	*	-7.4355	***	1.6633		0.2864	*	40.7153	***
	(0.3247)		(0.5988)		(1.2842)		(0.1513)		(5.7396)	
Directors -Top Two shareholders	0.8668	***	1.7500	***	0.6283		0.2616	***	-2.2338	
	(0.1186)		(0.2212)		(0.4604)		(0.0670)		(2.0045)	
Black - Top Two shareholders	1.6217	***	1.0213		-0.4599		0.3190	**	-4.7011	
	(0.3321)		(0.7077)		(1.3386)		(0.1463)		(7.6611)	
Foreign - Top Two shareholders	0.1621		-2.6264	***	1.7378	*	0.3778	***	24.7946	***
	(0.3363)		(0.5572)		(1.0016)		(0.1457)		(3.7041)	
Government - Top Two shareholders	-8.6838	**	-6.6979		4.6275		0.2523		16.8835	***
	(4.1252)		(12.4678)		(6.8241)		(0.9262)		(6.1438)	
Other - Top Two shareholders	-2.1446	***	-3.6887	***	-3.3452		0.4208		82.1994	***
	(0.4787)		(1.0031)		(5.1357)		(0.2609)		(12.5970)	
Control variables										
Size, total assets	0.4948	***	0.0930	*	-0.4887		0.0726	***	6.3160	***
	(0.0552)		(0.0555)		(0.3540)		(0.0185)		(1.2036)	
Tangibility	0.6479	***	1.0373	***	0.9388		0.1871	***	10.1783	***
	(0.0842)		(0.1935)		(1.1114)		(0.0593)		(1.9500)	
Non-debt tax shields	-1.0769	**	-8.7562	***	-13.9011	***	0.2766		-1.5231	
	(0.5319)		(1.1624)		(5.5344)		(0.3635)		(7.1761)	
Risk	-0.4719	***	-0.0244		-1.0818		-0.2618	***	3.4479	***
	(0.1756)		(0.2384)		(1.0158)		(0.0966)		(1.4083)	
Dividend payout ratio	-0.0037		0.0020		0.0003		-0.0019		-0.0253	
	(0.0033)		(0.0037)		(0.0087)		(0.0014)		(0.0198)	
Age	-0.0041	***	-0.0232	***	0.0135		0.0037	***	-0.0018	
	(0.0007)		(0.0028)		(0.0174)		(0.0007)		(0.0106)	
Growth - Total assets	-0.0133	***	-0.0038		-0.1586	**	-0.0108		0.3683	
	(0.0035)		(0.0053)		(0.0705)		(0.0115)		(0.2943)	
Liquidity	-0.0010		-0.0004		-0.0052		0.0004	***	-0.0528	***
	(0.0012)		(0.0017)		(0.0115)		(0.0001)		(0.0215)	
Total debt ratio - Book value	-1.7152	***	-0.0393		-0.5349	*	0.0721	*	-10.2834	***
	(0.1938)		(0.0906)		(0.2887)		(0.0392)		(1.8322)	
Weighted statistics										
R-squared	0.6914		0.2787		0.3354		0.9967		0.3419	
Adjusted R-squared	0.6858		0.2656		0.3233		0.9966		0.3300	
S.E. of regression	0.7136		2.3568		2.3302		0.2303		23.3827	
Durbin-Watson stat	0.3155		0.4313		1.1409		0.5548		0.3005	
Mean dependent var	0.3889		0.8205		2.8727		-0.1579		13.7501	
S.D. dependent var	2.7042		4.8193		7.2857		5.4067		53.4687	
Sum squared resid	561.6456		6126.4010		5972.9390		56.9985		601425.4000	
J-statistic	15.7239		18.1385		28.1513		18.1147		17.6878	
Prob(J-statistic)	0.6118		0.4466		0.0598		0.4481		0.4764	
Observations	1124		1124		1122		1096		1122	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Ownership concentration as measured by the Herfindahl index at the top two shareholders level had negative coefficients in three of the five corporate performance models. These models had Tobin's Q, economic value-added and market value-added as dependent variables. These results were similar to those obtained at the top one shareholder level using the same analytical method. The coefficient was statistically significant with the market value-added variable at the 1% level. The coefficient with market value-added (-50.07) was statistically significant at the 1% level. Negative coefficients of the ownership concentration variable were found with the return on assets and return on equity variables but a statistically significant effect was observed in the latter model, with a coefficient of 6.44. Therefore, the relationship between corporate performance and ownership concentration was mixed.

A 1% increase in the Herfindahl index led to a 6.44% increase in return on equity and a 50.07% reduction in market value-added.

Firm performance was positively affected by ownership by institutions, directors, black people, foreigners and government. The coefficients were statistically significant at the 1, 5 and 10% levels of significance. Higher percentages of these variables were associated with better corporate performance. Higher foreign ownership, for instance, was associated with better corporate performance, which could be due to better experience by such shareholders. A 1% increase in foreign ownership was associated with a 1.74% increase in Tobin's Q, a 0.38 increase in economic value-added and a 24.79% increase in market value-added, as well as a 2.62% reduction in return on equity.

Negative effects were found between corporate performance and ownership by the Public Investment Corporation and other shareholders. The coefficients for these variables were statistically significant at the 1% level. As ownership by these shareholders increased, corporate performance decreased. A 1% increase in ownership by the Public Investment Corporation was associated with a 1.29% decrease in return on assets, a 2.96% decrease in return on equity and a 7.59% increase in Tobin's Q. A 1% increase in the Public Investment Corporation ownership was associated with a

1.29% decrease in return on assets, a 2.96% decrease in the return on equity and a 7.59% increase in Tobin's Q.

The relationships between corporate and family and company ownership were mixed. Family ownership had a positive coefficient with market value-added (31.84) and a negative coefficient with return on equity (5.32) and both coefficients were statistically significant at the 1% level. Company ownership also had two positive and two negative coefficients, which were statistically significant at the same levels.

Control variables which had positive coefficients in the performance models were size and tangibility, as was the case at the top one shareholder level for the same analytical method. The results were statistically significant at the 1% and 10% levels. Negative coefficients were observed for non-debt tax shields, risk, firm age, growth and total debt ratio, as was the case for the top one shareholder scenario. Coefficients for these variables were statistically significant at the 1, 5 and 10% levels. An increase in these variables was associated with a decrease in corporate performance. Firms which had high debt ratios had lower performance. Dividend payout ratio had no significant effect on corporate performance. Liquidity had mixed effects on corporate performance, with a positive effect on economic value-added and a negative effect on market value-added. Coefficients for these variables were statistically significant at the 1% level.

The adjusted coefficients of determination (R^2) of the corporate performance models varied from 27% for the model with return on equity to 99% for the model with economic value-added. Lower coefficients of determination indicated the lower explanatory power by the independent variables and the higher values than 60% indicated higher explanatory power, such as models with the return on assets and economic value-added as dependent variables. The Durbin-Watson test statistics were between 0.30 for the model with market value-added and 1.14 for the one with Tobin's Q. The values were below two, denoting the potential presence of serial correlation, although the statistic for the latter model was reasonably large. The p-values of the J-statistics for all five firm performance models were not statistically significant showing that the models did not fit well, except for the one with the Tobin's Q variable. It had a statistically significant relationship at the 10% level. The summary results showed that the generalised method of moments model with a lagged dependent variable did not appear to be appropriate

for measuring the effects of ownership on firm performance for the four models. The model incorporating Tobin's Q was therefore significant in explaining the relationship between ownership and firm performance and was used in reaching conclusions, while results for the other models were excluded.

8.4 EFFECTS OF OWNERSHIP ON CORPORATE PERFORMANCE: THE TOP THREE SHAREHOLDERS, HERFINDAHL INDICES USING THE FIXED EFFECTS MODEL AND GENERALISED METHOD OF MOMENTS MODELS

The Herfindahl index for the top three shareholders was used as a measure of ownership concentration and the variables for ownership types were also considered for the top three shareholders at the next level of analysis of the effects of ownership on firm performance. All other variables remained unchanged. The fixed effects model, generalised method of moments model without a lag and the generalised method of moments model with a one-period lagged dependent variable were used.

8.4.1 Fixed effects model: the top three shareholders, types of shareholders and firm performance

The results of the fixed effects regression analysis of the effects of ownership on firm performance with the Herfindahl index of the top three shareholders as a measure of ownership concentration are shown in Table 8.7. The effects of ownership concentration as measured by the Herfindahl index at the top three shareholders level on corporate performace were mixed. Ownership concentration's coefficient was positive and statistically significant at the 1% level with Tobin's Q, positive and statistically significant at the 10% level with economic value-added and not statistically significant with market-value added. The coefficient for the model with Tobin's Q was 2.89, down from 3.50, and 2 267.97, up from 1 822.34 for the economic value-added. The ownership concentration coefficient retained negative effects with return on assets (-0.83) and return on equity variables (-0.14) as in the top two shareholders' scenario under the fixed effects model. The coefficients were statistically significant at the 1 and 5% levels respectively. For a 1% increase in the Herfindahl index, Tobin's Q ratio increased by 2.9% and the return on assets decreased by 0.83%. Hence the net effect of ownership

concentration on firm performance was mixed, with a slight tilt towards the negative relative effect.

Table 8.7: Effects of ownership on corporate performance using the fixed effects model at the top three shareholders level

Dependent variable	Return on assets, book value		Return on equity, book value		Tobin's Q		Economic value-added		Market value-added
Constant	-0.1450	***	-0.4861	***	2.0489	***	2864.2510	***	-1.9148
	(0.0329)		(0.0364)		(0.2073)		(946.0652)		(0.2511)
Concentration									
H I Top Three shareholders	-0.8344	***	-0.1455	**	2.8893	***	2267.9670	*	1.0028
	(0.0668)		(0.0679)		(0.4946)		(1229.4040)		(0.6484)
Shareholder type									
Institution - Top Three shareholders	0.4490	***	-0.2160	***	-4.0863	***	-1790.8280	**	-3.1588
	(0.0725)		(0.0491)		(0.3415)		(929.6818)		(0.5349)
Public Investment Corporation - Top Three shareholders	0.3202	***	-0.3634	***	2.4275	***	930.4954		-0.3985
	(0.0705)		(0.0734)		(0.3579)		(1116.9530)		(0.6253)
Family - Top Three shareholders	0.6591	***	0.2135	***	-0.9197	***	-1816.3620	***	-0.0061
	(0.0447)		(0.0386)		(0.3145)		(727.0532)		(0.4147)
Company - Top Three shareholders	0.4871	***	-0.0580		-1.1319	***	-1248.4580	**	0.9556
	(0.0382)		(0.0436)		(0.2867)		(574.3953)		(0.3527)
Directors - Top Three shareholders	-0.0398	***	0.0942	***	-0.3450	***	-173.4691		-0.7013
	(0.0140)		(0.0162)		(0.0960)		(160.9811)		(0.1360)
Black - Top Three shareholders	0.2613	***	-0.3192	***	-0.1307		-821.2298		-0.6975
	(0.0606)		(0.0488)		(0.4870)		(827.5626)		(0.3393)
Foreign - Top Three shareholders	0.3519	***	0.2910	***	-0.5692	*	-1509.8480	*	-0.3854
	(0.0411)		(0.0389)		(0.3000)		(832.7648)		(0.3733)
Government - Top Three shareholders	-0.1266		-0.0841		-2.1327	***	322.6146		-3.0629
	(0.1635)		(0.0807)		(0.6676)		(1212.5600)		(1.1237)
Other - Top Three shareholders	0.3912	***	-0.9550	***	3.8709	***	1400.2570		17.8179
	(0.0546)		(0.1781)		(0.8345)		(3210.7910)		(0.8632)
Control variable									
Size, total assets	0.0854	***	0.0989	***	-0.3485	***	-344.5730	***	0.7494
	(0.0051)		(0.0055)		(0.0364)		(116.1118)		(0.0453)
Tangibility	-0.0007	***	-0.0003		0.0501	***	0.6911		0.0187
	(0.0001)		(0.0002)		(0.0018)		(5.8595)		(0.0014)
Non-debt tax shield	-0.5063	***	0.3889	***	-6.6655	***	1097.4680		-18.9968
	(0.1196)		(0.0898)		(0.5366)		(1446.7110)		(1.2239)
Risk	0.0004		0.0085		-0.1169		-8181.2940	***	-0.0001
	(0.0152)		(0.0056)		(0.1401)		(2137.9010)		(0.2549)
Dividend payout ratio	0.0009		0.0001		0.0216	*	2.6038		0.0081
	(0.0016)		(0.0015)		(0.0115)		(26.8084)		(0.0116)
Age	-0.0008	***	-0.0010	***	0.0083	***	-4.1264	**	0.0047
	(0.0002)		(0.0002)		(0.0010)		(2.0069)		(0.0013)
Growth - Total assets	-0.0013	*	0.0000		-0.0019		164.2350	**	0.0089
	(0.0007)		(0.0008)		(0.0049)		(73.2649)		(0.0115)
Liquidity	-0.0007		0.0003		0.0048	***	0.7467		-0.0031
	(0.0005)		(0.0004)		(0.0017)		(6.9762)		(0.0042)
Total debt ratio - Book value	-0.6298	***	0.0204	***	3.8734	***	-150.8795		-1.2543
	(0.0171)		(0.0097)		(0.1312)		(197.1954)		(0.1234)
Weighted statistics									
R-squared	0.9839		0.5153		0.7655		0.0097		0.5265
Adjusted R-squared	0.9837		0.5094		0.7626		-0.0029		0.5207
S.E. of regression	0.7026		1.4748		4.0480		20397.5800		20.4670
F-statistic	4983.7990		86.7390		265.9957		0.7708		90.5863
Prob (F-statistic)	0.0000		0.0000		0.0000		0.7441		0.0000
Mean dependent var	0.6191		1.9198		6.4232		-522.2025		32.1139
S.D. dependent var	5.4697		20.9482		43.7374		20361.6200		82.5013
Sum squared residual	765.2508		3371.1510		25365.4600		624,000,000,000		648453.7
Durbin-Watson statistic	0.6547		0.8107		0.6726		1.1657		0.6745

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Positive coefficients were observed for ownership by the Public Investment Corporation, companies, foreigners and other shareholders' ownership and were statistically significant at the 1% level. Negative coefficients for ownership by institutions, directors, black people, and government persisted and were statistically significant at least at the 1% level. The effects of family ownership were mixed, with two variables (return on assets and return on equity) showing positive and statistically significant coefficients at the 1% level, and two variables (Tobin's Q and economic value-added) reflecting equally strong results with negative coefficients. The results for types of ownerships and firm performance were generally unchanged between the top two and top three shareholders levels under the fixed effects model.

Positive coefficients for control variables such as size, tangibility, dividend payout ratio and growth and liquidity had the same sign as under the analysis for the top two shareholders under the fixed effects model. Liquidity also had positive coefficients. Coefficients for size and tangibility were statistically significant at the 1% level, while growth and dividend payout ratio had statistically significant coefficients at the 5 and 10% levels.

Negative coefficients for control variables were observed for non-debt tax shields, risk, and firm age, similar to the results obtained under the top two shareholders level for the ixed effects models. The coefficients were statistically significant at the 1%level for non-debt tax shields, risk and firm age. The total debt ratio had a mixed effect on firm performance as coefficients were positive with two models (return on equity and Tobin's Q) and negative with two models (return on assets and market value-added). Both relationships were statistically significant at the 1% level.

The adjusted coefficients of determination (R^2) of the corporate performance models had a range from 51% to 98%. The models with return on assets and Tobin's Q had coefficients in excess of 60%, showing that the independent variables explained a significant portion of the dependent variables. The adjusted coefficient of determination for the model with economic value-added was -0.00%, indicating no explanatory power. The Durbin-Watson test statistics for serial correlation were far below two, in the range of 0.67 to 0.81, and 1.16 for the economic value-added model, signifying that there could

be serial correlation. The F-tests for the models had p-values of zero, making the relationships statistically significant at the 1% level and reflecting that the models fitted well. The p-value for the model with economic value-added as a dependent variable, at 0.74, remained not statistically significant and hence this model‘s results were dropped and not used in reaching conclusions. These results were similar to those obtained at the top two shareholders level.

8.4.2 Generalised method of moments model without a lag: the top three shareholders and corporate performance

The generalised method of moments model without a lagged variable of the dependent variable was also used to analyse the effects of ownership on firm performance at the top three shareholders level. The Herfindahl index was used as a measure of ownership concentration while the types of ownerships and control variables remained the same as for the same method of analysis at the top two shareholders level. Firm performance was measured by the five variables, leading to five models, which were named after the dependent variables used in the models.

Table 8.8 shows the results of the generalised method of moments model without a lagged dependent variable regression analysis of the effects of ownership on firm performance with the Herfindahl index of the top three shareholders as a measure of ownership concentration. The coefficients of the ownership concentration variable were positive in three of the five models, those which included return on assets, return on equity and Tobin’s Q variables, as was the case at the top two shareholders level under the same method of analysis. These results were statistically significant at the 1% level for return on assets and Tobin’s Q variables, and at the 5% level for return on equity. Ownership concentration had negative coefficients with the economic value-added and market value-added variables and the coefficients were statistically significant in the former model. A 1% increase in the Herfindahl index led to a 20.19% increase in Tobin’s Q, while economic value-added decreased by 0.56%. The results were similar to those obtained at the top two shareholders level under the same method of analysis. An increase in ownership concentration was associated with better corporate performance.

Table 8.8: Effects of ownership on corporate performance using the generalised method of moments model without a lag at the top three shareholders level

Dependent variable	Return on assets, book value		Return on equity, book value		Tobin's Q		Economic value-added		Market value-added	
Constant	0.8829	***	0.4244	*	21.0156	***	-0.7482	***	-9.0095	***
	(0.3087)		(0.2240)		(6.3622)		(0.0933)		(2.6019)	
Concentration										
H I Top Three shareholders	1.5431	***	1.7920	**	20.1952	***	-0.5653	**	-1.2910	
	(0.6082)		(0.8417)		(5.3133)		(0.2886)		(6.5169)	
Shareholder type										
Institution - Top Three shareholders	-1.2320	***	-1.2659	**	-16.6165	***	0.2096		-2.6473	
	(0.3756)		(0.5250)		(4.5848)		(0.1653)		(3.8658)	
Public Investment Corporation - Top Three shareholders	-1.5418	***	-0.0580		-3.4804	*	0.4058	***	-5.9350	
	(0.5373)		(0.4098)		(1.9810)		(0.1420)		(4.7271)	
Family - Top Three shareholders	-1.3308	***	-1.7728	**	-17.3777	***	0.3409	*	14.7749	***
	(0.4600)		(0.7655)		(4.7097)		(0.1953)		(4.1169)	
Company - Top Three shareholders	-0.7174	**	-2.0166	***	-9.3261	***	0.1625		7.9999	**
	(0.3235)		(0.6160)		(2.7917)		(0.1433)		(4.0057)	
Directors -Top Three shareholders	-0.2848	**	0.1940	**	-6.0890	***	0.2767	***	-3.5661	*
	(0.1296)		(0.0995)		(1.8313)		(0.0439)		(2.0750)	
Black - Top Three shareholders	-0.9421	**	3.4387	***	-16.9423	***	0.2783	*	-12.3109	*
	(0.3974)		(0.9515)		(4.6209)		(0.1645)		(7.1846)	
Foreign - Top Three shareholders	-0.5712	*	-0.3067		-13.1571	***	0.2439		4.2240	
	(0.3123)		(0.4067)		(3.3075)		(0.1555)		(3.3977)	
Government - Top Three shareholders	0.0934		3.4504	**	3.8989		4.0063	**	0.1306	
	(0.5971)		(1.5608)		(7.7852)		(1.7854)		(12.7290)	
Other - Top Three shareholders	0.5730		0.4600		7.1150	**	0.9363	***	8.8522	
	(0.5548)		(0.5273)		(3.2554)		(0.2544)		(6.5388)	
Control variables										
Size, total assets	0.1064	***	0.0393		-1.4972	**	0.0715	***	1.4380	***
	(0.0322)		(0.0275)		(0.6290)		(0.0118)		(0.3408)	
Tangibility	-0.7824	***	0.7236	***	-11.1110	***	0.2549	***	0.8472	
	(0.1518)		(0.1684)		(2.9690)		(0.0869)		(1.2404)	
Non-debt tax shield	-1.3072		-4.9582	***	-7.0698		0.1706		-15.0962	*
	(0.9704)		(0.9653)		(4.8941)		(0.2957)		(8.1485)	
Risk	0.7516	***	0.1680		0.9474		-0.1656	***	1.0173	
	(0.0954)		(0.1426)		(1.0195)		(0.0377)		(1.6396)	
Dividend payout ratio	-0.0018		-0.0036		0.0001		-0.0016		-0.0120	
	(0.0023)		(0.0026)		(0.0107)		(0.0017)		(0.0189)	
Age	-0.0198	***	-0.0093	***	-0.1343	***	0.0040	***	0.0075	
	(0.0037)		(0.0029)		(0.0342)		(0.0004)		(0.0167)	
Growth - Total assets	-0.0187	**	-0.0071	***	0.0164		0.0131		-0.1708	
	(0.0095)		(0.0024)		(0.2268)		(0.0084)		(0.1088)	
Liquidity	-0.0024	***	-0.0015	*	-0.0087	**	0.0002		0.0083	
	(0.0009)		(0.0008)		(0.0042)		(0.0002)		(0.0084)	
Total debt ratio - Book value	-1.0113	***	-0.4965	***	0.2497		0.0058		2.4165	**
	(0.2304)		(0.1526)		(0.6486)		(0.0384)		(1.1512)	
Weighted statistics										
R-squared	-0.3690		-0.1271		-0.7046		0.5394		-0.2952	
Adjusted R-squared	-0.3925		-0.1465		-0.7340		0.5312		-0.3175	
S.E. of regression	0.6438		1.1733		5.4427		0.2595		10.4596	
Durbin-Watson stat	0.3487		0.8382		0.3196		0.3790		0.4873	
Mean dependent var	0.2551		0.6454		2.9363		-0.0084		7.7866	
S.D. dependent var	1.0816		4.0850		5.7773		0.3867		13.3247	
Sum squared resid	457.5662		1519.8280		32644.5700		72.4706		120561.7000	
J-statistic	32.9490		11.9120		18.1232		9.8585		19.8809	
Prob(J-statistic)	0.0244		0.8894		0.5142		0.9564		0.4018	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Government ownership had positive coefficients in all performance models. However, only coefficients for models with return on equity and economic value-added measures were statistically significant at the 5% level. Hence the effect of government ownership

on firm performance was positive. Coefficients for ownership by other shareholders were positive for all performance models and statistically significant at the 1% and 5% levels in models with economic value-added and Tobin's Q respectively. The results for government and other ownerships were similar to those obtained from the analysis for the top two shareholders under the same method of analysis. Coefficients for ownership by institutions, the Public Investment Corporation, families, companies, directors, black people and foreigners were negative and most of them maintained their relationships in the firm performance models as was the case under the top two shareholders level under the general method of moments model without a lagged variable. The coefficients for these types of ownerships were all statistically significant at least at the 1% and 5% levels. An increase in shareholdings by any of these types of shareholders was associated with a decrease in corporate performance. A 1% increase in government ownership was associated with a 3.45% increase in return on equity and a 4.01 increase in economic value-added.

The control variable which maintained positive coefficients was size, with statistically significant coefficients at the 1% level. Larger firms were associated with better performance. Tangibility had a positive coefficient, which was statistically significant at the 1% level, having been negative at the top two shareholders level. Negative coefficients for non-debt tax shields, age of the firm, liquidity, growth and total debt ratio were observed and the first three variables retained the same sign as at the top three shareholders level for the same method of analysis. Coefficients were statistically significant at the 1% level. The coefficients for dividend payout ratio were statistically insignificant. Coefficients for tangibility and risk were mixed. Tangibility had positive coefficients with return on equity and economic value-added, whereas the coefficients with return on assets and Tobin's Q were negative. Risk had a positive coefficient with return on assets and a negative coefficient with economic value-added. The coefficients for the two variables were statistically significant at the 1% level. These results implied that, among other things, firms with higher liquidity and debt levels were associated with lower levels of performance. Results obtained for control variables were largely similar to those obtained at the top two shareholders level.

The adjusted coefficient of determination (R^2) for corporate performance models was 53% for the model with economic value-added and negative for return on assets, return

on equity, Tobin's Q and market value-added variables, showing that the models fitted the data poorly. The Durbin-Watson test statistics were between 0.32 and 0.93, much lower than two, indicating the potential presence of serial correlation. The p-values of the J-statistics were not statistically significant for all models except for the one with return on assets, which was statistically significant at the 5% level. Hence the models did not fit well, except for the one with the return on assets variable. However, because the adjusted coefficient of determination was negative, the relationships lacked meaning. The summary results showed that the generalised method of moments model without a lagged dependent variable did not appear to be appropriate for measuring the effects of ownership on corporate performance for all five models, except for the one which had return on assets as the dependent variable. The other four models were not taken into account in drawing conclusions.

8.4.3 Generalised method of moments model with a lag: the top three shareholders and corporate performance

The generalised method of moments model with a lagged dependent variable was used to analyse the effects of ownership on firm performance at the top three shareholders level. The Herfindahl index was used as a measure of ownership concentration at that level, while the types of shareholders and control variables remained unchanged, the same as for the same analytical method at the top two shareholders level. Five variables were used to measure firm performance leading to five models, which were named after the dependent variables used in the models.

Table 8.9 shows the results of the regression analysis using the generalised method of moments model with a lagged dependent variable of the effects of ownership on firm performance with the Herfindahl index of the top three shareholders as a measure of ownership concentration. The one-period lagged variables of each of the firm performance variables was included as an explanatory variable. Lagged variables in two corporate performance models, namely those which included Tobin's Q and economic value-added, had positive effects, which were statistically significant at the 1% level, as they were under the top two shareholders level. Coefficients were also positive with market value-added but they were not statistically significant. The lagged variables had negative coefficients with return on assets (-0.45) and return on equity (-

0.15) with the former being statistically significant at the 1% level, while the latter was not statistically significant. The coefficients had the same signs as at the top two shareholders level. Overall, the lagged variable therefore had positive effects on firm performance variables. An increase of 1% in the lagged variable led to a 0.45% decrease in return on assets, a 2.99% increase in Tobin's Q and a 0.57% increase in economic value-added.

Ownership concentration as measured by the Herfindahl index at the top three shareholders level had positive coefficients in four of the five corporate performance models, but the relationships were statistically significant in only one model, namely the return on equity model, at the 10% level. The coefficient in the model with market value-added was negative and statistically significant at the 1% level, making it stronger than the positive effect. Hence the effect of ownership concentration on corporate performance was negative. A 1% increase in the Herfindahl index led to a 2.03% increase in return on equity and a 17.11% decrease in market value-added.

