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Agency Problems and Ownership Structure in Large Private Firms in the UK

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**Agency Problems and Ownership Structure in Large Private
Firms in the UK**

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May 2015

This thesis is submitted to Bangor University in fulfilment of the requirements
for the degree of Doctor of Philosophy (Accounting and Finance)

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Abstract

This thesis investigates the relationships between ownership structure and agency costs, executive compensation and earnings management in large private firms in the UK. The study employs a sample of 1223 firms and data is collected from the FAME database and Annual Returns submitted to Companies House. The study uses a cross-sectional data set, with data from sample firms 2013 financial reports, and employs univariate tests and OLS and 2SLS regressions to test the proposed hypotheses.

The findings of the agency cost study are that high and low agency cost firms differ significantly in their managerial ownership and, to a lesser extent, in their ownership concentration. Agency costs, measured by the expense ratio, are negatively related to managerial ownership. Measured by asset utilisation, agency costs are non-linearly related to managerial ownership, declining and then rising with increasing managerial ownership. There is limited evidence of a monitoring effect associated with concentrated ownership. The findings of the executive compensation study are that compensation is cubically related to managerial ownership and is lower where ownership is highly concentrated. Compensation is sensitive to accounting performance. Pay-performance sensitivity is lower in firms in which the Managing Director is a majority shareholder and in firms in which ownership is highly concentrated. The findings of the earnings management study are that income increasing discretionary accruals, considered in isolation, are non-linearly (U-shaped) related to managerial ownership. Firms in which managerial ownership is low exhibit significantly higher income increasing discretionary accruals when firms experience a cash-flow loss or decline. A similar result is obtained using both measures of poor cash-flow performance, however the magnitude of the coefficients indicates that the effect is stronger when a cash-flow loss is experienced.

In general the results show that both low and high levels of managerial ownership are associated with significant agency costs in large private firms and that concentrated ownership performs a limited monitoring role in these firms.

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List of Abbreviations

2SLS	Two Stage Least Squares
AIM	Alternative Investment Market
BIS	Department of Business, Innovation and Skills
CEO	Chief Executive Officer
CPI	Consumer Price Index
DAC	Discretionary Accruals
EIS	Enterprise Investment Scheme
GDP	Gross Domestic Product
HI	Hirschman Index
HPD	Highest Paid Director
IPO	Initial Public Offering
LSE	London Stock Exchange
Max	Maximum
MD	Managing Director
Min	Minimum
N	Number of Observations
OFEX	Off Exchange
OLS	Ordinary Least Squares
R^2	Coefficient of Determination
ROA	Return on Assets
ROE	Return on Equity
SEIS	Seed Enterprise Investment Scheme
SIC	Standard Industrial Classification
UK	United Kingdom
VIF	Variance Inflation Factor

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Declarations

I hereby certify that this thesis has not been accepted for any award, and is not being submitted concurrently for any award and that it is my own work.

I agree to deposit an electronic copy of my thesis (the Work) in the Bangor University (BU) Institutional Digital Repository, the British Library ETHOS system, and/or in any other repository authorized for use by Bangor University and where necessary have gained the required permissions for the use of third party material.

Chapter 1 Introduction

1.1 Introduction

“the emphasis on large companies has led us to ignore (or study less than necessary) the rest of the universe: the young and small firms, who do not have access to public markets...a greater attention to these problems is well warranted.”

Luigi Zingales (2000). In Search of New Foundations

The objective of this thesis is to investigate the relationships between ownership structure and agency costs, executive compensation and earnings management in large private UK firms. It comprises three, linked empirical studies. The first question it addresses is whether agency costs vary with managerial ownership and ownership concentration. Existing research has reported evidence consistent with agency costs declining as managerial ownership increases. This study seeks to extend this research by considering whether high levels of managerial ownership lead to managerial entrenchment in large private firms, reflected in increased agency costs. The study also examines the relationship between ownership concentration and agency costs to establish whether concentrated ownership exerts a monitoring influence on managers of private firms and whether this effect is dominated at higher levels of concentration by agency costs arising from dominant shareholders exploiting their power.

The second question addressed in this study is whether the level and sensitivity to firm performance of executive compensation in private firms are related to managerial ownership and ownership concentration. The forms of the relationships between compensation and ownership structures are determined. The sensitivity of compensation in private firms to accounting performance (ROA) is tested. The study investigates whether this sensitivity is moderated by managerial ownership and ownership concentration. The third question addressed is, to what extent is earnings management behaviour in private firms associated with managerial ownership. The study tests for associations between income increasing and income decreasing discretionary accruals and managerial ownership. In firms exhibiting income increasing discretionary accruals, the study tests whether the magnitude of discretionary accruals in the face of poor firm performance is moderated by high and low levels of managerial ownership.

To answer these questions, an initial cross sectional sample of private UK firms is constructed, from which the samples used in each of the studies is drawn. The data for the study is collected from the FAME database, which provides data on private firms in the UK, and relates to the financial year 2013. Additional data is collected from Annual Reports returned to Companies House by sample firms. Reporting requirements for UK firms are set out in the Companies Act 1967 and subsequent Companies Acts. “Small”, “medium” and “large” companies, as defined in the relevant legislation, are subject to different financial reporting requirements. The sample of firms in this study is limited to those classified as “Large” in the Companies Act 1967 and subsequent Companies Acts due to the availability of more detailed financial and other data on these firms. The fundamental measures of managerial ownership and ownership concentration respectively are the ownership share of the MD¹ and the ownership share of the largest shareholder respectively, from which further variables are constructed. The data is analysed using univariate and multivariate methodologies to test the hypotheses proposed. To test the agency cost hypotheses, the ownership characteristics of high and low agency cost firms are compared and regressions are estimated using OLS, in which measures of agency costs are regressed on lagged ownership variables and control variables. To test the executive compensation hypotheses, Directors’ Remuneration is regressed on a measure of firm performance, ownership variables and control variables. An instrumental variables approach (2SLS) is used to estimate these regressions to account for endogeneity in the relationship between compensation and firm performance. The moderating effect of ownership structure on pay-performance sensitivity is tested. To test the earning management hypotheses, discretionary accruals are estimated using a modified-Jones approach and are regressed on lagged ownership and control variables, using OLS. The moderating effect of managerial ownership on earnings management behaviour is also tested.

¹ Firms in the sample use the terms Managing Director (MD) or Chief Executive Officer (CEO) in their financial statements in identifying the senior executive officer in the firm. For brevity MD is used hereafter in this study to identify this officer in the context of the data used in the present study, however CEO is used if appropriate when discussing other studies.

1.2 Organisation of the Thesis

This chapter outlines the motivation and background to the thesis, provides a summary of the main empirical results and describes the contributions this thesis makes to the literature. Chapter 2 reviews the extant literature on ownership structure as it relates to agency costs, executive compensation and earnings management. The paucity of empirical evidence on the ownership structure and related issues in private firms compared to the vast literature on these questions in public firms and the consequent gaps in the empirical literature are highlighted in the review. Agency costs arising from the separation of ownership and control and managerial entrenchment are discussed and evidence on the monitoring and expropriating effects of concentrated ownership is outlined. The literature on executive compensation and the extent to which compensation is sensitive to firm performance is reviewed. Evidence on the relationships between concentrated ownership and insider ownership and the level of executive compensation in public and private firms is outlined and the interaction between ownership structure and pay-performance sensitivity is discussed. The extant literature on earnings management in private firms is reviewed and the relationship between managerial ownership and earnings management is discussed.

Chapter 3 presents background information on the prevalence of public and private companies in the UK economy and outlines how public and private companies differ with respect to legal framework, financial characteristics and ownership structures. This chapter also considers the differing quality of financial reporting in public and private companies. Chapter 4 describes the sample and data used in the empirical analysis. The sample selection criteria are outlined and information is provided on the FAME database, the data source used. The construction of the primary explanatory variables used in this study, measuring managerial ownership and ownership concentration, is outlined. The measures of agency costs, executive compensation and earnings management are described, along with control variables used in each of the empirical studies. Descriptive statistics are provided for each of the study samples in this chapter.

The results of the empirical analysis are provided in Chapters 5, 6 and 7. Chapter 5 investigates the association between ownership concentration and managerial ownership and agency costs, measured using efficiency ratios. Chapter 6 provides the results of tests on the association between pay and firm performance and ownership structure and whether pay-performance sensitivity is moderated by managerial ownership and ownership concentration. Chapter 7 considers the relationship between earnings management, measured as discretionary accruals, and managerial ownership. Discretionary accruals are estimated using a modified-Jones approach. Results of tests on the association between managerial ownership and income increasing and income decreasing discretionary accruals are presented. The interaction between managerial ownership and earnings management by firms exhibiting poor cash-flow performance is also examined. Chapter 8 concludes the thesis, provides a summary of the findings and discusses limitations and avenues for further research.

1.3 Summary of Main Findings

This section provides a brief summary of the main empirical findings of this thesis. The first empirical study investigates the relationships between agency costs and ownership structure in the sample firms. Agency costs are measured using two efficiency ratios, the ratio of expenses to sales and the ratio of sales to total assets. A univariate, mean comparison analysis, finds that managerial ownership in firms exhibiting high agency costs is significantly lower compared to firms exhibiting low agency costs. Ownership concentration is lower in high agency cost firms, but differences in this respect are not generally significant. In a multivariate analysis, the expense ratio is linearly and negatively related to managerial ownership. The asset utilisation ratio (the ratio of sales to total assets), is non-linearly related to managerial ownership, with an inflection point at 56.9% (shareholding of the Managing Director (MD)). This results is consistent with both the “alignment of interests” and “managerial entrenchment” hypotheses. To further investigate this non-linear relationship, the extent of firm diversification (proxied using the number of SIC codes the firm includes in its return to Companies House) is regressed on the ownership share of the MD. The results indicate that firm diversification declines and then increases with increasing managerial ownership, with an inflection point at 60% MD ownership. Firm diversification appears to be negatively related to asset utilisation. The relationship between ownership concentration and

both measures of agency costs is relatively weak, agency costs are positively related to the number of shareholders in the sample firms and assets utilisation is lower in firms where ownership concentration is low.

The second study investigates the relationship between ownership structure and the level of executive compensation, the sensitivity of compensation to firm performance and the interaction between pay-performance sensitivity and ownership structure in the sample firms. To account for the endogenous nature of the pay-performance relationship, an instrumental variables approach is used to estimate regressions in this study. The level of executive compensation is non-linearly related to managerial ownership and the relationship is cubic in form. As managerial ownership increases, compensation declines, increases and declines. The inflection points are at 25% and 75% MD ownership share. Highly concentrated ownership is associated with lower compensation. Executive compensation in the sample firms is sensitive to accounting performance, measured as lagged ROA. This pay-performance sensitivity is significantly weaker in firms in which the MD is a majority shareholder and in firms in which ownership is highly concentrated.

The third empirical study investigates the relationship between managerial ownership and discretionary accruals in the sample firms. Discretionary accruals are estimated using a modified-Jones approach. A univariate analysis suggests a non-linear (U-shaped) relationship between managerial ownership and discretionary accruals. In a multivariate analysis, no association is found between discretionary accruals and managerial ownership, when income increasing and decreasing accruals are considered together. Income increasing discretionary accruals, considered in isolation, are non-linearly (U-shaped) related to managerial ownership, with an inflection point at 43.96% MD ownership. The sample of firms exhibiting income increasing discretionary accruals is further analysed to determine if differences are evident between firms with low and high managerial ownership when firm performance is poor. The results indicate that firms in which managerial ownership is low exhibit significantly higher income increasing discretionary accruals when firm performance is poor. A similar result is obtained using both measures of poor firm performance, however the magnitude of the coefficients indicates that the effect is stronger when a cash-flow loss is experienced.

1.4 Agency Conflicts in Private Firms

Where ownership and control of the firm are separated, self-interested actions of managers arising from the divergent interests of the managers and the shareholders impose costs on the shareholders. Agency theory, developed by Jensen and Meckling (1976) drawing on earlier theoretical literature on the contractual nature of the firm and ownership structure by Berle and Means (1932) and Coase (1937) among others, remains an important basis for empirical considerations of corporate ownership structure. As the ownership share of the manager declines, the incentive to divert firm resources to increase their own utility, through the consumption of perquisites, excessive risk aversion, inefficient investment and other routes, increases since the costs are borne proportionate to the ownership share but the gains are captured by the manager. Increasing the ownership share of the manager may not resolve the conflict since this may engender a second type of agency cost, which arises when the manager becomes entrenched in position due to a significant ownership share and the ability of shareholders to effectively monitor or replace agents declines. Concentrated ownership, by increasing both the ability and incentive of shareholders to monitor managers, should reduce the magnitude of residual agency costs. However, by facilitating the expropriation of firm resources by majority shareholders, it may create new agency conflicts. There is a vast empirical literature documenting manifestations of the costs of the separation of ownership from control in public firm in contexts such as capital structure (Leland 1998), pay-out policy (Fenn and Liang 2001), executive compensation (Hartzell and Starks 2003), earnings management (Garcia-Meca and Sanchez-Ballesta 2009), mergers and acquisitions (Masulis, Wang and Xie 2009) and security issuance (Barclay, Holderness and Sheehan 2007).

In contrast, agency conflicts in private firms have received relatively little empirical attention. It has been argued that the agency problems that exist in public firms are largely absent from private firms due to higher ownership concentration and managerial ownership, compared to public firms. Gao, Lemmon, and Li (2010) for example, compare CEO pay-performance sensitivity in public and private firms and find that pay is sensitive to firm performance in public, but not in private firms. Since contingent compensation is a mechanism to reduce agency conflicts, the authors argue that this finding is consistent with the greater ability and incentive of shareholders to monitor managers in private firms obviating the need for

performance based pay to align the interests of managers with those of shareholders. A growing body of research however suggests that significant agency costs do arise in private firms. Ang, Cole and Lin (2000) and Fleming, Heaney and McCosker (2005) document significant negative associations between measures of agency costs and managerial ownership, consistent with misaligned incentives in private firms significantly affecting firm performance. Michiels et al. (2012) and Cole and Mehran (2013) provide evidence that characteristics of the structure and level of executive compensation in US private firms are consistent with the predictions of agency theory. Hope, Langli and Thomas (2012) find evidence that auditor selection in private firms is related to agency conflicts. This thesis seeks to contribute to this developing literature by considering ownership structure in private firms as it relates to three areas: agency costs, executive compensation and earnings management.

The lack of empirical attention devoted to these questions in private firms is particularly noteworthy given the important role played by private firms in the economy, Brav (2009), for example, estimates that 60% of corporate assets in the UK are owned by private firms. The most obvious reason for the relative lack of empirical attention devoted to private firms is the availability of data. Financial, ownership and other data on public firms in developed economies is readily available to researchers whereas equivalent data on private firms has historically been unavailable, or not easily accessible in digitised form. Relatively new databases such as FAME, as used in this study, Amadeus and Sageworks² have opened the universe of private firms to empirical scrutiny.

Private firms differ from public firms in several respects relevant to how agency conflicts impose costs on shareholders, influence executive compensation and earnings management behaviour. Ownership in public firms in the UK is relatively homogenous³, CEO ownership is low and shareholders owning dominant ownership stakes are relatively uncommon. Ownership structures in private firms by comparison are heterogeneous, the sample used in this study includes firms in which ownership and control are unified in a single “owner-manager”. These firms conform to the “zero agency cost firm” described by Jensen and

² FAME and Amadeus databases are compiled by Bureau van Dijk and provide data on UK/Irish private firms and European private firms respectively. Sageworks is compiled by Sageworks Inc. and provides data on private US firms.

³ Chapter 3 includes a discussion of ownership structures in public and private firms.

Meckling (1976). At the other extreme, the sample includes firms in which the manager has no ownership stake and ownership is dispersed among many shareholders. This heterogeneity of ownership structures provides a rich environment in which to explore the agency conflicts that arise from both low managerial ownership and ownership concentration and also from entrenched managers and dominant shareholders. Private firms do not have access to public equity markets. They cannot readily make use of equity compensation mechanisms and cannot use market based-measures of firm performance to guide compensation levels. Because private firms' shares are not listed on exchanges, they cannot easily be traded and the transaction costs associated with trading shares are much higher than the equivalent costs for public firm shareholders (Nagar, Petroni and Wolfenzon 2011). Ownership in private firms is extremely "sticky" in comparison to ownership in public firms.

Public and private firms are exposed to different monitoring mechanisms. The Board of Directors in public firms performs important monitoring functions and represents the interests of generally dispersed shareholders of the firm. Boards in UK public firms have a median size of seven members (Guest 2009) and typically include several independent directors (Li, Pike and Haniffa 2008). Boards in private firms, by comparison, are smaller and comprise primarily executive directors, members of a controlling family and affiliated non-executive directors, with few independent directors (Arosa, Iturralde and Maseda 2010). Public firms are subject to stock market regulations, corporate governance codes, scrutiny by investment analysts and extensive media attention, which may serve to limit self-interested behaviour by managers (Chung and Jo 1996, Zingales 2000). Private firms are not generally subject to these formal and informal monitoring mechanisms. Private firms are more opaque than public firms. While the financial accounting requirements for public and private firms in the UK are similar⁴, public and private firms face different demands for accounting information from consumers of that information and financial reporting information from private firms is of a lower quality than that from public firms (Ball and Shivakumar 2005, Burgstahler, Hail and Leuz 2006, Peek and Buijink 2010). Given these extensive differences between public and private firms, it is not obvious that empirical results from studies of public firms in areas addressed by this study are generalizable to private firms. Extending empirical consideration of corporate ownership structure to private firms is important because of the central role they

⁴ Financial reporting requirements for public and private firms are discussed in Chapter 3.

play in the economy, because they differ so significantly from public firms and because characteristics of private firms, heterogeneous but generally high ownership concentration and insider ownership, mean that they provide an ideal environment to test some of the empirical predictions of agency theory.

1.5 Contributions of the Study

This study makes a number of contributions to the empirical literature on ownership structure, agency costs, executive compensation and earnings management in large private firms in the UK. There is a lack of clarity in the existing, limited literature on these issues in private firms, in particular the effects of managerial entrenchment remain relatively unexplored in this setting.

The first contribution is to extend research by Ang et al. (2000) and Fleming et al. (2005) who document a linear negative relationship between agency costs and managerial ownership in private firms. In this study the effects of both managerial entrenchment and incentive alignment in private firms are considered. The results indicate that agency costs decline as managerial ownership increases until the ownership share of the Managing Director (MD) reaches 57%, at which point the relationship reverses and agency costs are positively related to increasing managerial ownership. This results is consistent with managerial entrenchment dominating alignment effects at high levels of managerial ownership and is consistent with evidence on managerial entrenchment in public firms, reported by studies such as Florackis and Ozkan (2009) Chang and Zhang (forthcoming), in the UK and US respectively.

A second contribution of this paper is to extend the findings of Keasey, Short and Watson (1994), who, in a study of UK private firms, indicate that Return on Assets (ROA) declines at high levels of managerial ownership. Several findings presented in Chapter 5 shed light on this result. The expense ratio declines linearly with increasing managerial ownership, while the ratio of sales to assets is quadratically related to managerial ownership, suggesting that the effect on firms performance at high levels of managerial ownership documented by

Keasey et al. (1994) arises from a decline in the efficiency of asset utilisation and not higher expenses per unit of sales. Further, the results indicate that firm diversification is negatively related to asset utilisation and is quadratically related to managerial ownership. This finding suggests managerial risk aversion as a partial explanation for the observed decrease in efficiency at high levels of managerial ownership.

Evidence on pay-performance sensitivity from the limited literature on private firms is inconsistent, among recent studies Banghøj, Gabrielsen, Petersen, and Plenborg (2010) find no evidence of a significant pay-performance relation in Danish private firms whereas Michiels et al. (2012) document a significant positive relationship between Return on Assets (ROA) and executive compensation in US firms. These contrasting results, using similar methodological approaches, suggest that the pay-performance relation may vary by institutional setting. Evidence from public firms, such as Conyon and Murphy (2000) in which pay-performance sensitivity is found to be significantly higher in US than UK firms supports this. A third contribution of this study is to show, using a methodological approach that controls for the endogenous nature of the pay-performance relationship and a significantly larger sample than other studies on pay-performance sensitivity in private firms, that UK private firms exhibit significant pay-performance sensitivity. The sensitivity of compensation to accounting performance (ROA) is robust to controls for firm size, industry and other firm characteristics associated with compensation. This study further contributes to the literature by providing evidence that pay-performance sensitivity in private firms varies with ownership structure. Specifically the results show that the sensitivity of compensation to accounting performance is significantly lower in firms in which the MD's shareholding is greater than 50%, compared to firms in which the MD is not a majority shareholder and in firms in which ownership is highly concentrated.