Positive coefficients were observed between corporate performance and ownership by institutions, directors, black people, foreigners, government and other shareholders. Coefficients were statistically significant at the 1% and 5% levels. Increases in these ownership-type variables were associated with increases in corporate performance. A 1% increase in directors' ownership was associated with a 0.56% increase in return on assets, a 0.38% increase in economic value-added and a 1.65% increase in market value-added. The positive relationship between directors' ownership and corporate performance could be due to the alignment of interests between the managerial role of directors and the shareholder role, because the directors behaved as owners of the firms.

Corporate performance had negative effects on ownership by the Public Investment Corporation and families. Coefficients for these variables were statistically significant at the 1%, 5% and 10% levels. An increase in shareholdings by these two types of shareholders was associated with a decrease in corporate performance. A 1% increase in family ownership was associated with a 0.54% decrease in return on assets, a 2.05% decrease in return on equity and a 13.36% reduction in market value-added. A 1% increase in the Public Investment Corporation ownership was associated with a 2.05%

decrease in return on assets, a 0.99% decrease in return on equity and a 19.20% increase in Tobin's Q.

Table 8.9: Effects of ownership on corporate performance using the generalised method of moments model with a lagged dependent variable at the top three shareholders level

Dependent variable	Return on assets, book value		Return oneEquity, book value		Tobin's Q		Economic value-added		Market value-added	
Constant	-1.7547	***	0.9707	***	10.4170	***	-0.5769	***	-15.0039	***
	(0.3848)		(0.3472)		(2.6953)		(0.1893)		(3.3654)	
Dependent variable (-1)	-0.4506	***	-0.1533		2.9931	***	0.5703	***	0.0646	
	(0.0134)		(0.1145)		(0.7299)		(0.0999)		(0.1257)	
Concentration										
H I Top Three shareholders	0.7924		2.0260	*	1.3676		0.2276		-17.1095	***
	(0.5994)		(1.1163)		(6.2306)		(0.3449)		(5.1178)	
Shareholder type										
Institution - Top Three shareholders	-0.2870		-1.7982		2.5529		-0.1646		9.4926	***
	(0.3841)		(1.1090)		(5.4351)		(0.2089)		(1.9751)	
Public Investment Corporation - Top Three shareholders	-2.0460	***	-0.9869	*	19.2010	***	0.0111		-1.6844	
	(0.5042)		(0.5690)		(6.1253)		(0.1994)		(1.7459)	
Family - Top Three shareholders	-0.5384	**	-2.0553	***	5.9243	*	-0.3015		13.3600	***
	(0.2484)		(0.7837)		(3.4660)		(0.2105)		(3.5158)	
Company - Top Three shareholders	-0.4854		-2.1604	***	1.8377		-0.1732		14.8374	***
	(0.3025)		(0.7979)		(3.7141)		(0.1656)		(3.6015)	
Directors -Top Three shareholders	0.5607	***	-0.1301		0.2162		0.3854	***	1.6521	***
	(0.1800)		(0.1914)		(1.3564)		(0.1095)		(0.4705)	
Black - Top Three shareholders	1.0609	***	2.0299	**	-2.3634		-0.1536		-6.6112	
	(0.2881)		(0.9396)		(3.8563)		(0.1505)		(6.3179)	
Foreign - Top Three shareholders	0.1310		-0.3010		5.6250	**	-0.0977		6.2131	***
	(0.3356)		(0.5633)		(2.6499)		(0.1906)		(2.4297)	
Government - Top Three shareholders	-2.7166		6.2878	***	14.7734		0.9593		6.3192	
	(4.1753)		(1.9341)		(17.4342)		(1.9655)		(4.2365)	
Other - Top Three shareholders	-1.5434	***	-0.9509		30.4190	**	0.0763		34.9088	***
	(0.4987)		(1.0660)		(15.5913)		(0.3185)		(5.7789)	
Control variables										
Size, total assets	0.4132	***	-0.0008		-2.6751	***	0.0612	**	2.2968	***
	(0.0648)		(0.0389)		(0.7195)		(0.0256)		(0.5427)	
Tangibility	0.4266	***	0.8315	***	-3.3890	*	0.0735		-0.5765	
	(0.1380)		(0.1881)		(1.9488)		(0.1009)		(0.7752)	
Non-debt tax shields	-1.0797	**	-7.5214	***	-3.8370		0.7605		5.4711	
	(0.5254)		(1.4698)		(10.7381)		(0.5776)		(4.7948)	
Risk	-0.4426	***	-0.3847		3.2610		-0.1839	*	1.3686	
	(0.1731)		(0.3310)		(2.0318)		(0.1108)		(1.3364)	
Dividend payout ratio	-0.0040		-0.0002		0.0149		-0.0023	**	-0.0097	
	(0.0029)		(0.0026)		(0.0240)		(0.0013)		(0.0112)	
Age	-0.0012		-0.0155	***	0.0894	**	0.0039	***	0.0212	***
	(0.0010)		(0.0033)		(0.0400)		(0.0012)		(0.0043)	
Growth - Total assets	-0.0132	***	-0.0165		-0.2845	*	-0.0022		0.2743	***
	(0.0044)		(0.0113)		(0.1721)		(0.0083)		(0.0981)	
Liquidity	-0.0021	*	-0.0008		-0.0128		0.0004	***	-0.0113	
	(0.0012)		(0.0011)		(0.0325)		(0.0001)		(0.0096)	
Total debt ratio - Book value	-1.5623	***	-0.2568	*	-0.0716		0.0065		-0.2289	
	(0.1884)		(0.1489)		(0.9801)		(0.0506)		(0.4770)	
Weighted statistics										
R-squared	0.7782		0.2985		-1.3547		0.2429		0.7645	
Adjusted R-squared	0.7741		0.2858		-1.3975		0.2288		0.7602	
S.E. of regression	0.6558		1.3926		5.0847		0.2509		12.1890	
Durbin-Watson stat	0.3536		0.6324		0.5585		0.6049		0.8478	
Mean dependent var	0.5012		0.6804		2.5958		0.0118		23.9343	
S.D. dependent var	7.5919		4.3612		4.3574		0.2859		354.5444	
Sum squared resid	474.3447		2138.9460		28439.9900		67.6702		163427.6000	
J-statistic	18.2476		14.5441		20.1077		21.3746		42.3394	
Prob(J-statistic)	0.4395		0.6930		0.3268		0.2609		0.0010	
Observations	1124		1124		1122		1096		1122	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Company ownership had a mixed relationship with firm performance, with a positive coefficient against market value-added (14.84) and a negative coefficient for the model with return on equity (-2.16). Both coefficients were statistically significant at the 1% level.

Control variables which had positive coefficients in the corporate performance models were size, tangibility, firm age and liquidity. Increases in these control variables were associated with increases in corporate performance. The coefficients were statistically significant at the 1% and 5% levels. Older firms, for instance, were expected to have better corporate performance. Corporate performance was negatively affected by non-debt tax shields, risk, dividend payout ratio, growth and total debt ratio. Coefficients for these control variables were statistically significant at the 1%, 5% and 10% levels. As these variables increased, corporate performance was expected to decrease. Increased growth was associated with reduced corporate performance. These results implied that firms with high total debt ratios and those with high growth levels were associated with lower levels of performance. This could be due to a firm expanding its sales revenue by offering lower prices, thereby reducing its performance or by growing by incurring higher marginal costs, leading to an erosion of the firm's performance.

The adjusted coefficients of determination (R^2) of the corporate performance models varied widely from 23% for the model with economic value-added to 77% for return on assets. The coefficient of determination for the models, which included the market value-added model, was 76%. Lower coefficients of determination indicated lower explanatory power by the independent variables and the higher values indicated higher explanatory power. The model with Tobin's Q had a negative coefficient, indicating that the model did not fit the data. The Durbin-Watson test statistics were between 0.35 for the model incorporating return on assets and 0.85 for the one including market value-added, which was below two, indicating the potential presence of serial correlation. The p-values of the J-statistics for all five firm corporate performance models, except for the one with market value-added, were not statistically significant at 10% level showing that the models did not fit well. The corporate performance model with market value-added as a dependent variable was significant at the 1% level. The summary results showed that the generalised method of moments model with a lagged dependent variable did not

appear to be appropriate for assessing the effects of ownership on firm performance except for the model with market-value added. Hence the results of the corporate performance model which included market value-added were used in arriving at conclusions, while those for other models were excluded.

8.5 EFFECTS OF OWNERSHIP ON CORPORATE PERFORMANCE: THE TOP FIVE SHAREHOLDERS, HERFINDAHL INDICES USING THE FIXED EFFECTS MODEL AND GENERALISED METHOD OF MOMENTS MODELS

In the analysis of the effects of ownership on firm performance, the Herfindahl index for the top five shareholders was also used as a measure of ownership concentration. The variables for types of ownerships were also considered for the top five shareholders. All other variables remained unchanged. The fixed effects model, generalised method of moments model without a lag and the generalised method of moments model with a one-period lagged dependent variable were employed.

8.5.1 Fixed effects model: the top five shareholders, types of shareholders and corporate performance

Table 8.10 shows the results of the fixed effects regression analysis of the effects of ownership on firm performance when the Herfindahl index of the top five shareholders was a measure of ownership concentration. The results showed that ownership concentration as measured by the Herfindahl index at the top five shareholders level had a marginally negative effect on firm performance. Ownership concentration's coefficients were negative and statistically significant at the 1% level for the corporate performance models with return on assets and return on equity and were positive and statistically significant for those with Tobin's Q (1% level) and economic value-added variables (10% level). The results for market value-added were positive but not statistically significant. Hence the net effects were marginal. The models had similar results when ownership by the top three shareholders was under consideration using the fixed effects model. The coefficient for ownership concentration with Tobin's Q was 2.25, a decrease from 2.89, and 2 294.56, an increase from 2 267.96 for economic value-added. The ownership concentration coefficient with the market value-added variable was 0.35 at the top five shareholders level, having dropped from 1.00 at the top

three shareholders level. For a 1% per cent increase in the Herfindahl index, Tobin's Q ratio increased by 2.2% and the return on assets decreased by 0.76%.

Table 8.10: Effects of ownership on corporate performance using the fixed effects model at the top five shareholders level

Dependent variable	Return on assets, book value		Return on equity, book value		Tobin's Q		Economic value-added		Market value-added	
Constant	-0.2863	***	-0.6218	***	2.3230	***	2858.0610	***	-2.5360	***
	(0.0332)		(0.0323)		(0.2191)		(1026.9000)		(0.2356)	
Concentration										
H I Top Five shareholders	-0.7601	***	-0.1879	***	2.2460	***	2294.5610	**	0.3547	
	(0.0557)		(0.0492)		(0.4098)		(1102.3840)		(0.6112)	
Shareholder type										
Institution - Top Five shareholders	0.6275	***	0.0740	***	-4.5690	***	-1423.2400		-0.8321	**
	(0.0543)		(0.0263)		(0.3511)		(960.1328)		(0.3698)	
Public Investment Corporation - Top Five shareholders	0.3399	***	0.2761	***	2.7156	***	1257.5960		-0.3447	
	(0.0756)		(0.0785)		(0.4076)		(1297.6290)		(0.5291)	
Family - Top Five shareholders	0.6262	***	0.3454	***	-1.5829	***	-1838.5720	**	-1.3326	***
	(0.0308)		(0.0291)		(0.2596)		(803.2302)		(0.4117)	
Company - Top Five shareholders	0.4400	***	0.0084		-0.9041	***	-1236.3650	*	1.7602	***
	(0.0291)		(0.0281)		(0.2327)		(679.1067)		(0.3248)	
Directors - Top Five shareholders	-0.0012		0.1454	***	-0.4340	***	-189.1459		-0.7896	***
	(0.0126)		(0.0148)		(0.0923)		(180.8203)		(0.1271)	
Black - Top Five shareholders	0.4241	***	-0.5105	***	-0.0105		-454.8023		3.2570	***
	(0.0498)		(0.0499)		(0.4359)		(1129.8340)		(0.2359)	
Foreign - Top Five shareholders	0.4393	***	0.2716	***	-0.5977	**	-1328.9690	*	-0.4168	
	(0.0331)		(0.0315)		(0.2573)		(733.3535)		(0.3158)	
Government - Top Five shareholders	0.0493		0.1931	*	-1.0460		260.3972		-5.1127	***
	(0.1670)		(0.1014)		(0.8467)		(1768.0670)		(1.2580)	
Other - Top Five shareholders	0.3464	***	-1.4600	***	6.3835	***	738.0960		18.8566	***
	(0.0610)		(0.0693)		(0.6685)		(3203.6090)		(0.6302)	
Control variables										
Size, total assets	0.0885	***	0.1042	***	-0.3484	***	-336.6818	***	0.9389	***
	(0.0053)		(0.0054)		(0.0361)		(124.9064)		(0.0431)	
Tangibility	-0.0006	***	-0.0002		0.0501	***	0.7985		0.0188	***
	(0.0001)		(0.0001)		(0.0017)		(5.9950)		(0.0015)	
Non-debt tax shield	-0.6064	***	-0.0954		-2.9701	***	2037.2240		-26.4566	***
	(0.1200)		(0.1178)		(0.7523)		(1638.9230)		(1.1202)	
Risk	0.0177		0.0161	***	0.1536		-8502.3820	***	-0.1663	
	(0.0143)		(0.0060)		(0.1547)		(2179.0580)		(0.2657)	
Dividend payout ratio	0.0009		0.0034	**	0.0117		7.3451		0.0355	**
	(0.0015)		(0.0015)		(0.0111)		(24.1810)		(0.0159)	
Age	-0.0009	***	-0.0003	**	0.0031	***	-4.2165	*	0.0101	***
	(0.0001)		(0.0001)		(0.0010)		(2.2738)		(0.0011)	
Growth - Total assets	-0.0012		0.0003		-0.0003		160.6572	**	0.0130	
	(0.0008)		(0.0009)		(0.0047)		(77.1815)		(0.0137)	
Liquidity	-0.0008	*	0.0009	***	0.0042	**	1.1345		-0.0062	
	(0.0004)		(0.0003)		(0.0017)		(7.2201)		(0.0047)	
Total debt ratio - Book value	-0.5123	***	0.0592	***	3.4520	***	-227.8083		-2.7038	***
	(0.0193)		(0.0103)		(0.1331)		(209.7534)		(0.1016)	
Weighted statistics										
R-squared	0.4494		0.7907		0.6224		0.0100		0.7328	
Adjusted R-squared	0.4427		0.7881		0.6177		-0.0025		0.7295	
S.E. of regression	0.6717		1.5131		3.8796		20414.7700		23.4346	
F-statistic	66.5851		308.0978		134.2820		0.8014		223.4255	
Prob (F-statistic)	0.0000		0.0000		0.0000		0.7075		0.0000	
Mean dependent var	0.5169		1.3160		5.1242		-522.6150		78.2924	
S.D. dependent var	1.3096		3.3682		8.8679		20382.7000		1321.5640	
Sum squared resid	699.2877		3548.6950		23299.1600		625,000,000,000		850131.6000	
Durbin-Watson stat	0.7021		0.8395		0.7233		1.1656		0.6751	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Positive coefficients for the Public Investment Corporation and other shareholders ownership were unchanged and statistically significant at the 1% level, as under the top three shareholders level. Coefficients for ownership by institutions, companies, black people and foreigners were also positive and statistically significant at the 1% level. Negative and statistically significant coefficients at the 1% level were observed for ownership by families, directors and the state, in line with findings at the top three shareholders level under the fixed effects approach. The analysis of results at different levels showed the robustness of the relationships. There were slight changes in the relationships between ownership-type variables and firm performance between the top three and top five shareholders levels for the fixed effects model.

For control variables, positive coefficients for size, tangibility, dividend payout ratio, growth and liquidity retained the same sign as in the analysis for the top three shareholders for the fixed effects model. Coefficients for size, tangibility and liquidity were statistically significant at the 1% level, while coefficients for dividend payout ratio and growth were statistically significant at the 5% level. Coefficients for risk and total debt ratio risk were mixed. For risk, the positive coefficient was for the corporate performance model with return on equity, while the negative coefficient was under one with the economic value-added. Total debt ratio had positive coefficients for the corporate performance model with return on equity (0.06) and Tobin's Q (3.45) and negative coefficients for the one including return on assets (-0.51) and market-value added (-2.70). Coefficients for risk and total debt ratio were statistically significant at the 1% level.

Negative coefficients for control variables were observed for non-debt tax shields and firm age and total, as was the case at the top three shareholders level for the fixed effects model. The coefficients were statistically significant at the 1% level for non-debt tax shields and firm age, with firm age's coefficients also statistically significant at the 5% and 10% levels. The results for control variables were largely similar to those obtained at the top three shareholders level for the fixed effects models.

The adjusted coefficients of determination (R^2) of the corporate performance models had a range from 44% to 79%, with coefficients greater than 60% in models with return

on equity, Tobin's Q and market value-added. Therefore, the independent variables explained significant portions of the dependent variables, though the coefficients of determination were lower than those obtained at the top three shareholders level. The coefficient of determination for corporate performance models with economic value-added was -0.00%, showing no explanatory power of the independent variables in the model. The Durbin-Watson test statistics for serial correlation were far below two, with a range of 0.67 to 0.84, and 1.16 for the model including economic value-added, indicating that there could be some serial correlation. The F-tests for the models had p-values of zero, making the relationships statistically significant at the 1% per cent level and reflecting that the models fitted well. The p-value for the corporate performance model with economic value-added, at 0.71, remained not statistically significant and hence this model's results were dropped and not used in arriving at conclusions. These results were similar to those obtained at the top three shareholders level.

8.5.2 Generalised method of moments model without a lag: the top five shareholders and corporate performance

The generalised method of moments approach without a lagged variable of the dependent variables was used to analyse the effects of ownership on firm performance at the top five shareholders level. The Herfindahl index was used as a measure of ownership concentration while the types of shareholders and control variables remained the same as in the same method of analysis at the top three shareholders level. Firm performance was measured by the five variables, leading to five models, which were named after the dependent variables used in the models.

Results of the regression analysis of the effects of ownership on firm performance when the Herfindahl index of the top five shareholders was a measure of ownership concentration and using the generalised method of moments method without a lagged dependent variable are shown in Table 8.11. The coefficients of the ownership concentration variable were positive in three of the five corporate performance models, namely those including return on assets, return on equity and Tobin's Q, as was the case at the top three shareholders level in the same method of analysis. These results were statistically significant at the 1% level for Tobin's Q. Ownership concentration

coefficients for models with return on assets and return on equity were not statistically significant. Ownership concentration had negative coefficients with economic value-added and market value-added and the coefficients were statistically significant at the 1% level for the former variable. Hence the effect of ownership concentration on corporate performance was mixed. A 1% increase in the Herfindahl index led to an 8.6% increase in Tobin's Q and a 0.62% reduction in economic value-added.

Positive relationship coefficients were observed between corporate performance and ownership by the Public Investment Corporation, families, companies, foreigners and other shareholders. The coefficients were statistically significant at the 1% level for most coefficients except for company ownership where the coefficients were statistically significant at the 5% and 10% levels. The Public Investment Corporation ownership had positive coefficients with Tobin's Q (14.33) and economic value-added (0.40) and a negative coefficient with market value-added (-5.30). Increases in shareholdings by these types of shareholders were associated with increases in corporate performance for the variables for which there were positive coefficients.

Negative effects were found between corporate performance and ownership by institutions, directors and black people. The coefficients were statistically significant at the 1% and 5% levels. Coefficients for institutional ownership were negative in corporate performance models with three variables (return on assets, Tobin's Q and market value-added) and positive with return on equity. Similarly, ownership by directors had negative coefficients for three corporate performance models and positive coefficients for two models, resulting in a negative effect. Corporate performance decreased with increases in shareholdings by these types of shareholders. The effects of government ownership on corporate performance were mixed, with a positive coefficient (4.24) in the performance model, which includes return on assets and a negative coefficient in the one with market value-added (-40.89). A 1% increase in family ownership was associated with a 4.44% increase in market value-added and a -0.50% decrease in return on assets.

The control variables which maintained positive coefficients were size and risk. Coefficients for size were statistically significant at the 1%, 5% and 10% levels and for risk, they were statistically significant at the 1% level. Negative coefficients for non-debt

tax shields, age of the firm, liquidity and growth retained the same sign at the top three shareholders level under the same method of analysis. Coefficients were statistically significant at the 1% and 5% levels. Coefficients for dividend payout ratio were not statistically significant. Results for tangibility and total debt ratio were mixed, with two corporate performance models yielding positive coefficients and two models showing negative results for each variable. The results implied that, among other things, firms with higher non-debt tax shield levels were associated with lower levels of performance. Results obtained for control variables were largely similar to those obtained at the top three shareholders level for the general method of moments model without a lagged variable.

The adjusted coefficients of determination (R^2) for the corporate performance models were between 25% and 79% for the models that had positive adjusted coefficients of determination, namely those with return on assets, return on equity, economic value-added and market value-added as dependent variables, with the last three being significant because they were greater than 60%. The model including Tobin's Q had a negative coefficient of determination, indicating that the model fitted the data poorly. The Durbin-Watson test statistics were between 0.30 and 0.81, which were much lower than two, indicating the potential presence of serial correlation. The p-values of the J-statistics were statistically significant at the 5% level for the model with return on assets and at 1% for the model with market value-added. The p-values for corporate performance models incorporating return on equity, Tobin's Q, and economic value-added were not statistically significant, showing that the models did not fit well and could not be used to draw conclusions on the relationships. The summary results showed that the generalised method of moments method without a lagged dependent variable did not appear to be appropriate for measuring the effects of ownership on corporate performance for three of the five performance models.

Table 8.11: Effects of ownership on corporate performance using the generalised method of moments model without a lag at the top five shareholders level

Dependent variable	Return on assets, book value		Return on equity, book value		Tobin's Q		Economic value-added		Market value-added	
Constant	1.3909	***	0.5102	***	25.0687	***	-0.8597	***	-11.8069	***
	(0.2853)		(0.1650)		(7.7546)		(0.0494)		(2.2106)	
Concentration										
H I Top Five shareholders	0.4584		0.4947		8.5653	***	-0.6192	***	-3.3362	
	(0.3937)		(0.3120)		(3.0666)		(0.2201)		(3.8482)	
Shareholder type										
Institution - Top Five shareholders	-1.0010	***	-0.6382		-9.1965	***	0.3983	***	-5.3009	**
	(0.2310)		(0.4041)		(3.1354)		(0.1362)		(2.2485)	
Public Investment Corporation - Top Five shareholders	0.0577		-0.3367		14.3317	***	0.3136	***	-6.5971	***
	(0.4866)		(0.3299)		(3.6841)		(0.1272)		(2.3577)	
Family - Top Five shareholders	-0.4998	*	-0.3662		-6.9122		0.4438	***	4.4417	***
	(0.2624)		(0.2419)		(4.3493)		(0.1073)		(1.4112)	
Company - Top Five shareholders	0.0887		-0.8683	***	2.9596	*	0.2587	**	4.0167	*
	(0.1685)		(0.2817)		(1.7209)		(0.1145)		(2.2495)	
Directors -Top Five shareholders	-0.6246	***	-0.4712	***	-8.6862	***	0.1882	***	3.6876	***
	(0.1426)		(0.1153)		(2.5433)		(0.0488)		(1.0087)	
Black - Top Five shareholders	-0.1747		1.1814	*	-10.3401	**	0.3813	***	-14.5948	***
	(0.3012)		(0.7020)		(4.3346)		(0.1064)		(5.0623)	
Foreign - Top Five shareholders	-0.2230		0.3557	*	-3.8641	**	0.3886	***	-2.6211	
	(0.1997)		(0.1906)		(1.9146)		(0.1228)		(2.1454)	
Government - Top Five shareholders	4.2436	***	-1.1754		10.0761		2.0979		-40.8903	***
	(1.0296)		(9.1261)		(14.4856)		(1.6901)		(9.6841)	
Other - Top Five shareholders	2.8744	***	0.9999		22.3491	***	1.0430	***	-2.0867	
	(0.6652)		(0.9612)		(6.7595)		(0.2087)		(5.3576)	
Control variables										
Size, total assets	0.0494	*	0.0670	**	-2.4159	***	0.0810	***	1.5433	***
	(0.0276)		(0.0305)		(0.8155)		(0.0077)		(0.3143)	
Tangibility	-1.0819	***	0.8672	***	-12.3606	***	0.3410	***	-1.4686	
	(0.2104)		(0.2561)		(3.8668)		(0.0387)		(1.0795)	
Non-debt tax shield	-2.2322	***	-5.4759	***	-11.6716	*	0.1171		-0.8972	
	(0.4819)		(1.7805)		(6.3422)		(0.2589)		(3.3830)	
Risk	0.8285	***	-0.1606		5.5932	***	-0.1650	***	-1.4768	*
	(0.0890)		(0.1950)		(1.3544)		(0.0615)		(0.7868)	
Dividend payout ratio	-0.0028		0.0009		0.0008		-0.0034		-0.0040	
	(0.0027)		(0.0033)		(0.0160)		(0.0022)		(0.0294)	
Age	-0.0203	***	-0.0170	***	-0.1498	***	0.0044	***	0.0800	***
	(0.0029)		(0.0030)		(0.0398)		(0.0004)		(0.0146)	
Growth - Total assets	-0.0118		-0.0148	***	0.3942		0.0091		-0.4277	**
	(0.0145)		(0.0048)		(0.3059)		(0.0097)		(0.1774)	
Liquidity	-0.0028	***	-0.0013		-0.0111	**	0.0002		0.0152	***
	(0.0008)		(0.0010)		(0.0058)		(0.0002)		(0.0059)	
Total debt ratio - Book value	-1.2617	***	-0.4840	***	1.1497	***	0.0058		4.7064	***
	(0.2174)		(0.1486)		(0.4513)		(0.0230)		(1.0108)	
Weighted statistics										
R-squared	0.2654		0.7147		-0.4804		0.7957		0.5825	
Adjusted R-squared	0.2527		0.7098		-0.5059		0.7921		0.5753	
S.E. of regression	0.7474		1.2268		7.0187		0.2589		9.3381	
Durbin-Watson stat	0.3080		0.8114		0.4884		0.3699		0.3057	
Mean dependent var	0.3251		0.6226		3.7577		-0.0441		8.3303	
S.D. dependent var	1.5525		5.2685		22.4014		1.4927		21.3278	
Sum squared resid	616.6632		1661.5270		54287.1000		72.1393		96094.9500	
J-statistic	34.3812		20.1796		27.6937		13.1852		34.8755	
Prob(J-statistic)	0.0166		0.3838		0.0895		0.8290		0.0145	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

8.5.3 Generalised method of moments model with a lag: the top five shareholders and corporate performance

The generalised method of moments model with a lagged dependent variable was used to analyse the effects of ownership on firm performance at the top five shareholders level. The Herfindahl index was used as a measure of ownership concentration at that level while the types of shareholders and control variables remained unchanged as for the same analytical method at the top three shareholders level. Five variables were used to measure firm performance leading to five models, which were named after the dependent variables used in the models.

The results of the regression analysis using the generalised method of moments model with a lagged dependent variable of the effects of ownership on firm performance with the Herfindahl index of the top five shareholders as a measure of ownership concentration are shown in Table 8.12. The one-period lagged variable of each of the firm performance variables was used as an explanatory variable. Lagged variables in three corporate performance models, namely those including Tobin's Q (5.70), economic value-added (0.56) and market value-added (0.41) had positive coefficients, which were statistically significant at the 1% level. The relationship was similar for the first two models at the top three shareholders level for the same analytical method. Coefficients in models with return on assets and return on equity variables were negative and statistically significant at the 1% level as well. Hence the overall effect of lagged variables on firm performance was positive. An increase of 1% in the lagged variable led to a 0.48% decrease in return on assets, a 5.70% increase in Tobin's Q and a 0.41% increase in economic value-added.

Ownership concentration as measured by the Herfindahl index at the top five shareholders level had positive coefficients in two of the five models, but the relationships were not statistically significant. The coefficients in models including return on assets, economic value-added and market value-added were negative, and the last two were statistically significant at the 1 and 5% levels respectively. A 1% increase in the Herfindahl index led to a 0.56% decrease in return on economic value-added and a 6.04% decrease in market value-added.

Table 8.12: Effects of ownership on corporate performance using the generalised method of moments model with a lagged dependent variable at the top five shareholders level

Dependent variable	Return on assets, book value		Return on equity, book value		Tobin's Q		Economic value-added		Market value-added	
Constant	-2.6442	***	-0.0941		1.6205		-0.5212	***	-5.1848	
	(0.3843)		(0.3962)		(3.9690)		(0.1323)		(3.8032)	
Dependent variable (-1)	-0.4800	***	-0.5447	***	5.6983	***	0.5651	***	0.4061	***
	(0.0234)		(0.0921)		(1.1796)		(0.0632)		(0.1413)	
Concentration										
H I Top Five shareholders	-0.6002		0.8316		7.1847		-0.5636	***	-6.0452	**
	(0.7074)		(0.6647)		(5.5298)		(0.1830)		(2.6399)	
Shareholder type										
Institution - Top Five shareholders	1.0518	***	-1.0701	*	18.4340	***	0.3259	***	-1.2809	
	(0.3552)		(0.5640)		(4.7226)		(0.1264)		(1.0881)	
Public Investment Corporation - Top Five shareholders	-1.3220	***	0.2745		18.7031	***	0.3117	**	2.9235	
	(0.2711)		(1.0430)		(6.3655)		(0.1359)		(1.8269)	
Family - Top Five shareholders	0.0672		-0.9299		14.3335	***	0.3138	***	1.8413	
	(0.3159)		(0.6146)		(4.7960)		(0.1241)		(1.7411)	
Company - Top Five shareholders	0.3372		-1.1929	**	3.8570		0.2714	***	2.3822	
	(0.3162)		(0.5686)		(3.7799)		(0.1060)		(2.1876)	
Directors -Top Five shareholders	0.6703	***	-0.1282		-5.1962	*	0.1735	***	0.9881	***
	(0.1377)		(0.1370)		(3.0725)		(0.0616)		(0.3774)	
Black - Top Five shareholders	2.2636	***	2.7225	***	2.9216		0.2447	**	-4.0466	*
	(0.2736)		(0.9288)		(4.8534)		(0.1121)		(2.3231)	
Foreign - Top Five shareholders	1.0203	***	0.1638		-4.1793		0.4572	***	1.1111	
	(0.2770)		(0.4987)		(4.1060)		(0.1583)		(1.0042)	
Government - Top Five shareholders	0.9337		-26.1239		-11.3471		-0.1160		0.9907	
	(1.6852)		(17.4392)		(42.1277)		(1.8445)		(4.7847)	
Other - Top Five shareholders	-0.5236		1.1263		44.5212	*	0.7743	***	25.9472	***
	(0.6656)		(1.6216)		(24.2576)		(0.2492)		(4.8354)	
Control variables										
Size, total assets	0.4705	***	0.1438	**	-3.0947	***	0.0234	*	0.9761	
	(0.0686)		(0.0595)		(1.0214)		(0.0140)		(0.6281)	
Tangibility	0.7021	***	1.0552	***	-7.6064	***	0.3014	***	-0.3702	
	(0.1304)		(0.3011)		(2.5286)		(0.0547)		(0.9894)	
Non-debt tax shields	-1.8567	***	-3.6674	*	31.1200		-0.0369		-0.5534	
	(0.4301)		(1.9428)		(20.3946)		(0.4463)		(5.5811)	
Risk	-0.5371	**	0.1830		6.0080	**	-0.2532	***	4.4017	***
	(0.2380)		(0.4064)		(2.7233)		(0.0803)		(1.1978)	
Dividend payout ratio	-0.0027		-0.0006		0.0032		-0.0021	**	-0.0056	
	(0.0028)		(0.0055)		(0.0410)		(0.0010)		(0.0140)	
Age	0.0043	***	-0.0237	***	0.2942	***	0.0037	***	0.0032	
	(0.0010)		(0.0049)		(0.0868)		(0.0008)		(0.0051)	
Growth - Total assets	-0.0295	***	0.0010		0.0743		-0.0003		0.2464	***
	(0.0092)		(0.0218)		(0.1128)		(0.0070)		(0.1001)	
Institution - Top Five shareholders	-0.0021		-0.0010		0.1603	**	0.0004	***	-0.0129	**
	(0.0015)		(0.0016)		(0.0765)		(0.0001)		(0.0056)	
Total debt ratio- Book value	-1.5027	***	-0.1480		0.5282		0.1690	***	-0.7312	
	(0.2261)		(0.1249)		(2.5042)		(0.0460)		(0.8950)	
Weighted statistics										
R-squared	0.5469		-0.6067		-6.2154		0.9571		0.9405	
Adjusted R-squared	0.5387		-0.6358		-6.3466		0.9563		0.9394	
S.E. of regression	0.6902		2.0370		9.6816		0.2210		7.9973	
Durbin-Watson stat	0.3293		0.5013		0.3883		0.6583		1.1087	
Mean dependent var	0.2728		0.5764		2.4466		0.0671		17.9531	
S.D. dependent var	1.4165		2.3200		4.1914		2.1883		163.0354	
Sum squared resid	525.4888		4576.7410		103105.8000		52.4838		70351.9400	
J-statistic	14.2641		17.3164		15.9881		14.5890		29.2016	
Prob(J-statistic)	0.7117		0.5015		0.5934		0.6900		0.0460	
Observations	1124		1124		1122		1096		1122	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Inde

Positive coefficients were unchanged for ownership by directors, foreigners and other shareholders, as at the top three shareholders level. Coefficients for ownership by institutions, the Public Investment Corporation, families, companies and black people were positive. Directors' ownership had positive coefficients in three of the five firm performance models, which included those incorporating return on assets (0.67) economic value-added (0.17) and market value-added (0.99), which were all statistically significant at the 1% level, displaying a strong positive effect of directors' ownership on firm performance. Coefficients of foreign ownership were positive in four of the five performance models and were statistically significant at the 1% level in corporate performance models with return on assets (1.02) and the economic value-added (0.46). Coefficients for other ownerships were positive in models incorporating the Tobin's Q, economic value-added and market value-added and were statistically significant at the 1% level for market and economic value added and at 10% for Tobin's Q. Coefficients of ownership by institutions had positive and statistically significant coefficients in performance models incorporating return on assets (1.05), Tobin's Q (18.43) and economic value-added (0.33).

Ownership by the Public Investment Corporation also had positive and statistically significant effects on Tobin's Q at the 1% level and economic value-added at 5%. The coefficient with return on assets model was negative and statistically significant at the 1% level, resulting in an overall positive effect. Family ownership had a positive and statistically significant effect on Tobin's Q (14.33) and economic value-added (0.31). Company ownership's coefficient had a positive and statistically significant effect on the economic value-added model (at the 1% level) and a negative and statistically significant effect on return on equity (at the 5% level), resulting in a stronger positive than negative effect on firm performance. Coefficients for black ownership were positive and statistically significant at the 1% level with return on assets (2.26) and return on equity (2.72) and at the 5% level with economic value-added (0.24), displaying strong positive effects between black ownership and firm performance. A 1% increase in black ownership was associated with a 2.26% increase in return on assets, a 2.72% increase in return on equity and a 0.24 increase in economic value-added. Negative coefficients for ownership by government in three of the five ownership models were statistically

insignificant. Therefore, government ownership had no statistically significant effect on firm performance.

Control variables which had positive coefficients in the performance models were size, tangibility and age, yielding similar results to those obtained in the analysis at the top three shareholders level. For size, three coefficients were statistically significant at the 1%, 5% and 10% levels with one coefficient having a negative and statistically significant relationship at the 1% level. Hence the overall effect of firm size and firm performance was positive. Tangibility had three coefficients which were positive and statistically significant at the 1% level and one negative coefficient, which was equally significant, leading to a positive overall effect. The configuration of coefficients for firm age was similar to that for tangibility. Coefficients for risk were statistically significant for both positive and negative coefficients. For economic value-added and return on assets, the coefficients were negative and statistically significant at the 1% and 5% levels respectively. For market value-added and Tobin's Q, the coefficients were positive and statistically significant at the 1% and 5% levels. Hence the overall result was that risk had mixed effects on firm performance at the top five shareholders level. Liquidity had a positive effect on corporate performance, with statistically significant coefficients at the 1% and 5% levels.

Negative coefficients persisted for non-debt tax shields, dividend payout ratio, growth and total debt ratio, as was the case under the top three shareholders scenario. Non-debt tax shields had statistically significant coefficients with return on assets and return on equity models at the 1% and 10% levels respectively. Dividend payout ratio had one statistically significant coefficient at the 10% level with economic value-added, which was the lowest in the group of control variables with negative coefficients. Growth and total debt ratio had statically significant coefficients at the 1% level with return on assets and market value-added and with return on assets and economic value-added respectively. Hence the control variables contributed to explaining the effects of ownership on firm performance because they were statistically significant.

The adjusted coefficients of determination (R^2) of the corporate performance models varied from 55% in the model incorporating return on assets to 96% for the one including economic value-added, showing medium to high explanatory powers of the dependent

variables. However, the coefficients of determination for performance models with return on equity and Tobin's Q models were negative, indicating that the independent variables had no exploratory power for these models. The Durbin-Watson test statistics observed were between 0.33 for performance models incorporating return on assets and 1.11 for one including market value-added, which was below two, indicating the potential presence of serial correlation. The p-values of the J-statistics for all five firm performance models, except the one including market value-added as a dependent variable, were not statistically significant at the 5% level showing that the models did not fit well. The model with market value-added had a p-value which was statistically significant at the 5% level. The summary results showed that the generalised method of moments model with a lagged dependent variable did not appear to be appropriate for measuring the effects of ownership on firm performance except for the model including market value-added, a result similar to that obtained in the analysis at the top three shareholders level. Hence this result was used in reaching a conclusion, while the results of other models were excluded.

8.6 EFFECTS OF OWNERSHIP ON CORPORATE PERFORMANCE: THE TOP 10 SHAREHOLDERS, HERFINDAHL INDICES USING THE FIXED EFFECTS METHOD AND GENERALISED METHOD OF MOMENTS APPROACHES

The Herfindahl index for the top 10 shareholders was used as the highest measure of ownership concentration in the analysis of the effects of ownership on firm performance. The variables for ownership types were considered for the top 10 shareholders. All other variables remained unchanged and the fixed effects model, generalised method of moments model without a lag and the generalised method of moments model with a one-period lagged dependent variable were used to analyse the effects of ownership on firm performance.

8.6.1 Fixed effects model: the top 10 shareholders, types of shareholders and corporate performance

The results of the fixed effects regression analysis of the effects of ownership on firm performance when the Herfindahl index of the top 10 shareholders was a measure of

ownership concentration are shown in Table 8.13. The results showed that ownership concentration as measured by the Herfindahl index at the top 10 shareholders level had statistically significant positive relationships for three of the five performance models.

Table 8.13: Effects of ownership on corporate performance using the fixed effects model at the top 10 shareholders level

Dependent variable	Return on assets, book value		Return on equity, book value		Tobin's Q		Economic value-added		Market value-added
Constant	-0.6428	***	-0.7293	***	5.4754	***	3071.8980	***	-0.5123
	(0.0307)		(0.0332)		(0.1877)		(1102.0240)		(0.1947)
Concentration									
H I Top Ten shareholders	-0.8921	***	-0.4788	***	4.8151	***	1980.6810	*	3.4976
	(0.0488)		(0.0470)		(0.2473)		(1141.1280)		(0.4365)
Shareholder type									
Institution - Top Ten shareholders	0.7989	***	0.0749	**	-3.9875	***	-1682.1850	**	0.8821
	(0.0333)		(0.0389)		(0.2994)		(865.8132)		(0.2200)
Public Investment Corporation - Top Ten shareholders	0.2367	***	0.2326	***	0.9890	**	709.1338		1.1434
	(0.0712)		(0.0625)		(0.4285)		(1062.8580)		(0.5755)
Family - Top Ten shareholders	0.7323	***	0.4623	***	-4.3604	***	-1735.8530	**	-0.8357
	(0.0284)		(0.0256)		(0.1716)		(788.0995)		(0.2014)
Company - Top Ten shareholders	0.6258	***	0.4509	***	-2.8636	***	-1219.9010	*	-1.3129
	(0.0249)		(0.0270)		(0.1822)		(725.3134)		(0.2198)
Directors -Top Ten shareholders	0.0258	**	0.0872	***	-0.3089	***	-145.3086		-0.5270
	(0.0115)		(0.0145)		(0.1018)		(134.0073)		(0.0677)
Black - Top Ten shareholders	0.2071	***	-0.3660	***	-0.5809		-602.3452		1.1493
	(0.0414)		(0.0570)		(0.4175)		(1175.9600)		(0.4835)
Foreign - Top Ten shareholders	0.4299	***	-0.0389		-0.0020		-1158.0840	*	2.5976
	(0.0304)		(0.0258)		(0.1540)		(701.9053)		(0.2825)
Government - Top Ten shareholders	0.2964		0.2152	***	-0.6805		-812.8401		-4.2147
	(0.1835)		(0.0850)		(0.9178)		(1875.9250)		(1.2814)
Other - Top Ten shareholders	0.6126	***	0.0463		-1.4254	**	758.0335		2.2323
	(0.0563)		(0.0996)		(0.6329)		(2993.4580)		(0.3065)
Control variables									
Size, total assets	0.1316	***	0.1177	***	-0.8753	***	-333.7406	***	0.5069
	(0.0050)		(0.0054)		(0.0262)		(135.7942)		(0.0380)
Tangibility	-0.0004	**	-0.0001	***	0.0492	***	0.6794		0.0187
	(0.0002)		(0.0000)		(0.0019)		(6.1296)		(0.0006)
Non-debt tax shield	-0.4976	***	0.4374	***	7.5464	***	841.4823		-20.5531
	(0.1286)		(0.0828)		(0.7791)		(2538.8980)		(1.1964)
Risk	-0.0521	***	0.0159	**	-0.1179		-8648.1930	***	0.1198
	(0.0136)		(0.0079)		(0.1827)		(2199.5730)		(0.2308)
Dividend payout ratio	0.0017		0.0035	***	0.0065		4.1575		0.0177
	(0.0015)		(0.0013)		(0.0116)		(28.3710)		(0.0173)
Age	-0.0006	***	-0.0007	***	-0.0032	***	-4.2841		0.0107
	(0.0001)		(0.0002)		(0.0009)		(2.9414)		(0.0013)
Growth - Total assets	0.0000		0.0004		0.0281	***	149.2143	*	-0.0026
	(0.0008)		(0.0010)		(0.0070)		(82.4860)		(0.0113)
Liquidity	-0.0008	**	-0.0004		0.0068	***	4.0929		0.0022
	(0.0004)		(0.0004)		(0.0016)		(7.8917)		(0.0034)
Total debt ratio - Book value	-0.5734	***	0.0704	***	4.5654	***	-288.9761		-1.9349
	(0.0201)		(0.0138)		(0.1300)		(282.8736)		(0.1177)
Weighted statistics									
R-squared	0.7451		0.5402		0.8868		0.0102		0.9546
Adjusted R-squared	0.7420		0.5346		0.8854		-0.0023		0.9541
S.E. of regression	0.7103		1.4601		4.2566		20427.1900		20.3461
F-statistic	238.5065		95.8506		638.1251		0.8137		1713.4380
Prob (F-statistic)	0.0000		0.0000		0.0000		0.6924		0.0000
Mean dependent var	0.7919		1.4877		5.7172		-522.9718		48.7160
S.D. dependent var	8.8897		5.9140		21.7960		20396.6800		640.8866
Sum squared residual	782.0628		3304.4070		28048.2900		626,000,000,000		640815.6
Durbin-Watson statistic	0.7134		0.8656		0.5521		1.1638		0.6367

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Ownership concentration's coefficients were statistically significant at the 1% level for models with Tobin's Q and market value-added variables and statistically significant at the 10% level for economic value-added. The coefficient for Tobin's Q model was 4.81, an increase from 2.25, and for economic value-added, it was 1 980.68, a decrease from 2 294.56. The ownership concentration coefficient in the model for market value-added was 3.50 at the top 10 shareholders level, marking an increase from 0.35 at the top five shareholders level under the fixed effects model.

Ownership concentration coefficients remained negative in models with return on assets and return on equity as was the case in the top five shareholders scenario, with both statistically significant at the 1% level. For a 1% increase in the Herfindahl index, Tobin's Q ratio increased by 4.8% and the return on assets decreased by 0.89%.

Positive coefficients for the Public Investment Corporation and other shareholders ownership were unchanged from the results at the top five shareholders level, and statistically significant at the 1% and 5% levels in the fixed effects model. Other ownership types with positive coefficients were institutions, black people and foreigners. The coefficients were statistically significant at the 1% and 5% levels. Negative coefficients were observed for ownership by families, directors and companies, and these were statistically significant mainly at the 1% level. Coefficients for state ownership were mixed, showing a positive coefficient with return on equity and a negative coefficient with market value-added. The coefficients were statistically significant at the 1% level. The results were similar to those obtained using the top five shareholders level for the fixed effects model.

For control variables, positive coefficients for size, tangibility, dividend payout ratio, growth and liquidity persisted from the analysis for the top five shareholders level for the fixed effects method. The coefficients were statistically significant at the 1% level.

Negative coefficients for control variables were observed for firm age and risk, and were statistically significant at the 1% level for both variables. Old firms and firms with high risk performed badly. The effects of non-debt tax shields and the total debt ratio as control variables and corporate performance were mixed. For non-debt tax shields, two

corporate performance models had positive coefficients, while two models also had negative coefficients, and both sets of coefficients were statistically significant at the 1% level. The results for control variables were largely similar to those obtained at the top five shareholders level for the fixed effects model.

The adjusted coefficients of determination (R^2) of the corporate performance models had a range from 54% to 95%, with the exception of the coefficient of determination for the model with economic value-added, which was -0.00%. Therefore, the independent variables explained significant portions of the dependent variables, because they were almost all equal to or greater than 60%. The independent variables could not explain any portion of the dependent variables in the economic value-added model. The coefficients of determination were larger than those obtained at the top five shareholders level. The Durbin-Watson test statistics for serial correlation were below two, with a range of 0.55 to 0.86, and 1.16 for the performance model with economic value-added, signifying that there could be serial correlation. The F-tests for the models had p-values of zero, making the relationships statistically significant at the 1% level and reflecting that the models fitted well. The p-value for the economic value-added model, at 0.69, remained not statistically significant and hence that model‘s results were dropped and not used in making conclusions. These results were similar to those obtained at the top five shareholders level.

8.6.2 Generalised method of moments model without a lag: the top 10 shareholders and corporate performance

The generalised method of moments model without a lagged variable of the dependent variable was also used to analyse the effects of ownership on firm performance at the top 10 shareholders level. The Herfindahl index was used as a measure of ownership concentration while the types of shareholders and control variables remained the same as for the same method of analysis at the top five shareholders level. Firm performance was measured by the five variables, leading to five models, which were named after the dependent variables used in the models.

Table 8.14 shows the results of the regression analysis of the effects of ownership on firm performance when the Herfindahl index of the top 10 shareholders was a measure of ownership concentration and using the generalised method of moments model without a lagged dependent variable. The coefficients of the ownership concentration variable were positive in two of the five corporate performance models, namely models with return on assets and Tobin's Q, as was the case at the top five shareholders level for the same analytical method. The coefficients were statistically significant at the 1% and 5% levels for Tobin's Q and return on assets respectively. Ownership concentration had negative coefficients with economic value-added and return on equity variables. The coefficients were statistically significant at the 1% level. The effects of ownership concentration on corporate performance were therefore marginally negative. A 1% increase in the Herfindahl index led to a 12.95% increase in Tobin's Q and a 0.33% reduction in economic value-added.

Positive coefficients were observed for ownership by families, directors and other shareholders, as was the case at the top five shareholders level for the same analytical method. Family ownership's coefficient was positive and statistically significant at the 1% level for return on equity (10.56). Coefficients for ownership variables were positive in two models and negative in one model for each of the other two variables (directors and other shareholders). Hence increased corporate performance was associated with increased shareholdings by these types of shareholders.

Negative effects were observed between corporate performance and ownership by institutions, the Public Investment Corporation, directors, black people, foreigners and government. The coefficients for these types of ownerships were statistically significant mainly at the 1% level and in one case, at the 10% level. Models with negative coefficients exceeded those with positive coefficients. Therefore, as the shareholdings in these types of shareholdings increased, corporate performance decreased. A 1% increase in government ownership was associated with a 0.16% decrease in economic value-added and a 55.20% decrease in market value-added.

Control variables which maintained predominantly positive coefficients were size and total debt ratio. Coefficients for both variables were statistically significant at the 1% level as well as at the 10% level for the latter variable. Increases in these variables were

associated with increased firm performance. Negative coefficients for non-debt tax shields, age of the firm and growth retained the same sign at the top 10 shareholders level. Coefficients for these control variables were statistically significant at the 1 and 5% levels. Coefficients for dividend payout ratio were not statistically significant. Coefficients for tangibility, risk and liquidity were mixed. Tangibility had two models which were positive and two which were negative, whereas the last two variables had one model each on the negative and positive sides. All the coefficients were statistically significant at the 1% level. The results implied that, for instance, firms with higher growth levels were associated with lower levels of performance.

The adjusted coefficients of determination (R^2) for the corporate performance models were between 19% and 96% for models that had positive coefficients of determination, namely those that incorporated return on assets, return on equity, economic value-added and market value-added as dependent variables. The relationships for performance models with return on equity and economic value-added models were strong, with adjusted coefficients of determination far greater than 60%. The model with Tobin's Q had a negative coefficient of determination, indicating that the model fitted the data poorly. The Durbin-Watson test statistics were between 0.22 and 0.39, which were much lower than two, indicating the possible presence of serial correlation. The p-values of the J-statistics were statistically significant at the 10% level for the corporate performance model with the return on assets only, while those with return on equity, economic value-added and market value-added were not statistically significant, reflecting that the models did not fit well and could not be used to form conclusions on the relationships under study. The summary results showed that the generalised method of moments model without a lagged dependent variable did not appear to be appropriate for measuring the effects of ownership on firm performance for four of the five performance models, except for the one incorporating return on assets.