A fourth contribution to the literature made by this study is to show that the relationship between executive compensation and managerial ownership in private firms is non-linear, falling, rising and falling again as managerial ownership increases. These results indicate that alignment and entrenchment effects exert influences on the level of executive compensation in private firms at different levels of managerial ownership. This results contrasts with findings by Cole and Mehran (2013), who document a simple linear (negative) relationship

between compensation and managerial ownership in private US firms but is consistent with evidence from public firms (Ozkan 2011).

This study makes two contributions to the literature on earnings management. Prior research indicates that earnings management is more pervasive in private firms than in public firms (Ball and Shivakumar 2005, Burgstahler et al. 2006). The relationship between earnings management and managerial ownership in private firms has not been a focus of empirical research. This study makes a fifth contribution to the literature by providing evidence on the relationship between the ownership share of the MD and the magnitude of discretionary accruals in private firms. The results show that managerial ownership is non-linearly related to income increasing discretionary accruals (but not income decreasing discretionary accruals), in a U-shaped manner and suggests that managerial entrenchment is associated with the earnings management in private firms. This finding is consistent with results reported by Lennox (2005), in which a non-linear relationship between auditor quality and managerial ownership in private UK firms is documented. Finally, this study shows that the high degree of monitoring by concentrated ownership concentration and insider ownership prevalent in private firms does not prevent opportunistic earnings management choices made by managers when faced with poor firm performance documented in public firms by Chung, Firth and Kim (2002) and Peasnell, Pope and Young (2005). Sample firms managed by MDs who own a low ownership share in the firm, relative to the sample mean, exhibit significantly higher income increasing discretionary accruals when firm performance is poor compared to firms in which the MD's ownership share is intermediate or high.

Chapter 2 Literature Review and Hypotheses

2.1 Introduction

Since the emergence of large corporations, possessing a legal identity separate to that of their owners, the inherent conflict between the interests of those that provide capital to a firm and those of the managers of that firm has been a central concern. An early expression of this conflict is provided in a much-cited passage of *The Wealth of Nations* (Smith 1776).

“The directors of such companies . . . being the managers rather of other people’s money than of their own, it cannot well be expected that they should watch over it with the same anxious vigilance with which the partners in a private co-partnery frequently watch over their own. Like the stewards of a rich man, they are apt to consider attention to small matters as not for their master’s honour, and very easily give themselves a dispensation from having it. Negligence and profusion, therefore, must always prevail, more or less, in the management of the affairs of such a company.” (Book 5, Chapter 1, Part 3, Art. 1)

Berle and Means (1932) provide the foundations for the modern consideration of this conflict arguing that, while the ownership of corporations lies with the shareholders, it is the managers who exercise effective control. The agency perspective on the firm derives from the contractual view of the firm advanced by Coase (1937) and developed by Jensen and Meckling (1976). In this perspective the relationship between the manager and shareholders is determined by contract. If a complete contract could be agreed, setting out the duties of the manager in every possible contingency, no conflict between the interests of shareholders and the actions of managers would arise (Shleifer and Vishny 1997). In practice, no contract could anticipate every possible contingency and contracts between shareholders and managers are incomplete. This leaves significant residual control rights or discretion in the hands of managers (Grossman and Hart 1986). Under the assumption that managers are rational utility-maximisers this discretion allows the managers to use the assets of the firm to further their self-interest. Jensen and Meckling (1976) develop this agency perspective and argue that the incentive for managers to divert firm resources will increase as their ownership share declines. The cost of this self-interested managerial behaviour is termed the “residual agency cost” by Jensen and Meckling. The first empirical chapter in this thesis is

aimed at measuring this cost and its relationship to the ownership structure of the (private) firm. The second empirical chapter considers the use of incentive contracts, which make some portion of pay contingent on firm performance, as a mechanism to reduce the agency problem in private firms. The final empirical chapter examines accounting choices by private firms and whether accounting choices to disguise poor firm performance from shareholders vary with the ownership share of managers. The current chapter reviews the existing literature on ownership structure and agency costs, executive compensation and earnings management, with a particular focus on private firms.

A number of studies have examined ownership structures across different institutional settings and these have challenged the traditional assumption, which underlies much of the theoretical consideration of agency conflicts from Berle and Means (1932) onwards, that the ownership of equity in public firms is dispersed among many shareholders. La Porta, Lopez-De-Silanes and Shleifer (1999) show that only in countries with strong legal protection for the rights of minority shareholders, notably the US and the UK, is dispersed ownership the norm. In most countries, ownership is concentrated and individuals, families or the state own controlling shareholdings of the majority of public firms. Faccio and Lang (2002) provide evidence on the ownership structure of over 5000 publicly listed firms in Western Europe. They report that dispersed ownership of public firms predominates only in the UK and Ireland, with controlling owners present in the majority of public firms in all continental European countries. These findings indicate systematic variation across countries in ownership structure and suggest that the extent to which the rights of minority shareholders are protected is an important determinant of corporate ownership structures.

The UK has a comprehensive corporate governance framework in place for publicly listed firms, which is based on a “*comply or explain*” principle. Beginning in 1992 with the *Cadbury Report*, the UK has adopted a succession of corporate governance codes, drawing on expert reports. The current iteration of these codes is *The UK Corporate Governance Code* (2014). These codes contain recommendations as to general principles of corporate governance as well as specific recommendations in areas such as board of director functions, CEO duality, independent directors and relations with shareholders. No equivalent regulatory framework is in place for private firms in the UK. Private firms are insulated from

the monitoring activities of public capital markets (Burgstahler et al 2006). Public equity markets typically impose disclosure requirements on listed companies that are more intrusive than the legal obligations facing companies in general (Ball and Shivakumar 2005). While the legal protection accorded to minority shareholders in private firms is equivalent to that in public firms in the UK, the effective degree of protection may differ. Zingales (2000) for example argues that monitoring of firms by the media and resultant public pressure is an effective constraint on the expropriating activities of majority shareholders. Private firms, being in general much smaller than public firms, are unlikely to be subject to the same degree of media interest as public firms. These factors suggest that entrenched managers or dominant shareholders in private firms may face fewer, or less effective, impediments to expropriation than their counterparts in public firms, notwithstanding the legal protections afforded to minority shareholders in UK law.

The vast literature on corporate governance and ownership structure⁵ is concerned almost exclusively with public firms. The paucity of data on the ownership and other characteristics of private firms, in contrast to the widely available data on public firms, is at least in part responsible for this disparity in attention. A body of literature is developing which recognises fundamental differences between ownership structures of publicly listed and private firms. Much of this literature draws on survey data (see for example Ang et al. (2000), Cole and Mehran (2010) and Michiels et al. (2012) on agency costs, executive compensation and earnings management in private firms respectively). Other studies exploit relatively new sources of financial and ownership data in private firms, such as the FAME database that this study employs (see for example Ball and Shivakumar (2005) and Brav (2009) on earnings management and capital structure respectively). This growing literature is extending the empirical consideration of ownership structure into the relatively uncharted territory of private firms.

The remainder of this chapter is presented as follows. Section 2.2 introduces the discussion on agency costs and reviews the empirical literature on how agency costs relate to managerial ownership. The incentives and ability of large shareholders to monitor managers

⁵ Shleifer and Vishny (1997) and Brown, Beekes and Verhoeven (2011) provide reviews of the corporate governance literature.

and the consequent relationship between ownership concentration and agency costs are also explored. The argument that ownership structure and firm performance may be endogenously determined in public firms but not in private firms is then outlined. Section 2.3 introduces the discussion on executive compensation and reviews the extant empirical literature on the link between firm performance, managerial ownership and executive compensation, highlighting the limited studies and conflicting results pertaining to private firms. The monitoring role of concentrated owners in respect of executive compensation is discussed and alternative perspectives on how concentrated ownership relates to pay-performance sensitivity are outlined. Section 2.4 reviews the empirical literature on earnings management in private and public firms and the relationship between managerial ownership and earnings management.

2.2 Agency Costs

Jensen and Meckling (1976) outline the effect on incentives when a firm, which is wholly owned by a managing shareholder, issues equity to outside investors. Managers will consume firm resources until the marginal cost outweighs the marginal benefit. In a firm where all the equity is owned by managers this will result in an efficient level of managerial resource consumption as all the costs, in the form of reduced returns to equity, are borne by the managers. If an outside investor acquires equity in the firm, however, managers will bear the costs of the consumption of firm resources only in proportion to their shareholding. Thus, as their shareholding falls their incentive to consume firm resources for private purposes, at the expense of shareholders, increases. This form of agency costs is commonly referred to as *Type I* agency costs in the literature (Villalonga and Amit 2006). The expropriation of firm resources envisioned in Jensen and Meckling (1976) is the consumption of perquisites. Avenues for wealth transfers from shareholders to managers however are much broader than this. For example an investment, which generates a present value of future cash-flows of £100 for the firm and private benefits of £10 for the manager of a firm, but which costs £200 to acquire is wealth destructive for shareholders. If the manager owns 1% of the equity in the firm, the value of his or her residual claim declines by 1% of the total decline in the value of residual claims (£1) but this loss is outweighed by the private benefits created. This implies a negative relationship between managerial equity ownership and agency costs and is referred

to as the “*alignment of interests*” hypothesis (Jensen 1993). As the percentage of equity owned by the manager increases, the incentive to generate private benefits through (shareholder) wealth destructive actions is expected to decline.

High levels of managerial equity ownership may, however, insulate managers from the effects of shareholder monitoring and other corporate governance mechanisms by making managers difficult or costly to remove. Fama and Jensen (1983) suggest that higher levels of managerial ownership lead managers to become entrenched and therefore facilitate managerial self-interested behaviour at the expense of shareholders. This is referred to as the “*managerial entrenchment*” hypothesis and the costs that arise from conflicts between entrenched managers (or majority shareholders) and other shareholders are referred to as *Type II* agency costs (Villalonga and Amit 2006). In this perspective agency costs and managerial equity will be non-linearly related, exhibiting a negative relationship at lower levels of managerial ownership to a threshold point where the relationship becomes positive.

Morck, Shleifer and Vishney (1988) find that Tobin’s Q is positively correlated with insider ownership where insider ownership is between 0 - 5% but negatively related to insider ownership between 5% and 25%. McConnell and Servaes (1990 and 1995) report a similar relationship between the Tobin’s Q and managerial ownership, with a positive relation up to 40-50% insider ownership and a negative relationship thereafter. Morck et al. (1988) and McConnell and Servaes (1990 and 1995) both use samples drawn from US listed public firms, although the mean size of firms in the Morck et al. (1988) is significantly higher than in the McConnell and Servaes (1990 and 1995) samples. They report markedly different results with respect to the point at which entrenchment effects dominate alignment effects. Kole (1995) revisits the Morck et al. (1988) and McConnell and Servaes (1990) studies and finds that the different thresholds at which the studies report entrenchment can be explained by differences in the size of firms in the study samples. Steiner (1996), Han and Suk (1998) and Chang and Zhang (forthcoming) report further evidence of a negative relationship between managerial entrenchment and firm value in public US firms. In a UK context, Florackis and Ozkan (2009) report that managerial entrenchment in public firms is strongly associated with lower sales per unit of assets. Florackis (2005) reports that Tobin’s Q is negatively associated with increased executive director ownership, beyond 43%.

From the managerial entrenchment perspective, entrenched managers may seek to divert value from shareholders through various corporate actions. Berger, Ofek and Yermack (1997) report significantly lower leverage in firm managed by entrenched CEOs. The authors measure CEO entrenchment as the degree to which CEOs are insulated from pressure from large shareholders, monitoring from the board of directors and other corporate governance mechanisms. These results are consistent with managers seeking to avoid the monitoring and disciplining effects of leverage described by Jensen (1986). Barclay et al. (2007) report that entrenched managers use private placements rather than other equity issue mechanisms to allocate shares to passive shareholders. Corporate dividend policy (Farinha (2003)), the level and sensitivity to performance of executive compensation (Bebchuk and Fried 2003 and Fahlenbrach 2009) and the consumption of perquisites (Shleifer and Vishny 1989) are among the corporate behaviours found to be related to managerial entrenchment.

Of particular relevance to a consideration of managerial ownership in private firms are behaviours related to managerial risk aversion. For managers in private firms who own a large shareholding in a firm, the value of this shareholding is likely to represent a very significant proportion of their total wealth. Owners of small businesses are also commonly required to pledge personal assets or offer personal guarantees as collateral for firm borrowing (Ang, Lin and Tyler 1995 and Avery, Bostic and Samolyk 1998). A lack of portfolio diversification and personal liability for the debts of the firm create a rational incentive to reduce firm-specific risk. Kim and Lu (2011), in the context of US public firms, for example show that high levels of CEO ownership and weak external corporate governance is associated with below optimal levels of investment in (risky) Research and Development. One mechanism to reduce firm specific risk is to diversify the operations of the firm into sectors that yield cash-flows which are not perfectly positively correlated with those from the firm's existing operations. The existing evidence on managerial ownership and diversification in public firms generally reports a negative relationship (see for example Denis, Denis and Sarin 1997) and is consistent with a convergence of interests between shareholders and managers as insider ownership increases. At high levels of insider ownership however, there is evidence suggesting that managerial ownership is positively

related to sectoral diversification. Chen and Yu (2012) document a U-shaped relationship between managerial ownership and sectoral diversification.

Evidence on the relationship between managerial ownership and agency costs in private firms is limited. Evidence for the convergence of interests hypothesis in private firms is provided by Ang et al. (2000)⁶ and Fleming, Heaney and McCosker (2005), who document higher agency costs in firms managed by non-shareholders and a negative relationship between agency costs and insider ownership. Using a sample of 1,708 US unlisted firms, Ang et al. (2000) find statistically and economically significant differences in the efficiency of firms which have no outside (non-managing) equity ownership, compared to those that do. Ang et al. (2000) use two proxies for agency costs; the ratio of operating expenses to annual sales (*the expense ratio*) and the annual sales to total assets (*the asset utilisation ratio*). The expense ratio and the asset utilisation ratio are commonly used in the empirical literature to proxy for different forms of agency costs, particularly where market based measures, such as Tobin's Q, are not available (see for example Ang et al. 2000, Singh and Davidson 2003, Fleming et al. 2005, Chen and Yur-Austin 2007, McKnight and Weir 2009, Florackis and Ozkan 2009). The expense ratio captures direct agency costs such as the control of discretionary expenditure within the firm, including the consumption of perquisites and excessive managerial compensation. The asset utilisation ratio captures indirect agency costs such as sub-optimal investment decisions, the use of the firm's resources to purchase unproductive "trophy" assets and excessive managerial risk aversion or managerial "shirking". In a multivariate analysis, agency costs are found to be positively related to the number of non-managing shareholders, negatively related to the manager's equity holding and are lower for firms that are owned solely by managers than for firms that are not. They report that all of these relationships are statistically and economically significant.

Fleming et al. (2005) largely replicate the Ang et al. (2000) methodology and report similar findings for a sample of Australian unlisted firms. They also find a negative relationship

⁶ Ang, Cole and Lin (2000) make use of a survey of US small businesses conducted by the Federal Reserve in 1993 and again in 2003, the National Survey of Small Business Finances (NSSBF). The data from these surveys has been used a source for much of the empirical research on the finances and governance of private firms in the last two decades (for example Berger and Udell 1998, Nagar, Petroni and Wolfenzon 2011, Michiels, Voordeckers, Lybaert and Steijvers 2012 Cole and Mehran 2013 and Hope, Thomas and Vyas 2013.)

between family ownership and agency costs and a negative relationship between leverage and agency costs. While the results reported by Fleming et al. (2005) are qualitatively similar to those reported by Ang et al. (2000), the magnitude of the agency cost reduction associated with increases in managerial ownership is significantly less in the Australian data. This suggests that the relationship between ownership structure and agency costs in private firms may differ depending on the institutional setting.⁷

In private firms, the limited empirical evidence available suggests that entrenchment effects may outweigh alignment effects at higher levels. Keasey, Short and Watson (1994) examine the relationship between Return on Assets (ROA) and managerial equity ownership in a sample of 72 UK Small and Medium Enterprises (SMEs). They report an inverted-U shaped relationship between ROA and directors' equity ownership, with increased managerial equity ownership positively related to ROA until it reaches 68% ownership and declining thereafter. That the entrenchment effects appear to outweigh alignment effects of managerial ownership at a significantly higher level of ownership in SMEs than is the case in public firms appears consistent with the findings of Kole (1995) discussed above.

In summary, there is significant empirical evidence that both alignment and entrenchment effects arise from managerial equity ownership in public firms. In public firms agency costs decrease as managerial equity ownership increases from a low base and the relationship reverses beyond a threshold point, after which agency costs increase. In private firms, evidence from the US and Australia indicates that agency costs are higher in firms with non-manager shareholders and agency costs decline with increasing managerial equity ownership. If the entrenchment effects documented in the literature on public firms exist in private firms and outweigh the alignment effects of increasing managerial ownership documented by Ang et al. (2000) and Fleming et al. (2005), then I expect that agency costs will increase beyond a threshold point of managerial ownership. Hypothesis 5.1_c therefore predicts a non-linear relationship between agency costs and managerial ownership. To examine whether the

⁷ Singh and Davidson (2003) undertake a similar study in a sample of public US firms and report that asset utilisation is positively related to managerial ownership but that the expense ratio is not related to managerial ownership.

relationships documented, particularly in the US data, between agency costs and managerial ownership are evident in UK firms I posit the following hypotheses⁸:

H5.1_a: High agency cost firms will exhibit lower degrees of managerial ownership compared to low agency cost firms.

H5.1_b: There is a linear, negative relationship between agency costs and the degree of managerial ownership.

H5.1_c: There is a non-linear relationship between the agency costs and the degree of managerial ownership.

Following Ang et al (2000) agency costs are proxied by the ratio of operating expenses to annual sales (*the expense ratio*) and the annual sales to total assets (*the asset utilisation ratio*).

2.2.1 Agency Costs and Ownership Concentration

Fama and Jensen (1983) suggest that where ownership of the firm's equity is diffused among many residual claimants, each owning small fractions of the firm's equity, shareholders may rationally not incur the costs of monitoring agents since the gains from reducing agency conflicts will accrue to shareholders proportionate to their shareholding. If dispersed shareholders seek to avoid the costs of monitoring and hope to profit from the monitoring activities of others a free rider problem emerges and the management of the firm may be subjected to a lower than optimal level of monitoring. Shareholders owning a large proportion of the firm's cash-flow rights, commonly referred to as block-holders, can privately capture more of the benefits of costly monitoring activities themselves, thereby ameliorating this free rider problem and the consequent sub-optimal level of monitoring

⁸ The numbering of hypotheses refers to the empirical chapter in which the hypothesis is addressed. Hypotheses 5.x are addressed in Chapter 5, hypotheses 6.x are addressed in Chapter 6 and hypotheses 7.x are addressed in Chapter 7. All hypotheses are presented in their alternative form.

(Shleifer and Vishny 1986). Large shareholders, by virtue of their voting power, may also exercise significant control over areas such as investments made by the firm, compensation, pay-out and capital structure policies. If control rights are concentrated in large shareholders, these shareholders have the ability to effectively discipline, or remove, managers. Concentrated ownership therefore, by inducing monitoring of agents and increasing the ability to discipline agents, should reduce agency costs.

There is a significant body of empirical evidence indicating that large shareholders perform a valuable monitoring role. Yafeh and Yosha (1996) report that the presence of block holders in Japanese firms reduces discretionary expenditure, such as entertainment and advertising expenses. In a study focussing on individual investors who own large blocks of equity, Becker, Cronqvist, and Fahlenbrach (2011) find that block holders appear more prevalent in firms in which the potential marginal benefit from monitoring is greatest (smaller and poorly performing firms) and that the presence of a block holder is positively associated with measures of firm performance. Chen and Yur-Austin (2007) report that block-holders appear to mitigate some forms of agency costs, but not others. Of the three forms of agency costs examined in a sample of public US firms, managerial extravagance (measured using the ratio of expenses to sales) is negatively associated with the percentage of equity owned by block-holders. Agency costs proxied by the asset turnover ratio or underinvestment are not significantly associated with the shareholdings of block-holders. If large shareholders are more exposed to firm-specific risk due to the concentration of their portfolios their incentive to actively monitor the firm will be greater, Ekholm and Maury (2014) provide evidence that the portfolio concentration of shareholders is positively associated with subsequent firm performance and valuation.