Table 8.14: Effects of ownership on corporate performance using the generalised method of moments model without a lag at the top 10 shareholders level

Dependent variable	Return on assets, book value		Return on equity, book value		Tobin's Q		Economic value-added		Market value-added	
Constant	1.0631	***	-4.3976	***	26.1875	***	-0.8344	***	18.0607	***
	(0.2489)		(0.4153)		(8.0300)		(0.0836)		(3.4284)	
Concentration										
H I Top Ten shareholders	0.6642	**	-0.9153	***	12.9508	***	-0.3317	***	-1.0921	
Shareholder type	(0.3197)		(0.3583)		(5.0325)		(0.0694)		(4.6438)	
Institution - Top Ten shareholders	-1.0946	***	-1.3011	***	-17.8950	***	0.1782	*	-2.9163	
	(0.3312)		(0.4110)		(3.7628)		(0.1044)		(2.9134)	
Public Investment Corporation - Top Ten shareholders	-0.8763	***	-2.0310	***	6.2060	*	0.0005		16.3408	***
	(0.2389)		(0.3120)		(3.7896)		(0.1513)		(4.3655)	
Family - Top Ten shareholders	0.0651		1.0559	***	-1.7328		0.0516		2.0134	
	(0.2197)		(0.3081)		(2.9477)		(0.0927)		(5.0823)	
Company - Top Ten shareholders	-0.2049		0.5694	***	-4.6721	**	0.0841	***	-0.7661	
	(0.1578)		(0.1959)		(2.1558)		(0.0311)		(2.4111)	
Directors -Top Ten shareholders	-0.7542	***	-0.2853		-9.8179	***	0.2814	***	-1.2506	
	(0.1551)		(0.2417)		(1.8529)		(0.0299)		(0.9010)	
Black - Top Ten shareholders	-0.5707	***	3.1553	***	-13.9517	***	0.0772		-32.3999	***
	(0.1347)		(0.3762)		(5.6416)		(0.0545)		(7.9914)	
Foreign - Top Ten shareholders	-0.3161	*	-1.2983	***	-7.3663	***	0.1908	**	4.1792	
	(0.1750)		(0.2902)		(2.8035)		(0.0905)		(3.2929)	
Government - Top Ten shareholders	2.9907		4.5056		25.2222		-0.1634	***	-55.1967	***
	(3.0844)		(13.1302)		(22.3938)		(0.0651)		(9.7993)	
Other - Top Ten shareholders	6.8370	***	-0.8902		58.9683	***	-0.3785	***	-6.2389	
	(1.6238)		(1.3032)		(16.2424)		(0.1439)		(6.8969)	
Control variables										
Size, total assets	0.1346	***	0.6351	***	-2.2769	***	0.0861	***	-1.9932	***
	(0.0293)		(0.0676)		(0.8760)		(0.0114)		(0.4883)	
Tangibility	-0.9711	***	0.7542	***	-15.3052	***	0.3020	***	2.3406	
	(0.2022)		(0.1483)		(3.5895)		(0.0402)		(1.4070)	
Non-debt tax shield	-2.6631	***	-3.4163	***	-6.0396	**	0.9634	***	-3.1525	
	(0.7133)		(1.3342)		(3.0951)		(0.1398)		(8.1682)	
Risk	-0.1718		-0.2228		5.8884	***	-0.1647	***	-0.4549	
	(0.1867)		(0.1566)		(1.5196)		(0.0265)		(2.7358)	
Dividend payout ratio	-0.0023		0.0047		-0.0158		-0.0016		-0.0251	
	(0.0025)		(0.0057)		(0.0186)		(0.0020)		(0.0338)	
Age	-0.0229	***	0.0155	***	-0.1482	***	0.0038	***	-0.1347	***
	(0.0038)		(0.0016)		(0.0341)		(0.0003)		(0.0271)	
Growth - Total assets	-0.0335	***	-0.0241	***	-0.0245		0.0091		0.3110	
	(0.0116)		(0.0062)		(0.4307)		(0.0090)		(0.3973)	
Liquidity	-0.0015	***	0.0014		0.0003		0.0006	***	0.0075	
	(0.0009)		(0.0019)		(0.0066)		(0.0002)		(0.0121)	
Total debt ratio - Book value	-1.3827	***	0.0878		2.5851	***	0.0137		2.0340	*
	(0.1841)		(0.0587)		(1.0475)		(0.0229)		(1.1995)	
Weighted statistics										
R-squared	0.5336		0.9407		-1.7553		0.9576		0.1902	
Adjusted R-squared	0.5256		0.9397		-1.8028		0.9569		0.1762	
S.E. of regression	0.7951		1.6271		6.7849		0.2626		12.4429	
Durbin-Watson stat	0.3585		0.3904		0.3208		0.3745		0.2165	
Mean dependent var	0.4050		0.3779		3.1617		0.0284		8.1751	
S.D. dependent var	6.1327		6.6717		10.1872		1.4713		20.2524	
Sum squared resid	697.8688		2922.9290		50731.0100		74.1873		170618.4000	
J-statistic	27.7748		19.1135		26.9315		21.3008		11.5374	
Prob(J-statistic)	0.0879		0.4496		0.1063		0.3204		0.9044	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

8.6.3 Generalised method of moments model with a lag: the top 10 shareholders and corporate performance

The generalised method of moments model with a lagged dependent variable was used to analyse the effects of ownership on firm performance at the top 10 shareholders level, as the last level. The Herfindahl index was used as a measure of ownership concentration at that level while the types of shareholders and control variables remained unchanged for the same analytical method at the top five shareholders level.

Table 8.15 shows the results of the regression analysis uing the generalised method of moments model with a lagged dependent variable of the effects of ownership on firm performance when the Herfindahl index of the top 10 shareholders was a measure of ownership concentration. The one-period lagged variable of each of the firm performance variables was used as an explanatory variable. Lagged variables in three performance models, namely Tobin's Q (2.42), economic value-added (0.71) and market valued-added (0.29) had positive coefficients, which were statistically significant at the 1% level for the first two variables and at the 10% level in the model for the last variable. Coefficients for return on assets and return on equity variables were negative and statistically significant at the 1% level as well. The overall effect of lagged variables on firm performance was positive. An increase of 1% in the lagged variable led to a 0.48% decrease in return on assets, a 2.42% increase in Tobin's Q and a 0.71% increase in economic value-added.

Ownership concentration as measured by the Herfindahl index at the top 10 shareholders level had a negative and statistically significant coefficient at the 1% level with market value-added (-10.79). Coefficients in other corporate performance models were statistically insignificant. A 1% increase in the Herfindahl index led to a 10.79% decrease in market value-added.

Positive coefficients were unchanged for ownership by directors, as at the top five shareholders level. Directors' ownership had positive coefficients in four of the five firm performance models, which included return on assets (0.67), return on equity (1.16), Tobin's Q (1.08) and economic value-added (0.27). They were all statistically significant at the 1% level except for Tobin's Q, which was statistically significant at the 5% level.

Table 8.15: Effects of ownership on corporate performance using the generalised method of moments model with a lagged dependent variable at the top 10 shareholders level

Dependent variable	Return on assets, book value		Return on equity, book value		Tobin's Q		Economic value-added		Market value-added	
Constant	-2.7999	***	-5.8216	***	5.4489	***	-0.3148	***	1.5775	
	(0.6931)		(0.3391)		(1.9833)		(0.1054)		(1.9955)	
Dependent variable (-1)	-0.4778	***	-0.5378	***	2.4208	***	0.7106	***	0.2885	*
	(0.0215)		(0.1298)		(0.5561)		(0.0752)		(0.1718)	
Concentration										
H I Top Ten shareholders	-0.1487		0.0390		0.6154		0.0815		-10.7874	***
	(0.6035)		(0.6071)		(1.2483)		(0.1468)		(2.1471)	
Shareholder type										
Institution - Top Ten shareholders	0.0683		-3.3916	***	0.8260		0.0714		1.0506	
	(0.4935)		(0.4935)		(2.0327)		(0.1066)		(2.7724)	
Public Investment Corporation - Top Ten shareholders	-0.9703		-2.2928	***	-1.2262		-0.0656		-2.1552	
	(0.6350)		(0.7291)		(1.7633)		(0.0894)		(2.0281)	
Family - Top Ten shareholders	0.2431		-0.3204		0.2296		-0.2143	***	0.6033	
	(0.3295)		(0.3834)		(0.5971)		(0.0808)		(0.8777)	
Company - Top Ten shareholders	0.1470		-0.6030		-1.7650	***	-0.1314	*	9.1588	***
	(0.2540)		(0.3899)		(0.6440)		(0.0732)		(1.1573)	
Directors - Top Ten shareholders	0.6733	***	1.1642	***	1.0769	**	0.2674	***	-0.9635	
	(0.2573)		(0.2231)		(0.5356)		(0.0963)		(1.1609)	
Black - Top Ten shareholders	1.6283	***	3.8708	***	-6.7894	***	-0.1278		-21.2499	***
	(0.4550)		(0.5221)		(1.7769)		(0.0820)		(5.4090)	
Foreign - Top Ten shareholders	0.8785	***	-1.9097	***	-4.8436	***	-0.0207		3.1409	*
	(0.2870)		(0.3849)		(0.9096)		(0.0871)		(1.7301)	
Government - Top Ten shareholders	-1.9164		11.9951		14.6559		0.8190		-94.1299	***
	(2.6924)		(12.4280)		(11.5540)		(1.1197)		(33.9705)	
Other - Top Ten shareholders	-0.3971		-7.4131	**	-0.9603		0.0886		-1.1187	
	(0.7503)		(3.2616)		(2.4120)		(0.3084)		(2.9742)	
Control variables										
Size, total assets	0.4893	***	0.8105	***	-1.2315	**	0.0122		0.4008	
	(0.1299)		(0.0519)		(0.5650)		(0.0114)		(0.5073)	
Tangibility	0.9406	***	0.6275	***	-3.8650	**	0.2221	***	1.0702	
	(0.1437)		(0.1742)		(1.8151)		(0.0351)		(1.0185)	
Non-debt tax shields	-1.4652	**	-4.6927	***	3.2190		0.8357	***	0.7700	
	(0.6325)		(1.7372)		(9.1650)		(0.1517)		(2.1763)	
Risk	-0.3443	**	-0.5516	***	2.0941	**	-0.2843	***	1.7141	
	(0.1605)		(0.1604)		(0.8901)		(0.0844)		(1.2941)	
Dividend pa-out ratio	-0.0046	**	0.0067		0.0120		-0.0027	**	0.0277	**
	(0.0024)		(0.0076)		(0.0204)		(0.0011)		(0.0123)	
Age	0.0040	***	0.0211	***	0.0810	***	0.0036	***	-0.0451	
	(0.0016)		(0.0022)		(0.0328)		(0.0007)		(0.0348)	
Growth - Total assets	-0.0299	**	-0.0150	*	-0.0984		0.0046		0.4056	**
	(0.0143)		(0.0090)		(0.0647)		(0.0091)		(0.2045)	
Liquidity	-0.0018		-0.0006		0.0070		0.0005	***	0.0148	
	(0.0016)		(0.0034)		(0.0135)		(0.0002)		(0.0305)	
Total debt ratio - Book value	-1.4655	***	0.9858	***	-1.0934	*	0.0932	**	-3.0327	***
	(0.3590)		(0.1808)		(0.5762)		(0.0407)		(1.2249)	
Weighted statistics										
R-squared	0.6355		0.8584		0.1814		0.6874		0.8640	
Adjusted R-squared	0.6288		0.8558		0.1665		0.6816		0.8615	
S.E. of regression	0.6868		2.4620		3.8764		0.2250		12.9873	
Durbin-Watson stat	0.2915		0.3094		0.6433		0.7541		0.5223	
Mean dependent var	0.2841		0.8331		3.2460		0.0134		25.8408	
S.D. dependent var	2.0070		11.2863		8.8775		0.3987		426.0118	
Sum squared resid	520.3385		6685.8780		16529.3400		54.4361		185537.9000	
J-statistic	12.9491		16.3959		33.8017		23.2187		19.9676	
Prob(J-statistic)	0.7946		0.5649		0.0133		0.1823		0.3346	
Observations	1124		1124		1122		1096		1122	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

These results showed a strong positive effect of directors' ownership on firm performance.

Negative coefficients for ownership were observed for ownership by institutions, government, companies, families, the Public Investment Corporation, foreigners and other shareholders. Institutional ownership's only negative and statistically significant coefficient at the 1% level was with return on equity (-3.39). Family ownership had a negative and statistically significant coefficient at the 1% level with economic value-added (0.21). Government ownership's coefficient was negative and statistically significant at the 1% level with the market value-added model (-94.13). Ownership by the Public Investment Corporation had a negative and statistically significant coefficient at the 1% level with return on equity (-2.29). Company ownership's coefficients had negative and statistically significant relationships with Tobin's Q (5% level) and economic value-added (1%) as well as a positive and statistically significant relationship at the 1% level with the market value-added model (9.16). The overall effect was therefore negative. Negative effects were observed between foreign ownership and firm performance and return on equity and Tobin's Q variables at the 1% level. Positive coefficients were found with return on assets (at the 1% level) and market value-added (at the 10% level), leading to an overall marginally negative effect. Ownership by other shareholders had a negative and statistically significant coefficient at the 5% level with return on equity (-7.41).

Black ownership's coefficients were statistically significant at the 1% level in four models, two were positive with return on assets and return on equity variables, and the other two were negative with Tobin's Q and market value-added variables. The resultant effect with firm performance was therefore mixed.

Control variables which had positive coefficients in the performance models were size, tangibility, age and liquidity, yielding similar results to those obtained in the analysis as was the case for the top five shareholders. For size, two coefficients were positive and statistically significant at the 1% level, with one coefficient having a negative and statistically significant relationship at the 5% level. Hence the overall effect of firm size on firm performance was positive. Tangibility had three coefficients which were positive and statistically significant at the 1% level and one coefficient which was negative and statistically significant at the 5% level, resulting in a positive overall relationship. Four coefficients for the age variable had four coefficients with corporate performance

variables, which were statistically significant at the 1% level, showing a strong positive relationship. Liquidity had a low, positive and statistically significant coefficient at the 1% level with economic value-added. Increases in these variables were associated with increases in corporate performance.

Negative coefficients for control variables were observed for non-debt tax shields, dividend payout ratio, risk, growth and total debt ratio, as was the case in the top five shareholders scenario. Non-debt tax shields had negative and statistically significant coefficients with return on assets and the return on equity at the 5% and 1% levels respectively, as well as a positive coefficient and statistically significant coefficient with economic value-added, resulting in a negative effect. Dividend payout ratio had negative and statistically significant coefficients at the 5% level with return on assets and economic value-added variables, and a positive and equally statistically significant coefficient with market value-added, resulting in a negative effect. The coefficients for risk were negative and statistically significant at the 1% level with return on equity and economic value-added at the 5% level with the return on assets model. The coefficient for risk associated with Tobin's Q model was positive and statistically significant at the 5% level. Hence the effect on firm performance was negative.

Growth had negative and statically significant coefficients at the 5% and 10% levels with return on assets and return on equity and a positive and statistically significant relationship at the 5% level with market value-added. Coefficients for total debt ratio were negative and statistically significant with return on assets, market value-added (5%) and Tobin's Q (10%) and positive and statistically significant with return on equity (5%) and economic value-added (1% level). The overall effect of total debt ratio on firm performance was therefore negative. Increases in these variables were associated with decreases in corporate performance.

The adjusted coefficients of determination (R^2) of the corporate performance models varied widely from 17% for the model with Tobin's Q to 86% for market value-added, displaying low to high explanatory power of the independent variables. The coefficients of determination of all other models, apart from the one with Tobin's Q, were greater than 60%. The Durbin-Watson test statistics observed were between 0.29 for the corporate performance model with return on assets and 0.75 for economic value-added,

which were below two, indicating the potential presence of serial correlation. The p-values of the J-statistics for all five firm performance models, except for the one in which Tobin's Q was the dependent variable, were not statistically significant at the 5% level, showing that the models did not fit well. The model with Tobin's Q had a p-value, which was statistically significant at the 5% level. The summary results showed that the generalised method of moments model with a lagged dependent variable did not appear to be appropriate for measuring the effects of ownership on firm performance except when Tobin's Q was the dependent variable. Therefore, the results incorporating Tobin's Q were used in drawing conclusions, while the rest of the results were dropped.

8.7 CONCLUSION

The effects of ownership on corporate performance were analysed using the fixed effects method, the generalised method of moments approach without a lagged variable and the generalised method of moments approach with a lagged variable. The analyses were carried out at the top one, two, three, five and top 10 shareholders levels, using the Herfindahl index as a measure of ownership concentration.

Out of the five models for dependent variables used in the fixed effects approach, economic value-added yielded statistically insignificant results at all levels of shareholding. Hence the results for the economic valued-added dependent variable were not used in drawing conclusions. Return on assets, return on equity, Tobin's Q and market value-added yielded statistically significant results at all shareholders levels. The generalised method of moments approach without a lagged variable had statistically significant results for the return on assets dependent variable at the top one, top two, top five and top 10 shareholders levels. The top two shareholders level had additional statistically significant results for the return on equity, Tobin's Q and market value-added dependent variables. Results for the market value dependent variable were also statistically significant at the top five shareholders level. For the generalised method of moments approach with a lagged variable, statistically significant results were recorded for Tobin's Q (top two and 10 shareholder levels) and market value-added at the top three and five shareholders levels. Conclusions are drawn only from the statistically significant models and variables. The results are summarised in Chapter 9.

CHAPTER 9:

CONCLUSION

9.1 INTRODUCTION

This study was undertaken because of the absence of empirical evidence to show the effects of ownership on capital structure and firm performance in developing countries, mainly for South African-listed firms. The pooled ordinary least regression model was not employed in the analysis of data due to the evidence from previous studies which indicated that the model was not suitable for panel data analysis. In addition, as the panel was unbalanced, the random effects model was not used because it was considered inappropriate and other studies which attempted to use the model found it not suitable. The fixed effects approach was used in order to allow for unobserved heterogeneity. In addition, the generalised method of moments approach was employed because of its capability to handle the problem of endogeneity. Two versions of the generalised method of moments model (one with a lagged variable and another without a lagged variable) were used in the study. The study is one of the first to examine the effects of ownership on capital structure and firm performance using data on South African-listed firms.

This section summarizes the structure of the rest of the chapter. Section 9.2 provides a summary of the results of the analysis of the effects of ownership on capital structure. Section 9.3 discusses the results of the effects of ownership on capital structure. Section 9.4 provides a summary of the results of the analysis of the effects of ownership on corporate performance. Section 9.5 discusses the results of the effects of ownership on corporate performance. Section 9.6 provides the policy implications or recommendations following from the results, while Section 9.7 discusses the limitations of the study. Section 9.8 provides recommendations for further study and Section 9.9 concludes.

9.2 CONCLUSION: EFFECTS OF OWNERSHIP ON CAPITAL STRUCTURE

The results are summarised in Table 9.1, showing the hypotheses tested in the study of the effects of ownership on capital structure.

Table 9.1: Summary of results: effects of ownership on capital structure

Hypothesis	Sign of coefficient	Accept/Reject hypothesis
H_{a1}: There is a significant relationship between concentrated ownership and capital structure	Negative	Accept
H_{a2}: There is a significant relationship between family ownership and capital structure.	Positive	Accept
H_{a3}: There is a significant relationship between managerial ownership and capital structure.	Positive	Accept
H_{a4}: There is a significant relationship between institutional ownership and capital structure.	Positive	Accept
H_{a5}: There is a significant relationship between foreign ownership and capital structure	Positive	Accept
H_{a6}: There is a significant relationship between black ownership and capital structure.	Negative	Accept
H_{a7}: There is a significant relationship between company ownership and capital structure.	Positive	Accept
H_{a8}: There is a significant relationship between government ownership and capital structure.	Mixed	Accept
H_{a9}: There is a significant relationship between the Public Investment Corporation ownership and capital structure.	Negative	Accept
H_{a10}: There is a significant relationship between other shareholders ownership and capital structure.	Positive	Accept

9.3 DISCUSSION: EFFECTS OF OWNERSHIP ON CAPITAL STRUCTURE

9.3.1 Effects of ownership concentration on capital structure

The study found a negative and statistically significant relationship between concentration of ownership as measured by the Herfindahl index from the top one to the top 10 shareholders level for the fixed effects method in South African firms. Both versions of the generalised method of moments approach had positive relationships but the results were not statistically significant. The results implied that in the sample of South African firms, as the ownership concentration increased, the usage of debt in the firm's capital structures decreased. Top shareholders therefore preferred to use less debt in the firms that they controlled. Given that lenders are associated with additional monitoring of management on behalf of shareholders, the implication would be that the large shareholders did not consider such a role for lenders to be an important one in their firms. Lin, Ma, Malatesta and Xuan (2013:517) observe that large shareholders

avoid bank lending (and in this case prefer public debt), in order to avoid scrutiny and monitoring by banks. It could be that the large shareholders want to do the monitoring on their own due to the perception of their capacity to do so (Moh'd *et al*., 1998:91), or that they prefer to control their firms without necessarily having to make reference to the lenders. Risk aversion on the part of the large shareholders could also explain the negative relationship (Faccio, Marchica & Mura, 2011:3602; Santos, Moreira & Vieira, 2014:1084).

Since the average age of the firms in the sample was 25.63 years, some firms were probably in their mature stages and did not have high cash needs. Alternatively, if they had such requirements, they could be met from internal investee companies' resources or obtained from the parent companies or general equity financing potential (Schmid, 2013:262), if they were part of a group.

9.3.2 Effects of family ownership on capital structure

There was a positive and statistically significant relationship between family ownership and capital structure. In line with the fact that South Africa is a bank-based economy, the availability of debt makes it possible for family shareholders to raise debt for their companies. The long-established relationships associated with family-owned companies should make it easier for these companies to have such links with banks to enable them to obtain debt (Schmid, 2013:258).

Families, as shareholders, may have limited resources and therefore be unable to follow on equity calls if additional finance is required in the form of equity. If families are unable to raise additional equity and other shareholders do so, their shareholding is diluted. Croci, Doukas and Gonenc (2011:860) report that family firms prefer debt because it is a non-control diluting security. As a result, family-owned companies may prefer to fund their companies using debt rather than equity, leading to a positive relationship between family ownership and capital structure. If the family-owned firms are led by professional management rather than family members, debt may be used as a tool for controlling management. A positive relationship between family ownership and debt was also observed in small capitalisation public firms in the USA (Back, Cho & Fazio, 2016:169).

9.3.3 Effects of managerial ownership on capital structure

A positive and statistically significant relationship was observed between managerial or directors' ownership and firm leverage. A possible reason for the relationship could be the control argument (Kim & Sorensen, 1986:131). By financing corporations with debt, the management does not dilute its ownership in the firm. Limited personal wealth restrains management from following up on calls for additional equity. Hence the use of debt enables management to obtain finance and yet maintain its shareholdings. The shareholdings by management enable it to direct the firms in the way it intends to and also affords it power to decide how resources in the firms can be utilised. Funds available may be used by managers to pursue their own interests, exacerbating the agency problem. High debt levels may assist management to resist takeovers (Harris & Raviv, 1988:56). In addition, management can utilise debt for self-control or self-monitoring (Sun, Ding Guo & Li, 2016:450) to ensure that the lenders can always keep the management within accepted norms.

To the extent that lenders act as monitors to the borrowing firms, management would be restrained from consumptions of perquisites or acting in its own self-interest. The banking system in South Africa is fairly developed. However, as long as the borrowers are within their debt covenants, the role of the banks in monitoring may be limited, leaving some discretion to the management.

9.3.4 Effects of institutional ownership on capital structure

The research on the effects of ownership on capital structure found a positive relationship between institutional ownership and leverage. Institutional investors play an important role in managing and investing funds on behalf of the public, among other functions. In South Africa, the major banks are owned by or affiliated to insurance companies, as follows: Absa Bank (Sanlam), Standard Bank (Liberty Life), Nedbank (Old Mutual) and First National Bank (Momentum Life). Although these institutional investors, banks and other investee firms are related, they generally operate quite independently. Hence investee companies raise their own finance. However, the

knowledge that an investee company which may be seeking funds is owned by any of these large institutional investors provides comfort to lenders that the loan will be repaid. Hence ownership by institutional investors may have a signalling effect.

Firms which are owned by financial institutions have been found to have better access to finance (Margaritis & Psillaki, 2010:626). The institutional investors may prefer to use banks in a complementary role as monitors of management, resulting in higher debt levels. Institutional ownership was reported to have a positive relationship with leverage in Canada (King & Santor, 2008:2429) and the UK (Sun *et al.,* 2016:448).

9.3.5 Effects of foreign ownership on capital structure

The relationship between foreign ownership and capital structure was positive and statistically significant. Foreign investors were associated with having access to a variety of sources of finance from different jurisdictions. Their international expertise and experience enable them to reduce their cost of capital. In addition, they usually have stronger balance sheets than local firms. Vo (2011:3), Dahlquist and Robertsson (2001:413) found that most of the foreign investors in the Vietnamese study were institutional investors. The positive relationship between debt and foreign ownership could be attributed to the competitiveness of the South African banks, leading foreign investors to have a greater appetite for South African debt in their investee companies' capital structures. In addition, foreign investors may recognise the information asymmetries between them and local investors due to their limited knowledge of the local environment. Debt may therefore be used to mitigate agency problems (Phung & Le, 2013:40). Hence foreign shareholders may prefer more debt in the firms they own.

9.3.6 Effects of black ownership on capital structure

The study observed a negative and statistically significant relationship between black ownership and capital structure in South African firms. The study covered the second decade of the South African democratic period from 2004 to 2014, with the country having attained democratic rule in 1994. The historical exclusion of black people from the mainstream economy made it difficult for them to accumulate capital. Black equity

participation was mainly financed by banks and government-owned development corporations such as the Industrial Development Corporation. Banks mainly used debt to finance such equity stakes, while the state-owned corporations mainly used preference share structures to finance the black equity stakes. The repayment periods of such loans and vesting of such shares were commonly long. The repayment of the financial instruments was based on dividends from the investee companies. During the periods of such indebtedness, any additional debt on the investee companies would potentially limit the capacity of such firms to make other payments before dividends, which would lead to a potential default on the black ownership financing. Hence companies in these positions tended to shun debt, leading to a negative relationship between black ownership and leverage.

The results can be contrasted with those obtained by Ezeoha and Okafor (2010:256), who found a positive and statistically significant relationship between local ownership and total debt in Nigeria. It must be emphasised that the local ownership was greater than foreign ownership, whereas black ownership in South Africa was very small, and that black ownership was one of several components of local ownership. Black ownership may also have a negative effect on debt because black shareholders' wealth portfolios were not diverse and they were risk averse, as was the observation for families in the study by Santos *et al.* (2014:1063).

9.3.7 Effects of company ownership on capital structure

The research found a positive and statistically significant relationship between company ownership and capital structure. Hence as company ownership increased, the leverage in the investee company increased. Where companies which own shares in the investee companies have long-established relationships with banks in their own right, these relationships are likely to be passed on to the investee companies. Although the investee companies are assessed for their creditworthiness, the track record of the parent company may not be ignored in the credit decision. In addition, conditional or implicit guarantees are embedded in holding company-subsidiary structures, leading to increased debt, when compared with stand-alone firms with no similar guarantees (Luciano & Nicodano, 2014:2736). Schiantarelli and Sembenelli (2000:175) argue that

investee firms that are affiliated to business groups are also expected to have better access to capital markets within their group structures as well as outside their group structures than firms that are not affiliated. The experience gained by the parent in approaching and raising money from such markets is used in the affiliates. Manos, Murinde and Green (2007:463) found statistically significantly higher leverage in group affiliates than in stand-alone firms in India. For investee companies that were owned by non-group companies such as shelf companies, which had limited resources, the positive relationship could be due to the reluctance of such shareholders to dilute their shareholdings and hence preferring to raise debt finance rather than equity.

9.3.8 Effects of government ownership on capital structure

The relationship between government ownership and capital structure was mixed. The results of some models were positive and statistically significant, while an equal number showed negative and statistically significant results. These results could be explained by the nature of organisations that comprised government ownership. By way of an example, one of the state-owned companies which held shares in listed companies was the Industrial Development Corporation, which finances industrial firms in project development, implementation and operation phases. The corporation takes equity and debt positions in investee companies and may continue to provide debt to such investee companies on its own account. As the companies require more finance, commercial banks also co-lend to the companies. The presence of the corporation as a major shareholder provides comfort to commercial banks to lend comfortably to the investee company. A positive relationship between government ownership and capital structure would ensue from such ownership and is purely commercially driven.

The state may own shares in firms which are deemed to be strategic but making losses. In those cases, the government remains a shareholder and does not provide any guarantees on behalf of the investee company. A negative relationship between government ownership and capital structure could ensue from such a scenario. The combination of the positive relationship, on the one hand, and the negative relationship, on the other, could explain the mixed relationship.