Large shareholders also appear to play a monitoring role in private companies. Ang et al. (2000) report that firms in which a single family owns a majority of equity have significantly lower agency costs (measured by the ratio of expenses to sales) compared to firms without a controlling family owner. No significant difference is apparent between family controlled and other firms in respect of the ratio of sales to assets, however. The ownership share of the largest single shareholder is negatively related to both measures of agency costs. Complementary evidence is presented by Fleming et al. (2005) for Australian private firms,

where controlling family shareholders are associated with lower expense ratios but not significantly associated with asset utilisation. The magnitude of the reduction in agency costs in the presence of a controlling family is significantly lower in the Australian data compared to the results of the Ang et al. (2000) study on US firms.

The literature summarised on the monitoring role of large shareholders indicates that at least some forms of agency costs may be mitigated by the presence of large shareholders. The limited evidence available on private firms suggests that the same monitoring role may be evident in these firms, although the difference in the magnitude of the effect in US and Australian firms indicates that the value of the monitoring provided by large shareholders depends on the institutional setting. Hypotheses 5.2_a and 5.2_b predict that in UK private firms, concentrated equity ownership (measured in this study using the percentage of equity owned by the largest single shareholder) will be associated with lower agency costs, due to monitoring effects.

H5.2_a: High agency cost firms will exhibit more dispersed ownership compared to low agency cost firms.

H5.2_b: There is a linear, negative relationship between agency costs and the degree of ownership concentration.

Concentrated ownership may however impose costs by enabling majority shareholders to expropriate firm resources at the expense of minority shareholders. Dominant shareholders may cause the firm to pursue their specific interests rather than the interests of shareholders in general. Shleifer and Vishny (1997) develop the argument that large shareholders may expropriate firm resources for their private benefit to the detriment of smaller shareholders. “Tunnelling” behaviour (Johnson, La Porta, Lopez-de-Silanes and Shleifer 2000 and Morck and Yeung 2003), where dominant shareholders or managers act in their self-interest, to the detriment of other shareholders, may be manifested in ways such as the appointment of unsuitable managers to the firm or transactions with related parties on terms unfavourable to the firm. This “expropriation” argument implies a possible non-linear relationship between

ownership concentration and agency costs, as the benefits of increased monitoring by large shareholders are outweighed by the costs of expropriation once ownership concentration crosses a threshold.

Several studies provide evidence of costs associated with dominant shareholders. Claessens, Djankov, Fan and Lang (2002) investigate shareholder entrenchment by examining the difference between cash-flow and control rights of shareholders. They report that firm value, measured as the market to book ratio, increases with the shareholding of the largest shareholder. Firm value decreases with an increasing difference between control rights and cash-flow rights. This is consistent with entrenched shareholders influencing firm managers to act in the interests of the dominant shareholder at the expense of minority shareholders. Maury and Pajuste (2005) find that in firms where there are multiple large shareholders, a more equal distribution of shareholding is associated with increased firm value, compared to firms where a single shareholder is dominant. Similar evidence to the effect that uncontested control by a single large shareholder increases agency costs is provided by Morck, Wolfenson and Yeung (2005), Bozec and Laurin (2008) and Masulis, Wang and Xie (2009).

Nagar, Petroni and Wolfenzon (2011) provide some evidence of expropriation effects in private firms. Using the same sample of private US firms as Ang et al. (2000), the authors report that “shared ownership” firms, in which no shareholder owns more than 50% of equity exhibit significantly higher performance across a range of accounting measures. Net income and EBITDA are higher and the ratio of operating expenses to sales is lower in shared ownership firms compared with firms in which a single shareholder owns a majority of equity. These results complement those reported by Ang et al. (2000) and suggest a non-linear (U-shaped) relationship between the ownership share of the largest owner and agency costs.

In summary, the literature on public firms indicates that dominant shareholders may impose costs on firms, particularly where control is uncontested. The limited literature on this effect in private firms suggests that a similar relationship may exist in these firms, although the literature on agency costs in private firms suggests that geographic and institutional setting

may influence the relationships between ownership structure and agency costs and so caution should be exercised when generalising results from one institutional setting (the US). I posit the following hypothesis (H5.2_c), predicting that in private UK firms the expropriation effects of a dominant shareholder will outweigh the monitoring effects of greater ownership concentration beyond a threshold point.

H5.2_c: There is a non-linear relationship between the agency costs and the degree of ownership concentration.

In the preceding two sections, hypotheses predicting linear (H5.1_b and H5.2_b) and non-linear (H5.1_c and H5.2_c) relationships between agency costs and managerial ownership and ownership concentration are proposed. Separate hypotheses predicting linear and non-linear relationship in the data are proposed and tested for two reasons. Firstly, the discussion in these sections outlines empirical and theoretical grounds for predicting either linear or non-linear relationships between agency costs and managerial ownership and ownership concentration in the sample firms. Secondly, two distinct measures of agency costs are used in this study, the asset utilisation ratio and the expense ratio. Existing empirical research (Singh and Davidson 2003, Chen and Yur-Austin 2007) suggests that the nature of the relationships between asset utilisation and ownership structure may differ from those between the expense ratio and ownership structure in public firms. To allow for this difference in the study sample, both linear and non-linear relationships are separately hypothesised.

2.2.2 The Nature of the Ownership Performance Relationship in Private Firms

Demsetz and Lehn (1985) argue that ownership structure and firm performance are endogenously determined and that any attempt to establish a causal link from ownership structure to performance must take account of this in order to be valid. Outside shareholders or managers can adjust their ownership shares in response to firm performance or in anticipation of future firm performance. Managers, for example, may reduce equity holdings in anticipation of a poor performance. Similarly a firm's ownership concentration may increase or decrease due to the reactions of individual shareholders to firm performance or

their anticipation of future performance, excessive managerial expropriation could entice changes in the holdings of shareholders. Thus causality may run from firm performance to ownership structure rather than vice versa.

Much of the empirical literature on firm performance and ownership structures in public firms acknowledges the persuasiveness of this argument and controls for endogeneity in the methodological design (see for example Demsetz and Villalonga (2001), Bhagat and Black (2002), De Miguel, Pindado, De la Torre (2004), Coles, Lemon & Meschke, (2007) and Laeven and Levine (2008)). The argument that ownership and performance are endogenously determined is less persuasive in the context of private firms. In order for a causal relationship from performance to ownership to be plausible as argued by Demsetz and Lehn (1985), equity in the firm must be tradable at relatively low cost, allowing shareholders to adjust their holdings in response to or anticipation of firm performance. This is not the case in private firms as shares in these firms are not listed on exchanges and they cannot easily be traded. Shareholders therefore are unlikely to respond to changes in firm performance by adjusting upwards or downwards their ownership shares. Nagar et al. (2011) point out that this characteristic of private firms means the ownership structures of these firms are effectively pre-determined, static variables, rather than endogenous choice variables. Similar arguments, that where trading in firms' equity is constrained by very high transaction costs and changes in ownership shares are consequently extremely infrequent, that ownership structure should be considered an exogenous independent variable in firm performance regression, are made by Gorton and Schmid (2000) and Core and Larcker (2002). Given this characteristic of shareholdings in private firms, ownership is treated as an exogenous variable in the empirical tests described in Chapter 5.

This section discusses the extant literature on the relationship between ownership structure, that is the extent of managerial ownership and the concentration of ownership, and agency costs in both public and private firms. Hypotheses are posited predicting a relationship between ownership concentration and agency costs in private firms that reflect possible monitoring and expropriating effects. The relationship between managerial ownership and agency costs is predicted to reflect both alignment and managerial entrenchment.

2.3 Executive Compensation

Executive compensation is generally considered within an Agency Theory framework, where a separation of ownership and control and the divergent interests of executives and shareholders lead to self-interested behaviour by management and inefficient allocation of firm resources (Jensen and Meckling 1976). Shleifer and Vishny (1997) suggest one means of aligning the incentives of principals and agents is through contingent compensation contracts, where executive pay is tied to firm performance. The degree of agency costs in a firm may vary depending on executive equity ownership (Jensen and Meckling 1976) and the monitoring ability of shareholders is likely to be positively related to ownership concentration (Fama and Jensen 1983, Shleifer and Vishny 1986). The use of contingent compensation contracts as a mechanism to reduce agency costs, substituting for effective monitoring, should also vary, therefore, depending on these two characteristics of ownership structure.

2.3.1 Firm Performance and Executive Compensation

In the presence of information asymmetry, where perfect monitoring of managers is not possible, incentive contracts provide a mechanism to, at least partially, align the interests of shareholders and executives. An incentive contract which provides for a sufficiently high level of pay-performance sensitivity will reduce the likelihood that the marginal benefits of self-interested behaviour by managers will outweigh the resulting marginal cost of reduced compensation (Shleifer and Vishny 1997, Murphy 1999). This is the “optimal contracting” perspective on executive pay. Much research has focussed on establishing whether executive compensation is sensitive to firm performance, consistent with these theoretical predictions. One of the first efforts to measure this pay-performance sensitivity was Jensen and Murphy (1990). This study, using data from 1974 to 1986, estimated that CEOs captured \$3.25 for every \$1000 of shareholder wealth created. Several studies report an increase in the sensitivity of CEO pay to firm performance in the 1990s and suggest this is due to an increase in the use of equity based compensation, particularly in the US. Perry and Zenner (2001) and Hall and Lieberman (2000) estimate that CEOs captured approximately \$11 for every \$1000 of shareholder wealth created, in 1997 and 1998 respectively. Conyon and Murphy (2000),

comparing CEO compensation and incentives in the US and the UK using data from 1997, estimate that CEOs in the US capture, through compensation and equity holdings, 1.48% of shareholder wealth created, compared to 0.25% for UK CEOs. Murphy (2013) reports that CEO pay-performance sensitivity had declined by 2010, but remained significantly higher than the levels reported by Jensen and Murphy (1990). Empirical evidence on this pay-performance relationship in public US firms is relatively consistent, other studies reporting complementary findings to those discussed include Hubbard and Palia (1995) and Aggarwal and Samwick (2003). This literature generally reports a pay-performance relationship which is economically significant, but weaker than would be predicted by the agency theory perspective of compensation contracts as mechanisms to align the incentives of shareholders and managers. Jensen and Murphy (1990) argue that negative public reactions to executive compensation have served to weaken the pay-performance relation.

The exercise of managerial power has been advanced as an alternative explanation for the weaker than expected pay-performance relationship, as well as other characteristics of executive compensation. Bebchuk, Fried and Walker (2002) and Bebchuk and Fried (2003, 2004) challenge the traditional agency theory view of executive compensation arrangements as being the outcome of a Board of Directors, operating at arms-length from the CEO, designing an optimal contract to align the interests of executives with those of shareholders. In this perspective, powerful managers use their influence over their Boards to design compensation contracts to extract rents from the firm, in the form of higher and less risky compensation than is optimal. Managerial power may arise from a number of sources including managerial equity ownership, lower than optimal monitoring arising from the absence of large outside shareholders, managerial dominance of the Board of Directors and protections from hostile takeovers. From the managerial power perspective, executive compensation can be a manifestation of the agency problem, rather than an instrument to address it. Van Essen, Otten and Carbery (2012) review the empirical evidence on the managerial power theory of compensation and conclude that the theory has significant predictive power in respect of the level of CEO pay but less so in respect of the sensitivity of CEO pay to firm performance.

Empirical evidence suggests that the pay-performance relation is relatively weak in UK firms. Ozkan (2011) and Gregg, Jewell and Tonks (2005) find little evidence that levels of cash compensation and performance are related in large UK firms over the period 1994-2002. Examining both cash and equity-based compensation over the period 1983-1989 for UK firms, Main, Bruce and Buck (1996) report a low sensitivity of cash compensation to firm performance but a higher level of sensitivity to performance once equity based compensation is considered. Ozkan (2007) conversely reports that cash-compensation is (weakly) positively related to performance, while total compensation is not. Buck, Bruce, Main and Udueni (2003) examine the effect of Long Term Incentive Plans (LTIP) on executive compensation in UK firms. They report that the adoption of LTIPs is associated with an increase in total compensation but a decrease in pay-performance sensitivity, suggesting that managerial opportunism may be prevalent in the design of compensation systems.

A much smaller strand of the literature examines the pay-performance relation in private firms. An important distinction between the literature on public and private firms is that much research on public firms uses market-based variables such as shareholder wealth created or equity returns as performance measures whereas private firms' equity is not traded on public markets and such measures are therefore not available. The pay-performance relationship in private firms is generally tested by examining the sensitivity of measures of director or executive pay to measures of accounting performance. Studies on pay-performance sensitivity in private firms yield conflicting results, which may, in part, be explained by differing institutional settings, methodological approaches and definitions of pay and performance variables. Barkema and Pennings (1998) use survey data, collected from Dutch firms, on salary and bonus payments to executives and report that bonus payments are sensitive to firm performance, whereas salary is not. Ke, Petroni and Safieddine (1999) compare the relationship between CEO compensation and Return on Assets (ROA) in publicly listed and private insurance firms in the US. They report no significant relationship between performance and compensation in private firms, whereas for public firms a strong pay-performance relationship is documented. The authors suggest that this finding is evidence that the ability of shareholders to monitor management effectively in private firms, due to concentrated ownership and low information asymmetry, makes incentive alignment through performance related pay unnecessary.

A number of recent papers in this area treat firm performance as endogenous in the (private firm) pay-performance relationship and use an instrumental variables approach to control for this. Banghøj et al. (2010), using this approach, find no significant relationship between pay and performance in a sample of private Danish firms. In contrast, Michiels et al. (2012) report results that suggest accounting performance is a significant predictor of executive compensation in private, family-controlled, US firms.⁹ Watson and Wilson (2005), using a sample of UK SMEs, with data from 1991-1995, find that in closely-held¹⁰ firms, directors pay is closely correlated with current year accounting performance. They also report that non-closely held SMEs, pay is related to several factors, namely, the level of pay in comparable firms; the difference between reported profits and “benchmark profits” and reported profits in the preceding year.

Hypothesis 6.1 is concerned with pay performance sensitivity in the sample firms. I hypothesise that there will be a positive and significant relationship between accounting performance and executive compensation in the sample firms.

H6.1: Directors’ compensation is positively related to firm performance.

2.3.2 Ownership Concentration and Executive Compensation

Due to the greater ability and incentive of large shareholders compared to small shareholders, to monitor managers, increased ownership concentration may be associated with lower compensation. Hartzell and Starks (2003) report a negative relationship between institutional ownership concentration and the level of executive compensation and argue that this reflects concentrated shareholders monitoring managers and reducing self-interested behaviour (in the form of excessive compensation). Similar results are reported by Benz, Kucher and

⁹ It is worth noting that both Ke et al. (1999) and Banghøj et al. (2010) use relatively small samples of private firms, 106 and 125 firms respectively. The sample size in Michiels et al. is 529 firms.

¹⁰ The definition of “a closely held firm” is one which is owned and controlled by 5 or fewer members.

Stutzer (2001), Cyert, Kang and Kumar (2002) Khan, Dharwadkar and Brandes (2005) and Sapp (2008). Evidence from this relationship in public firms is generally consistent. I expect a similar relationship between compensation and ownership concentration to exist in private firms. Hypothesis 6.2_a predicts a negative, linear relationship, between compensation and the ownership share of the largest single shareholder.

H6.2_a: The level of directors' compensation will be lower in firms where ownership is concentrated compared to firms where ownership is dispersed.

Concentrated equity ownership reduces agency costs in two ways: large shareholders have an incentive to monitor management because the gains from reducing agency costs are realised by shareholders proportionate to their holdings and, in addition, large shareholders are more likely to have the power to enforce their preferences on the manager. In the case of shareholders owning more than 50% of equity, this power to direct management is essentially absolute. This suggests two opposing views on the relationship between ownership concentration and pay-performance sensitivity. First, these mechanisms may substitute for one another and a higher level of ownership concentration may be associated with less necessity for incentive alignment and hence a lower level of performance sensitivity in executive compensation contracts. Compensation contracts, in this perspective, are designed in the context of the corporate governance characteristics of the firm, a weaker governance structure necessitates greater incentive alignment. This *substitution hypothesis* (Rediker and Seth 1995), in the context of ownership structure, predicts a negative relationship between ownership concentration and pay-performance sensitivity. The *complementarity hypothesis* (Rediker and Seth 1995), suggests that a risk averse managers will resist highly contingent compensation contracts and that a strong governance environment is required to impose pay-performance sensitivity. This hypothesis predicts a positive relationship between ownership concentration and pay-performance sensitivity.

Existing research provides some evidence for both of these propositions. Mehran (1995) reports that, in a sample of 153 US manufacturing firms, equity-based compensation, which is by its nature highly sensitive to performance, as a proportion of total compensation, is

negatively related to the presence of block-holders holding more than 5% of equity. Cyert et al. (2002) provide supporting evidence for this contention, both the equity portion of compensation and the discretionary portion of compensation (as opposed to salary) in general are significantly negatively related to the ownership share of the single largest shareholder. Fahlenbrach (2009) finds that weak corporate governance, including low ownership concentration, is associated with higher pay-performance sensitivity. Similar evidence is reported by Wang and Xiao (2011) for Chinese public firms. Croci, Gonenc and Ozkan (2012) examine executive pay in German public firms and find that family control is associated with less equity based compensation as a proportion of total compensation. This suggests that the monitoring ability of family owners reduces the necessity for aligning pay with firm performance. The US non-profit sector comprises firms from which shareholders are entirely absent, and, in findings consistent with the complementarity argument advanced above, Newton (2015) reports that the pay-performance relation in these firms is in fact negative.

In contrast to these studies, Hartzell and Starks (2003) find that ownership concentration is positively related to pay-performance sensitivity. The authors measure ownership concentration as the total percentage of equity owned by institutional shareholders. This finding supports the complementarity hypothesis. Michiels et al. (2012) report similar results using a sample of US private firms, where ROA is a significant predictor of CEO pay only when ownership is concentrated. There is some evidence to suggest that the effect of ownership concentration on pay-performance sensitivity is different at high and low levels of concentration. Gao and Li (2014), examine the relationship between pay-performance sensitivity in a sample of public and private firms¹¹. They report that at low levels of ownership concentration, ownership concentration is positively related to pay-performance sensitivity and at high levels of concentration the relationship is reversed. The authors suggest that at high levels of ownership concentration, the substitution effect dominates and where ownership is diffuse, concentration and pay-performance sensitivity are complementary mechanisms to reduce agency costs.

¹¹ The sample of private firms examined in Gao and Li (2014) comprises US private firms with in excess of 500 shareholders, which are required to file annual and quarterly reports providing detailed compensation information. These private firms therefore differ qualitatively from the private firms examined in this study and most other studies on private firms.

In summary, there are two plausible hypotheses advanced to describe the relationship between ownership concentration and pay-performance sensitivity. The substitution hypothesis suggests that concentrated ownership obviates or reduces the necessity for contingent pay. The complementarity hypothesis argues that concentrated ownership facilitates the imposition of contingent pay on managers. The extant empirical evidence provides some support for both of these hypotheses. In the context of private firms, where ownership is generally highly concentrated, shareholder monitoring of managers is likely to be effective due to informal information flows between managers and shareholders (Cornelli, Kominek and Ljungqvist 2013). I hypothesise that in the sample of UK private firms, the relationship between the ownership share of the largest single owner and the degree of pay-performance sensitivity is negative.

H6.2_b: Pay-performance sensitivity will be lower in firms where ownership is concentrated compared to firms where ownership is dispersed.

2.3.3 Managerial Ownership and Executive Compensation

Agency theory predicts a negative relationship between managerial equity ownership and pay-performance sensitivity since alignment between shareholders and executives is an increasing function of managerial ownership (Jensen and Meckling 1976), implying less necessity to align incentives through the structure of compensation contracts. Similarly, the alignment of interests resulting from high managerial ownership suggests a negative relationship between the level of executive compensation and managerial ownership, as incentives to divert firm resources for personal benefits decline with increasing ownership. However, high levels of managerial ownership entrench managers, insulating them from effective shareholder monitoring and discipline, Wright, Ferris, Sarin and Awasthi (1996) for example document a negative relationship between CEO ownership and CEO Turnover and Kim and Lu (2011) find a negative relationship between firm value and CEO ownership, at high levels of CEO ownership. This *entrenchment* perspective on CEO compensation is

further developed by Bebchuk and Fried (2004) in their *managerial power* perspective on compensation. In this perspective, risk averse managers seeking higher and less risky compensation implies that the relationship between managerial ownership (as a factor increasing managerial power) and the level of pay and the sensitivity of this pay to firm performance will be positive and negative respectively.

The prediction of the alignment hypothesis, that the level of CEO pay is inversely related to CEO ownership finds significant support in the empirical literature. In an early study Mehran (1995) reports that equity-based compensation as a proportion of total compensation is inversely related to executive share ownership in a sample of US manufacturing firms in 1979-1980. Findings reported by Lambert, Larcker and Weigelt (1993), Cyert, Kang and Kumar (1997) and Core, Holthausen and Larcker (1999) also support the contention that CEO pay is negatively related to CEO share ownership. Ozkan (2007) similarly reports in a UK context, that CEO compensation is lower where directors' ownership is higher. Again in a UK context, Ozkan (2011) finds a non-linear (U-shaped) relationship between CEO pay and executive directors share ownership, which is consistent with entrenchment effects dominating alignment effects at higher levels of directors' ownership.

The entrenchment hypothesis with respect to executive compensation in public firms is also supported by empirical results. Khan et al. (2005), for example, report that in a sample of firms drawn from the Execucomp database, the degree of CEO ownership is negatively related to the sensitivity of compensation to performance and positively associated with salary, although no significant relationship between total compensation and CEO ownership was found. Abernethy, Kuang and Qin (2015) report that measures of CEO power are positively associated with less challenging performance targets in compensation structures. In a UK context, Ozkan (2011) report contrasting findings to Khan et al. (2005) with respect to the relationship between pay-performance sensitivity and CEO ownership. CEO ownership and the sensitivity of equity-based compensation are positively related, suggesting that managerial ownership and incentive pay may function as complementary mechanisms of governance.

In considering empirical evidence on executive compensation and managerial ownership in private firms, the fact that CEO ownership is typically considerably higher in private firms than in the large public firms that comprise the samples of most empirical studies in this area is significant. In the present study for example, mean (median) CEO/MD share ownership is 43.2% (39.7%). This magnitude of CEO ownership suggests that managerial entrenchment may be pervasive in the sample firms.

Cole and Mehran (2013), using data from the Federal Reserve NSSBFs (1993 and 2003), document a negative relationship between CEO ownership and pay. The authors do not report testing for a non-linear relationship between ownership and compensation. Gao and Li (2014)¹² report similar results, CEO pay declines with increasing CEO ownership. They also report that the sensitivity of CEO pay to firm performance (ROA) is negatively related to CEO ownership, indicating that greater alignment through share ownership may obviate the need for pay-performance sensitivity. Michiels et al. (2012), also using data from the NSSBF, provide further evidence for this relationship, reporting that that pay-performance sensitivity is lower in firms in which the CEO is a member of a family that owns in excess of 50% of the firm's shares.

Based on the literature discussed above, three hypotheses are posited in relation to managerial ownership and compensation. The first predicts a linear, negative relationship between MD ownership and compensation. Hypothesis 6.3_b predicts that, due to the dominance of entrenchment effects once managerial ownership passes a threshold, the relationship will be non-linear. Finally I expect that pay-performance sensitivity will be lower in firms where managerial ownership is high, reflecting the alignment of managerial and shareholder incentives.

¹² As discussed earlier, Gao and Li (2014) draw their sample from private firms with in excess of 500 shareholders, which are required to file detailed compensation information. The ownership structures of these firms differ significantly from those in the present study and in most other studies on private firms. One relevant aspect of this difference is in CEO ownership, the mean (median) value for this variable in Gao and Li (2014) is 13.6% (2.1%), which are much lower than the equivalent values in this study.

H6.3_a: The level of directors' compensation will be lower in firms where the degree of managerial ownership is high compared to firms where the degree of managerial ownership is low.

H6.3_b: The relationship between the level of directors' compensation and managerial ownership will be non-linear in nature.

H6.3_c: Pay-performance sensitivity will be lower in firms where the degree of managerial ownership is high compared to firms where the degree of managerial ownership is low.

2.4 Earnings Management

The final section of this chapter reviews the literature relevant to earnings management in private firms and its relation to managerial ownership. Walker (2013) in a review article on earnings management, defines the practice as “*The use of managerial discretion over (within GAAP) accounting choices, earnings reporting choices, and real economic decisions to influence how underlying economic events are reflected in one or more measures of earnings.*” Reported earnings can be managed in two ways, firstly by changing the operations of the firm to alter its underlying cash-flows, by for example deferring required maintenance spending or increasing research and development spending. Secondly, firms may make accounting choices, which are within the discretion allowed to firms by Generally Accepted Accounting Practices (GAAP), that change the reported earnings of the firm without changing the underlying cash-flows. Accounting choices about accruals such as the level of bad debt provisions and the timing of revenue recognition provide scope for earnings management.

2.4.1 Incentives for Managers to Opportunistically Manage Earnings

If managers' compensation or continued employment is sensitive to firms' accounting performance and managers have the ability, through discretion over the magnitude of accruals, to change the reported accounting performance of the firm, this may result in

opportunistic accounting choices. Employment or compensation contracts may for example create incentives to manage earnings upwards to prevent them falling below a threshold where dismissal becomes likely or to maximise bonus or other forms of performance related pay. Since accruals will reverse over time there may also be incentives to “bank” good performance for future reporting by managing earnings downwards if they exceed the point which makes dismissal unlikely or the point which maximises compensation or meets another benchmark in the formal contractual or informal relationship between the manager and shareholders.

In a seminal study on earnings management and compensation, Healy (1985) examines accounting choices and accruals in the context of firms’ short term bonus plans and finds that managers make accounting choices to increase or decrease reported earnings to meet bonus targets. Holthausen, Larcker and Sloan (1995) similarly focus on the incentives to manage earnings through manipulating accruals created by firms’ bonus structures. The authors report income decreasing earnings management when earnings exceed the threshold to maximise the bonus paid to the CEO. More recent empirical work has focussed on relationships between earnings management and the sensitivity of executive compensation to equity returns and report generally similar findings, the structure of compensation contracts can incentivise earnings management. Bergstesser and Philippon (2006) find that the magnitude of discretionary accruals is greater at firms where the CEO’s compensation is more sensitive to share price performance and that firm years when CEOs exercise unusually high amounts of share options coincide with years where accruals are unusually high. Kuang (2008) provide evidence of earnings management to meet compensation targets in a UK context by showing that managers use of accruals to manage reported earnings is positively related to their holdings of performance-vested options and that the observed earnings management is consistent with managers increasing reported earnings where performance is poor and reducing reported earnings where performance is good (to allow for upward earnings management in the future).

While most studies in this area examine incentives to manage earnings within the discretion allowed to firms, compensation structures also appear to incentivise earnings manipulation beyond that allowed by GAAP. Burns and Kedia (2006) find that the sensitivity of a CEO’s

option portfolio to the firm's share price is positively related to its likelihood of having to announce a restatement to their financial reports in the future. The magnitude of these restatements is positively related to the sensitivity of the option portfolio to firm performance. Interestingly, non-equity based pay-performance sensitivity (i.e. the sensitivity of bonus and salary to firm performance) is not associated with increased misreporting of earnings.

Avoidance of dismissal provides a second possible motivation for opportunistic earnings management. Fudenberg and Tirole (1995) develop a model where managers engage in earnings management to smooth earnings to avoid dismissal or interference by shareholders. Defond and Parks (1997), basing their empirical study on the theoretical framework of Fudenberg and Tirole (1995), provide support for the proposition that managers, concerned about dismissal, manage accruals to reduce the likelihood of dismissal and closer monitoring by shareholder. Firms with poor current performance but good future expected performance use accruals to "borrow" future earnings and the opposite behaviour is observed for firms with good current performance and poor expected future performance. Opportunistic earnings management has also been reported related to Management Buy Outs (Perry and Williams 1994 and Wu 1997), Initial Public Offers and Seasoned Equity Offers (DuCharme, Malatesta and Sefcik 2004).

2.4.2 Managerial Ownership and Earnings Management

If opportunistic earnings management is motivated by managers' efforts to increase the proportion of firm cash-flows captured by them, rather than shareholders, then the incentive to engage in this behaviour should decline as managerial shareholding increases. Warfield et al. (1995) report that the magnitude of discretionary accruals is inversely related to the level of managerial ownership. Gul, Chen and Tsui (2003) similarly report that firms with low levels of managerial ownership engage in more opportunistic earnings management. In a meta-analysis of studies on corporate governance and earnings management, Garcia-Meca and Sanchez-Ballesta (2009) conclude that higher board ownership is associated with lower discretionary accruals. There is some conflicting evidence on this question and several authors report finding no significant linear relationship between managerial ownership and

earnings management (see for example Klein 2002, Koh 2003 and Peasnell, Pope and Young 2005).

It is possible that, if there is a relationship between insider ownership and discretionary accruals, it is not linear in nature. Increasing managerial ownership from a low level may align the incentives of managers with shareholders but once managerial ownership crosses a threshold, managers become entrenched, and the ability of outside shareholders to effectively monitor managers and discipline non-value maximising behaviour is diminished (Morck et al. 1988). A manager who is also a dominant shareholder may act in ways which deprive minority shareholders of their due share of firm cash-flows. This expropriation of firm resources for private benefit, commonly referred to as “tunnelling” (Johnson et al. 2000, Morck and Yeung 2003), may take a wide range of forms. Examples of opportunities to capture firm resources include excessive managerial compensation, the employing of relatives of the manager on favourable terms and transactions with related firms or individuals on terms favourable to them. Earnings management, by allowing the manager to disguise the underlying economic performance of the firm and thus evidence of expropriation, may be associated with this behaviour. This entrenchment argument implies that the magnitude of earnings management may be an increasing function of managerial ownership once it crosses a particular threshold. Fan and Wong (2002) provide some support for this argument in a study on East Asian firms, which exhibit high insider ownership, report that high managerial ownership is associated with lower earnings quality and that managerial entrenchment is at least a partial explanation for this relationship. Yeo, Tan, Ho, and Chen (2002), using data on listed Singaporean firms which also exhibit high insider ownership, document a U-shaped relationship between insider ownership and the informativeness of earnings.

Some studies have reported a cubic relationship between managerial ownership and earnings quality or related measures. Lennox (2005), for example, reports that audit firm quality and managerial ownership in UK private firms are cubically related. The use of a Big 5 auditor declines with increasing managerial ownership at low levels of insider ownership, the relationship is positive at intermediate levels and negative at high levels of insider ownership. The form of this relationship is consistent with alignment of interests effects dominating at

low and high levels of insider ownership and entrenchment effects dominating at intermediate levels of insider ownership. Teshima and Shuto (2008) document a cubic relationship between discretionary accruals and directors' ownership. These studies suggest that earnings quality first improves, then dis-improves and then improves again as insider ownership increases.

2.4.3 Private Firms and Earnings Management

The studies discussed above examine earnings management in the context of public firms. A number of studies have examined the extent of earnings management in private or unlisted firms but the determinants of earnings management in private firms, in particular its relation to ownership structure, remains relatively unexplored in the empirical literature.

The incentives facing managers in private firms, and their opportunity to disguise true economic performance through discretionary accruals, may differ systematically from the situation in public firms due to, among other reasons, fundamental differences in ownership structure between public and private firms. Compared to public firms, private firms in the UK are smaller, have more concentrated ownership, higher levels of managerial ownership and changes in ownership are relatively rare (Brav 2009). Higher levels of insider ownership may reduce incentives for managers to engage in opportunistic earnings management and more concentrated ownership may reduce the discretion managers can exercise over accounting choices. Conversely, the results outlined in Chapter 6 indicate that executive compensation in private UK firms is closely tied to accounting performance and this pay-performance sensitivity may incentivise the management of earnings to increase compensation.

Private firms in the UK, although subject to substantially identical financial reporting, auditing and taxation regulations to public companies, are likely to face quite different demands from stakeholders as to the quality and informativeness of financial statements. The highly concentrated ownership and high degree of insider ownership typical in these firms means that the role of financial reports in reducing information asymmetries between

management and shareholders and between firms and creditors is less important than in the case in public firms (Peek and Buijink 2010).

There is consistent evidence that earnings management is more pervasive in private firms than in public firms. Ball and Shivakumar (2005) examine “timely loss recognition”, as a measure of the quality of financial reports, among private UK firms. The authors hypothesise that public and private firms face differential demands for financial reporting quality due to a greater informal flow of information between managers and shareholders, lenders, trade creditors and customers in private firms compared to public firms. This differential demand will lead to systematic differences in earnings quality between public and private firms in the UK, with private firms producing lower quality earnings. The findings confirm the authors’ hypotheses. Burgstahler et al. (2006) provide evidence that a similar difference in earnings quality between public and private firms pertains across European countries. They compare the magnitude of accruals and other measures of earnings management in public and private firms across 13 European countries. They conclude that earnings management is more pervasive in private firms than in public firms due to a demand from shareholder for higher quality financial reporting in public firms compared to private firms. Coppens and Peek (2005) report similar evidence.

Governance characteristics of private firms, aligning the interests of managers and shareholders or facilitating shareholder monitoring, may be associated with higher earnings quality. Hope, Langli and Thomas (2012), report that, in a sample of Norwegian private firms, audit fees (a proxy for auditor effort) were negatively related to ownership concentration and CEO ownership, consistent with higher agency firms requiring greater auditor monitoring. The propensity to use a Big 4 auditor was also higher in higher agency cost firms. Niskanen, Karjalainen and Niskanen (2011) report that, in Finnish private firms, audit quality is quadratically related to CEO ownership, with lowest likelihood of the choice of a Big 4 auditor at intermediate levels of CEO ownership. Monitoring may also be provided by lenders to private firms, demanding high quality financial reporting to reduce information asymmetry in the lending relationship. Hope, Thomas and Vyas (2011) use data from a World Bank international survey of private firms and show that firms with a controlling shareholder in countries with weak investor protection which choose to have their financial

statements audited face lower financing constraints. Family relationships between CEOs and shareholders also appear to influence the management of earnings. Stockmans, Lybaert and Voordeckers (2010) examine the relationship between the CEO and the founding family as a determinant of discretionary accruals in a sample of 132 Belgian private family controlled firms. Firms led by founder CEO's exhibit significantly higher income increasing discretionary accruals when the firm performs poorly (when pre-managed earnings are negative) than those led by descendants of the founder or non-family CEO's. External CEOs, not members of the controlling family, engage in less income increasing earnings management when pre-managed earnings are negative.

A number of studies have investigated the constraining influence of auditors on earnings management behaviour in private firms. Bauwhede, Willekens and Gaeremynck (2003) compare the effect of auditing by a Big 6 auditor in a sample of public and private Belgian firms. The authors report that both public and private firms engage in earnings management to smooth earnings and that the presence of a Big 6 auditor is associated with lower income decreasing discretionary accruals but not associated with income increasing discretionary accruals. Van Tendeloo and Vanstraelen (2008) find that being audited by a Big 4 audit firm reduces the extent of earnings management only in countries where financial reporting and tax systems are highly aligned. The UK is not among these countries, and they report no significant relationship between Big 4 auditor and earnings management in the UK.

In summary, the empirical evidence discussed above suggests that private firms appear to engage in earnings management behaviour to a greater extent than public firms, in part due to differential demands from information consumers. The magnitude of earnings management in public firms is positively associated with managerial incentives to report higher profits, such as performance contingent pay or bonuses and avoidance of dismissal. A significant relationship between managerial ownership and earnings management is consistently documented in studies of public firms. While no empirical evidence is available on the direct relationship between discretionary accruals and CEO ownership in private firms, studies have reported a significant relation between audit variables and CEO ownership in these firms, suggesting that the quality of financial reporting may be related to insider ownership in

private firms. Based on the literature reviewed, three hypotheses in respect of earnings management and managerial ownership in the sample firms are posited:

H7.1_a Discretionary accruals are negatively related to managerial equity ownership.

H7.1_b Discretionary accruals and managerial ownership exhibit a U-shaped relationship. As managerial ownership increases, discretionary accruals first decline and then increase.

H7.2: Firms with an MD owning a low shareholding will exhibit a higher degree of income increasing earnings management when firm performance is poor, compared to firms in which the MD owns a high shareholding.

2.5 Summary and Conclusions

This chapter reviews the empirical literature on ownership structure and its relation to three distinct but related areas: agency costs, the level and sensitivity to firm performance of executive compensation and earnings management. The focus of the chapter is on empirical studies of these issues in private firms and gaps in this body of empirical research are identified.

The chapter begins by outlining the agency problem arising from the separation of ownership and control in corporations. This separation, coupled with the divergent interests of managers and shareholders, may induce managers to act in ways that increases their utility at the cost of shareholder wealth maximisation. If agency costs are manifested in reduced firm performance, this “Type 1” agency hypothesis implies a negative relationship between firm performance and managerial ownership. Conversely, managerial ownership beyond a threshold at which managers become “entrenched”, insulated from shareholder discipline, may facilitate self-interested behaviour. This entrenchment hypothesis implies a non-linear relationship between managerial ownership and firm performance, with increasing managerial ownership aligning the interests of shareholders and managers but this effect being dominated by the effects of managerial entrenchment at higher levels. The

concentration of ownership among the firm's shareholders is hypothesised as a mechanism to increase the efficacy of monitoring and reduce costs but highly concentrated ownership structures may induce conflicts between large and small shareholders and facilitate dominant shareholders expropriating resources from the firm ("Type II" agency costs). The empirical literature discussed provides significant support for these hypotheses in public firms. Studies, drawing samples from a range of institutional settings, document both the hypothesised alignment and entrenchment effects of managerial ownership. The monitoring role large shareholders are hypothesised to play is also supported by the empirical evidence. This body of literature, finding a causal link from ownership structure to performance, has been criticised for ignoring the plausible arguments that ownership structure (both managerial ownership and ownership concentration) and firm performance may be simultaneously determined or that causality may run from firm performance to ownership, as shareholders adjust holdings in response to or anticipation of firm performance.

Agency costs in private firms have also received some limited empirical attention. The alignment effects of managerial ownership have been documented in UK, US and Australian private firms. The effect of managerial entrenchment in private firms however remains relatively unexplored. This gap in the literature is surprising given the heterogeneous nature of managerial ownership in private firms in comparison to public firms, in which the share of managerial ownership is typically small. The existence of many private firms with very low and very high levels of managerial ownership offers a rich environment for testing the effect of managerial ownership on agency costs. The monitoring role played by large shareholders in private firms is documented in a number of studies, suggesting they perform a role similar to that performed in public firms. There is evidence that private firms in which a single shareholder exercises uncontested control exhibit higher agency costs compared to firms in which control is contested among multiple shareholders, however the relationship between the largest shareholders ownership share and the agency costs associated with "Type II" agency costs in private firms has not been directly addressed in the literature. The nature of the distribution of largest shareholder ownership shares in private firms, containing many firms in which ownership is dispersed as well as firms in which ownership is highly concentrated, means that private firms offer an interesting environment to examine the effects of ownership concentration on agency costs. A second characteristic of private firms that makes them an interesting environment to examine the relationship between ownership

structure and agency costs is the “stickiness” of ownership. Since shares are not publicly traded and consequently it is costly for shareholders to adjust their shareholdings in response to firm performance, it is unlikely that ownership and performance are simultaneously determined or that causation in the relationship between ownership and performance runs from performance to ownership.

The second part of this literature review considers the area of executive compensation in relation to ownership structure. Excessive executive compensation is one channel through which managers may divert firm resources from shareholders. The alignment and entrenchment hypotheses discussed above suggest that the level of executive remuneration will vary with managerial ownership. In studies of public firms both of these hypotheses are supported, CEO compensation and share ownership are negatively related at low levels of ownership and this relationship reverses at high levels of managerial ownership. The presence of large shareholders reduces the level of executive compensation. Making compensation contingent on firm performance is a mechanism to potentially reduce agency costs by aligning the interests of shareholders and managers. Several hypotheses are advanced in the literature in respect of the relation between pay performance sensitivity and managerial ownership. The alignment hypothesis predicts that since managerial ownership aligns the interests of principals and agents, increased managerial ownership reduces the necessity for pay-performance sensitivity. The entrenchment (and managerial power) hypotheses suggest that risk-averse managers will seek to reduce the riskiness of compensation by decoupling pay from performance and increased managerial ownership will facilitate this. Most, though not all, studies on this question report that increased managerial ownership is associated with lower pay-performance sensitivity.