9.3.9 Effects of Public Investment Corporation ownership on capital structure

This study observed a negative and statistically significant relationship between the Public Investment Corporation ownership and corporate leverage. The hybrid nature of the Public Investment Corporation as an organisation makes it unique as an ownership type and its inclusion in the analysis is part of the contribution of the study. As a manager of the South African Government Employees Pension Fund, the Public Investment Corporation would be classified as an institutional investor. However, since the same organisation is a state institution, it is part of government. The Public Investment Corporation, in turn, outsources fund management services to other privately owned financial institutions. To the extent that the private fund managers are incentivised to maximise returns to remain on the list of service providers to the Public Investment Corporation, they will maximise short-term profits and this may include investing in companies that have low debt levels and therefore higher free cash flows. From the monitoring argument's perspective, the private institutional investors may be taking the monitoring role of the investee firms and supplanting lenders. These arguments point to a negative relationship between the Public Investment Corporation and the capital structure of investee firms.

From a government perspective, the Public Investment Corporation had a strong balance sheet with highly liquid assets. In relation to its co-shareholders in investee companies, the Public Investment Corporation is probably held in high esteem. It can follow on equity calls with no difficulties and for that reason it may not prefer to use debt in the capital structures of its investee companies. Large shareholders have also been known to prefer to reduce debt due to risk aversion (Boubaker, Nguyen & Rouatbi, 2016:700).

9.3.10 Effects of other shareholders ownership on capital structure

The study found a positive relationship between ownership and other shareholders. This group consisted of all other shareholders which could not be classified into the groups above, hence it was diverse. The other shareholders preferred to utilise more debt in the capital structure of their investee companies.

9.4 CONCLUSION: EFFECTS OF OWNERSHIP ON CORPORATE PERFORMANCE

Table 9.2 shows the summarised results of the study on the effects of ownership and firm performance in South African-listed non-financial firms for the period 2004 to 2014. The fixed effects method and the two versions of the generalised method of moments approaches, where the models had statistically significant results, were used to arrive at the conclusions.

Table 9.2: Summary of results: effects of ownership on corporate performance

Hypothesis	Sign of coefficient	Accept/Reject hypothesis
H_{a11}: There is a significant relationship between concentrated ownership and corporate performance.	Mixed	Accept
H_{a12}: There is a significant relationship between family ownership and corporate performance.	Mixed	Accept
H_{a13}: There is a significant relationship between managerial ownership and corporate performance.	Negative	Accept
H_{a14}: There is a significant relationship between institutional ownership and corporate performance.	Negative	Accept
H_{a15}: There is a significant relationship between foreign ownership and corporate performance.	Positive	Accept
H_{a16}: There is a significant relationship between black ownership and corporate performance.	Negative	Accept
H_{a17}: There is a significant relationship between company ownership and corporate performance.	Mixed	Accept
H_{a18}: There is a significant relationship between government ownership and corporate performance.	Mixed	Accept
H_{a19}: There is a significant relationship between the Public Investment Corporation ownership and corporate performance.	Negative	Accept
H_{a20}: There is a significant relationship between other shareholders ownership and corporate performance.	Positive	Accept

9.5 DISCUSSION: EFFECTS OF OWNERSHIP ON CORPORATE PERFORMANCE

9.5.1 Effects of ownership concentration on corporate performance

This study observed a mixed relationship between ownership concentration and corporate performance. The result meant that some investee firms whose shareholders had larger stakes in them performed better while others performed worse than those with lower levels of shareholding. Larger ownership stakes enabled shareholders to control their investee firms and enabled the shareholders to influence the strategic direction of the firms by being members of their boards. Positive relationships may therefore be found between the concentrated ownership and firm performance. Isik and Soykan (2013:23) argue that concentration of ownership reduces the conflict of interest between minority shareholders and the company's management. If the large shareholder already has expertise and resources, these can be deployed in the investee company, leading to better performance.

Concentrated ownership can lead to entrenchment of the large shareholders, who then use the firm's resources to their own benefit, at the expense of the other shareholders as well as to the detriment of the performance of the company. Negative relationships between concentration of ownership and firm performance have been observed in other emerging markets (Wang & Shailer, 2015:199). Alipour (2013:1160) found mixed results between ownership concentration and corporate performance in Iran. In particular, they found return on assets positively related to ownership concentration, while return on assets and Tobin's Q were inversely related to the same variable. A combination of these factors could be the reason for the mixed relationship between ownership concentration and corporate performance in South African firms.

9.5.2 Effects of family ownership on corporate performance

The research found a mixed relationship between family ownership and corporate performance. A possible explanation for this result could be that the families owned companies and passed them on from one generation to another. Performance was

found to be lower when non-founder members of families take over the leadership of such firms (Villalonga & Amit, 2006:385). In South Africa, some companies such as Anglo American Corporation, Pick 'n Pay and Altron groups passed on managerial functions to non-founder family members as well as professional managers. The average age of a firm in this study was 25.63 years with a maximum of 55 years, indicating that this phenomenon could be present in the South African corporate environment. Additionally, family firms have been associated with employment of staff on the basis of family relationships rather than on merit. Performance of such staff tends to be lower and may partially lead to a negative relationship between corporate performance and family ownership. Plausible reasons for such practices include protecting the family legacies as well as succession planning, all of which may not be directly related to positive firm performance.

By the same token, firms which are run by their founders would be expected to perform well. In addition, long-standing relationships with stakeholders may enable firms to manage their processes better. Families may also have access to knowledge passed down generations, which enables the firms to thrive even in adverse conditions. Longer investment horizons (Miller & Le Breton-Miller, 2005:11), close relationships between the families and senior managers could also be reasons for better performance by family-owned firms. These factors may be associated with better family firm performance. The mixed relationship between family ownership and corporate performance could be partially due to a combination of these factors.

9.5.3 Effects of managerial ownership on corporate performance

The study found a negative relationship between managerial ownership and firm performance. Agency theory explains that when managers are not owners of firms that they manage, they are not incentivised to make decisions in the interests of shareholders. Hence when the management has ownership, the interests of management and other shareholders should be aligned, leading to a reduction in agency costs and increased performance. If managerial ownership also exceeds certain levels, then managerial entrenchment may set in (Shleifer & Vishny, 1989:123). When managers become entrenched (Kumar & Rabinovitch, 2013:899), it becomes difficult

for them to be removed. In such instances, the management may use its control of the company to extract benefits and make decisions which are not necessarily in the best interest of the firm, leading to lower firm performance. In addition, if managerial monitoring by the large shareholders is not effective, perhaps linked to the free-rider problem where smaller shareholders expect larger shareholders to monitor, but they actually do not, the same result may ensue.

9.5.4 Effects of institutional ownership on corporate performance

The research found a negative relationship between institutional ownership and firm performance. Institutional investors have been associated with access to resources which many ordinary shareholders do not have. Institutional investors take stakes in different companies and have the expertise and systems to monitor and direct their investments towards good performance. The spread of their investments in different companies also enables institutional investors to understand the interrelationships between various sectors in the economy. If such knowledge is utilised advantageously in making investment and financing decisions in investee companies, better performance is expected to be the result.

The average shareholding of institutional investors in the study was 13.74%. A number of institutional investors would constitute such a shareholding. The average percentage held by any single institutional investor would therefore be much smaller. With small shareholdings, some of the benefits attributed to institutional investors may be lost. The result may be portfolio investments in the shares of companies, with little monitoring of management by any particular institutional investor (Maug, 1998:67). In this case, it would be a version of what Davis (2008:11) observes, where there is ownership without control. Stated differently, the relatively small shareholdings may not provide institutional investors with board seats to enable them to exercise more oversight on management. In addition, institutional investors may not have incentives to monitor management (Villalonga & Amit, 2006:387). If such situations prevail, management teams may have the latitude to lead the firms as they deem fit, knowing that there is very little monitoring. Cornett, Marcus, Saunders and Tehranian (2007:1792) state that certain types of institutional investors (pressure-sensitive or those that may have

business relations with investee firms) may even be compromised as monitors of management. Negative and statistically significant coefficients were reported for return on assets and Tobin's Q measures under institutional ownership in Jordan (Zeitun, 2009:104).

9.5.5 Effects of foreign ownership on corporate performance

The study observed a positive relationship between foreign ownership and firm performance. The rationale for such a result is that foreign investors have the skills, systems, experience and resources to manage firms in which they invest. Such investors have the ability to manage firms in different situations and can use the knowledge acquired from operating in different jurisdictions to navigate the business environments that they find themselves in, such as South Africa. Ting *et al.* (2016:1) found a similar relationship between foreign ownership and corporate performance in Malaysia as well as Uwuigbe and Olusanmi (2012:208) in Nigeria and Abor and Biekpe (2007:288) in Ghana. Higher productivity, managerial efficiency and use of the latest technology were some of the reasons for the results obtained in other countries, which could apply to South Africa.

9.5.6 Effects of black ownership on corporate performance

The study found a negative relationship between black ownership and corporate performance. The result could partially be explained by how this type of ownership arose. For some companies, the introduction of black ownership was due to government regulations, which stipulated that for such companies to be eligible for government contracts, they needed a certain percentage of black shareholding. In the absence of such ownership, the income of these firms was expected to fall. There was also a time lag between the requirement for black shareholding and the full assumption of ownership by that group. Some opportunities which would have been available in the first instance were lost. Hence by the time black ownership was secured, there may have been fewer or no opportunities. Negative corporate performance could be the result.

In addition, if black ownership is financed through loans or preference shares, the repayment is expected from dividends. The unavailability of such dividends may trigger default provisions in loan agreements or may necessitate an extension of the period over which the financial instruments may be paid off. The investee company may feel compelled to pay dividends even if that may not be in the best interest of the company. Some investment opportunities may be missed leading to lower corporate performance.

9.5.7 Effects of company ownership on corporate performance

The research found a mixed but statistically significant relationship between company ownership and corporate performance. The spectrum of companies as owners in South Africa was fairly wide, ranging from the smaller close corporations, which were in the process of being phased out, private companies and public companies. Some companies may simply be vehicles for holding shares and may not be engaged in any other business. Such entities may have neither the expertise nor resources to monitor the investee companies to perform well. Such a scenario could result in a negative relationship between corporate ownership and performance.

On the other hand, there are large companies which have subsidiaries and associates which are also listed on the stock exchange. These companies have the capacity to provide leadership and other resources to the investee companies, making them perform better than they otherwise would. In addition, companies as owners have been argued to be close to managers of investee companies and to have an interest in getting better returns from their investments. This may imply that the investee companies may be closely monitored, leading to better performance. A positive relationship between firm performance and corporate performance was reported in the study by Alipour (2013:1137). The companies which owned shares in the South African-listed firms could be from both ends of the company spectrum, partially explaining the mixed relationship.

9.5.8 Effects of government ownership on corporate performance

The research found a mixed and statistically significant relationship between government ownership and corporate performance. The results could be explained by

the nature of objectives of the state entities that held the shares in the listed firms. Ownership was held by state-owned profit-making entities such as the Industrial Development Corporation as well as other corporations which may have had other strategic goals as their prime objectives. Due to strategic objectives such as employment creation or saving jobs, the state may hold a stake in a firm which is in a distressed industry, simply to ensure that jobs in that firm are preserved, with the hope that when the economic or commodity cycle turns, the firm will make money. In other cases, the investments in some firms were made by the state to develop and preserve strategic inputs into downstream industries in the economy in order to guarantee security of supply. In this case, the state may continue to hold shares in the firm in order to enable the industry to survive. Zeitun (2009:96) reports a negative relationship between government ownership and corporate performance in Jordan.

However, some of the state-owned entities which hold shares in investee companies are run on commercial lines. The Industrial Development Corporation, for instance, is a founder member and still a shareholder in some of the large companies listed on the JSE Securities Exchange, such as Sasol. The commercial orientation also compels these shareholders to monitor their investments to ensure that they provide good return to the investor. Such actions lead to positive results. Varied objectives and the bases on which the state-owned entities are expected to operate could explain the mixed relationship between government ownership and corporate performance. Uddin, Halbouni and Raj (2014:233) observed mixed results in the United Arab Emirates, with opposite signs between market and accounting measures and no effect using economic efficiency measures.

9.5.9 Effects of Public Investment Corporation ownership on corporate performance

The study recorded a negative and statistically significant relationship between the Public Investment Corporation ownership and firm performance. The Public Investment Corporation partially outsources the function of investing funds to other fund managers, in addition to their direct investments. The Public Investment Corporation is therefore split into several smaller portfolios which are then monitored. The fund managers, in

turn, may be expected to monitor the investee companies. As long as the fund managers can meet the performance criteria set by the Public Investment Corporation, the outsourcing relationship is likely to continue.

A related explanation could be that the Public Investment Corporation may be assumed to be monitoring its investments when they are thinly spread across their investment portfolio. Hence the level of monitoring may be low. On the other hand, other shareholders may be expecting the Public Investment Corporation to do the monitoring due to the size and financial resources of the organisation. Low levels of monitoring or the absence thereof may result in reduced levels of corporate performance.

As a government entity and an institutional investor, the investment horizon of the Public Investment Corporation is expected to be long. Any disinvestment of the Public Investment Corporation from an investment in its portfolio could be perceived to convey an adverse message to the market and would have to be done cautiously. Strategic considerations may be very important for the investments in which the Public Investment Corporation participates. Such considerations may lead to a negative relationship between Public Investment Corporation ownership and the corporate performance.

9.5.10 Effects of other shareholders ownership on corporate performance

The study found a positive relationship between ownership by other shareholders and corporate performance. The other shareholders were a residual group, after the shareholders were classified into the groups discussed above. This ownership type enabled the study to ensure that the shareholders at each of the top one, two, three, five and 10 levels could be accounted for. Hence it included charities and trade unions, among others. No general pattern could be derived from such ownership and consequently, there was no direct explanation for this ownership type.

9.6 POLICY IMPLICATIONS

9.6.1 Effects of ownership on capital structure

The results of the study lead to recommendations for government policy and South African firms. The type of ownership was shown to affect the capital structure of a firm. In essence, type of ownership matters. Family ownership was shown to have a positive effect on capital structure. This implies that the ownership by families should be promoted for the economy to continue to increase the demand for corporate debt, thereby increasing the level of economic activity not only in the banking sector but in the firms. Such ownership would be promoted from small and medium enterprises because these organisations may eventually grow to be listed companies.

The corollary of the same policy is to ensure that while entrepreneurship by families is encouraged, the availability of finance from financial institutions should increase. The use of debt to leverage financial resources enables the limited equity provided by families and other types of ownerships to finance investments which they would otherwise have been unable to take up on their own.

Black ownership had a negative association with capital structure. As black ownership increased, leverage decreased. The result could be due to the use of funding of debt-type instruments to fund equity. Government policy aims to increase ownership of the economy by black people. This population group historically had low capital accumulation and hence limited financial resources for use as equity in its investments. Given that the majority of the population in South Africa is black and that business ownership has to be promoted to reflect the demographics of the population, innovative ways have to be found to provide finance to black investors. These may include increasing the supply of finance available to this population group from the banking sector or from government-owned institutions. Different approaches to risk may be needed. As an example, properties in certain areas of South Africa may not be considered as security for banking purposes, yet that may be all they have.

In addition, greater emphasis should be placed on creating new productive capacity in the economy by the black population, leading to increased black ownership, rather than emphasising sharing or redistributing ownership of existing companies. Such a policy may assist in increasing the actual ownership percentage that this population group has by virtue of being the founders of the businesses. The current policy tends to encourage the acquisition of a small stake, which is likely to be sold at a premium, but not providing the buyer of the shares with a meaningful stake.

Institutional investors, foreign investors and companies had positive and statistically significant relationships with capital structure in South African firms. The complementarity between equity investors and debt providers is essential to the development of firms and hence the economy as a whole. The policy-makers need to ensure that a conducive environment is maintained for these equity investors to continue to invest in South African firms and that their investee companies can raise the debt that is required. The complementary monitoring roles between these equity investors and debt-holders are essential for good corporate governance. However, the negative relationship between the Public Investment Corporation ownership and capital structure may imply that the Public Investment Corporation is averse to debt. Firms in which these shareholders have equity may unnecessarily be constrained for growth. Policies to change the perception regarding the role of debt may be necessary.

The banking sector in South Africa currently consists of five major banks. The regulatory environment appears to favour large banks, presumably in order to manage the possibility of bank failure. In other words, when banks are large, they may be too big to fail. However, the small number of players in the provision of finance creates an oligopolistic situation where competition may be stifled, leading to higher prices and increased cost of capital to borrowers. Policy-makers should consider the creation of smaller banks which may be nimble enough to take advantage of the diverse debt requirements of the different types of shareholders and other potential borrowers in the South African economy.

9.6.2 Effects of ownership on corporate performance

Foreign ownership was positively related to corporate performance in South African firms. As ownership by foreigners increased, firm performance improved. A policy implication of this result is that the economic environment should be friendly to foreign investment. Such an environment attracts foreign investors and the benefits attributed to such ownership, including skills, experience and financial resources, which are all necessary ingredients of economic growth.

Performance was negatively related to black ownership. Policy-makers need to create an environment that enables black-owned businesses to thrive. It could be that black ownership was going mainly to companies which were already not performing well. Hence black ownership would have been seen as a panacea for better performance, which then turned out not to be the case. Training needs for the black owners may need to be dealt with due to the historical lack of formal exposure to the nuances of business.

Institutional investors are a major type of shareholder for listed firms. They manage money on behalf of the public and other investors. Generally, they are associated with monitoring investee companies because of the resources that they manage. Prudence would dictate that they spread their investments across different investments. The lower the percentage they invest in any firm, the lower their exposure to that particular firm. However, the low exposure may not make it worthwhile for the institutional investor to monitor the investments optimally, which may lead to negative performance. Institutional investors therefore have to adopt strategies of portfolio allocation bearing in mind their perceived role as monitors.

9.7 LIMITATIONS OF THE STUDY

Even though the study did answer the research questions and provided insight into the effects of ownership on capital structure and corporate performance in South Africa, an emerging market, there were limitations.

Firstly, the period for which the study was conducted was relatively short. Data was collected for the period 2004 to 2014, a period of 11 years. The starting point was determined by the availability of data on the database used, which collected ownership information from 2004. Some companies which had not migrated to the electronic share transfer system of the JSE Securities Exchange would not have individual ownership information and were therefore excluded from the analysis, leading to fewer observations. The exclusion of such observations may affect the reliability of the results. Results of the research may be partly affected by the global financial crisis because some of the data pertained to that period. More research would be required to explore the effects of the crisis on the results.

Secondly, the study considered the potential use of different methods such as ordinary least squares, fixed effects, random effects and the generalised method of moments. The fixed effects method and two versions of the generalised method of moments approaches were eventually used to analyse the data. The fixed effects method, while having the advantage of overcoming the heterogeneity problem, cannot resolve the endogeneity problem, where there may be reverse causality, for instance. Roodman (2009a:135) argues that the generalised method of moments approach is complicated and can easily generate estimates that are unreliable. However, the availability of different econometric tests ensures that meaningful results can be obtained.

In addition, the research was conducted in a single country, South Africa. The applicability of such results to other countries may be questionable. This is especially true given that South Africa was only 10 years into democracy at the start of the sample period. The argument would therefore be for the inclusion of more than one country to make the results more widely applicable. However, South Africa has some of the typical characteristics of emerging economies that make the results applicable to other developing countries. The study's focus on one country as opposed to a few countries promoted a narrower and deeper approach, which is not necessarily possible where several countries are studied together.

Analysis of shareholdings was conducted at the top one, two, three, five and 10 shareholders levels. An analysis of the total number of shareholders for each firm would probably give a more accurate picture of the ownership and its effects on capital

structure and corporate performance. However, the efficacy of such an approach would be doubtful given the large numbers of shareholders and the changes that take place in shareholdings from time to time. In addition, the current study used five levels of shareholding whereas other studies used one or two levels only.

Corporate ownership was analysed only one level up and not at the ultimate owners level. One owner could invest in the same company using different types of vehicles. The current study treated all the owners individually without relating them to each other. Knowledge of ultimate ownership provides exact information regarding the types of shareholders, but requires extensive separate analysis.

Finally, the shareholdings by directors were available for all shareholders rather than at the different levels for all the other types of shareholders. As a result, the analysis for this type of shareholder remained constant across all levels of shareholdings. An analysis where the different levels are taken into account could lead to a different result, at the different levels, although across all shareholders, the result would be as analysed in this study.

9.8 RECOMMENDATIONS FOR FURTHER RESEARCH

Institutional investors play an important role in managing funds on behalf of investors. Hence they are generally assumed to have sufficient resources to both conduct research and monitor their investee companies. The portfolios that are managed by the institutional investors would be expected to yield increasing returns to investors. However, the concept of heterogeneity of institutional investors in terms of their levels of ownership, investment strategies and durations of their investments needs further examination so that issues of monitoring by these investors and their effects on leverage and corporate performance can be better understood.

In light of the role played by the Public Investment Corporation in managing the Government Employees Pension Fund and other government funds and its investments directly and through other fund managers, further research is required to understand how managerial monitoring is conducted and the effects thereof, in this multilayered

approach. For example, if different fund managers, acting on behalf of the Public Investment Corporation, and the Public Investment Corporation as direct investors, are shareholders in one company, for corporate governance reasons, these shareholdings may not be aggregated, leading to a lower perceived shareholding, less control and probably lower levels of monitoring. Such research may provide more light on the effects of ownership by the Public Investment Corporation on capital structure and firm performance.

The presence or absence of non-linear effects of managerial ownership and foreign ownership on corporate performance and capital structure was not examined in the current study. Further research in this direction would lead to a better understanding of the extent of alignment and entrenchment effects as they pertain to these types of shareholders. Such research would indicate the levels of ownership that are optimal for these types of shareholders and those which are not.

Family ownership had a mixed effect on firm performance. Hence some firms had a positive effect on firm performance while others had a negative effect. This type of ownership is important in the South African economy and warrants further examination. The current study did not delineate whether the family firms were managed by family members and professional managers, nor did it investigate whether the family firms were run by founders or successors to founders. Further studies on these aspects of family ownership would provide more insight into these important aspects of family ownership and their effects on firm performance.

An examination of the funding sources and structures of black business ownership is another potential area for further research. Whereas the acquisition shareholdings in existing businesses by black people were initially funded by development financial institutions such as the Industrial Development Corporation, the Development Bank of Southern Africa and the National Empowerment Fund, commercial banks and other funds have and continue to provide such funding. The mismatch between using debt for funding equity remains unresolved in most of the structures. In addition, the JSE Securities Exchange also has a few black-founded listed firms. The effects of black ownership on capital structure and corporate performance on these difference sub-groups could shed more light on policy.

9.9 CONCLUSION

This study set out to investigate the effects of ownership on capital structure and corporate performance. The extant literature was reviewed and the relevant hypothesis formulated. Data to test the hypotheses using the appropriate methodology was collected and analysed. Ownership was subdivided into ownership concentration, which was measured by the Herfindahl index, and the types of ownerships. The types of ownerships were institutional investors, the Public Investment Corporation, families, companies, management or directors, foreigners, government, black people and other shareholders. The first conclusion is that ownership affected capital structure: positively for institutional, family, company, management, foreign and other shareholders ownership; and negatively for concentrated ownership, ownership by the Public Investment Corporation and black people. The effect of government ownership on capital structure was mixed. The last conclusion is that ownership affected corporate performance positively for foreign and other shareholders; and negatively for institutional investors, the Public Investment Corporation, management and black people. The effect of family, company, government and concentration of ownership was mixed. Hence ownership matters and affects important corporate decisions such as capital structure and corporate performance in South African firms.