The empirical literature on executive compensation and ownership in private firms is limited and its findings are somewhat contradictory. Studies document a negative relation between managerial ownership and compensation, consistent with the alignment hypothesis. Findings on the sensitivity of pay to performance and whether this varies with managerial ownership and ownership concentration are less consistent. Pay-performance sensitivity is reported in a number of studies but others do not find any significant relationship. In reviewing this literature a number of issues are evident. Firstly, there are significant methodological

differences between these studies, some do not control for the possible endogeneity of firm performance in the compensation – performance relationship, the sample size in a number of studies is small and the measures of executive compensation vary widely. In the studies reviewed above they include: bonuses paid to managers, CEO compensation and total Directors' compensation. Secondly, the studies reviewed draw samples from private firms in a range of institutional settings: the US, the Netherlands, Denmark and the UK. Executive compensation practices may vary across countries so care should be exercised when drawing general conclusions. The most persuasive of these studies suggest that executive compensation in private firms is sensitive to firm performance and that pay-performance sensitivity is stronger where ownership is concentrated. The role that the shareholding of the CEO plays in moderating pay-performance sensitivity is not directly addressed in this literature, although control by the CEO's family appears to be negatively related to pay-performance sensitivity.

The final part of this chapter reviews the literature on earnings management and managerial ownership, with a focus on private firms. Monitoring by shareholders and contingent compensation contracts may create an incentive for managers to disguise the true performance of the firm from shareholders through earnings management. The empirical literature presented above provides strong evidence that managers in public firms respond to these incentives by managing reported earnings. The magnitude of discretionary accruals appears to be related to managerial ownership, although studies in public firms report conflicting findings as to both the existence and shape of this relationship. A number of studies report a negative relationship between discretionary accruals and managerial ownership, consistent with the alignment hypothesis. Studies of samples of firms with high levels of managerial ownership suggest that managerial entrenchment is associated with higher discretionary accruals, although these studies draw samples from only one particular institutional setting (Asia).

The magnitude of discretionary accruals is higher in private firms than is the case in public firms and this finding is consistent across a range of institutional settings. The wide range of managerial ownership shares existing in private firms allows empirical testing of the effect of managerial ownership on earnings management at low, intermediate and high levels of

ownership. Direct empirical evidence is not available on the relationship, if any, between the magnitude of discretionary accruals and the shareholding of the CEO in private firms, although one study reviewed above indicates that an external CEO (not part of a controlling family) is associated with less income smoothing compared to a CEO who is part of a controlling family.

Having reviewed the extant literature on ownership structure and its relation to agency costs, executive compensation and earnings management in private firms, the institutional setting for this study will be discussed in the following chapter.

Chapter 3

Institutional Setting

3.1 Introduction

While more than 99% of companies in most European economies are private companies, rather than listed on a stock exchange (Burgstahler et al. 2006), the institutional setting for most empirical research in accounting and corporate finance is the universe of public firms (Hope et al. 2012). This thesis amends for this peculiarity of the empirical literature through an institutional focus on large UK based private firms. This sample selection therefore differentiates this thesis from most in the most preceding empirical research in this area in two significant respects. One, the firms in this thesis are, on average, smaller than publically owned firm, and two, they are privately held.

This chapter presents background information on private firms in the UK to provide a context for the empirical research discussed in this thesis. Privately-held companies in the UK account for more than 99% of companies by number¹³ and own approximately 60% of corporate assets (Brav 2009). Private firms also play an important role in economies globally, with US private companies creating half of private sector output (Hope et al. 2013) and 52% of employment (Nagar et al. 2009). While most private companies are small enterprises, many are not. For example in the UK large private companies would include (with 2014 turnover in parenthesis) chemical manufacturer INEOS (£20,226m), fuel supplier Greenergy (£15,685m) and retailer John Lewis (£9,028m).

Listing on a stock exchange has traditionally been considered the natural progression for private firms seeking to raise equity finance. However, the number of companies moving from private to public status by undertaking an Initial Public Offerings (IPO) has declined over the past decade and a half. Gao, Ritter and Zhu (2013) document a fall in the average number of companies listing on US stock exchange annually from 310 between 1980 and 2000 to 99 between 2001 and 2012. This decline in IPOs is particularly steep among smaller firms. This process may be fostered through both changes in the regulatory environment for public firms and the increasingly costly regulatory burden associated with achieving and

¹³ Companies House Incorporated Companies in the United Kingdom. January 2014.

maintaining a public listing and a fall in the number of underwriters and analysts focussing on smaller listed firms (Mitchell 2011). Brau and Fawcett (2006) surveying large private firms which have not listed on an exchange, report the two most commonly cited reasons large public firms choose not to seek a public listing is to retain decision-making control in the firm and to avoid the dilution of ownership. A similar, though less pronounced, trend of declining numbers of firms choosing to list is evident in European IPO markets, particularly in the numbers of firms listing on main markets such as the LSE Main Market as opposed to smaller markets such as the AIM (Mason 2011 and Vismara, Paleari and Ritter 2012). The Kay Review of UK Equity Markets and Long-Term Decision Making (2012), commissioned in part due to a concern that fewer UK companies, particularly small and medium sized companies, are listing on stock markets, reported that *“The relatively small number of UK companies which access the new issue market often use it as a means to achieve liquidity for early stage investors, rather [than] to raise funds for new investment.”*

To extend the discussion of these issues this chapter is organised as follows. Section 3.2 discusses the economic activity generated by small, medium and large enterprises in the UK. Section 3.3 describes some differences between public and private companies in the UK. Section 3.4 discusses financial reporting in private companies. Section 3.5 concludes the chapter.

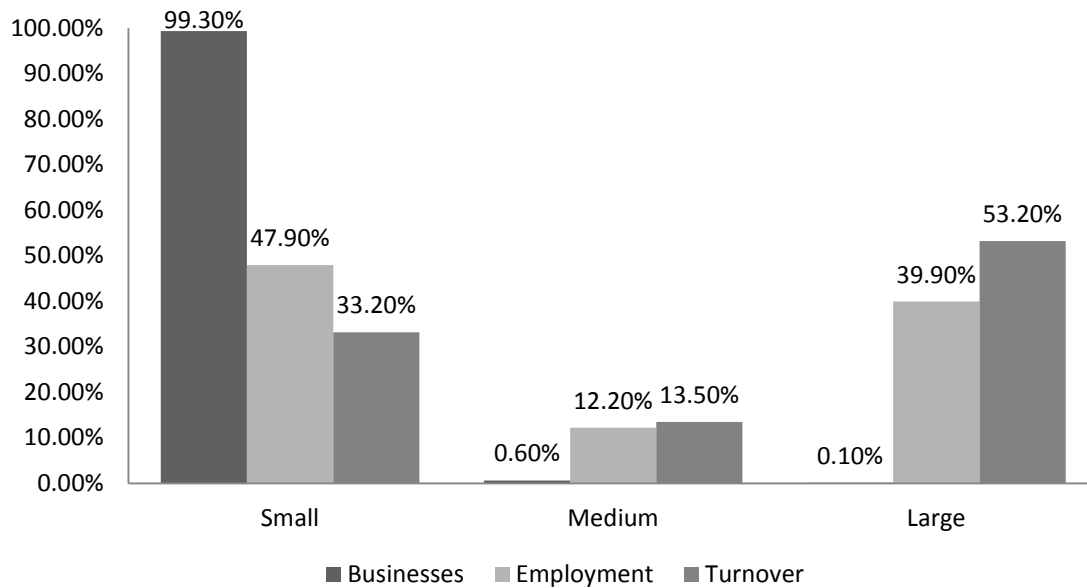
3.2 Small, Medium and Large Enterprises in the UK

At the beginning of 2014, a total of 5.2 million businesses existed in the UK¹⁴. These businesses are organised in a number of forms; sole proprietorships, partnerships and companies. A majority of these businesses are very small, 76% are self-employed individuals, not having any employees other than a single owner or single employee director. Of the total businesses in the UK, approximately three million are organised as companies. The UK Department of Business, Innovation and Skills (BIS) publishes statistics on the

¹⁴ UK Department for Business, Innovation and Skills. Business Population Estimate November 2014.

economic activity accounted for by small, medium and large businesses. Figure 3.1 shows the percentage of private sector businesses, employment and turnover by each category.

Figure 3.1 : Economic Activity in UK Businesses by Size Category¹⁵



The categorisation of enterprises in statistics by the BIS is on the basis of the number employed in the business. Small, medium and large enterprises have average employees in the period of 0-49, 50-249 and >250 respectively. While the vast majority of enterprises are small, large enterprises account for more than half of private sector turnover and almost 40% of employment in the UK.

3.3 Publicly-held and Privately-held Companies

Limited companies¹⁶ are incorporated in the UK with Companies House, either as public or private companies. The legal framework under which companies operate in the UK is set out

¹⁵ Data from the Department of Business, Innovation and Skills, Business Population Estimates 2014.

in the Companies Acts and is equivalent for public and private companies in most respects, with a number of exceptions. Among these, private companies are prohibited from offering shares to the public (Companies Act 2006 s 755), whereas public firms are not. The minimum authorised share capital of a public company is £50,000 (Companies Act 2006 s 763), there is no minimum authorised share capital for a private limited company. Private Companies are required to have at least one director and public companies must have at least two directors. Prior to 1992, a limited liability company in the UK was required to have a minimum of two shareholders. The Companies (Single Member Private Limited Companies) Regulations 1992 altered this requirement to allow private limited liability companies with a single shareholder. Public companies in the UK may be listed on one of two stock exchanges operated by the London Stock Exchange (LSE), the Main Market and the Alternative Investment Market (AIM). In January 2014 there were 956 UK companies listed on the Main Market and 905 UK companies listed on the AIM. Publicly limited companies, not listed on a stock exchange are termed OFEX (Off Exchange) companies. In January 2014 a total of 6,628 public limited companies were incorporated in the UK, including OFEX companies.

While the legal framework governing public and private companies in the UK is broadly similar, the characteristics of these companies differ significantly. A small, but growing, literature explores differences between public and private companies in the UK and other settings. Brav (2009) provides data on public and private¹⁷ companies in the UK in 2003 and reports that public companies are 16 times larger than private firms, measured by total assets and 13 times larger, measured by turnover. Public companies, unsurprisingly given their ability to issue shares to the public, raise capital through the sale of new equity much more frequently than private companies and private companies rely on debt to a greater extent than public companies. Michaely and Roberts (2012) report that private companies in the UK smooth dividends to a lesser extent than public companies. Saunders and Steffan (2011) compare the cost of syndicated debt for public and private UK firms and find that private firms face higher borrowing costs, after controlling for borrower characteristics. This finding is consistent with a greater degree of information asymmetry between lenders and private

¹⁶ The discussion in this chapter considers only companies limited by shares. Private companies in the UK may also be incorporated as companies limited by guarantee or unlimited companies.

¹⁷ "Small" private companies, as defined by Companies House, are excluded from the data used by Brav (2009) and public companies, not listed on an exchange (OFEX) companies are included in the definition of public companies.

firms than between lenders and public firms and increased risk-taking due to the alignment of manager and shareholder interests in private firms. In the sample of UK public and private firms issuing syndicated debt, private firms are smaller, younger, more leveraged and more slowly growing compared to public firms and have similar levels of profitability to public firms.

The most fundamental difference between public and private companies is in their ownership structures. Public companies in the UK are generally characterised by a dispersed shareholder base, compared to publicly held firms in other European settings. Munari, Oriani and Sobrero (2010) report that in a sample of 592 publicly-traded manufacturing firms in the UK, the ownership share of the largest shareholder in 70% of firms is less than 20% and in 26.4% of firms the largest shareholder owns less than 10%. In comparison to ownership in public firms, ownership in private UK firms is highly concentrated. In the sample used in this study, the largest shareholder's ownership share is greater than 20% in 93.4% of firms and greater than 10% in 98.7% of firms. Managerial ownership is also significantly higher in private firms than in public firms in the UK. Gregory-Smith (2012) reports that, CEOs of FTSE 350 firms in the period 1996-2008 own on average 2.29% of the companies they manage. The mean ownership share of CEOs in the sample of private firms used in this study is 43.4%.

3.4 Financial Reporting in Private Companies

Companies registered in the UK are required to make an annual return to Companies House each year. Large companies and all publicly listed companies regardless of size, must return full accounts to Companies House including balance sheet, profit and loss account, directors report and auditors report. Medium sized companies must file as for large companies except that the profit and loss account may be in abridged form. Small companies are required to file an abridged balance sheet only. The legal duty of directors, not to approve company accounts unless they give a "*a true and fair view of the assets, liabilities, financial position and profit or loss of the company*" (Companies Act 2006, s 393), applies to private and public

companies regardless of size. Taxation law in the UK does not distinguish between public and private companies.

Despite public and private companies operating under similar financial reporting regulations, there is significant empirical evidence that the quality of financial reporting in private firms is lower than that in public firms. Ball and Shivakumar (2005) consider the timeliness of loss recognition in public and private firms in the UK and find that, by this measure, the quality of financial reporting is significantly higher in public firms. This finding is consistent with the role of financial reporting in conveying information about the firm to stakeholders being more important in public companies, with a greater separation between ownership and control and more dispersed ownership structures, than in private companies where informal information flows between management, shareholders and other stakeholders are prevalent. Similar evidence, indicating a lower quality of financial reporting by private companies in comparison to public companies both in the UK and in other settings, is reported by Coppens and Peek (2005) and Burgstahler et al. (2006). The quality of financial reporting in public and private companies is discussed in Chapter 2 (Section 2.4.3).

3.5 Summary and Conclusions

This chapter provides background information on private firms in the UK. Private firms constitute an important part of the economy in the UK and globally, yet are relatively underrepresented in the empirical literature. The legal framework within which public and private firms in the UK operate is broadly similar but significant differences exist in the characteristics of these firms. Private firms are smaller, and capital structures and pay-out policies differ in public and private companies. Ownership is significantly more dispersed in public firms and managerial ownership is significantly higher in private firms. Financial reporting requirements are equivalent for public and (large) private firms. Both categories of firms are required to include full company accounts in the return made to Companies House, however empirical evidence consistently indicates that financial reporting is of a lower

quality in private firms compared to public firms. Having outlined the institutional setting for this study, the following chapter describes the data collection, sample and variables used in this study.

Chapter 4 Data, Sample and Variables

4.1 Introduction

Chapter 2 outlines three sets of hypotheses based on the existing literature on Agency Costs, Executive Compensation and Earnings Management. These hypotheses are tested in a sample of large private UK firms. This chapter outlines the data sources, sample selection and variables used in each of the three empirical studies in this thesis.

This chapter is organised as follows. Section 4.2 outlines the sources of the data, Section 4.3 describes the sample selection procedure used to select the initial sample as well as the construction of the managerial ownership and ownership concentration variables. Section 4.4 discusses the sample and variables used in the Agency Cost study. Section 4.5 discusses the sample and variables used in the Executive Compensation study and Section 4.6 discusses the samples and variables used in the Earnings Management study. Section 4.7 concludes the chapter.

4.2 Sources of Data

The accounting, ownership and other data for this study are collected from the Bureau van Dijk FAME database. The FAME database contains digitised financial statements, ownership, and other data on all public and private firms in the UK and Ireland. The data was collected in September 2013 and September 2014. The ownership variables are drawn from the latest Annual Returns filed with the UK Companies House as at September 2013. The financial and other variables are drawn from the latest Annual Returns and Company Accounts filed with the UK Companies House as at September 2013 and September 2014¹⁸. The identity of the Managing Director or Chief Executive Officer of sample firms is ascertained by visually inspecting the financial statements provided to Companies House.

¹⁸ The data collection in September 2014 was undertaken to collect financial data for use in the Agency Cost tests and Earnings Management tests, discussed in Chapters 5 and 7. These tests use lagged ownership variables, from the September 2013 data collection, and financial variables from the following years Annual Report and Company Accounts.

Private companies in the UK are required to submit an Annual Return and Company Accounts to Companies House within nine months of the end of their financial year. The Annual Return must include, inter alia, details of directors and the secretary of the company, the company's principal business activities, registered address, the names and addresses of each of the company's shareholders and their shareholding in the company. The requirements in respect of Company Accounts which must be filed differ depending on the size of the company. For "Large" private companies¹⁹, as defined by the Companies Acts 1967 and subsequent Companies Acts, The Company Accounts must include a detailed Profit and Loss Account and Balance Sheet. Once these are received by Companies House, they are digitised and made available to the public.

Bureau van Dijk continuously collects information submitted to the UK Companies House and makes it available through the commercial FAME database. This data is provided in one of two categories of variables in the FAME database, *annual* and *header* variables. *Annual* data items, primarily accounting information, are available for the latest year and the preceding nine years. *Header* items comprise non-financial information about the company, including address, ownership and principal business activities and are available only for the latest year. This characteristic of the database precludes the construction of a panel data set including both financial and non-financial data, such as ownership variables. This study uses a cross-sectional approach to address the research questions.

Each of the three empirical studies described in this thesis uses a different sample due to differing variable requirements, although the differences between samples are relatively small. These study samples are drawn from the initial sample, the selection of which is described in the following section.

¹⁹ As discussed in Section 4.3 the sample used for this study is limited to companies classified as "Large" for the purposes of making a return to Companies House.

4.3 Initial Sample

A number of criteria are used to select the initial sample for this study from the data on FAME. This database provides information on all incorporated entities in the UK, including over three million companies. Basic information such as name, corporate form, address and industrial classification is available for all firms in the database. The extent of financial and other data available on firms varies with firm size. Reporting requirements for UK firms are set out in the Companies Act 1967 and subsequent Companies Acts. “Small”, “medium” and “large” companies, as defined in the relevant legislation, are subject to different financial reporting requirements. Classification as a “small” or “medium” company is on the basis of a maximum value of, at least two of: Turnover, Balance Sheet Total and Number of Employees. For “medium” companies the criteria are: annual turnover of no more than £25.9m, balance sheet total of £12.9m and average number of employees of no more than 250 for the current and preceding financial year. Qualifying “small” and “medium” companies may choose to submit abridged financial reports. The first limitation imposed on the sample is with respect to firm size. Including “small” and “medium” companies in the sample would result in a large number of missing variables. To minimise missing variables the sample excludes companies falling within these categories. Only companies classified as “Large” companies, as defined in the Companies Acts, are included in the sample. The financial reports prepared by these companies are subject to a mandatory audit²⁰.

The second limitation imposed is related to the ownership of shares in the sample firms. Equity in private firms in the UK is owned by a wide range of categories of shareholders. The FAME database distinguishes between institutional shareholders (eight categories), government/public ownership, publicly listed, trustee shareholders, named individual shareholders and unnamed/aggregated individual shareholders. Determining the total, direct and indirect, percentage equity ownership of each shareholder is necessary in order to construct variables measuring ownership concentration and managerial equity ownership. Where a firm is owned in whole or in part by one or more corporate bodies, trusts or any

²⁰ During the sample period UK companies can qualify for an audit exemption if they fulfil at least two of the following criteria (1) an annual turnover of no more than £6.5m, (2) assets worth a maximum of £3.26m, (3) 50 or fewer employees on average during the period. Companies Act 2006 s. 477.

other entity other than a private individual, the shareholders or beneficiaries of the second entity are indirect owners of the first company, but will not be captured as such using the data available and so the measures of ownership concentration are likely to be inaccurate for these firms. For this reason, the sample is limited to firms owned entirely by named individuals. The sample also excludes firms organised in corporate forms other than private limited companies.

I also limit the sample based on industrial classification. Based on 2 digit 2007 UK Standard Industrial Classification of Economic Activities (SIC) codes I exclude from the sample firms in the categories 64, 65 (financial services and insurance) and 84 (public administration). I exclude financial services and insurance firms because these firms operate under unique regulatory regimes and are subject to different reporting requirements than non-financial firms. I expect the incentives of firms engaged in public administration to be fundamentally different to those engaged in private enterprise and so these firms are excluded from the sample. These exclusions are consistent with other studies in this area. Finally, because managerial equity ownership, measured in this study as the percentage of equity owned by the MD/CEO²¹, is used in this study I limit the sample to those firms where the MD is identified by name in the most recent financial reports submitted to the Companies Office. I also exclude firms where the reporting period for either the current or previous year's financial statements is not 12 months. After excluding the firms mentioned above the initial sample is 1,223 firms.

The distribution of the initial sample by Industry and Age is shown in Tables 4.1 and 4.2 respectively. Companies in the UK are required to state their Principal Business Activity in their Annual Return, submitted to Companies House. To comply with this requirement, companies nominate the 2007 SIC Code (Standard Industrial Classification Code), which corresponds to their Principal Business Activity. The 2007 SIC Code is a four digit code. The

Industry listed in Table 4.1 is the primary business activities falling under the relevant one digit code. Just under half the firms in the sample (48.57%) are classified under SIC Code 4, construction and retailing or wholesaling and motor vehicles. Manufacturing firms (Codes 1 and 2) account for 18.56% of the sample. The distribution of sample firms by age is shown in Table 4.2. The sample is relatively evenly distributed between young (<10 years) (28.05%), intermediate aged (10-25 years) (34.34%) and older firms (>25 years) (37.61%). The measure of firm age is the number of years between the incorporation of the firm and the date of the latest Company Accounts available on FAME in September 2013.

Table 4.1 Distribution of Initial Sample by Industry

1 Digit SIC	Industry	N	% of Sample
0	Agriculture, Basic Industries	32	2.62%
1	Manufacturing (Food, Textile Products)	116	9.48%
2	Manufacturing (Chemicals, Metal and Electrical Products, Other Manufacturing)	111	9.08%
3	Utilities	52	4.25%
4	Construction, Retail and Wholesale and Motor Vehicles	594	48.57%
5	Transportation, Accommodation and Food Service	60	4.91%
6	Broadcasting, Information Technology	73	5.97%
7	Professional Services	75	6.13%
8	Administrative, Educational and Social Services	73	5.97%
9	Recreation and Other Service Activities	37	3.03%
Total		1223	100%

Table 4.2 Distribution of Initial Sample by Age

Age of firm*	N	% of Sample
< 10 years	343	28.05%
10-25 years	420	34.34%
> 25 years	460	37.61%
Total	1223	100%

*years from incorporation to latest accounts date

The limitations imposed on the sample, particularly the exclusion of “small” and medium” firms and the requirement that 100% of shares be owned directly by individuals, suggests it may not necessarily be representative of the population of private firms in the UK. Two other relatively recent studies have drawn samples from the FAME database and used less

restrictive sample selection criteria than this study. Brav (2009), in a study on the capital structures of public and private UK firms, uses data on private companies drawn from the FAME database over the period 1993 to 2003. Brav (2009) restricts the sample to “medium” and “large” firms, excludes financial firms and does not impose limitations based on ownership structure, unlike this study. The sample used in Brav’s study is large (54,285 private firms) and is therefore likely to be representative of the population of “medium” and “large” private UK firms. Comparing the distribution of the sample firms in Brav (2009) with those used in this study, several differences are evident.²² Firstly, as expected given the size restrictions imposed on the sample, firms in the present study have a higher mean (median) turnover, £95.9m (£54.9m) compared to £42.4m (£12.3m). Secondly firms in this study are slightly older with a mean (median) age of 25.5 years (18.4 years), compared to 23.3 years (16.0 years). 49.3% of firms in this study are dividend payers in the current year compared to 36% in the Brav (2009) sample. Finally, firms in the present study report mean (median) ROA of 0.096 (0.074) compared to 0.083 (0.074) reported by Brav (2009).

Clatworthy and Peel (2006) examine the effect of public or private corporate status on audit fees using a sample of public and private firms drawn from the FAME database. The authors limit their sample to firms for which audited accounts are available and for which a number of data items relating to audit fees are not missing, subsidiary companies are also excluded. The sample data is from the financial year 2003 and the total sample is 51,429, of which 47,896 are private firms. Mean (median) firm turnover in this study is 32.3m (1.17m). The mean (median) number of subsidiaries for firms in Clatworthy and Peel (2006) is 1.41 (0.00) compared to 5.79 (3.00) in this study. In summary, the sample firms used in this study are, on average, larger and older than the population of UK private firms, have more subsidiaries, are more likely to pay dividends and are slightly more profitable. It should be noted that the sample periods for the Brav (2009) and Clatworthy and Peel (2006) studies are 1993-2003 and 2003 respectively compared to 2012 and 2013 for this study and this difference in sample period may account for some differences in sample characteristics.

²² The financial data in Brav (2009) and Clatworthy and Peel (2006) are expressed in 2003 GBP. To facilitate comparison with the present sample I have adjusted all GBP values to 2013 pounds, using the UK CPI.

The primary explanatory variables in this study are those related to the ownership structure of sample firms, specifically managerial ownership and ownership concentration. The construction of the ownership variables is described in the following sections.

4.3.1 Managerial Ownership Variables

The hypotheses outlined in Chapter 2 predict that agency costs, executive compensation and earnings management will vary with managerial ownership, reflecting the effects of incentive alignment and managerial entrenchment. The variables described here are constructed to capture the extent of managerial alignment and entrenchment. Managerial ownership in the three empirical studies that follow is measured in the first instance as the percentage of the firm's equity owned by the MD. The ownership share of the MD is collected by matching the MD named in the financial statements to the percentage ownership shares of individuals recorded on the annual return.

The primary measure of managerial ownership used in each empirical study is a continuous variable measuring the percentage of equity owned by the MD (*MD %*). From this I construct four further variables, representing levels of managerial ownership, *MD High* is a dummy variable which takes the value of one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation and zero otherwise and *MD Low*, which is coded one where the MD's ownership percentage is less than the sample mean MD ownership minus one standard deviation and zero otherwise. *MD High* and *MD Low* represent the extremes of high and low managerial ownership. In the initial sample, the mean value for *MD%* is 43.35%, with a standard deviation of 34.55%. *MD High* is therefore coded one for firms where the MD percentage ownership is greater than 77.91% (273 firms) and *MD Low* is coded one where the MD percentage ownership is less than 8.80% (284 firms). Managerial ownership lies between 8.80% and 77.91% in 666 sample firms and these are classified in neither of the above categories. *MD50*, is a dummy variable coded one where the MD is a majority shareholder in the firm, that is where the MD owns in excess of 50% of the shares in the firm. In the initial sample, *MD50* is coded one in 447 firms, 36.5% of the sample. Finally, *MD LGST* is a dummy variable coded one where the MD is the single largest

shareholder in the firm. This variable is coded one in 63.04% of firms in the initial sample (771 firms).²³

4.3.2 Ownership Concentration Variables

The second aspect of ownership structure I consider in this study is the concentration of ownership in the sample firms. The primary measure of ownership concentration used in this study is the percentage of the firms shares owned by the single largest shareholder (*LGST%*). As with managerial ownership, a number of dummy variables are constructed from *LGST %* to capture degrees of ownership concentration. *LGST High* is a dummy variable which takes the value of one where the largest single shareholder's ownership percentage is greater than the sample mean plus one standard deviation and zero otherwise. *LGST Low* is coded one where the largest single shareholder's ownership percentage is less than the sample mean minus one standard deviation and zero otherwise. These two variables differentiate between firms in which ownership is highly concentrated and highly dispersed (relative to the sample mean). The mean ownership percentage of the largest single shareholder (*LGST%*) in the initial sample is 58.78% and the standard deviation is 27.70%. *LGST High* is therefore coded one for firms where the percentage ownership of the largest shareholder is greater than 86.48% (290 firms) and *LGST Low* is coded one where the percentage ownership of the largest shareholder is less than 31.08% (231 firms). Of the firms coded one for *LGST High*, 191 firms have a single shareholder owning 100% of the firms shares. I also include a dummy variable, *LGST 50*, which indicates a single shareholder owns more than 50% of shares in the firm. In the initial sample, this variable is coded one for 636 firms, indicating the presence of a majority shareholder in 52% of sample firms.

Two secondary measures of ownership are used in some of the empirical tests that follow. A Herfindahl Index (*HI*) is computed using the ownership shares of the five largest shareholders in the firm. This measure is defined as the sum of the squared ownership shares of the five largest shareholders in the firm.

²³ Descriptive statistics for ownership and other variables are provided separately for each study sample in Sections 4.4.3, 4.5.4 and 4.6.3

$$\text{Eq.1} \quad HI_i = S_1^2 + S_2^2 + S_3^2 + S_4^2 + S_5^2$$

Where for firm i:

HI is the Herfindahl Index and S_n is the ownership share of the n^{th} largest shareholder.

The mean value of *HI* in the Earnings Management study sample²⁴ is 0.5126. A final measure of ownership concentration is the number of shareholders in the firm (*No. of Shareholders*). The mean (median) number of shareholders in the Agency Cost study sample²⁵ firms is 7.72 (4). I expect a declining marginal effect of additional shareholders, so this variable is included after being log transformed.

Table 4.3 provides definitions of all variables used in the three empirical studies in this thesis. The construction of these variables is discussed in the following sections.

²⁴ The *HI* variable is included only in the Earnings Management tests.

²⁵ The *No. of Shareholders* variable is included only in the Agency Cost tests.

Table 4.3 Definition of Variables

Variable	Definition
Ownership Structure	
MD %	Percentage shareholding of the MD.
LGST %	Percentage shareholding of the Largest Shareholder.
MD Low (D)	Dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.
MD 50 (D)	Dummy variable coded one where the MD's equity ownership percentage is greater than 50%.
MD High (D)	Dummy variable coded one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation.
MD LGST (D)	Dummy variable coded one where the MD is the largest single shareholder in the firm.
LGST Low (D)	Dummy variable coded one where the largest single shareholder's ownership percentage is less than the sample mean minus one standard deviation.
LGST 50 (D)	Dummy variable coded one where the largest single shareholder's equity ownership percentage is greater than 50%.
LGST High (D)	Dummy variable coded one where the largest single shareholder's ownership percentage is greater than the sample mean plus one standard deviation.
HI	Herfindahl Index computed using the shareholdings of the five largest shareholders.
No. of Shareholders	The number of Shareholders in the firm. Natural log transformed.
Agency Costs	
Expense to Sales Ratio	Administration and Distribution Expenses divided by Sales. Natural log transformed.
Sales to Assets Ratio	Sales divided by Total Assets. Natural log transformed.
Executive Compensation	
Dirs. Remun.	Directors Remuneration. Total Directors Fees plus Pension Contributions plus Other Emoluments. Natural log transformed.
ROA ₋₁	Return on Assets. Profit or Loss before Tax divided by Total Assets. Lagged (by one period)
<i>Instruments for ROA₋₁</i>	
Leverage ₋₁	(Total Debt) divided by (Total Debt plus Shareholders Funds). Lagged (by one period)
FAI ₋₁	Fixed Asset Intensity. (Fixed Assets) divided by (Turnover). Lagged (by one period)
Earnings Management	
DAC	Discretionary accruals scaled by lagged total assets. Estimated using the modified Jones model.
CF Loss (D)	Dummy variable taking the value of one where Cash-flow from Operating Activities (CF) ₀ < 0 and zero otherwise.
CF Fall (D)	Dummy variable taking the value of one where CF ₀ < CF ₋₁ and zero otherwise.
Control Variables	
Turnover	Total Sales. The natural log of this measure is used.
Industry	10 Dummy variables based on one-digit 2007 SIC classification.
Firm Age	Years since incorporation. Natural log transformed.
Leverage	(Total Debt) divided by (Total Debt plus Shareholders Funds).
Number of Subsidiaries	The number of subsidiaries the firm has. Natural log transformed.
Dividends Paid	Dividends paid in the last year. Natural log transformed.
Growth	(Total Assets ₀ - Total Assets ₋₁) / Total Assets ₋₁
Big 4 (D)	Dummy variable taking the value of one where the firm is audited by a Big 4 accounting firm.

The following three sections of this chapter outline the samples and variables used in each of the three empirical studies: the Agency Cost tests, the Executive Compensation tests and the Earnings Management tests.

4.4 Sample and Variables for Agency Cost Tests

Ownership variables used to test the hypotheses on agency costs are lagged by one period to control for the possibility that agency costs and ownership are simultaneously determined. Ownership variables are from the sample firms' latest Annual Report available on the FAME database in September 2013. All other variables used in the Agency Cost tests are collected from the subsequent Annual Report and Company Accounts. The subsequent Annual Report and Company Accounts was not available or variables were missing for 30 firms at the time of data collection (September 2014) and consequently the sample for this study is reduced from 1223 in the initial sample to 1193.

4.4.1 Agency Cost Variables

The measures of agency costs used in this study are based on an assumption that differences in agency costs between firms are manifested in differences in the operating efficiency of firms. Two measures of operating efficiency are utilised, the ratio of expenses to sales and the ratio of sales to total assets. Both of these ratios are commonly used as measures of agency costs in the empirical literature (see for example Ang et al. 2000, Singh and Davidson 2003, Fleming et al. 2005, Chen and Yur-Austin 2007, McKnight and Weir 2009 and Florackis and Ozkan 2009). These measures are commonly referred to as the expense ratio and the asset utilisation ratio respectively.

The ratio of expenses to sales is computed by scaling the Administration and Distribution Expenses by Sales. Administration and Distribution Expenses comprise operating expenses less Cost of Goods Sold and Interest Expense. This ratio is intended to capture "direct agency costs", including the consumption of perquisites, other forms of unproductive expenditure as well as the extent to which operating costs are controlled by managers. Higher expenses per unit of sales are consistent with higher agency costs. Ang et al. (2000) and Fleming et al.

(2005) exclude managerial compensation from the measure of expenses. I include managerial compensation (directors' remuneration) on the basis that agency costs may include excessive compensation. In the sensitivity analysis section of Chapter 5 I exclude managerial compensation from the expenses to sales ratio and the results of the analysis are not significantly affected. The expense to sales ratio exhibits significant positive skew and is log transformed. This transformation is consistent with the approach followed by Fleming et al. (2005).

The second measure of agency costs, the ratio of sales to total assets, is computed by scaling Total Sales by Total Assets. This asset utilisation ratio measures the efficiency with which firms deploy corporate assets to generate sales. A higher ratio indicates greater efficiency in a firm's use of assets. A lower ratio indicates lower efficiency and may be associated with sub-optimal investment decisions, the use of the firm's resources to purchase unproductive "trophy" assets, the acquisition of assets from related parties on terms unfavourable to the firm, excessive investment or excessive managerial risk aversion. As is the case with the expense to sales ratio, this variable is significantly skewed to the right and is log transformed.

The agency cost variables are intended to capture both Type I and Type II agency costs, that is agency costs due to a divergence of interests between shareholders and managers and due to managerial entrenchment or expropriation by majority shareholders. While the two measures of agency costs differ in the particular manifestations of agency costs that they measure, significant overlap exists. Dominant shareholders or managers placing unsuitable family members in executive positions for example may lead to both increased expenses per unit of sales and reduced sales per unit of assets.

4.4.2 Control Variables

The measures of agency costs, the asset utilisation and the expense ratios, are likely to vary across firms for reasons other than ownership structure. Consequently Leverage, Industry, Size and Age are controlled for in the empirical analysis of Agency Costs presented in Chapter 5.

Debt in private firms is almost exclusively non-public in nature. To counter the moral hazard arising from the opacity of private firms for lenders, borrowing is likely to induce monitoring by the firm's lending bank(s), which, because of the concentrated ownership of debt and the nature of relationship banking, are not subject to free rider costs to the same extent as dispersed owners of public debt. This monitoring, aimed at protecting the interests of the creditor, should indirectly reduce equity agency costs borne by shareholders, by incentivising managers to operate the firm more efficiently. I expect that incentives to monitor the firm will positively correlate with the degree of indebtedness. The incentive and ability to monitor will also depend on the number of bank lenders to the firm and the length of the banking relationships. Free rider problems between lenders will grow as the number of lenders increases. In private firms the length of the banking relationship mitigates information asymmetry (Berger and Udell 1998) and firms with longer banking relationships have easier access to bank debt (Hernandez-Canovas and Martinez-Solano 2010). Data on the number of banking relationships and the duration of those relationships for sample firms is, unfortunately, not available. Leverage also reduces the agency costs of free cash flow (Jensen 1986). The ratio of Total Debt to Total Debt plus Shareholders Funds (*Leverage*) is used as a proxy for lender monitoring. I recognise that this variable is a partial measure of the ability and incentive to monitor the firm. The relationship between leverage and agency costs is expected to be negative, reflecting this monitoring effect.²⁶

Firm size is included as a control variable in each regression. This is measured as the natural log of Turnover. Economies of scale should result in lower expenses per unit of sales for larger firms compared to smaller firms. Firm size should therefore be negatively related to the ratio of expenses to sales. Firm size may be positively related to the ratio of sales to total assets due to economies of scope, which arise from “...inputs that are shared or utilised

²⁶ It should be noted that the numerator in the ratio of Expenses to Sales excludes interest expenses.

jointly” in the production process (Teece (1980) p.226). It is expected that firm size and efficiency, using both measures, will be positively related. Both expenses to sales and sales to assets will vary widely across industries due to differences in asset and cost structures. Ten dummy variables, based on the 1 digit 2007 SIC codes, are included to control for industry variations²⁷. The dummy variables are constructed using the first digit of the Primary Business Activity SIC Code included in the Annual Return for each sample firm. I also include a control for the age of sample firms. Firm age may be associated with efficiency in a number of ways. Younger firms may suffer from deficiencies in managerial ability (Thornhill and Amit 2003) and “*corporate learning*” may increase efficiency as a firm ages. Conversely, the efficiency of older firms may suffer due to technical obsolescence and organisational rigidity (Agarwal and Gort 2002). Firm age is defined as the number of years since the firm was incorporated. Since the marginal effects of a one year increase in age are likely to decline as firms age, I take the natural log of this measure to construct the variable *Age*. No prediction is made as to the significance or sign of the coefficient on this variable in the Agency Cost regressions.

4.4.3 Descriptive Statistics

Table 4.4: Summary Statistics for Agency Costs and Other Variables

²⁷ When reporting regression results in Chapters 5, 6 and 7, the individual coefficients and standard errors are not reported for each industry dummy variable. For brevity, a single value is reported in each table, either “No”, indicating that no industry dummy variable is statistically significant or “Yes”, indicating that one or more industry variables are statistically significant in the model estimated.

VARIABLES	N	Mean	SD	Min	Max
Expense to Sales Ratio	1,193	0.234	0.337	0.00241	6.799
Sales to Assets Ratio	1,193	2.288	1.628	0.014	18.3
Leverage	1,193	0.35	1.337	0	41.11
Turnover (GBP th.)	1,193	102,548	175,062	6,196	2,918,887
Age (Years)	1,193	27.22	22.91	2.274	123
Number of Shareholders	1,193	7.719	11.29	1	90
LGST %	1,193	58.6	27.9	2.8	100
MD %	1,193	43.0	34.6	0.0	100
		Coded 1		% Coded 1	
LGST Low (D)	1,193	225		18.9	
LGST 50 (D)	1,193	616		51.6	
LGST High (D)	1,193	285		23.9	
MD LOW (D)	1,193	280		23.5	
MD 50 (D)	1,193	433		36.3	
MD HIGH (D)	1,193	266		22.3	
MD LGST (D)	1,193	755		63.3	

Table 4.4 presents summary statistics for the Agency Cost sample firms. The mean values of the measures of agency costs, Expenses to Sales and Sales to Assets, are 0.234 and 2.288. Both of these variables exhibit significant positive skew and, as described in Section 4.4.1, are log transformed. Ownership is highly concentrated in the sample firms. The mean ownership share of the largest shareholder is 58.6%. The ownership concentration dummy variables provide further detail on the distribution of ownership concentration in the sample. In 18.9% of firms, the largest shareholder owns less than 30.72% of equity and in 23.9% of firms the largest shareholder owns more than 86.32% of equity. While the mean ownership share of MDs is 43%, 23.5% of firms are managed by an MD owning less than 8.59% of equity. In 63.3% of sample firms, the MD is the largest single shareholder in the firm.

The next section describes the sample and variables for the Executive Compensation study.

4.5 Sample and Variables for Executive Compensation Tests

The measure of accounting performance used to examine the relationship between executive compensation and firm performance is Return on Assets (ROA) (lagged by one year). Of 1223 firms in the initial sample, this variable is missing for 6 firms. The sample used in the Executive Compensation tests therefore comprises 1217 firms.

4.5.1 Executive Compensation Variable

Research on the pay-performance relationship in private firms has used a variety of measures of executive compensation, depending on data availability. Banhoj et al. (2010) survey Danish firms and collect data on total compensation and bonus payments to members of Boards of Directors in Danish private companies. Cavalluzzo and Sankaraguruswamy (2000 WP), Cole and Mehran (2010) and Michiels et al (2012) select sample firms from the US Federal Reserve Board *Survey of Small Business Finance* dataset, which includes a question asking for the total compensation paid to all executive officers of the firm. Barkema and Pennings (1998) use survey data on Dutch private firms, which includes salary and bonus paid to “Executive Directors” (not necessarily the CEO/MD) of the firm. Ke et al. (1999) examine executive compensation in privately held insurance companies in the US, which are required to disclose the level and composition of CEO pay. Gao and Li (2014) use a sample of private firms that have a class of equity with more than 500 shareholder, who are required to disclose detailed executive compensation information to the Securities and Exchange Commission, including total CEO compensation, which is the measure of executive compensation used. Studies use either measures of aggregate director or executive remuneration in the firm or the pay of the CEO, MD or other executive director(s). In summary, the measures of executive compensation used in research in private firms vary across studies and in general, differ from those used in public firm research and, if the fundamental variable of interest is the compensation paid to the most senior executive in a firm, are generally imperfect proxies of this.