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APPENDICES

Appendix 4.1: JSE Securities Exchange list of non-financial firms on 31 December 2014

	Long Name	ICB Industry LongName
1	1time Holdings Ltd	Consumer Services
2	Accentuate Limited	Industrials
3	Adaptit Holdings Limited	Technology
4	Adcock Ingram Hldgs Ltd	Healthcare
5	Adcorp Holdings Limited	Industrials
6	Advanced Health Ltd	Healthcare
7	ADvTECH Ltd	Consumer Services
8	AECI Limited	Basic Materials
9	Africa Cellular Towers	Technology
10	African & Over Ent Ltd	Consumer Services
11	African Eagle Res plc	Basic Materials
12	African Media Ent Ltd	Consumer Services
13	African Oxygen Limited	Basic Materials
14	African Rainbow Min Ltd	Basic Materials
15	Afrimat Limited	Industrials
16	AfroCentric Inv Corp Ltd	Healthcare
17	AH-Vest Limited	Consumer Goods
18	Alert Steel Holdings Ltd	Consumer Services
19	Alliance Mining Corp Ltd	Technology
20	Allied Electronics Corp A	Industrials
21	Amalgamated Elec Corp Ltd	Industrials
22	Anglo American Plat Ltd	Basic Materials
23	Anglo American plc	Basic Materials
24	Anglogold Ashanti Ltd	Basic Materials
25	Ansys Limited	Industrials
26	Aquarius Platinum Ltd	Basic Materials
27	ARB Holdings Limited	Industrials
28	ArcelorMittal SA Limited	Basic Materials
29	Argent Industrial Ltd	Industrials
30	Ascendis Health Ltd	Healthcare
31	Aspen Pharmacare Hldgs Ltd	Healthcare
32	Assore Ltd	Basic Materials
33	Astral Foods Ltd	Consumer Goods
34	Astrapak Limited	Industrials
35	Atlatsa Resources Corp	Basic Materials
36	Austro Group Ltd	Industrials
37	Aveng Group Limited	Industrials
38	AVI Ltd	Consumer Goods
39	Awethu Breweries Ltd	Consumer Goods
40	Barloworld Ltd	Industrials
41	Basil Read Holdings Ltd	Industrials

42	Bauba Platinum Limited	Basic Materials
43	Beige Holdings Limited	Consumer Goods
44	Bell Equipment Ltd	Industrials
45	BHP Billiton plc	Basic Materials
46	Bidvest Ltd	Industrials
47	Bioscience Brands Ltd	Consumer Goods
48	Blue Label Telecoms Ltd	Telecommunications
49	Bowler Metcalf Ltd	Industrials
50	Brikor Ltd	Industrials
51	British American Tob plc	Consumer Goods
52	BSI Steel Limited	Basic Materials
53	Buffalo Coal Corp	Basic Materials
54	Buildmax Ltd	Basic Materials
55	Business Connexion Grp Ltd	Technology
56	Cafca Limited	Industrials
57	Calgro M3 Hldgs Ltd	Industrials
58	Camac Energy Inc.	Oil & Gas
59	Capevin Holdings Ltd	Consumer Goods
60	Cargo Carriers Ltd	Industrials
61	Cartrack Holdings Ltd	Industrials
62	Cashbuild Ltd	Consumer Services
63	Caxton CTP Publish Print	Consumer Services
64	Central Rand Gold Ltd	Basic Materials
65	Chemical Specialities Ld	Industrials
66	Chrometco Ltd	Basic Materials
67	City Lodge Hotels Ltd	Consumer Services
68	Clicks Group Ltd	Consumer Services
69	Clover Industries Ltd	Consumer Goods
70	Coal of Africa Ltd	Basic Materials
71	Comair Limited	Consumer Services
72	Combined Motor Hldgs Ltd	Consumer Services
73	Command Holdings Limited	Industrials
74	Compagnie Fin Richemont	Consumer Goods
75	Compu Clearing Outs Ltd	Technology
76	Cons Infrastructure Grp Ltd	Industrials
77	Convergenet Holdings Ltd	Technology
78	Crookes Brothers Ltd	Consumer Goods
79	CSG Holdings Ltd	Industrials
80	Cullinan Holdings Ltd	Consumer Services
81	Curro Holdings Limited	Consumer Services
82	Datacentrix Holdings Ltd	Technology
83	Datatec Ltd	Technology
84	Delrand Resources Ltd	Basic Materials
85	Delta EMD Ltd	Basic Materials

86	Diamondcorp plc	Basic Materials
87	Digicore Holdings Limited	Industrials
88	Distell Group Ltd	Consumer Goods
89	Distr and Warehousing	Industrials
90	DRD Gold Ltd	Basic Materials
91	Eastern Platinum Ltd	Basic Materials
92	ELB Group Ltd	Industrials
93	Ellies Holdings Ltd	Industrials
94	EOH Holdings Ltd	Technology
95	Eqstra Holdings Ltd	Industrials
96	Erbacon Inv Hldgs Ltd	Industrials
97	Esor Limited	Industrials
98	Evraz Highveld Steel & Van	Basic Materials
99	Exxaro Resources Ltd	Basic Materials
100	Famous Brands Ltd	Consumer Services
101	Faritec Holdings Ltd	Technology
102	Ferrum Crescent Limited	Basic Materials
103	Firestone Energy Limited	Basic Materials
104	Foneworx Holdings Ltd	Technology
105	Gijima Group Limited	Technology
106	Giyani Gold Corporation	Basic Materials
107	Glencore plc	Basic Materials
108	Gold Fields Ltd	Basic Materials
109	Goliath Gold Mining Ltd	Basic Materials
110	Gooderson Leisure Corp	Consumer Services
111	Great Basin Gold Ltd	Basic Materials
112	Grindrod Ltd	Industrials
113	Group Five Ltd	Industrials
114	Harmony GM Co Ltd	Basic Materials
115	Holdsport Limited	Consumer Services
116	Homechoice Int plc	Consumer Services
117	Howden Africa Hldgs Ltd	Industrials
118	Hudaco Industries Ltd	Industrials
119	Huge Group Ltd	Technology
120	Hulamin Ltd	Basic Materials
121	Hwange Colliery Ltd	Basic Materials
122	Iliad Africa Ltd	Consumer Services
123	Illovo Sugar Ltd	Consumer Goods
124	Imbalie Beauty Limited	Consumer Goods
125	Impala Platinum Hlgs Ltd	Basic Materials
126	Imperial Holdings Ltd	Industrials
127	Infrasors Holdings Ltd	Basic Materials
128	Insimbi Ref & Alloy Sup	Basic Materials
129	Interwaste Hldgs Ltd	Industrials

130	Invicta Holdings Ltd	Industrials
131	IPSA Group plc	Utilities
132	ISA Holdings Limited	Technology
133	Italtile Ltd	Consumer Services
134	Jasco Electron Hldgs Ltd	Industrials
135	JD Group Ltd	Consumer Services
136	Jubilee Platinum plc	Basic Materials
137	KAP Industrial Hldgs Ltd	Industrials
138	Kaydav Group Ltd	Industrials
139	Keaton Energy Hldgs Ltd	Basic Materials
140	Kibo Mining plc	Basic Materials
141	Kumba Iron Ore Ltd	Basic Materials
142	Labat Africa Ltd	Industrials
143	Lewis Group Ltd	Consumer Services
144	Life Healthc Grp Hldgs Ltd	Healthcare
145	Litha Healthcare Grp Ltd	Healthcare
146	Lonmin plc	Basic Materials
147	Marshall Monteagle plc	Industrials
148	Masonite Africa Ltd	Industrials
149	Massmart Holdings Ltd	Consumer Services
150	Master Drilling Grp Ltd	Industrials
151	Mazor Group Ltd	Industrials
152	Mediclinic Internat Ltd	Healthcare
153	Merafe Resources Ltd	Basic Materials
154	Metair Investments Ltd	Consumer Goods
155	Metmar Ltd	Basic Materials
156	Metrofile Holdings Ltd	Industrials
157	Micromega Holdings Ltd	Industrials
158	Mine Restoration Inv Ltd	Industrials
159	Miranda Mineral Hldgs Ld	Basic Materials
160	Mix Telematics Ltd	Industrials
161	Mondi Ltd	Basic Materials
162	Mondi plc	Basic Materials
163	Money Web Holdings Ltd	Consumer Services
164	Montauk Holdings Ltd	Oil & Gas
165	Morvest Business Grp Ltd	Industrials
166	Mpact Limited	Industrials
167	Mr Price Group Ltd	Consumer Services
168	MTN Group Ltd	Telecommunications
169	Murray & Roberts Hldgs	Industrials
170	Mustek Ltd	Technology
171	Nampak Ltd	Industrials
172	Naspers Ltd -N-	Consumer Services
173	Net 1 UEPS Tech Inc	Industrials

174	Netcare Limited	Healthcare
175	Nictus Ltd	Consumer Services
176	Northam Platinum Ltd	Basic Materials
177	Nutritional Holdings Ltd	Healthcare
178	Nu-World Hldgs Ltd	Consumer Goods
179	Oakbay Res and Energy Ltd	Basic Materials
180	Oando plc	Oil & Gas
181	Oceana Group Ltd	Consumer Goods
182	Omnia Holdings Ltd	Basic Materials
183	Onelogix Group Ltd	Industrials
184	Pamodzi Gold Limited	Basic Materials
185	Pan African Resource plc	Basic Materials
186	Petmin Ltd	Basic Materials
187	Phumelela Game Leisure	Consumer Services
188	Pick N Pay Holdings Ltd	Consumer Services
189	Pick n Pay Stores Ltd	Consumer Services
190	Pinnacle Hldgs Ltd	Technology
191	Pioneer Foods Group Ltd	Consumer Goods
192	Platfields Limited	Basic Materials
193	Poynting Hldgs Ltd	Technology
194	PPC Limited	Industrials
195	Primeserv Group Ltd	Industrials
196	Protech Khuthele Hldgs	Industrials
197	PSV Holdings Ltd	Industrials
198	Quantum Foods Hldgs Ltd	Consumer Goods
199	Randgold & Expl Co Ltd	Basic Materials
200	Rare Holdings Ltd	Industrials
201	Raubex Group Ltd	Industrials
202	RBA Holdings Ltd	Consumer Goods
203	RCL Foods Limited	Consumer Goods
204	Remgro Ltd	Industrials
205	Resource Generation Ltd	Basic Materials
206	Reunert Ltd	Industrials
207	Rex Trueform Cloth Co Ld	Consumer Services
208	Rhodes Food Grp Hldg Ltd	Consumer Goods
209	Rockwell Diamonds Inc	Basic Materials
210	Rolfes Technology Hldgs	Basic Materials
211	Royal Bafokeng Platinum Ltd	Basic Materials
212	Sable Metals and Min Ltd	Basic Materials
213	SABMiller plc	Consumer Goods
214	Sacoil Holdings Ltd	Oil & Gas
215	Santova Logistics Ltd	Industrials
216	Sanyati Holdings Ltd	Industrials
217	Sappi Ltd	Basic Materials

218	Sasol Limited	Oil & Gas
219	Sea Kay Holdings Ltd	Industrials
220	Seardel Inv Corp Ltd	Consumer Goods
221	Sentula Mining Ltd	Basic Materials
222	Sephaku Holdings Ltd	Industrials
223	Shoprite Holdings Ltd	Consumer Services
224	Shoprite Investments Limited	Consumer Services
225	Sibanye Gold Limited	Basic Materials
226	Silverbridge Holdings	Technology
227	Soapstone Investment Ltd	Basic Materials
228	South African Coal Mining	Basic Materials
229	South Ocean Holdings Ltd	Industrials
230	Sovereign Food Inv Ltd	Consumer Goods
231	Spanjaard Limited	Basic Materials
232	Spur Corporation Ltd	Consumer Services
233	Square One Solutions Grp	Technology
234	Stefanuti Stck Hldgs Ltd	Industrials
235	Steinhoff Int Hldgs Ltd	Consumer Goods
236	Sun International Ltd	Consumer Services
237	Super Group Ltd	Industrials
238	Taste Hldgs Ltd	Consumer Services
239	Tawana Resources NL	Basic Materials
240	Telemaster Holdings Ltd	Telecommunications
241	Telkom SA SOC Ltd	Telecommunications
242	Tharisa plc	Basic Materials
243	The Foschini Group Limited	Consumer Services
244	The Spar Group Ltd	Consumer Services
245	The Waterberg Coal Co Ltd	Basic Materials
246	Tiger Brands Ltd	Consumer Goods
247	Times Media Group Ltd	Consumer Services
248	Tongaat Hulett Ltd	Consumer Goods
249	Torre Industries Limited	Industrials
250	Total Client Services Ld	Technology
251	Trans Hex Group Ltd	Basic Materials
252	Transpaco Ltd	Industrials
253	Trencor Ltd	Industrials
254	Truworths Int Ltd	Consumer Services
255	Tsogo Sun Holdings Ltd	Consumer Services
256	Ububele Holdings Ltd	Consumer Goods
257	Value Group Ltd	Industrials
258	Verimark Holdings Ltd	Consumer Services
259	Village Main Reef GM Co	Basic Materials
260	Vodacom Group Ltd	Telecommunications
261	Wescoal Holdings Ltd	Basic Materials

262	Wesizwe Platinum Ltd	Basic Materials
263	WG Wearne Ltd	Industrials
264	Wilderness Holdings Ltd	Consumer Services
265	William Tell Holdings Ltd	Industrials
266	Wilson Bayly Hlm-Ovc Ltd	Industrials
267	Winhold Ltd	Industrials
268	Woolworths Holdings Ltd	Consumer Services
269	Workforce Holdings Ltd	Industrials
270	York Timber Holdings Ltd	Basic Materials
271	ZCI Limited	Basic Materials

Source: JSE Securities Exchange: Listed companies by sector: 15 July 2016

Appendix 7.1: Effects of ownership on capital structure using the generalised method of moments model without a lag at the top one shareholder level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Constant	-0.4145	***	0.5527	***	0.0613		4.2368		-0.1565	***	0.3894	***	0.2773	**
	(0.0557)		(0.0880)		(0.0841)		(3.0663)		(0.0570)		(0.0706)		(0.1259)	
Shareholder type														
H I Top One shareholder	0.4341	***	0.7023	***	1.4968	***	28.9156	***	0.6148	***	0.3769	**	1.0850	***
	(0.1262)		(0.1304)		(0.2739)		(7.2920)		(0.2130)		(0.1677)		(0.3408)	
Institution - Top One shareholder	0.0611		-0.5879	***	-0.9573	***	-12.7922		-0.4943	***	-0.5027	***	-1.0276	***
	(0.0780)		(0.1982)		(0.3053)		(9.8908)		(0.1663)		(0.1155)		(0.2905)	
Public Investment Corporation - Top One shareholder	-0.2955	***	-0.4797	***	-1.7119	***	-16.2802		-0.7486	***	-0.5498	***	-1.3199	***
	(0.1119)		(0.1565)		(0.4490)		(12.1176)		(0.1173)		(0.1792)		(0.2037)	
Family - Top One shareholder	-0.2396	***	-0.9514	***	-1.4299	***	-18.0360	***	-0.3488	**	-0.5707	***	-0.8968	***
	(0.0924)		(0.1051)		(0.2244)		(7.1655)		(0.1692)		(0.1710)		(0.2535)	
Company - Top One shareholder	-0.3098	***	-0.4979	***	-1.0968	***	-24.6821	***	-0.3929	***	-0.2265	***	-0.7845	***
	(0.0593)		(0.1095)		(0.2174)		(7.5296)		(0.1301)		(0.0797)		(0.2322)	
Directors -Top One shareholder	0.1274	***	0.0896	***	0.1596	***	0.4498		-0.0587	*	0.1084	***	0.1024	***
	(0.0204)		(0.0238)		(0.0538)		(2.4344)		(0.0344)		(0.0290)		(0.0324)	
Black - Top One shareholder	-0.0325		-0.2322	**	-0.5493	*	-15.5592	*	-0.3161	***	-0.1661		-0.4208	
	(0.1124)		(0.1143)		(0.3265)		(8.2814)		(0.1144)		(0.1520)		(0.2699)	
Foreign - Top One shareholder	-0.3455	***	-0.6133	***	-1.2673	***	-19.7916	*	-0.4261	***	-0.2953	**	-0.5810	***
	(0.0717)		(0.1094)		(0.2371)		(11.3700)		(0.1274)		(0.1236)		(0.2214)	
Government - Top One shareholder	-0.8976		-13.7953		-17.3346		-38.1482		-8.0451	*	-3.8901		-6.9620	
	(0.8380)		(9.9162)		(11.0702)		(76.0962)		(4.3225)		(3.9801)		(5.4167)	
Other - Top One shareholder	-0.0350		-1.5901	***	-1.3715	**	-20.1922		-6.7971	**	-0.8033		-2.3033	***
	(0.2402)		(0.2907)		(0.6813)		(17.0931)		(2.8458)		(0.5435)		(0.8371)	

Appendix 7.1 *(continued)*: Effects of ownership on capital structure using the generalised method of moments model without a lag at the top one shareholder level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Control Variables														
Size, Total assets	0.0862	***	-0.0049		0.1056	***	-0.4347		0.0613	***	-0.0511	***	0.0101	
	(0.0106)		(0.0139)		(0.0099)		(0.5927)		(0.0099)		(0.0116)		(0.0181)	
Profitability - Return on sssets	-0.0060	*	-0.0053		-0.0089		-0.2043		-0.0039		0.0095		-0.0019	
	(0.0031)		(0.0255)		(0.0271)		(0.3457)		(0.0317)		(0.0111)		(0.0198)	
Tangibility	-0.0685	**	-0.1561	***	-0.1582	***	0.5809		0.0256		0.1273	***	0.1427	***
	(0.0287)		(0.0351)		(0.0440)		(2.8677)		(0.0277)		(0.0256)		(0.0351)	
Non-debt tax shield	0.4804	**	0.5231		0.4536	**	6.0194		0.5135	*	0.8073	***	1.0030	***
	(0.2261)		(0.3692)		(0.2335)		(6.7785)		(0.3145)		(0.2617)		(0.3289)	
Risk	0.0093		-0.0654		-0.0640		-0.9389		0.0495		-0.1203	***	-0.1543	*
	(0.0102)		(0.0649)		(0.0734)		(1.7167)		(0.0318)		(0.0432)		(0.0942)	
Dividend payout ratio	0.0004		-0.0011		-0.0018		-0.0454		0.0012		-0.0022		-0.0019	*
	(0.0003)		(0.0018)		(0.0012)		(0.0501)		(0.0009)		(0.0017)		(0.0011)	
Age	-0.0014	***	-0.0025	***	-0.0035	***	0.0766		-0.0027	***	0.0062	***	0.0026	***
	(0.0002)		(0.0003)		(0.0004)		(0.0955)		(0.0002)		(0.0002)		(0.0002)	
Growth - Total Assets	-0.0014		-0.0039		-0.0065	***	0.1983		0.0111		0.0002		-0.0299	*
	(0.0037)		(0.0053)		(0.0010)		(0.1537)		(0.0079)		(0.0007)		(0.0175)	
Liquidity	-0.0001		-0.0004		-0.0009		0.0056		0.0026	**	-0.0002		0.0002	
	(0.0001)		(0.0006)		(0.0006)		(0.0145)		(0.0012)		(0.0004)		(0.0005)	
Weighted statistics														
R-squared	0.8123		0.9965		0.8445		-0.0618		0.7473		0.8935		0.6166	
Adjusted R-squared	0.8090		0.9965		0.8418		-0.0801		0.7428		0.8917		0.6100	
S.E. of regression	0.1504		0.2622		0.3228		7.7157		0.1924		0.2324		0.2729	
Durbin-Watson stat	0.5123		0.3458		0.3452		1.6531		0.4892		0.2991		0.5609	
Mean dependent var	0.2053		2.8018		1.1475		2.9782		0.2873		0.4677		0.6789	
S.D. dependent var	0.6789		63.3856		2.9388		8.0095		0.88898		0.8889		2.0966	
Sum squared resid	24.9793		75.8879		115.0372		65722.7900		39.4797		59.6010		82.2205	
J-statistic	18.0386		19.7299		16.3802		21.9423		15.1888		12.8337		10.6745	
Prob(J-statistic)	0.5199		0.4110		0.6318		0.2871		0.7105		0.8470		0.9343	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Appendix 7.2: Effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top one shareholder level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Constant	-0.3266	***	0.5110	***	0.2219	***	10.1627	**	-0.1740	***	0.3556	***	-0.2419	***
	(0.0363)		(0.0500)		(0.0517)		(4.5789)		(0.0358)		(0.0926)		(0.0487)	
Concentration														
Dependent variable (-1)	0.3516	***	0.7616	***	0.5065	***	-1.1734	***	0.2241	***	0.4610	***	0.6063	***
	(0.0315)		(0.0372)		(0.0305)		(0.2014)		(0.0408)		(0.0694)		(0.0171)	
Shareholder type														
H I Top One shareholder	0.5046	***	0.6805	***	1.1543	***	20.6011		0.1790		0.5149	**	1.1431	***
	(0.1161)		(0.1668)		(0.2502)		(14.5047)		(0.1298)		(0.2424)		(0.2163)	
Institution - Top One shareholder	-0.1371	*	-0.4423	***	-0.6721	***	10.4678		-0.1566	*	-0.3208	*	-0.7514	***
	(0.0726)		(0.1574)		(0.2092)		(17.3149)		(0.0930)		(0.1789)		(0.1908)	
Public Investment Corporation - Top One shareholder	-0.4885	***	-0.7219	***	-1.2152	***	40.8470		-0.4467	***	-0.8283	***	-1.6281	***
	(0.0817)		(0.1509)		(0.1781)		(26.6719)		(0.0759)		(0.2920)		(0.1982)	
Family - Top One shareholder	-0.3735	***	-0.6117	***	-1.0656	***	2.4070		-0.1291		-0.3960	**	-0.8430	***
	(0.0792)		(0.1615)		(0.2458)		(16.7231)		(0.0855)		(0.1937)		(0.1918)	
Company - Top One shareholder	-0.3906	***	-0.3803	***	-0.7326	***	-8.1882		-0.1279	*	-0.3422	**	-0.7346	***
	(0.0681)		(0.1321)		(0.1829)		(13.7867)		(0.0680)		(0.1592)		(0.1819)	
Director s-Top One shareholder	0.0857	***	-0.1725	***	-0.0491		7.9223	**	0.0172		-0.0320		-0.0200	
	(0.0303)		(0.0290)		(0.0304)		(4.0902)		(0.0221)		(0.0322)		(0.0319)	
Black - Top One shareholder	0.0465		-0.6554	***	-0.4292	***	8.6497		-0.3534	***	-0.3322	*	-0.3649	**
	(0.0868)		(0.1963)		(0.1755)		(16.5947)		(0.0810)		(0.1790)		(0.1579)	
Foreign - Top One shareholder	-0.3024	***	-0.6825	***	-0.9543	***	21.1622		-0.1412	*	-0.5033	***	-0.9191	***
	(0.0731)		(0.1258)		(0.1596)		(27.0796)		(0.0820)		(0.1947)		(0.1794)	
Government - Top One shareholder	-0.7027		-8.0106	**	-9.8972	**	-31.8222		-0.9348	***	-1.5541		-3.9860	
	(1.0127)		(4.0455)		(4.8380)		(89.7292)		(0.3427)		(1.4703)		(4.4293)	
Other - Top One shareholder	-0.3040	**	-0.3186		-2.6406	***	-5.8882		-1.4652	***	-0.1347		-1.8808	***
	(0.1486)		(0.6284)		(0.9814)		(34.4315)		(0.2098)		(0.3215)		(0.6580)	

Appendix 7.2 (*continued)*: Effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top one shareholder level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Control variables														
Size, Total assets	0.0720 (0.0044)	***	-0.0243 (0.0071)	***	0.0504 (0.0061)	***	-3.2965 (1.8229)	*	0.0535 (0.0052)	***	-0.0427 (0.0150)	***	0.0812 (0.0057)	***
Profitability - Return on assets	-0.0017 (0.0041)		-0.0237 (0.0116)	**	-0.0249 (0.0059)	***	0.2569 (0.8588)		0.0157 (0.0099)		-0.0024 (0.0082)		0.0027 (0.0074)	
Tangibility	0.0695 (0.0093)	***	-0.4477 (0.0207)	***	-0.2048 (0.0402)	***	-8.4280 (6.2031)		-0.0267 (0.0134)	**	-0.2059 (0.0413)	***	-0.0428 (0.0208)	**
Non-debt tax shield	-0.1891 (0.1093)	*	0.4027 (0.2102)	*	0.0030 (0.2841)		17.5999 (8.8133)	**	0.2019 (0.1879)		0.7990 (0.2552)	***	0.0471 (0.3612)	
Risk	-0.0590 (0.0486)		0.0378 (0.0405)		-0.1541 (0.0809)	*	3.7042 (3.3824)		0.0519 (0.0174)	***	-0.0489 (0.0379)		-0.1521 (0.0370)	***
Dividend payout ratio	0.0004 (0.0004)		-0.0008 (0.0003)	***	-0.0007 (0.0006)		-0.2143 (0.1242)	*	0.0003 (0.0006)		-0.0012 (0.0011)		-0.0008 (0.0008)	
Age	-0.0020 (0.0003)	***	-0.0021 (0.0002)	***	-0.0046 (0.0002)	***	0.4424 (0.2678)	*	-0.0015 (0.0002)	***	0.0054 (0.0006)	***	-0.0003 (0.0001)	**
Growth - Total assets	0.0005 (0.0059)		0.0075 (0.0090)		-0.0037 (0.0054)		0.1175 (0.1025)		0.0067 (0.0067)		0.0014 (0.0008)	*	-0.0008 (0.0005)	*
Liquidity	0.0000 (0.0001)		-0.0015 (0.0006)	**	-0.0004 (0.0008)		0.0089 (0.0321)		-0.0026 (0.0023)		-0.0003 (0.0002)		0.0005 (0.0004)	
Weighted statistics														
R-squared	0.9926		0.9750		0.9414		-1.7652		0.9504		0.8157		0.9763	
Adjusted R-squared	0.9924		0.9745		0.9403		-1.8154		0.9495		0.8123		0.9759	
S.E. of regression	0.1194		0.1862		0.2317		16.4193		0.1268		0.1683		0.1825	
Durbin-Watson stat	0.7218		0.8552		0.5994		0.4561		0.5474		0.5571		0.9165	
Mean dependent var	0.2398		0.9515		1.2672		4.7749		0.3211		0.3925		0.9922	
S.D. dependent var	1.5696		2.8286		3.7525		46.7667		1.4790		0.5644		6.6233	
Sum squared resid	15.7358		38.2297		59.2060		297359.6000		16.9478		31.2571		36.7469	
J-statistic	10.6741		11.8762		20.2501		15.6416		25.4881		11.9397		18.0111	
Prob(J-statistic)	0.9077		0.8536		0.3189		0.6175		0.1121		0.8503		0.4549	
Observations	1124		1124		1124		1124		1075		1124		1124	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Appendix 7.3: Effects of ownership on capital structure using the generalised method of moments model without a lag at the top two shareholders level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Constant	-0.4039	***	0.4838	***	-0.321879	*	-6.4178		-0.2944	***	0.3154	***	-0.0483	
	(0.0364)		(0.0635)		(0.1850)		(7.3116)		(0.0792)		(0.0391)		(0.0605)	
Concentration														
H I Top Two shareholders	0.4253	***	0.3938	**	0.530404	*	46.0823	***	0.2831	***	0.1065		0.0696	
	(0.1361)		(0.1692)		(0.2852)		(15.3696)		(0.0978)		(0.1490)		(0.2046)	
Shareholder type														
Institution - Top Two shareholders	-0.0337		-0.5921	**	-0.199151		11.1515		-0.2184	***	-0.0067		-0.0739	
	(0.1478)		(0.2521)		(0.2566)		(18.3171)		(0.0664)		(0.1156)		(0.0869)	
Public Investment Corporation - Top Two shareholders	-0.3231	***	-0.1522		-0.621836	**	-18.2639		-0.7466	***	-0.1504		-0.6435	***
	(0.1006)		(0.2092)		(0.2596)		(19.7542)		(0.1399)		(0.1134)		(0.1998)	
Family - Top Two shareholders	-0.3968	***	-0.5234	***	-0.654608	***	-15.0742		-0.1977	**	-0.0177		-0.0689	
	(0.0944)		(0.1695)		(0.1931)		(9.8116)		(0.0819)		(0.0838)		(0.1184)	
Company - Top Two shareholders	-0.2966	***	-0.2527	*	-0.341033	**	-29.1978	***	-0.1861	***	0.1064		0.0594	
	(0.0517)		(0.1341)		(0.1645)		(11.4281)		(0.0646)		(0.0698)		(0.1013)	
Director s-Top Two shareholders	0.2002	***	0.0659		0.300636	***	7.6537		0.0102		0.0423	***	0.0821	**
	(0.0307)		(0.0574)		(0.0581)		(7.0041)		(0.0235)		(0.0166)		(0.0389)	
Black - Top Two shareholders	-0.0175		-0.0201		0.189821		-25.5988	*	-0.3018	*	0.3411	***	0.4909	**
	(0.0641)		(0.1468)		(0.2472)		(13.9409)		(0.1706)		(0.1178)		(0.2236)	
Foreign - Top Two shareholders	-0.2382	***	-0.4255	***	-0.586817	***	-4.1938		-0.1591	**	-0.1019		-0.0418	
	(0.0650)		(0.1492)		(0.2220)		(15.2196)		(0.0721)		(0.1047)		(0.1717)	
Government - Top Two shareholders	0.5731		-2.5070	***	-5.573395	***	-145.7484	**	-2.3214		-0.4508		-1.0594	*
	(0.9209)		(0.4595)		(1.9469)		(70.7840)		(3.5520)		(1.0346)		(0.6051)	
Other - Top Two shareholders	0.0495		-1.4561	***	-0.861235	***	-19.7706		-1.6058	***	-0.8290	***	-1.0499	***
	(0.1917)		(0.2279)		(0.3376)		(19.0456)		(0.2405)		(0.2347)		(0.1510)	