The FAME database has two data items which could potentially be used as measures of executive compensation: Total Directors’ Remuneration and Highest Paid Director’s (HPD) Remuneration. Total Directors Remuneration is the aggregated sum of Directors’ Fees plus

Pension Contributions plus Other Emoluments for all directors of the firm. HPD Remuneration is the sum of Director's Fees plus Pension Contributions plus Other Emoluments for the single highest paid director in the firm. The UK Companies Acts require that the remuneration of the highest paid director be reported only where the total director's remuneration for the firm exceeds £200,000 in the reporting period. Of the total sample, 23.22% (284 firms) report aggregate directors' remuneration of less than £200,000 and therefore do not report the remuneration of the highest paid director. Limiting the sample to those firms reporting the remuneration of the HPD may materially bias the sample towards larger and/or better performing firms which are likely to be disproportionately represented in the firms reporting paying in excess of £200,000 aggregate directors' remuneration.

For this reason I use Total Directors' Remuneration as a measure of executive compensation in the empirical tests that follow. Total Directors Remuneration is log transformed to correct for significant positive skew. The obvious disadvantage of this variable is that it captures the remuneration paid to all directors, executive and non-executive, rather than solely executive director or MD pay. To account for the expected positive relationship between the number of directors and this measure of remuneration, I include the number of directors as a control variable in all specifications.

4.5.2 Firm Performance Variable

The literature on executive compensation in public firms generally uses market based measures of firm performance, most commonly: Tobins's Q (Mehran 1995, Bebchuk, Cremers and Peyer 2011) and measures of change in shareholder wealth (Canyon and Murphy 2000, Hartzell and Starks 2003). For public firms both accounting and market based measures of firm performance add incremental explanatory power when both are included in models of executive compensation (Brick, Palmon and Wald 2006). A wide variety of measures of accounting performance have been used to proxy for firm performance in the compensation literature. Tosi, Katz and Gomez-Mejia (2000), in a meta-analysis of the CEO pay-performance literature, identify 24 separate measures of accounting performance used, although Return on Equity (ROE) and particularly ROA predominate.

In the literature on the pay-performance relationship in private firms, ROA is used by most studies as the primary performance measure (Ke et al. (1999), Banhoj et al. (2010), Michiels et al. 2012). In this study, lagged (by one year) ROA is the performance measure used because it is expected that there may be a delay in directors' remuneration adjusting to performance. Bonus payments, for example may be awarded based on historical firm performance. Inspection of the distribution of $ROA_{.j}$ revealed the presence of outliers in these variables. To address this, $ROA_{.j}$ is winsorised at the 5th and 95th percentile. The winsorised observations are reported in the descriptive statistics. The effect of this procedure on the results obtained is discussed in Section 6.4.8.

The empirical design used in Chapter 6 to examine the relationships between executive compensation, firm performance and ownership structure employs an instrumental variables approach to address the endogeneity of firm performance in this relationship. This approach is described in detail in Section 6.3.1. Two variables are used to instrument for $ROA_{.j}$ in this study, $Leverage_{.j}$ (Total Debt/Total Equity) and $Fixed Asset Intensity_{.j}$ (Fixed Assets/Sales). Following Rajan and Zingales (1995) I expect leverage to be negatively correlated with ROA. Michaelas, Chittenden and Poutziouris (1999) and Brav (2009) show that the negative relationship between leverage and ROA is evident in private UK firms. Leverage is used as an instrument for ROA in similar empirical studies (Michiels et al. 2012 and Banhoj et al. 2010). I do not expect leverage to influence Directors' Remuneration other than through its effects on firm profitability, in other words leverage is not expected to be correlated with the error term in the equation of interest. The second instrument used is Fixed Asset Intensity. ROA has been found to be related to Capital Intensity (Selling and Stickney 1989). I do not expect that fixed asset intensity is correlated with directors' remuneration, other than through its correlation with ROA. Both instrumental variables are winsorised at the 5th and 95th percentile to reduce the effect of outliers. Results of tests to determine the validity of the instruments used for $ROA_{.j}$ are reported in Chapter 6 (Section 6.4.8). These results indicate that the instruments are valid.

4.5.3 Control Variables

In the empirical analysis of executive compensation presented in Chapter 6 control variables for Size, Industry, Age, Firm Complexity and Dividends Paid are included based on the existing literature on executive compensation. It is well established in the existing literature that size is an important predictor of executive compensation (e.g. Conyon and Murphy 2000). Tosi et al. (2000) estimate that firm size accounts for approximately 40% of variability observed in executive compensation. The natural log of Turnover is used to control for size effects. It is likely that executive pay will vary across sectors if demand for sector-specific skills result in segmented markets for managerial talent therefore 10 dummy variables, based on 1 digit 2007 SIC codes, are included to control for this. To avoid multicollinearity one dummy variable is excluded from the sets of industry variables. Fahlenbrach (2009) reports that older firms exhibit less pay-performance sensitivity and I include the natural log of firm age in years to control for possible age effects on compensation.

More complex firms may require more competent or skilled managers, able to demand a compensation premium over less skilled managers. Therefore firm complexity may be positively related to executive compensation. Firm complexity cannot be directly observed but the number of subsidiaries for each firm is included as a proxy for this factor (Woo and Koh 2001). To correct for significant positive skew and the presence of outliers in the distribution of this variable, the variable is log transformed. For an MD who is also a shareholder in the firm, dividends and retained earnings will function, to a greater or lesser extent, as substitutes for direct compensation thus I include dividends paid as a control, this variable is log transformed to correct for significant positive skew and outliers in the distribution.

4.5.4 Descriptive Statistics

Table 4.5 Panel A, shows summary statistics for the Executive Compensation study sample variables. The mean value of *Dirs. Remun* is £720,000. This variable exhibits a high standard deviation (£947,600) and is skewed to the right. As discussed in section 4.5.1 this variable is log transformed when included in the analysis that follows. Dividends also vary widely across the sample firms, with a mean of £468,000 and a standard deviation of £1,791,000. Slightly over half of the sample firms (620 firms) do not pay any dividend in the sample year. The mean shareholding of the largest single shareholder is 58.6% and the mean shareholding of the MD is 43.2%. A significant minority of the sample firm (282) are managed by MDs who own less than 8.69% of equity. Slightly fewer firms (270) are managed by MDs who own in excess of 77.8% of equity in the firm.

In 775 of the 1217 firms in the sample the MD is the largest single shareholder. I separately examine a reduced sample of firms, comprising the sample firms in which the MD is not the largest shareholder. The mean ownership share of the largest single shareholder in this sample is 51.6%. *LGST High* (*LGST Low*) in this sample are dummy variables coded one where the largest shareholder's shareholding is greater (less) than 78.7% (24.2%). This subsample is analysed to provide further evidence on Hypotheses 6.2_a and 6.2_b, which examine the influence of ownership concentration on the level and sensitivity to firm performance, of executive compensation. Panel B of Table 4.5 shows summary statistics for the reduced sample of firms (442 firms) in which the MD is not the largest single shareholder.

Table 4.6 provides the results of tests comparing the characteristics of the full and reduced samples. The results of t-tests for difference in means and Wilcoxon rank-sum (Mann-Whitney) tests are reported, in both cases these are two tailed tests. Unlike the t-test, the Wilcoxon signed-rank test does not assume the variables are normally distributed. Several differences are apparent when comparing the characteristics of the full sample and the reduced sample. There are significant differences in remuneration, size, age, number of subsidiaries and ownership structure between the samples. The reduced sample firms are larger, have more subsidiaries, are older and pay higher dividends compared to the full

sample. The ownership structures of the firms in each sample also differ significantly. This is expected since the reduced sample is created with reference to the shareholding of the MD. The shareholdings of MDs in the reduced sample firms average 9.87%, compared to 43.21% in the full sample. The magnitude of the difference in the largest shareholders ownership is much less (51.61% compared to 58.64%) but is statistically significant.

Table 4.5: Summary Statistics for Directors Remuneration and Explanatory Variables

Panel A: Full Sample					
VARIABLES	N	Mean	SD	Min	Max
Dirs. Remun (GBP th.)	1,217	720	947.6	0	16,590

Number of Directors	1,217	5.335	2.276	1	16
Return on Assets (ROA) ₋₁	1,217	0.0963	0.103	-0.0632	0.359
Turnover (GBP th.)	1,217	96,035	159,923	25,987	3,032,254
Number of Subsidiaries	1,217	5.793	9.668	0	119
Age (Years)	1,217	25.63	22.71	1.162	130
Dividends Paid (GBP th.)	1,217	468.2	1,791	0	33,802
LGST %	1,217	58.6	27.7	2.8	100
MD %	1,217	43.2	034.5	0.0	100

		Coded 1	% Coded 1
LGST Low (D)	1,217	230	18.9
LGST 50 (D)	1,217	630	51.8
LGST High (D)	1,217	287	23.6
MD LOW (D)	1,217	282	23.2
MD 50 (D)	1,217	443	36.4
MD HIGH (D)	1,217	270	22.2
MD LGST (D)	1,217	767	63.0

Panel B: Sample of Firms in which MD is not the Largest Shareholder.

VARIABLES	N	Mean	SD	Min	Max
Dirs. Remun (GBP th.)	442	873.3	1,176	0	16,590
Number of Directors	442	5.964	2.402	1	16
Return on Assets (ROA) ₋₁	442	0.0942	0.103	-0.0632	0.359
Turnover (GBP th.)	442	112,253	225,880	25,994	3,032,254
Number of Subsidiaries	442	7.578	12.76	0	119
Age (Years)	442	29.33	25.86	1.603	124
Dividends Paid (GBP th.)	442	686.1	2,368	0	33,802
LGST %	442	51.6	27.2	5.4	100
MD %	442	9.9	14.1	0.0	44.1
		Coded 1	% Coded 1		
LGST Low (D)	442	73		16.5	
LGST 50 (D)	442	193		43.6	
LGST High (D)	442	91		20.6	

Table 4.6: Comparison of Characteristics of Full and Reduced Samples

Variables	Full Sample (n= 1217)	Reduced Sample (n=442)	Difference In Means	t-test for difference in means (2-tailed)	Wilcoxon rank-sum Test (2-tailed)
	Mean	Mean		t-statistic	z-statistic
Dirs. Remun (GBP th.)	720.0	873.3	153.3	2.739***	4.445***
No of Directors	5.335	5.964	0.629	4.936***	4.912***
Return on Assets (ROA) ₋₁	0.0963	0.0942	-0.002	-0.369	-0.326
Turnover	96,034	112,253	16.219	1.632	0.029
No of Subsidiaries	5.792	7.578	1.786	3.054***	2.496**
Age (Years)	25.62	29.33	3.71	2.843***	1.992**
Dividend Paid	468.1	686.1	218	2.012**	2.993***
LGST %	58.6	51.6	-7.0	-4.640***	-4.741***
MD %	43.2	9.9	-33.3	-19.899***	-18.521***

*** p<0.01, ** p<0.05, * p<0.1

The following section describes the sample and variables used in the Earnings Management tests.

4.6 Sample and Variables for Earnings Management Tests

Ownership variables used to test the hypotheses on earnings management are lagged by one period to control for the possibility that discretionary accruals and ownership are simultaneously determined. Ownership variables are from the sample firms' latest Annual Report available on the FAME database in September 2013. All other variables used in the earnings management tests are collected from the subsequent Annual Report and Company Accounts. The subsequent Annual Report and Company Accounts were not available for 27 firms at the time of data collection (September 2014) and consequently the sample for this study is reduced from 1223 in the initial sample to 1196. The procedure used to estimate discretionary accruals, the cross-sectional modified Jones approach described in the following section, requires a minimum of 10 firms in each industry group (2-digit SIC code) to estimate the non-discretionary element of accruals. This requirement reduces the sample in the earnings management tests from 1196 to 1028.

4.6.1 Earnings Management Variables

A range of measures of accruals based earnings management exist in the empirical literature. The most common approach is to assume that a firm's total accruals comprise a non-discretionary and a discretionary element, with the former depending on the business activities of the firm and the latter being the result of accounting choices or earnings management. Non-discretionary, or "normal" accruals, are most commonly estimated using one of several alternative specifications of the Modified Jones Model (Walker 2013). Subtracting the non-discretionary accruals from the firm's total accruals yields an estimate of discretionary accruals.

The original Jones approach proposed in Jones (1991) models non-discretionary accruals as a function of lagged total assets, change in sales and property plant and equipment. Several modifications to the original model have subsequently been proposed. Deschow, Sloan and Sweeney (1995) argued that the change in sales should be adjusted for the change in receivables to account for managerial discretion in the recognition of credit sales. As proposed by Kothari, Leone and Wasley (2005) I include an intercept in the model. Bartov, Givoly and Hayn (2000) report that cross sectional versions of the modified Jones model, estimated on industry based samples, are better specified than time-series versions and this is the approach I follow here.

Total accruals are calculated on a balance sheet basis and comprise the change in current assets (less the change in cash) minus the change in current liabilities (less the change in short term debt and taxes payable) minus depreciation and amortisation.

For firm i in year t :

$$\text{Eq.2} \quad TAC_{it} = (\Delta CA_{it} - \Delta \text{Cash}_{it}) - (\Delta CL_{it} - \Delta \text{STD}_{it} - \Delta \text{TP}_{it}) - DEP_{it}$$

Where for firm i at time t :

TAC is total accruals, ΔCA is the change in Current Assets from year $t-1$ to year t , ΔCL is the change in Current Liabilities from year $t-1$ to year t , ΔCash is the change in Cash from year $t-$

1 to year t, ΔSTD is the change in Short Term Debt and current portion of long term debt included in Current Liabilities from year t-1 to year t, ΔTP is the change in taxes payable included in Current Liabilities from year t-1 to year t and DEP is the depreciation and amortisation charge for year t.

The relationship between total accruals, discretionary accruals and non-discretionary accruals is as follows:

$$\text{Eq.3} \quad TAC_{it} = NDAC_{it} + DAC_{it}$$

Where for firm i at time t,

TAC is total accruals, calculated using Eq. 2, $NDAC$ is Non-discretionary accruals estimated using the modified Jones model outlined in this section and DAC is discretionary accruals calculated by subtracting $NDAC$ from TAC .

The modified Jones model, used to estimate $NDAC$, first estimates the following OLS regression for each group of sample firms in a 2 digit sector, in which there are at least 10 firms:

$$\text{Eq.4} \quad \frac{TAC_{i,t}}{TA_{i,t-1}} = \alpha + \beta_1 \left(\frac{1}{TA_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{TA_{i,t-1}} \right) + \beta_3 \left(\frac{PPE_{i,t}}{TA_{i,t-1}} \right) + \varepsilon_{i,t}$$

Where, for firm i at time t:

TAC is total accruals, TA is total assets (lagged by one year), ΔREV is the change in Revenue from year t-1 to year t, ΔREC is the change in Receivables from year t-1 to year t. PPE is the gross Property, Plant and Equipment and ε is an error term.

DAC for firm i in year t, scaled by lagged total assets, is:

$$\text{Eq.5} \quad \frac{DAC_{i,t}}{TA_{i,t-1}} = \left(\frac{TAC_{i,t}}{TA_{i,t-1}} \right) - \left(\hat{\alpha} + \hat{\beta}_1 \left(\frac{1}{TA_{i,t-1}} \right) + \hat{\beta}_2 \left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{TA_{i,t-1}} \right) + \hat{\beta}_3 \left(\frac{PPE_{i,t}}{TA_{i,t-1}} \right) \right)$$

Where hats indicate estimated coefficients from Eq. 4 and all other variables are as previously defined.

Positive discretionary accruals are interpreted as resulting from income decreasing discretionary accruals and negative discretionary accruals are interpreted as resulting from income increasing earnings management by firms. The absolute value (unsigned) discretionary accruals are used as the measure of earnings management.

Hypothesis 7.2 predicts that the extent of earnings management engaged in by poorly performing firms will vary with managerial ownership. The measures of underlying firm performance used are based on the Cash-flow from Operating Activities. A number of studies measure the incentive to manage earnings to meet benchmarks by relating the firms pre-managed earnings to zero or to the lagged reported earnings i.e. firms may manage earnings to avoid reporting a loss or a fall in earnings. Pre-managed earnings in the earnings management literature is generally computed by reversing the effect of estimated discretionary accruals on reported profit (see for example Cornett, Marcus and Tehranian 2008). Both DeFond and Park (1997) and Peasnell et al. (2005) point out that this approach may result in spurious correlations being detected between discretionary accruals and pre-managed earnings since any error in estimating a firm's discretionary accruals will cause an error of exactly equal magnitude but opposite sign in the pre-managed earnings calculated subsequently. Peasnell et al. (2005) suggest using thresholds based on Cash Flow from Operating Activities (CF) rather than pre-managed earnings to identify firms with an incentive to manage earnings upwards, which avoids this potential source of bias. This is the approach followed here.

I construct two dummy variables to reflect managers' incentives to manage earnings upwards: *CF Fall*, which takes the value of one where $CF_0 < CF_{-1}$ and zero otherwise, and *CF Loss* where $CF_0 < 0$ and zero otherwise. Hypothesis 7.2 predicts that firms anticipating either a loss (proxied by *CF Loss*) or a fall in reported earnings (proxied by *CF Fall*) may

engage in income increasing earnings management through negative accruals but that the incentive to do so may differ depending on the degree of MD equity ownership.

4.6.2. Control Variables

Based on the existing literature on the determinants of discretionary accruals a number of control variables are included in the earnings management regressions. *Leverage* (Total Debt over Total Debt plus Shareholders Funds) is included as a control variable because leverage may influence accruals in at least two ways. Highly leveraged firms may manage earnings upwards to avoid breaching debt covenants (Becker, DeFond, Jiambalvo and Subramanyam 1998). Conversely, increased leverage may be associated with closer monitoring by lenders, which may constrain earnings management (Ahn and Choi 2008). No prediction about the direction of any relationship between discretionary accruals and leverage is made.

Firm size has been found to be negatively related to the extent of earnings management (Xie, Davidson and DaDalt 2003). The natural log of turnover is included here to control for this effect and a negative relationship between firm size and discretionary accruals is expected. The evidence on whether Big 4 (or previously Big 6/5) auditors enforce higher quality earnings is mixed, Becker et al. (1998) report that firms audited by Big 6 auditors report lower discretionary accruals than clients of non-Big 6 auditors. Other studies (e.g. Lawrence, Minutti and Zhang 2011) suggest it is differences in underlying firm characteristics between Big 4 and non-Big 4 clients that account for these differences. Van Tendeloo and Vanstraelen (2008) do not find evidence of Big 4 auditors, compared to non-Big 4 auditors, constraining earnings management in UK firms. I include a dummy variable, *Big 4*, coded one where the firm is audited by a Big 4 accounting firm to control for a potential effect. The coefficient on this variable is expected to be either insignificant or negative.

Nine Industry dummies, based on 2007 one-digit SIC codes are included to control for any industry effects. McNichols (2000) reports a positive relationship between accruals and both growth and return on assets. Control variables for *Growth* (one-year growth in total assets)

and *ROA* are included but since it is expected that growth and Return on Assets may be associated in different ways with positive and negative discretionary accruals, I do not make a prediction about the relationship between *Growth* and *ROA* and discretionary accruals. Finally I include the natural log of firm age, *Ln Age*, (the number of years since incorporation) to control for any possible age effects.

4.6.3 Descriptive Statistics

The analysis of the relationship between discretionary accruals and managerial ownership presented in Chapter 7 examines the full sample, income increasing discretionary accruals sample and income decreasing discretionary accruals samples separately. To determine whether there are significant differences between the characteristics of these samples I report summary statistics for each sample separately and parametric and non-parametric tests comparing the income increasing and income decreasing samples. These statistics are provided in Tables 4.7 and 4.8.