Appendix 7.3 *(continued)*: Effects of ownership on capital structure using the generalised method of moments model without a lag at the top two shareholders level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Control variables														
Size, Total assets	0.0817 (0.0062)	***	0.0098 (0.0111)		0.153633 (0.0304)	***	-0.3290 (1.4802)		0.0704 (0.0138)	***	-0.0565 (0.0066)	***	0.0242 (0.0109)	**
Profitability - Return on assets	-0.0020 (0.0063)		0.0199 (0.0327)		0.001515 (0.0361)		0.0342 (0.7606)		-0.0111 (0.0225)		0.0185 (0.0145)		0.0003 (0.0108)	
Tangibility	0.0577 (0.0451)		-0.0596 (0.0359)	*	-0.061626 (0.0679)		-20.3627 (11.3294)	*	0.0949 (0.0344)	***	0.1911 (0.0316)	***	0.2984 (0.0304)	***
Non-debt tax shield	0.2721 (0.1098)	***	0.6092 (0.5576)		0.649826 (0.7994)		0.6489 (18.6401)		0.5022 (0.2518)	**	0.3982 (0.2035)	**	1.1759 (0.3058)	***
Risk	0.0197 (0.0141)		-0.1388 (0.0778)	*	-0.011908 (0.1060)		2.9550 (3.0719)		0.0582 (0.0350)	*	-0.0926 (0.0304)	***	-0.0932 (0.0409)	**
Dividend payout ratio	0.0003 (0.0002)	*	-0.0013 (0.0017)		-0.001141 (0.0017)		-0.1785 (0.0968)	*	0.0009 (0.0005)	*	-0.0021 (0.0017)		-0.0020 (0.0016)	
Age	-0.0016 (0.0003)	***	-0.0043 (0.0007)	***	-0.005432 (0.0008)	***	0.5729 (0.1987)	***	-0.0012 (0.0002)	***	0.0081 (0.0004)	***	0.0061 (0.0004)	***
Growth - Total assets	0.0042 (0.0049)		-0.0051 (0.0048)		-0.008793 (0.0017)	***	0.5828 (0.4589)		0.0090 (0.0145)		0.0006 (0.0015)		0.0013 (0.0090)	
Liquidity	-0.0002 (0.0001)	**	-0.0003 (0.0005)		-0.000298 (0.0006)		-0.0003 (0.0301)		0.0003 (0.0003)		-0.0001 (0.0003)		-0.0001 (0.0004)	
Weighted statistics														
R-squared	0.6623		0.6345		0.719841		-2.7703		0.5530		0.9272		0.9910	
Adjusted R-squared	0.6565		0.6283		0.715019		-2.8351		0.5450		0.9260		0.9908	
S.E. of regression	0.1526		0.2412		0.32168		18.0055		0.1461		0.2488		0.3038	
Durbin-Watson stat	0.5333		0.3761		0.316417		0.3743		0.4242		0.2592		0.3227	
Mean dependent var	0.1920		0.8988		0.940154		5.0279		0.2379		0.5768		0.9370	
S.D. dependent var	0.2902		8.6573		2.1358		74.0571		0.5545		4.0603		6.3528	
Sum squared resid	25.6919		64.2338		114.2397		357915.4000		22.7877		68.3536		101.8912	
J-statistic	10.1825		12.3404		7.462597		10.8368		18.0604		10.1475		13.5134	
Prob(J-statistic)	0.9483		0.8706		0.991309		0.9292		0.5184		0.9492		0.8113	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Appendix 7.4: Effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top two shareholders level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Constant	-0.2600 (0.0427)	***	0.4428 (0.0499)	***	0.3472 (0.0657)	***	-2.6451 (5.2969)		-0.0314 (0.0744)		0.1793 (0.0792)	**	-0.3489 (0.0541)	***
Dependent variable (-1)	0.4999 (0.0459)	***	0.7285 (0.0346)	***	0.8137 (0.0284)	***	-0.5291 (0.2740)	**	0.1984 (0.0700)	***	0.3455 (0.0797)	***	0.5045 (0.0290)	***
Concentration														
H I Top Two shareholders	-0.0356 (0.0831)		0.2197 (0.2022)		0.5602 (0.1092)	***	61.2268 (15.7363)	***	0.1508 (0.1170)		0.2361 (0.1995)		0.5241 (0.2180)	**
Shareholder type														
Institution - Top Two shareholders	0.0275 (0.0801)		-0.1101 (0.2002)		-0.3581 (0.1316)	***	-9.3205 (15.5501)		-0.2242 (0.0749)	***	0.0725 (0.1050)		-0.1498 (0.0927)	
Public Investment Corporation - Top Two shareholders	-0.1778 (0.1101)		-0.3005 (0.2444)		-0.7256 (0.1111)	***	-19.2717 (16.7055)		-0.3411 (0.1046)	***	-0.0273 (0.1779)		-0.9683 (0.1025)	***
Family - Top Two shareholders	-0.0975 (0.0586)	*	-0.1209 (0.1596)		-0.5179 (0.0684)	***	-27.6753 (10.3410)	***	-0.1367 (0.0851)		0.0142 (0.1140)		-0.3362 (0.1193)	***
Company - Top Two shareholders	-0.0602 (0.0459)		-0.1209 (0.1159)		-0.3709 (0.0562)	***	-39.8754 (9.9015)	***	-0.1547 (0.0554)	***	-0.0236 (0.1319)		-0.1526 (0.1720)	
Directors -Top Two shareholders	0.0938 (0.0272)	***	-0.1845 (0.0414)	***	-0.0992 (0.0220)	***	7.9812 (7.7571)		0.0450 (0.0292)		0.0005 (0.0218)		0.0096 (0.0251)	
Black - Top Two shareholders	0.2893 (0.0711)	***	-0.0881 (0.1693)		0.0542 (0.0655)		-32.5767 (14.2046)	**	-0.2510 (0.0710)	***	0.2307 (0.1197)	**	0.2840 (0.1704)	*
Foreign - Top Two shareholders	0.0602 (0.0553)		-0.2228 (0.1400)		-0.3002 (0.0612)	***	-13.1972 (13.4371)		-0.0139 (0.0796)		-0.0949 (0.1311)		-0.3481 (0.0992)	***
Government - Top Two shareholders	0.1354 (0.5757)		-0.9974 (0.9974)		-1.8838 (0.2268)	***	-71.9837 (39.0187)	*	-0.1579 (2.7065)		0.3255 (0.6695)		-0.8920 (1.6704)	
Other - Top Two shareholders	-0.2770 (0.1298)	**	-1.0108 (0.2818)	***	-1.5058 (0.2875)	***	-19.2934 (11.1446)	*	-0.3452 (0.1543)	**	-0.2237 (0.2437)		-0.9897 (0.2704)	***

Appendix 7.4 *(continued)*: Effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top two shareholders level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Control variables														
Size, Total assets	0.0501	***	-0.0233	***	0.0001		-0.1531		0.0260	**	-0.0329	***	0.0675	***
	(0.0073)		(0.0089)		(0.0078)		(1.2998)		(0.0114)		(0.0121)		(0.0083)	
Profitability - Return on assets	0.0001		-0.0387	***	-0.0160		-0.0799		0.0187		0.0077		0.0124	
	(0.0061)		(0.0124)		(0.0153)		(0.6577)		(0.0178)		(0.0067)		(0.0151)	
Tangibility	0.2392	***	-0.1688	***	0.0243		-18.5512	**	0.0049		-0.0817	*	0.1470	***
	(0.0316)		(0.0390)		(0.0229)		(8.9461)		(0.0286)		(0.0483)		(0.0229)	
Non-debt tax shield	-0.2360		-0.1710		-0.6265	***	0.9330		0.2795	**	0.6617		0.7134	***
	(0.2558)		(0.2324)		(0.0528)		(20.1576)		(0.1258)		(0.4117)		(0.2472)	
Risk	-0.0424	*	-0.0496	*	-0.1681	***	2.1508		0.0535	***	-0.0700	**	-0.1154	**
	(0.0260)		(0.0285)		(0.0242)		(2.6678)		(0.0137)		(0.0355)		(0.0534)	
Dividend payout ratio	0.0007		-0.0007		0.0005		-0.1777	**	0.0005		-0.0019		-0.0016	
	(0.0005)		(0.0005)		(0.0006)		(0.0829)		(0.0004)		(0.0012)		(0.0013)	
Age	-0.0025	***	-0.0024	***	-0.0047	***	0.4585	***	-0.0002		0.0066	***	0.0034	***
	(0.0002)		(0.0004)		(0.0003)		(0.1610)		(0.0003)		(0.0006)		(0.0003)	
Growth - Total assets	-0.0031		0.0101		0.0041		0.3952		0.0209	**	0.0002		-0.0007	
	(0.0049)		(0.0101)		(0.0052)		(0.2777)		(0.0099)		(0.0014)		(0.0009)	
Liquidity	0.0002		-0.0012	**	-0.0009		0.0053		-0.0179	***	-0.0002		0.0000	
	(0.0001)		(0.0006)		(0.0008)		(0.0271)		(0.0053)		(0.0003)		(0.0003)	
Weighted statistics														
R-squared	0.9809		0.9811		0.9869		-1.6359		0.6084		0.7341		0.9720	
Adjusted R-squared	0.9805		0.9808		0.9866		-1.6837		0.6010		0.7292		0.9715	
S.E. of regression	0.1162		0.1506		0.1781		15.5895		0.1342		0.1924		0.2023	
Durbin-Watson stat	0.6796		1.1702		0.8740		0.4110		0.7088		0.4255		0.6472	
Mean dependent var	0.2389		0.8977		1.1946		3.3187		0.2268		0.3732		0.9411	
S.D. dependent var	1.2347		2.2975		4.1023		16.3723		0.3003		0.5369		3.8344	
Sum squared resid	14.8872		25.0007		34.9792		268065.8000		18.9936		40.8127		45.1556	
J-statistic	8.6362		19.0687		15.7649		16.1597		8.2080		8.4245		17.5147	
Prob(J-statistic)	0.9676		0.3876		0.6090		0.5814		0.9754		0.9716		0.4880	
Observations	1124		1124		1124		1124		1087		1124		1124	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Appendix 7.5: Effects of ownership on capital structure using the generalised method of moments model without a lag at the top three shareholders level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Constant	-0.3144	***	0.2736	**	0.1053		-1.7178		-0.3007	***	0.2433	***	-0.1216	**
	(0.0390)		(0.1361)		(0.1308)		(6.8153)		(0.0412)		(0.0384)		(0.0532)	
Concentration														
H I Top Three shareholders	0.2920	***	0.3564	**	0.6376	***	23.8375	**	0.2249	**	-0.0812		0.1262	
	(0.0785)		(0.1636)		(0.2511)		(11.1751)		(0.0988)		(0.1274)		(0.1336)	
Shareholder type														
Institution - Top Three shareholders	0.0241		-0.6228	***	-0.5642	**	9.1815		-0.0720		-0.0026		-0.0337	
	(0.1013)		(0.1791)		(0.2387)		(9.4377)		(0.0628)		(0.0849)		(0.0660)	
Public Investment Corporation - Top Three shareholders	-0.4122	***	-0.4992	*	-0.6227	***	-10.9966		-0.7692	***	-0.2720	*	-1.1048	***
	(0.1133)		(0.2752)		(0.1410)		(12.8366)		(0.1163)		(0.1487)		(0.1766)	
Family - Top Three shareholders	-0.2959	***	-0.6339	***	-0.9155	***	-5.9882		-0.1512	***	0.0938		-0.0983	
	(0.0921)		(0.1622)		(0.1961)		(7.5792)		(0.0456)		(0.0749)		(0.0968)	
Company - Top Three shareholders	-0.3007	***	-0.2130		-0.5312	***	-12.7151		-0.1264	***	0.2077	***	0.0204	
	(0.0425)		(0.1316)		(0.1684)		(8.5479)		(0.0488)		(0.0569)		(0.0637)	
Directors -Top Three shareholders	0.2033	***	0.1653	***	0.4086	***	3.6997		0.0164		0.0531	***	0.1151	***
	(0.0270)		(0.0645)		(0.0571)		(5.0645)		(0.0212)		(0.0168)		(0.0408)	
Black - Top Three shareholders	-0.0343		0.1387		0.1594		-10.2907		-0.1141		0.4929	***	0.5704	***
	(0.0414)		(0.1240)		(0.1197)		(8.0327)		(0.1835)		(0.0831)		(0.0628)	
Foreign - Top Three shareholders	-0.1596	***	-0.3918	***	-0.3694	***	6.9463		-0.0384		0.0643		0.1019	
	(0.0546)		(0.1447)		(0.1218)		(5.5031)		(0.0653)		(0.1072)		(0.1068)	
Government - Top Three shareholders	-0.7305	*	-2.3753	***	-2.2645	***	-46.7874		-3.6277		0.8387		2.6110	***
	(0.4171)		(0.7573)		(0.4165)		(45.9388)		(4.5016)		(0.5967)		(0.7346)	
Other - Top Three shareholders	0.2149		-1.4999	***	-1.1892	***	6.8327		-0.8962	***	-0.2549		-0.7522	***
	(0.2372)		(0.2400)		(0.2412)		(27.2279)		(0.1723)		(0.1967)		(0.2348)	

Appendix 7.5 *(continued)*: Effects of ownership on capital structure using the generalised method of moments model without a lag at the top three shareholders level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Control variables														
Size, Total assets	0.0724	***	0.0388	*	0.0870	***	-0.6781		0.0730	***	-0.0496	***	0.0350	***
	(0.0069)		(0.0207)		(0.0194)		(1.1974)		(0.0093)		(0.0080)		(0.0100)	
Profitability - Return on assets	-0.0109		0.0243		-0.0167		0.0125		-0.0036		0.0151		-0.0003	
	(0.0085)		(0.0349)		(0.0284)		(0.4756)		(0.0137)		(0.0114)		(0.0108)	
Tangibility	0.0174		-0.0693		-0.0185		-10.9562	***	0.0726	***	0.2036	***	0.3395	***
	(0.0278)		(0.0468)		(0.0477)		(4.2024)		(0.0259)		(0.0240)		(0.0373)	
Non-debt tax shield	0.2046		1.3525		0.6944		-8.8772		0.7866	***	0.3494		0.4930	
	(0.1316)		(0.8935)		(0.4445)		(15.1319)		(0.1663)		(0.3236)		(0.3430)	
Risk	0.0316		-0.1923	*	0.0429		2.8139		0.0526		-0.0669	***	-0.0709	**
	(0.0234)		(0.1060)		(0.0849)		(3.2208)		(0.0356)		(0.0180)		(0.0368)	
Dividend payout ratio	0.0001		-0.0013		-0.0018		-0.1619	***	0.0007		-0.0021		-0.0019	
	(0.0002)		(0.0018)		(0.0015)		(0.0614)		(0.0004)		(0.0017)		(0.0016)	
Age	-0.0017	***	-0.0036	***	-0.0048	***	0.3778	***	-0.0017	***	0.0081	***	0.0063	***
	(0.0003)		(0.0005)		(0.0004)		(0.1215)		(0.0002)		(0.0006)		(0.0004)	
Growth - Total assets	0.0079		-0.0063		-0.0074	***	0.4463		0.0031		0.0008		0.0000	
	(0.0061)		(0.0044)		(0.0017)		(0.3210)		(0.0130)		(0.0023)		(0.0055)	
Liquidity	-0.0003	***	-0.0003		-0.0005		-0.0076		0.0001		-0.0002		-0.0005	
	(0.0001)		(0.0006)		(0.0004)		(0.0245)		(0.0002)		(0.0003)		(0.0004)	
Weighted statistics														
R-squared	0.9592		0.2494		0.9129		0.4940		0.9349		0.9566		0.9934	
Adjusted R-squared	0.9585		0.2365		0.9114		0.4853		0.9337		0.9559		0.9933	
S.E. of regression	0.1515		0.2597		0.2950		12.1169		0.1531		0.2510		0.2850	
Durbin-Watson stat	0.5768		0.3684		0.2981		0.6912		0.3808		0.2557		0.3159	
Mean dependent var	0.2377		0.6825		1.7631		6.3630		0.2633		0.4960		0.9370	
S.D. dependent var	0.8565		1.7015		21.6429		102.9331		0.7824		2.4422		6.3528	
Sum squared resid	25.3542		74.4539		96.0941		162089.0000		25.0175		69.5628		101.8912	
J-statistic	15.2679		10.2371		8.6531		12.7345		14.7846		10.8870		13.5134	
Prob(J-statistic)	0.7054		0.9469		0.9788		0.8519		0.7362		0.9276		0.8113	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Appendix 7.6. Effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top three shareholders level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Constant	-0.2513	***	0.4715	***	0.3518	***	1.7427		-0.1769	*	0.1689	***	-0.2586	***
	(0.0311)		(0.0502)		(0.0649)		(6.7918)		(0.0922)		(0.0565)		(0.0647)	
Dependent variable (-1)	0.5549	***	0.7755	***	0.8214	***	-0.6058	**	0.1529		0.2881	***	0.5217	***
	(0.0725)		(0.0288)		(0.0275)		(0.2563)		(0.1166)		(0.0549)		(0.0533)	
Concentration														
H I Top Three shareholders	0.0339		0.5391	***	0.5895	***	52.5187	***	0.1714		0.0774		0.3906	***
	(0.0686)		(0.1278)		(0.0822)		(18.2471)		(0.1274)		(0.1283)		(0.1189)	
Shareholder type														
Institution- Top Three shareholders	0.0889		-0.3866	***	-0.2713	**	-6.5557		0.1160		0.0077		-0.1541	**
	(0.0585)		(0.0885)		(0.1233)		(15.4007)		(0.1718)		(0.0950)		(0.0797)	
Public Investment Corporation - Top Three shareholders	-0.2341	***	-0.6079	***	-0.7553	***	-17.5256		-0.4331	***	-0.3648	*	-0.9761	***
	(0.0878)		(0.1498)		(0.1415)		(15.2324)		(0.1182)		(0.1913)		(0.1224)	
Family - Top Three shareholders	-0.1383	***	-0.4296	***	-0.4648	***	-24.1923	**	-0.1686	***	-0.0083		-0.1908	***
	(0.0449)		(0.0884)		(0.0524)		(10.1610)		(0.0686)		(0.0812)		(0.0716)	
Company - Top Three shareholders	-0.1144	***	-0.3010	***	-0.3629	***	-28.4925	***	-0.1162	*	0.1127		-0.0831	
	(0.0423)		(0.0661)		(0.0466)		(11.5146)		(0.0631)		(0.0812)		(0.0819)	
Directors - Top Three shareholders	0.1499	***	-0.1268	**	-0.0776	**	11.0138	**	0.1155	***	0.0197		-0.0181	
	(0.0277)		(0.0621)		(0.0337)		(5.5648)		(0.0323)		(0.0206)		(0.0320)	
Black - Top Three shareholders	0.1468	*	-0.2259	***	0.0174		-20.4505	*	-0.1368		0.3910	***	0.3412	***
	(0.0812)		(0.0861)		(0.0811)		(11.0111)		(0.0978)		(0.1124)		(0.1120)	
Foreign - Top Three shareholders	0.0578		-0.4077	***	-0.2993	***	-7.0298		-0.0775		0.0013		-0.1554	*
	(0.0469)		(0.0841)		(0.0646)		(10.0806)		(0.0920)		(0.0890)		(0.0950)	
Government - Top Three shareholders	0.5067		-3.8004	**	-1.9908	**	-124.3578		2.2800	**	1.2592	***	1.1966	**
	(0.3724)		(1.6152)		(0.7616)		(79.4835)		(0.9917)		(0.3361)		(0.5153)	
Other - Top Three shareholders	-0.1904		-1.3042	***	-1.1737	***	-17.2103		-0.4239	**	0.1043		-0.8408	***
	(0.1189)		(0.1877)		(0.2109)		(23.9047)		(0.1739)		(0.2116)		(0.1006)	

Appendix 7.6 *(continued)*: The effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top three shareholders level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Control variables														
Size, Total assets	0.0477 (0.0044)	***	-0.0199 (0.0090)	**	-0.0011 (0.0102)		-1.3682 (1.3102)		0.0448 (0.0129)	***	-0.0372 (0.0094)	***	0.0523 (0.0110)	***
Profitability - Return on assets	-0.0006 (0.0059)		-0.0289 (0.0107)	***	-0.0150 (0.0179)		0.0608 (0.6058)		0.0145 (0.0131)		0.0113 (0.0074)		0.0184 (0.0136)	
Tangibility	0.2209 (0.0297)	***	-0.2705 (0.0487)	***	-0.0417 (0.0349)		-14.5935 (9.0201)		0.0554 (0.0504)		0.0560 (0.0560)		0.1492 (0.0396)	***
Non-debt tax shield	-0.4880 (0.2935)	*	0.2051 (0.3280)		-0.6838 (0.0596)	***	-4.5449 (27.3292)		0.0999 (0.2221)		0.4696 (0.5052)		0.4375 (0.1772)	***
Risk	-0.0339 (0.0309)		-0.0580 (0.0310)	*	-0.1196 (0.0277)	***	2.7945 (2.5898)		0.0557 (0.0189)	***	-0.0405 (0.0283)		-0.1436 (0.0504)	***
Dividend payout ratio	0.0005 (0.0004)		-0.0006 (0.0004)		0.0001 (0.0005)		-0.2014 (0.0893)	**	0.0008 (0.0005)	*	-0.0018 (0.0014)		-0.0015 (0.0012)	
Age	-0.0021 (0.0001)	***	-0.0023 (0.0005)	***	-0.0037 (0.0004)	***	0.5414 (0.2044)	***	-0.0001 (0.0002)		0.0074 (0.0008)	***	0.0036 (0.0005)	***
Growth - Total assets	0.0003 (0.0044)		0.0099 (0.0101)		0.0053 (0.0060)		0.4317 (0.2694)		0.0106 (0.0108)		-0.0002 (0.0019)		-0.0003 (0.0009)	
Liquidity	0.0000 (0.0001)		-0.0010 (0.0008)		-0.0016 (0.0010)	*	0.0062 (0.0292)		-0.0103 (0.0063)	*	-0.0004 (0.0003)		-0.0002 (0.0003)	
Weighted statistics														
R-squared	0.9562		0.9595		0.9811		-1.6036		0.5779		0.8237		0.9912	
Adjusted R-squared	0.9554		0.9587		0.9808		-1.6508		0.5699		0.8205		0.9910	
S.E. of regression	0.1125		0.1686		0.1659		16.9231		0.1767		0.2155		0.1961	
Durbin-Watson stat	0.7881		0.9637		0.9872		0.3424		0.8651		0.3717		0.7940	
Mean dependent var	0.2173		0.9158		1.7763		3.3512		0.2538		0.4193		0.9037	
S.D. dependent var	0.7051		2.6159		22.2206		12.4034		0.5094		1.1023		4.4076	
Sum squared resid	13.9476		31.3360		30.3446		315888.8000		32.9110		51.2386		42.4329	
J-statistic	9.5399		10.1898		20.2909		8.3169		7.0164		6.8506		22.3788	
Prob(J-statistic)	0.9459		0.9255		0.3167		0.9735		0.9900		0.9913		0.2156	
Observations	1124		1124		1124		1124		1087		1124		1124	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Appendix 7.7: Effects of ownership on capital structure using the generalised method of moments model without a lag at the top five shareholders level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Constant	-0.3836 (0.0299)	***	0.3554 (0.0749)	***	-0.0385 (0.1068)		-0.0544 (8.3377)		-0.4057 (0.0650)	***	0.0887 (0.0952)		-0.2342 (0.0437)	***
Concentration														
H I Top Five shareholders	0.2273 (0.0726)	***	0.0221 (0.1034)		0.2605 (0.1948)		43.7627 (8.0346)	***	0.1914 (0.1471)		-0.1085 (0.1703)		-0.0554 (0.1635)	
Shareholder type														
Institution - Top Five shareholders	0.0590 (0.0719)		-0.3230 (0.1440)	**	0.0270 (0.1828)		4.4186 (11.0428)		-0.1085 (0.0809)		0.1393 (0.1074)		0.1382 (0.0805)	*
Public Investment Corporation - Top Five shareholders	-0.4242 (0.0556)	***	0.2131 (0.1111)	**	-0.2573 (0.2243)		-37.7554 (18.6481)	**	-1.1215 (0.1200)	***	-0.4206 (0.1925)	**	-1.2818 (0.1316)	***
Family - Top Five shareholders	-0.2089 (0.0335)	***	-0.2812 (0.0812)	***	-0.4434 (0.1632)	***	-15.3037 (7.0812)	**	-0.1182 (0.0827)		0.1765 (0.0764)	**	0.1157 (0.1416)	
Company - Top Five shareholders	-0.2371 (0.0400)	***	0.0670 (0.0647)		-0.1906 (0.0883)	**	-35.2931 (7.1678)	***	-0.1153 (0.0776)		0.1564 (0.0814)	**	0.1640 (0.0979)	*
Directors - Top Five shareholders	0.1831 (0.0100)	***	0.0961 (0.0337)	***	0.2728 (0.0663)	***	8.7836 (3.3362)	***	0.0294 (0.0392)		0.0832 (0.0342)	***	0.1146 (0.0459)	***
Black - Top Five shareholders	-0.0363 (0.0456)		0.4564 (0.0766)	***	0.3704 (0.1165)	***	-6.8200 (7.2159)		0.0704 (0.0974)		0.5111 (0.0980)	***	0.5743 (0.0757)	***
Foreign - Top Five shareholders	-0.1538 (0.0391)	***	-0.0423 (0.0747)		-0.0436 (0.1445)		-3.6195 (10.1374)		-0.1105 (0.0774)		0.2210 (0.1331)	*	0.2040 (0.0924)	**
Government - Top Five shareholders	-0.2532 (1.0976)		-1.2973 (0.1645)	***	-4.3961 (4.0180)		-119.8393 (24.5561)	***	-5.0955 (2.0257)	***	3.0795 (1.3285)	**	3.5324 (0.3338)	***
Other - Top Five shareholders	0.3299 (0.1404)	**	-0.9869 (0.1772)	***	-1.1817 (0.1905)	***	-18.7631 (7.3546)	***	-1.9059 (0.3094)	***	-0.2724 (0.1185)	**	-0.7358 (0.2130)	***

Appendix 7.7 *(continued)*: Effects of ownership on capital structure using the generalised method of moments model without a lag at the top five shareholders level

Dependent Variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Control variables														
Size, Total assets	0.0851	***	0.0131		0.0987	***	-1.1291		0.0893	***	-0.0288		0.0391	***
	(0.0045)		(0.0109)		(0.0185)		(1.2843)		(0.0121)		(0.0187)		(0.0057)	
Profitability - Return on assets	-0.0078		-0.0029		0.0034		0.4158		-0.0022		0.0144		0.0127	
	(0.0077)		(0.0286)		(0.0374)		(0.8330)		(0.0042)		(0.0103)		(0.0108)	
Tangibility	-0.0077		0.1024	**	0.1836	*	-5.4877		0.0103		0.1689	***	0.2512	***
	(0.0164)		(0.0511)		(0.1039)		(3.9247)		(0.0415)		(0.0473)		(0.0361)	
Non-debt tax shield	0.1387		0.1789		-0.0779		-7.2915		0.8528	***	-0.1674		0.7111	
	(0.1097)		(0.5406)		(0.6267)		(13.3618)		(0.1590)		(0.3364)		(0.4534)	
Risk	0.0463	***	-0.1061		-0.1318		0.5404		0.0529	*	-0.0265		-0.0187	
	(0.0178)		(0.0681)		(0.0962)		(3.5850)		(0.0302)		(0.0298)		(0.0296)	
Dividend payout ratio	0.0002	**	-0.0013		-0.0008		-0.1714	*	-0.0001		-0.0028		-0.0024	
	(0.0001)		(0.0017)		(0.0016)		(0.0948)		(0.0005)		(0.0020)		(0.0017)	
Age	-0.0017	***	-0.0033	***	-0.0054	***	0.5088	***	0.0003	**	0.0090	***	0.0091	***
	(0.0001)		(0.0003)		(0.0003)		(0.1403)		(0.0004)		(0.0006)		(0.0007)	
Growth - Total assets	0.0017		-0.0051	*	-0.0070	***	0.9495	**	0.0048		-0.0011		0.0008	
	(0.0063)		(0.0028)		(0.0015)		(0.4049)		(0.0074)		(0.0024)		(0.0026)	
Liquidity	-0.0003	***	-0.0005		-0.0003		-0.0003		0.0005	*	-0.0003		-0.0004	
	(0.0001)		(0.0005)		(0.0005)		(0.0260)		(0.0003)		(0.0004)		(0.0004)	
Weighted statistics														
R-squared	0.8409		0.9699		0.7591		-1.7816		0.8759		0.8899		0.9951	
Adjusted R-squared	0.8381		0.9694		0.7549		-1.8294		0.8737		0.8880		0.9950	
S.E. of regression	0.1515		0.2443		0.3031		16.7566		0.1945		0.2717		0.3159	
Durbin-Watson stat	0.5356		0.3856		0.3414		0.5725		0.4095		0.2689		0.2953	
Mean dependent var	0.2846		1.5756		0.9898		4.2389		0.2702		0.4435		1.1669	
S.D. dependent var	1.6007		21.4646		2.6975		51.8864		0.6359		1.2504		11.3011	
Sum squared resid	25.3432		65.8818		101.4208		309986.6000		40.3671		81.4727		110.1472	
J-statistic	11.0331		16.5685		11.1413		14.7505		16.3308		7.8806		16.3828	
Prob(J-statistic)	0.9227		0.6191		0.9190		0.7383		0.6351		0.9878		0.6316	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Appendix 7.8: Effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top five shareholders level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Constant	-0.2893	***	0.4598	***	0.2799	***	5.0039		-0.3110	***	0.1474	***	-0.4875	***
	(0.0200)		(0.0463)		(0.1051)		(3.7389)		(0.0457)		(0.0542)		(0.1105)	
Dependent variable (-1)	0.4192	***	0.7256	***	0.7133	***	-0.6952	***	0.3067	***	0.2791	***	0.5226	***
	(0.0462)		(0.0172)		(0.0470)		(0.2083)		(0.0823)		(0.0608)		(0.0862)	
Concentration														
H I Top Five shareholders	0.0037		0.1234		0.3055	**	37.8509	***	0.0243		-0.1045		0.0914	
	(0.0575)		(0.0763)		(0.1424)		(11.2501)		(0.0746)		(0.1735)		(0.1817)	
Shareholder type														
Institution - Top Five shareholders	0.0841	*	-0.1989	***	-0.1894		-4.4499		0.0685		0.1675	**	0.1172	
	(0.0494)		(0.0537)		(0.1171)		(6.4164)		(0.0570)		(0.0755)		(0.1108)	
Public Investment Corporation - Top Five shareholders	-0.3160	***	-0.1568		-0.5376	***	2.2666		-0.7949	***	-0.2746	*	-1.1325	***
	(0.0624)		(0.1075)		(0.1461)		(14.5478)		(0.0789)		(0.1460)		(0.2042)	
Family - Top Five shareholders	-0.0774	**	-0.1440	***	-0.1979	***	-11.8625	**	-0.0559		0.0927		0.0403	
	(0.0341)		(0.0508)		(0.0739)		(5.7369)		(0.0355)		(0.1008)		(0.1196)	
Company - Top Five shareholders	-0.0826	***	-0.0300		-0.1655	***	-27.0967	***	0.0000		0.0174		0.0984	
	(0.0240)		(0.0445)		(0.0668)		(6.7446)		(0.0482)		(0.0930)		(0.1097)	
Directors - Top Five shareholders	0.1021	***	-0.1321	***	-0.0926	**	9.5731	***	0.0779	***	0.1501	**	0.0284	
	(0.0132)		(0.0271)		(0.0407)		(2.6496)		(0.0150)		(0.0734)		(0.0390)	
Black - Top Five shareholders	0.2115	***	0.0810	*	0.2584	***	-10.3933	**	-0.0390		0.3463	***	0.5404	***
	(0.0404)		(0.0432)		(0.0920)		(4.4720)		(0.0514)		(0.1192)		(0.1403)	
Foreign - Top Five shareholders	-0.0064		-0.1931	***	-0.0929		-6.6039		-0.0481		0.2968	***	0.0868	
	(0.0266)		(0.0571)		(0.0925)		(5.1498)		(0.0512)		(0.1150)		(0.0934)	
Government - Top Five shareholders	-0.2104		-0.5954	**	-5.7331	*	-79.4902	*	-2.5339		4.4458	***	2.5063	***
	(0.7511)		(0.2661)		(3.2373)		(46.4338)		(2.4717)		(1.7444)		(0.4568)	
Other - Top Five shareholders	-0.1465		-0.9258	***	-1.2980	***	-4.0563		-1.0784	***	-0.0679		-0.4311	***
	(0.1047)		(0.1262)		(0.3155)		(14.6361)		(0.1586)		(0.1874)		(0.1641)	

Appendix 7.8 *(continued)*: Effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top five shareholders level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Control variables														
Size, Total assets	0.0564 (0.0031)	***	-0.0282 (0.0064)	***	0.0122 (0.0178)		-1.5045 (0.9241)	*	0.0671 (0.0072)	***	-0.0415 (0.0114)	***	0.0740 (0.0149)	***
Profitability - Return on assets	0.0010 (0.0041)		-0.0262 (0.0157)	*	0.0065 (0.0282)		-0.0793 (0.5552)		-0.0047 (0.0162)		0.0094 (0.0070)		0.0266 (0.0104)	***
Tangibility	0.1803 (0.0223)	***	-0.2387 (0.0386)	***	-0.0338 (0.0285)		-9.9641 (2.5545)	***	-0.0691 (0.0179)	***	0.0302 (0.0657)		0.1115 (0.0249)	***
Non-debt tax shield	-0.1917 (0.1375)		0.1634 (0.2409)		-0.6145 (0.1537)	***	10.9711 (2.9667)		0.2312 (0.1727)		-0.3297 (0.5509)		0.2240 (0.5049)	
Risk	-0.0228 (0.0195)		-0.0571 (0.0297)	**	-0.1299 (0.0541)	**	3.5375 (19.7413)		0.0999 (0.0291)	***	-0.0351 (0.0495)		-0.2292 (0.0800)	***
Dividend payout ratio	0.0007 (0.0003)	**	-0.0010 (0.0004)	**	-0.0009 (0.0009)		-0.1350 (0.0779)	*	-0.0002 (0.0004)		-0.0023 (0.0018)		-0.0013 (0.0011)	
Age	-0.0019 (0.0001)	***	-0.0014 (0.0002)	***	-0.0036 (0.0005)	***	0.3735 (0.1115)	***	0.0012 (0.0002)	***	0.0086 (0.0010)	***	0.0055 (0.0010)	***
Growth - Total assets	-0.0025 (0.0057)		0.0048 (0.0067)		-0.0036 (0.0070)		0.4807 (0.2911)	*	0.0029 (0.0029)		-0.0006 (0.0021)		-0.0012 (0.0024)	
Liquidity	0.0000 (0.0001)		-0.0017 (0.0008)	**	-0.0022 (0.0015)		-0.0055 (0.0221)		-0.0148 (0.0049)	***	-0.0003 (0.0004)		-0.0004 (0.0003)	
Weighted statistics														
R-squared	0.9382		0.9690		0.9609		-0.5286		0.9445		0.9152		0.9948	
Adjusted R-squared	0.9371		0.9684		0.9602		-0.5563		0.9435		0.9136		0.9947	
S.E. of regression	0.1123		0.1437		0.2333		13.5502		0.1430		0.2473		0.2257	
Durbin-Watson stat	0.7302		1.1387		0.7188		0.5176		0.6047		0.3510		0.6499	
Mean dependent var	0.2295		0.8877		1.1320		3.7860		0.3330		0.4137		0.9075	
S.D. dependent var	0.5845		1.8243		3.2206		19.8658		1.5696		1.1887		4.3487	
Sum squared resid	13.9027		22.7647		60.0235		202520.5000		21.5502		67.4514		56.1751	
J-statistic	8.8642		15.8225		9.3483		13.2848		14.2312		6.1624		15.2477	
Prob(J-statistic)	0.9628		0.6049		0.9511		0.7744		0.7139		0.9955		0.6449	
Observations	1124		1124		1124		1124		1087		1124		1124	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Appendix 7.9: Effects of ownership on capital structure using the generalised method of moments model without a lag at the top 10 shareholders level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Constant	-0.3470 (0.0220)	***	0.2835 (0.1024)	***	0.0253 (0.1431)		-15.9100 (9.8885)		-0.3593 (0.0755)	***	0.2598 (0.0751)	***	-0.2613 (0.0641)	***
Concentration														
H I Top Ten shareholders	0.0925 (0.0887)		0.1099 (0.1396)		0.5728 (0.1549)	***	43.9774 (12.2431)	***	0.0869 (0.0801)		-0.0639 (0.1806)		0.4070 (0.1748)	**
Shareholder type														
Institution - Top Ten shareholders	0.1776 (0.0346)	***	-0.6116 (0.1282)	***	-0.3950 (0.1433)	***	6.1931 (21.3380)		0.0792 (0.0796)		-0.1749 (0.0976)	*	0.1135 (0.0520)	**
Public Investment Corporation - Top Ten shareholders	-0.2187 (0.0318)	***	-0.1324 (0.1184)		-0.4573 (0.1629)	***	-61.2631 (22.7419)	***	-0.5493 (0.1226)	***	-1.0739 (0.3739)	***	-1.4371 (0.1852)	***
Family - Top Ten shareholders	-0.1181 (0.0189)	***	-0.2013 (0.0911)	**	-0.4721 (0.0964)	***	-17.1833 (14.2738)		0.0430 (0.0437)		-0.0794 (0.1142)		-0.1331 (0.0806)	*
Company - Top Ten shareholders	-0.1031 (0.0328)	***	-0.2001 (0.1097)	*	-0.4148 (0.0717)	***	-30.1801 (10.2143)	***	-0.0326 (0.0491)		0.0826 (0.0854)		-0.0180 (0.0645)	
Directors - Top Ten shareholders	0.1244 (0.0168)	***	0.1786 (0.0372)	***	0.2416 (0.0454)	***	7.5198 (3.3124)	**	-0.0615 (0.0325)	*	0.1117 (0.0354)	***	0.0365 (0.0543)	
Black - Top Ten shareholders	0.1537 (0.0460)	***	0.1856 (0.0897)	**	0.3424 (0.1020)	***	1.0994 (7.4002)		0.1780 (0.0737)	**	0.2560 (0.0633)	***	0.5407 (0.1458)	***
Foreign - Top Ten shareholders	-0.0386 (0.0141)	***	-0.1407 (0.0968)		-0.0922 (0.0739)		5.3205 (8.5116)		0.0098 (0.0515)		-0.1079 (0.1049)		-0.2721 (0.1361)	**
Government - Top Ten shareholders	-0.6893 (1.6765)		-0.7377 (1.2664)		0.5287 (0.3666)		-158.5007 (36.5944)	***	-0.6065 (1.0209)		0.2292 (0.4530)		0.3258 (0.2311)	
Other - Top Ten shareholders	0.7996 (0.1012)	***	0.2813 (0.1759)		1.4710 (0.3990)	***	-14.7488 (18.5337)		-0.1531 (0.3878)		-0.9742 (0.5060)	**	-0.0128 (0.6099)	

Appendix 7.9 *(continued)*: Effects of ownership on capital structure using the generalised method of moments model without a lag at the top 10 shareholders level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Control variables														
Size, Total assets	0.0756 (0.0031)	***	0.0230 (0.0163)		0.0890 (0.0199)	***	0.9838 (1.5074)		0.0790 (0.0113)	***	-0.0440 (0.0132)	***	0.0624 (0.0121)	***
Profitability - Return on assets	-0.0012 (0.0055)		0.0032 (0.0399)		-0.0114 (0.0308)		0.7877 (0.7571)		0.0180 (0.0174)		-0.0060 (0.0108)		0.0046 (0.0040)	
Tangibility	-0.0549 (0.0080)	***	0.0872 (0.0514)	*	0.1574 (0.0410)	***	-6.3962 (6.7359)		0.0042 (0.0378)		0.2781 (0.0817)	***	0.1602 (0.0348)	***
Non-debt tax shield	-0.0189 (0.1767)		0.4907 (0.5264)		-0.5639 (0.3653)		-9.5799 (28.5749)		0.5610 (0.3584)		1.0549 (0.4661)	**	1.6527 (0.2722)	***
Risk	0.0081 (0.0174)		-0.0742 (0.0638)		-0.0120 (0.0610)		0.3203 (3.9820)		-0.0223 (0.0489)		-0.0854 (0.0377)	**	-0.0407 (0.0645)	
Dividend payout ratio	0.0001 (0.0002)		-0.0019 (0.0020)		-0.0033 (0.0016)		-0.2597 (0.1082)	**	0.0005 (0.0007)		-0.0012 (0.0018)		-0.0012 (0.0014)	
Age	-0.0016 (0.0001)	***	-0.0013 (0.0007)	**	-0.0033 (0.0004)	***	0.6169 (0.1644)	***	-0.0008 (0.0001)	***	0.0082 (0.0011)	***	0.0077 (0.0003)	***
Growth - Total assets	-0.0073 (0.0039)	*	-0.0039 (0.0012)	***	-0.0076 (0.0053)		1.0510 (0.5725)	*	-0.0346 (0.0160)	**	0.0060 (0.0060)		0.0006 (0.0024)	
Liquidity	0.0001 (0.0002)		-0.0016 (0.0007)	**	-0.0014 (0.0007)	**	0.0098 (0.0358)		-0.0005 (0.0004)		-0.0006 (0.0003)	*	-0.0015 (0.0004)	***
Weighted statistics														
R-squared	0.8813		0.6918		0.9401		-0.5313		0.7077		0.9679		0.9634	
Adjusted R-squared	0.8792		0.6865		0.9391		-0.5577		0.7025		0.9673		0.9628	
S.E. of regression	0.1483		0.2425		0.2833		18.6817		0.1903		0.2695		0.3108	
Durbin-Watson stat	0.5571		0.3282		0.3511		0.4355		0.5818		0.2803		0.3020	
Mean dependent var	0.3726		0.7764		1.3746		2.7521		0.2573		0.5122		1.2424	
S.D. dependent var	5.0095		3.8436		13.1087		16.4748		0.6786		3.5550		17.5049	
Sum squared resid	24.2654		64.9170		88.5838		385301.8000		38.6517		80.1762		106.6663	
J-statistic	11.7643		14.2843		14.4274		12.5134		10.6827		4.6574		9.3050	
Prob(J-statistic)	0.8955		0.7669		0.7582		0.8625		0.9341		0.9997		0.9681	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Appendix 7.10: Effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top 10 shareholders level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Constant	-0.2959	***	0.5187	***	0.1835	**	2.0546		-0.2192	***	0.1838	***	-0.3757	***
	(0.0125)		(0.0563)		(0.0954)		(11.8761)		(0.0331)		(0.0534)		(0.1022)	
Dependent variable (-1)	0.2830	***	0.7920	***	0.5180	***	-0.2591		0.2040	***	0.4299	***	0.4950	***
	(0.0189)		(0.0280)		(0.0548)		(0.3740)		(0.0369)		(0.0666)		(0.0449)	
Concentration														
H I Top Ten shareholders	0.1073	**	0.2835	***	0.2799	***	67.6415	***	0.0807		-0.0744		0.1842	
	(0.0447)		(0.0799)		(0.0948)		(19.3357)		(0.0667)		(0.1132)		(0.1218)	
Shareholder type														
Institution - Top Ten shareholders	0.1277	***	-0.3752	***	-0.4461	***	-11.7115		0.1604	***	-0.0772		0.1217	
	(0.0197)		(0.0596)		(0.0547)		(22.5237)		(0.0381)		(0.1101)		(0.0827)	
Public Investment Corporation - Top Ten shareholders	-0.2570	***	-0.3330	***	-0.6824	***	-58.0207	**	-0.3071	***	-1.0694	***	-0.7618	***
	(0.0423)		(0.0685)		(0.1303)		(23.9479)		(0.0671)		(0.2266)		(0.1932)	
Family - Top Ten shareholders	-0.1049	***	-0.1651	***	-0.1361	***	-34.0387	*	0.0223		-0.0957		-0.0070	
	(0.0197)		(0.0524)		(0.0471)		(20.6170)		(0.0200)		(0.0634)		(0.0967)	
Company - Top Ten shareholders	-0.1064	***	-0.2198	***	-0.2531	***	-47.1257	***	0.0563	*	-0.0004		0.1066	
	(0.0207)		(0.0470)		(0.0423)		(14.4157)		(0.0308)		(0.0467)		(0.0693)	
Directors - Top Ten shareholders	0.1043	***	-0.1064	***	-0.0345		10.2110	*	-0.0158		0.0589	***	-0.0279	
	(0.0185)		(0.0290)		(0.0424)		(5.4837)		(0.0139)		(0.0188)		(0.0573)	
Black - Top Ten shareholders	0.2344	***	-0.2606	***	0.0871		-5.5853		-0.0138		0.2347	***	0.5787	***
	(0.0215)		(0.0701)		(0.0680)		(14.0852)		(0.0450)		(0.0566)		(0.1699)	
Foreign - Top Ten shareholders	-0.0126		-0.0777	*	-0.0594		-7.7707		0.0257		-0.0270		-0.1200	*
	(0.0153)		(0.0424)		(0.0395)		(13.0286)		(0.0374)		(0.0732)		(0.0736)	
Government - Top Ten shareholders	0.7441	**	-0.3574	*	0.4318	**	-145.7927	***	0.2803		0.1116		0.7095	
	(0.3665)		(0.2090)		(0.2194)		(31.2008)		(1.8122)		(0.3529)		(1.0730)	
Other - Top Ten shareholders	0.7822	***	0.4133	***	0.8971	***	-2.4135		-0.1892		-0.3039		-0.5015	
	(0.1127)		(0.1064)		(0.1844)		(37.9163)		(0.1417)		(0.5691)		(0.3799)	

Appendix 7.10 *(continued)*: Effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top 10 shareholders level

Dependent variable	Long-term debt ratio, Book value		Short-term debt ratio, Book value		Total debt ratio, Book value		Leverage factor		Long-term debt ratio, Market value		Short-term debt ratio, Market value		Total debt ratio, Market value	
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Control variables														
Size, Total assets	0.0612 (0.002 1)	***	-0.0393 (0.0058)	***	0.0492 (0.0207)	**	-1.5699 (1.6081)		0.0522 (0.0049)	***	-0.0329 (0.0082)	***	0.0638 (0.0184)	***
Profitability - Return on assets	-0.0017 (0.0014)		-0.0297 (0.0050)	***	-0.0270 (0.0228)		0.2356 (1.0736)		-0.0055 (0.0109)		0.0037 (0.0098)		0.0046 (0.0101)	
Tangibility	0.0099 (0.0159)		-0.2146 (0.0354)	***	-0.1216 (0.0392)	***	-16.6385 (7.1854)	**	-0.0741 (0.0137)	***	0.0864 (0.0461)	*	0.0896 (0.0375)	**
Non-debt tax shield	-0.1855 (0.0788)	**	0.1371 (0.1906)		-0.6585 (0.1295)	***	2.1508 (31.2226)		0.3991 (0.1185)	***	0.7893 (0.4061)	**	0.6449 (0.4838)	
Risk	-0.0193 (0.0257)		-0.0329 (0.0235)		-0.0411 (0.0415)		2.0735 (4.3557)		0.0619 (0.0151)	***	-0.0385 (0.0317)		-0.0499 (0.0600)	
Dividend payout ratio	0.0003 (0.0001)	***	-0.0007 (0.0005)		-0.0017 (0.0008)	**	-0.3242 (0.1264)	***	0.0003 (0.0006)		-0.0014 (0.0013)		-0.0007 (0.0009)	
Age	-0.0015 (0.0001)	***	-0.0011 (0.0003)	***	-0.0041 (0.0006)	***	0.8026 (0.2024)	***	-0.0001 (0.0001)		0.0065 (0.0006)	***	0.0044 (0.0005)	***
Growth - Total assets	-0.0031 (0.0040)		0.0131 (0.0067)	**	-0.0040 (0.0022)	*	1.7925 (0.7641)	**	0.0016 (0.0045)		0.0010 (0.0044)		-0.0003 (0.0020)	
Liquidity	0.0001 (0.0001)		-0.0014 (0.0004)	***	-0.0015 (0.0009)	*	0.0121 (0.0431)		-0.0129 (0.0046)	***	-0.0007 (0.0003)	***	-0.0008 (0.0003)	**
Weighted statistics														
R-squared	0.9780		0.9752		0.9395		0.6804		0.6805		0.8451		0.9443	
Adjusted R-squared	0.9776		0.9747		0.9384		0.6746		0.6745		0.8423		0.9433	
S.E. of regression	0.1183		0.1439		0.1964		22.3147		0.1247		0.1952		0.2047	
Durbin-Watson stat	0.7503		1.2036		0.5803		0.3410		0.5200		0.5180		0.6003	
Mean dependent var	0.2825		0.9282		1.2750		4.0191		0.3068		0.4145		0.7773	
S.D. dependent var	1.6483		2.4023		6.9146		53.5562		1.1255		0.7961		2.7139	
Sum squared resid	15.4406		22.8505		42.5588		549232.4000		16.3988		42.0217		46.2233	
J-statistic	10.0439		18.7777		13.6097		12.5955		25.7804		12.7539		12.3832	
Prob(J-statistic)	0.9305		0.4056		0.7542		0.8150		0.1049		0.8060		0.8268	
Observations	1124		1124		1124		1124		1087		1124		1124	

Note: Standard errors in parenthesis; *, **,*** represent 10%, 5%, and 1% levels of significance respectively; H I = Herfindahl Index

Appendix 7.11: List of results tables available on request but not included in this document

- The effects of ownership on capital structure using the fixed effects model at the top one shareholder level.
- The effects of ownership on capital structure using the generalised method of moments model without a lag at the top one shareholder level.
- The effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top one shareholder level.
- The effects of ownership on capital structure using the fixed effects model at the top two shareholders level.
- The effects of ownership on capital structure using the generalised method of moments model without a lag at the top two shareholders level.
- The effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top two shareholders level.
- The effects of ownership on capital structure using the fixed effects model at the top three shareholders level.
- The effects of ownership on capital structure using the generalised method of moments model without a lag at the top three shareholders level.

- The effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top three shareholders level.

- The effects of ownership on capital structure using the fixed effects model at the top five shareholders level.

- The effects of ownership on capital structure using the generalised method of moments model without a lag at the top five shareholders level.

- The effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top five shareholders level.

- The effects of ownership on capital structure using the fixed effects model at the top 10 shareholders level.

- The effects of ownership on capital structure using the generalised method of moments model without a lag at the top ten shareholders level.

- The effects of ownership on capital structure using the generalised method of moments model with a lagged dependent variable at the top 10 shareholders level.

- The effects of ownership on corporate performance using the fixed effects model without a lag at the top one shareholder level.

- The effects of ownership on corporate performance using the generalised method of moments model without a lag at the top one shareholder level.

- The effects of ownership on corporate performance using the generalised method of moments model with a lagged dependent variable at the top one shareholder level.

- The effects of ownership on corporate performance using the fixed effects model without a lag at the top two shareholders level.

- The effects of ownership on corporate performance using the generalised method of moments model without a lag at the top two shareholders level.

- The effects of ownership on corporate performance using the generalised method of moments model with a lagged dependent variable at the top two shareholders level.

- The effects of ownership on corporate performance using the fixed effects model without a lag at the top three shareholders level.

- The effects of ownership on corporate performance using the generalised method of moments model without a lag at the top three shareholders level.

- The effects of ownership on corporate performance using the generalised method of moments model with a lagged dependent variable at the top three shareholders level.

- The effects of ownership on corporate performance using the fixed effects model without a lag at the top five shareholders level.

- The effects of ownership on corporate performance using the generalised method of moments model without a lag at the top five shareholders level.

- The effects of ownership on corporate performance using the generalised method of moments model with a lagged dependent variable at the top five shareholders level.

- The effects of ownership on corporate performance using the fixed effects model without a lag at the top 10 shareholders level.

- The effects of ownership on corporate performance using the generalised method of moments model without a lag at the top 10 shareholders level.

- The effects of ownership on corporate performance using the generalised method of moments model with a lagged dependent variable at the top 10 shareholders level.