Table 4.7: Summary Statistics for Discretionary Accruals and Explanatory Variables

Panel A: Full Sample

VARIABLES	N	Mean	SD	Min	Max
DAC	1,028	0.0738	0.0805	0.000571	0.479
Return on Assets (ROA)	1,028	0.0447	0.0616	-0.147	0.279
Turnover	1,028	99,146	168,150	329.2	3,184,246
Leverage	1,028	0.330	0.271	0	0.987
Age (Years)	1,028	25.49	22.66	1.162	130
Growth in total assets	1,028	0.0623	0.161	-0.353	0.641
MD %	1,028	44.2	34.2	0	100
		Coded 1		% Coded 1	
Big 4 (D)	1,028	229		22.3	
MD Low (D)	1,028	234		22.8	
MD High (D)	1,028	229		22.3	
CF Loss (D)	1,028	145		14.1	
CF Fall (D)	1,028	461		44.8	

Panel B: Income Increasing Discretionary Accruals Sample

VARIABLES	N	Mean	SD	Min	Max
DAC	518	0.0714	0.0748	0.000571	0.404
Return on Assets (ROA)	518	0.0350	0.0623	-0.134	0.217
Turnover	518	102,404	206,407	329.2	3,184,246
Leverage	518	0.363	0.281	0	0.987
Age (Years)	518	24.31	22.63	1.162	124
Growth in total assets	518	0.0435	0.157	-0.300	0.531
MD %	518	42.9	34.6	0	100
		Coded 1		% Coded 1	
Big 4 (D)	518	125		24.1	
MD Low (D)	518	126		24.3	
MD High (D)	518	113		21.8	
CF Loss (D)	518	31		5.98	
CF Fall (D)	518	159		30.7	

Panel C: Income Decreasing Discretionary Accruals Sample					
Variables	N	mean	sd	min	max
DAC	510	0.0763	0.0858	0.00112	0.479
Return on Assets (ROA)	510	0.0545	0.0594	-0.147	0.279
Turnover	510	95,836	117,275	6,196	1,246,989
Leverage	510	0.2960	0.2561	0	0.8930
Age (Years)	510	26.70	22.65	1.258	130
Growth in total assets	510	0.0814	0.162	-0.353	0.641
MD %	510	45.5	33.9	0	100
		Coded 1		% Coded 1	
Big 4 (D)	510	104		20.3	
MD Low (D)	510	108		21.1	
MD High (D)	510	116		22.7	
CF Loss (D)	510	114		22.3	
CF Fall (D)	510	301		59.1	

Table 4.8: Comparison of Income Increasing DAC sample and Income Decreasing DAC sample

Variables	Income Decreasing (n= 510)	Income Increasing (n=518)	Difference In Means	t-test for difference in means (2-tailed)	Wilcoxon rank-sum Test (2-tailed)
	Mean	Mean		t-statistic	z-statistic
DAC	0.0763	0.0720	0.0043	0.852	0.438
Return on Assets (ROA)	0.0544	0.0350	0.0194	5.122***	5.653***
Turnover	95,836	102,327	-6,491	-0.619	0.209
Leverage	0.2960	0.3628	-0.0668	-3.992***	-3.785***
Age (Years)	26.69	24.24	2.4500	1.743**	2.435**
Growth in total assets	0.0814	0.0419	0.0394	3.949***	4.805***
MD %	45.4	43.0	2.5	1.154	1.276
CF	5.5	13.8	-8.4	-9.295***	-11.019***

*** p<0.01, ** p<0.05, * p<0.1

DAC, *Leverage*, *ROA* and *Growth* have been winsorised at 1st and 99th percentile to reduce the effect of outliers. Table 4.7, Panel A shows statistics for the full sample, Panels B and C show summary statistics for income increasing and income decreasing samples respectively. Table 4.8 provides the results of tests comparing the latter two samples. The results of t-tests

for difference in means and Wilcoxon rank-sum (Mann-Whitney) tests are reported, in both cases these are two tailed tests. Unlike the t-test, the Wilcoxon signed-rank test does not assume the variables are normally distributed. Slightly more firms report income increasing *DAC* (518 compared to 510) and the mean magnitude of income decreasing *DAC* is greater than the magnitude of income increasing *DAC*. Note that while income increasing *DAC* are negative and income decreasing *DAC* are positive, the absolute values of *DAC* are reported here. The difference between the means of income increasing and income decreasing *DAC* is not statistically significant. Statistically significant differences between the samples are evident in *ROA*, *Leverage*, *Age*, *Growth* and *CF* (Cash Flow from Operations), with the income increasing *DAC* sample having lower *ROA*, mean *Age*, and *Growth* and higher *Leverage* and *CF* than the income decreasing discretionary accruals sample. There are no significant differences between the samples in respect of firm size or managerial ownership.

In the full sample and both sub-samples, the three managerial ownership variables indicate a high level of share ownership by the MD. In the full sample, the mean shareholding of the MD (*MD %*) is 44.2% but with a significant minority (22.69%) of firms managed by an outsider or low shareholding MDs (with less than 9.96% shareholding). The majority (55%) of firms are managed by an MD owning a shareholding between 9.96% and 78.48%. *MD High* and *MD Low* represent the extremes of insider ownership in the sample. *CF Loss* and *CF Fall* indicate firms which underperform based on two cash-flow measures. 45% of firms report a fall in cash flow from operating activities and 14.06% of firms report a negative cash flow from operating activities.

4.7 Summary and Conclusions

This chapter describes the sample and variables used in the empirical tests described in Chapters 5, 6 and 7. The sample of private UK firms is drawn from the FAME database, which contains financial, ownership and other data on public and private firms in the UK. The sample is limited in a number of ways necessary to collect the required data from sample

firms. “Small” and “medium” sized firms are not required to submit Company Accounts to Companies House in as detailed a format as “large” firms and are excluded from the sample. The second significant criterion for inclusion in the initial sample is that 100% of the shares in the sample firms are required to be owned directly by individuals and the MD is required to be identified by name in the Company Accounts. The initial sample of firms is 1223.

The three empirical studies that follow consider the relationships between ownership structure (ownership concentration and managerial ownership) and agency costs, executive compensation and earnings management. The construction and distribution of the ownership variables are described. The primary measure of ownership concentration used in the study is the percentage of shares owned by the largest shareholder, a number of further concentration variables are constructed from this measure. Ownership in the sample firms is highly concentrated. The mean shareholding of the largest shareholder is 58.78% and in 191 firms (15.62%) of firms, one shareholder owns 100% of shares. A significant proportion of sample firms have less concentrated ownership structures, with the largest shareholder in 231 firms owning 31.08% or less of shares in the firm. The primary measure of managerial ownership, the second aspect of ownership structure considered, is the percentage of shares owned by the MD of the firm. The mean value of this variable in the initial sample is 43.35%. A significant number of the sample firms (284) are managed by an MD who own a relatively low (less than 8.08%) percentage of the firms’ shares. A similar number of firms, 273, are managed by MDs owning in excess of 77.91% of the firms shares and could be termed “owner-managed” firms. The distribution of both ownership variables in the sample firms indicates, that while the degrees of both ownership concentration and managerial ownership are generally high, there is significant heterogeneity in the ownership structures of the sample firms.

The samples and variables used in each of the three empirical chapters are outlined in Sections 4.4, 4.5 and 4.6. The agency costs tests, described in Chapter 5, use lagged ownership variables to address the concern that agency costs and ownership may be simultaneously determined. The sample for these tests comprises 1193 firms. Agency costs are measured using two variables, the ratio of expenses to sales and the ratio of sales to total assets, which are standard measures of agency costs in the extant literature. The control

variables included in the agency cost tests are Leverage, Industry, Size and Age. Descriptive statistics for the agency cost sample are provided.

The sample for the executive compensation tests, described in Chapter 6, comprises 1217 firms. The measure of executive compensation used is Total Directors Remuneration as private firms in the UK are not required to disclose the compensation paid to the MD of the firm. Firms in which Total Directors remuneration exceeds £200,000 are required to disclose the compensation paid to the Highest Paid Director, however a significant number of sample firms report Total Directors Remuneration of less than this amount and so the limitation of the sample to firms reporting the compensation of the Highest Paid Director is likely to bias the sample towards larger or better performing firms. The measure of firm performance used in the compensation tests is ROA_{-1} . To address concerns that compensation and performance are endogenously related, an instrumental variables methodology is employed in these tests and $Leverage_{-1}$ and $Fixed\ Asset\ Intensity_{-1}$ are used as instruments for ROA_{-1} . Size, Industry, Age, Firm Complexity and Dividends are included as control variables in the executive compensation tests. Descriptive statistics for the executive compensation sample are provided.

The earnings management tests, which are described in Chapter 7, employ lagged ownership variables to address the possibility that discretionary accruals and ownership may be simultaneously determined. The sample size for this study is 1028 firms. The significant reduction in the sample size for this study compared to the initial sample results from the procedure used to estimate discretionary accruals, which requires at least 10 firms in each industry group. The measure of earnings management used is discretionary accruals, estimated using a cross-sectional modified-Jones approach. Control variables included in the earnings management regressions are Leverage, Size, Industry, Big-4 auditor, Growth and ROA.

Having outlined the selection of the study samples and the variables used in each of the studies, the following three chapters describe the empirical testing of the hypotheses outlined in Chapter 2. Chapter 5 describes the empirical testing of the agency cost hypotheses.

Chapter 5 Ownership Structure and Agency Costs in Private Firms

5.1 Introduction

The first empirical chapter in this thesis examines the relationship between agency costs and ownership structure. Agency costs arise when ownership and control of the firm are separated. In a firm owned entirely by its managers, ownership and control is unified and no agency costs arise. Manifestations of equity agency costs documented in the empirical literature include value destructive acquisitions (Masulis, Wang and Xie 2009), accounting choices (Garcia-Meca and Sanchez-Ballesta 2009), an increased cost of equity (Chen, Chen and Wei 2011), excessive managerial compensation (Goergen and Renneboog 2011), excessive consumption of perquisites (Edgerton 2012) and corporate diversification (Chen and Yu 2012).

This body of empirical research has focussed primarily on public firms, which are characterised to a greater or lesser extent by a separation of ownership and control and a dispersed ownership structure. The ownership structures of private firms, from which the present study sample is drawn, differ qualitatively from this. Owner-managed firms, in which ownership and control are unified, are common but the universe of private firms contains firms from across the managerial ownership spectrum. Ang et al. (2000) report that, in private US firms, agency costs decline with increased managerial ownership. Fleming et al. (2005) report similar findings in Australian private firms. These results indicate that Type I agency conflicts, arising from the separation of ownership and control, are mitigated by increased managerial ownership. The nature of ownership structures in private firms, in which managers are generally significant shareholders and firms are typically owned by few, large shareholders, suggests that Type II agency costs, in which entrenched managers or majority shareholders expropriate firm resources, may also arise.

This chapter addresses two research questions. Firstly, is the negative relationship between managerial ownership and agency costs, documented in the US and Australia, evident in UK private firms? Secondly, is there evidence that high level of managerial ownership and ownership concentration, evident in private firms, is associated with agency costs arising from managerial entrenchment or expropriation of firm resources by dominant shareholders?

This study examines how equity agency costs, measured here using the expense ratio and the asset utilisation ratio, vary in sample firms with the shareholding of the MD, the shareholding of the largest shareholder and other measures of ownership structure. To control for the possible simultaneous determination of ownership structure and firm efficiency, ownership variables are lagged by one year in the analysis. The results indicate that firms exhibiting high agency costs have significantly lower managerial ownership and lower ownership concentration compared to firms exhibiting lower agency costs. In a multivariate analysis controlling for firm size, age industry and leverage, strong evidence is provided that the expense ratio is negatively and linearly related to managerial ownership and ownership concentration. The asset utilisation ratio is negatively, but weakly, related to ownership concentration. The relationship between managerial ownership and the efficiency of asset utilisation is non-linear (inverted U-shaped). The results suggest that managerial entrenchment effects dominate alignment effects beyond the point where 56.9% of equity is owned by the MD. Corporate diversification is suggested as a partial explanation for the decline in asset utilisation observed at high levels of managerial ownership.

The primary contribution of this study is to extend work by Ang et al. (2000) and Singh and Davidson (2003), who document negative relationships between ownership concentration and managerial ownership and Type I agency costs, in private and public US firms respectively. In this study I also consider the effects of managerial entrenchment and dominant shareholder expropriation on Type II agency costs as well as considering Type I agency costs in private firms. A second contribution of this paper is to extend the findings of Keasey, Short and Watson (1994), who, in an analysis of UK private firms, indicate that ROA declines at high levels of managerial ownership. This study suggests that the decline in ROA arises from a non-linear relationship between managerial ownership and asset utilisation, whereas the expense ratio declines linearly with increasing ownership.

This chapter is organised as follows. Section 5.2 restates the hypotheses derived from the literature reviewed in Chapter 2. In section 5.3 the empirical method used to test these hypotheses is outlined. Section 5.4 presents the results of a univariate comparison of the

ownership structures of high and low agency cost firms and the results of estimating regressions, which establish the relationship between managerial ownership and agency costs and between ownership concentration and agency costs. The chapter concludes with a discussion of these results and conclusions in section 5.5.

5.2 Hypotheses

This section sets out the hypotheses that are tested in the empirical analysis that follows. The development of the hypotheses are outlined in detail in Chapter 2, this section restates the hypotheses to be tested.

***H5.1_a**: High agency cost firms exhibit lower degrees of managerial ownership compared to low agency cost firms.*

***H5.1_b**: There is a linear, negative relationship between agency costs and the degree of managerial ownership.*

***H5.1_c**: There is a non-linear relationship between the agency costs and the degree of managerial ownership.*

***H5.2_a**: High agency cost firms exhibit more dispersed ownership compared to low agency cost firms.*

***H5.2_b**: There is a linear, negative relationship between agency costs and the degree of ownership concentration.*

***H5.2_c**: There is a non-linear relationship between the agency costs and the degree of ownership concentration.*

5.3 Empirical Method

The empirical approach used to test the hypotheses outlined in the previous section is described in this section. The source of data, data collection process and the sample is described in detail in Chapter 4. Table 5.1 provides definitions of the variables used in the empirical analysis that follows.

The first stage in the analysis examines the ownership characteristics of firms with above and below median values for the agency cost measures. This analysis is similar to the approach used by Ang et al. (2000), Singh and Davidson (2003) and Fleming et al. (2005). In the second stage of the analysis I examine the relationship between agency costs and managerial ownership and ownership concentration by estimating regression models which control for other firm characteristics and allow for non-linear associations between agency costs and ownership measures.

The variables used in this analysis are discussed in Chapter 4 (Section 4.4). Descriptive statistics for this sample are provided in Table 4.4. Table 5.1 provides definitions of the variables used in the analysis presented in this chapter.

Table 5.1: Definition of Variables used in Agency Cost Tests

Variable	Definition
Expense to Sales Ratio	Administration and Distribution Expenses divided by Sales. Natural log transformed.
Sales to Assets Ratio	Sales divided by Total Assets. Natural log transformed.
MD %	Percentage shareholding of the MD.
LGST %	Percentage shareholding of the Largest Shareholder.
MD Low (D)	Dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.
MD 50 (D)	Dummy variable coded one where the MD's equity ownership percentage is greater than 50%.
MD High (D)	Dummy variable coded one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation.
MD LGST (D)	Dummy variable coded one where the MD is the largest single shareholder in the firm.
LGST Low (D)	Dummy variable coded one where the largest single shareholder's ownership percentage is less than the sample mean minus one standard deviation.
LGST 50 (D)	Dummy variable coded one where the largest single shareholder's equity ownership percentage is greater than 50%.
LGST High (D)	Dummy variable coded one where the largest single shareholder's ownership percentage is greater than the sample mean plus one standard deviation.
No. of Shareholders	The number of Shareholders in the firm. Lagged by one year. Natural log transformed.
Turnover	Total Sales. Natural log transformed.
Industry	10 Dummy variables based on one-digit 2007 SIC classification.
Firm Age	Years since incorporation. Natural log transformed.
Leverage	(Total Debt) divided by (Total Debt plus Shareholders Funds).

5.3.1 Univariate Analysis

Hypotheses 5.1_a and 5.2_a predict that firms exhibiting high agency costs will have lower managerial ownership and ownership concentration, when compared to firms exhibiting lower agency costs. The univariate analysis is conducted by partitioning the sample firms based on above, or below, the sample median values for the agency cost measures. The sample median values for Sales to Assets and Expenses to Sales ratios are 1.996 and 0.1448, respectively. For the continuous measures of ownership structure (*MD %*, *LGST %* and *Number of Shareholders*), I compare the mean values for these variables and test statistical significance of any difference in relationship to the agency cost proxies using two-sample t-tests and Wilcoxon rank-sum tests. In each case these tests are one-tailed and the agency costs are predicted to be higher where ownership is more dispersed or where managerial ownership is lower. The non-parametric Wilcoxon rank-sum test does not assume the variables are normally distributed. For the dummy variables (*MD Low*, *MD 50*, *MD High*, *MD LGST*, *LGST Low*, *LGST 50* and *LGST High*) the mean value is the proportion of observations coded one and the test statistic is a z score indicating whether the proportions

are equal. The results of this analysis are provided in Tables 5.3 and 5.4.

5.3.2 Regression Analysis

Hypotheses 5.1_b, 5.1_c, 5.2_b and 5.2_c are tested by specifying a series of cross-sectional regressions, which are estimated using OLS. In each model, the dependent variable is one of the two measures of agency costs, the predictors are one or more lagged ownership structure variables and controls as outlined in Section 5.3.5.

Hypotheses 5.1_b and 5.2_b predict that agency costs will decline in a linear fashion as managerial ownership (5.1_b) and ownership concentration (5.2_b) increase. For brevity, in the following discussion I outline the regression equations which include *ln Expenses to Sales* as the dependent variable. The regressions which include *ln Sales to Assets* are in each case identical other than the dependant variable. To test whether agency costs decline linearly with increasing managerial ownership I estimate the following models:

$$\text{Eq.6} \quad \ln \text{ Expenses to Sales}_{i,t} = \partial + \beta_1 \text{MD Low}_{i,-1} + \beta_2 \text{Controls}_{i,t} + \varepsilon_i$$

$$\text{Eq.7} \quad \ln \text{ Expenses to Sales}_{i,t} = \partial + \beta_1 \text{MD 50}_{i,-1} + \beta_2 \text{Controls}_{i,t} + \varepsilon_i$$

$$\text{Eq.8} \quad \ln \text{ Expenses to Sales}_{i,t} = \partial + \beta_1 \text{MD High}_{i,-1} + \beta_2 \text{Controls}_{i,t} + \varepsilon_i$$

$$\text{Eq.9} \quad \ln \text{ Expenses to Sales}_{i,t} = \partial + \beta_1 \text{MD LGST}_{i,-1} + \beta_2 \text{Controls}_{i,t} + \varepsilon_i$$

$$\text{Eq.10} \quad \ln \text{ Expenses to Sales}_{i,t} = \partial + \beta_1 \text{MD Low}_{i,-1} + \beta_2 \text{MD High}_{i,-1} + \beta_3 \text{Controls}_{i,t} + \varepsilon_i$$

$$\text{Eq.11} \quad \ln \text{ Expenses to Sales}_{i,t} = \partial + \beta_1 \text{MD \%}_{i,-1} + \beta_2 \text{Controls}_{i,t} + \varepsilon_i$$

Hypothesis 5.1_b predicts that the coefficient B_1 in Eq. 6 will be positive indicating that firms in which MD ownership is low (< 8.59% of equity in the firm) exhibit higher agency costs. The hypothesis predicts negative coefficients on B_1 in Eq. 7 and 8 indicating that MD majority control and high MD ownership (> 77.64%) are associated with lower agency costs in the sample firms. Eq. 9 includes *MD LGST*, which is a dummy variable coded one where the MD is the largest single shareholder in the firm. If an MD with a dominant share ownership increases the alignment between manager and shareholder interests and

consequently reduces agency costs, the coefficient on B_2 in Eq. 9 will be negative. Eq. 10 includes both *MD Low* and *MD High*. The coefficients on B_1 and B_2 will indicate the effect of low and high MD ownership, in comparison to the reference category of intermediate MD ownership. Hypothesis 5.1_b predicts a positive coefficient on *MD Low* and a negative coefficient on *MD High*, indicating that agency costs are higher (lower) in firms in which the MD ownership is low (high) compared to firms in which MD ownership is in the intermediate range. Eq. 11 includes a continuous measure of managerial ownership, *MD %*. A negative coefficient on this variable will suggest a linear, negative relationship between agency costs and managerial ownership, consistent with Hypothesis 5.1_b.

To address hypothesis 5.1_c, that the relationship between agency costs and managerial ownership is non-linear, I estimate two further regressions, Eq. 12 and Eq. 13. Eq. 12 adds the square of *MD %* to Eq. 11. The final managerial ownership regression adds the cubed term. In both regressions, Hypothesis 5.1_c predicts a negative coefficient on the linear term, *MD %*, indicating that managerial ownership is negatively associated with agency costs at low levels of managerial ownership. The discussion in Chapter 2 (Section 2.2) suggests that the relationship may be U-shaped, agency costs declining and then increasing with increased managerial ownership or may be cubic, with agency costs declining, rising and declining with increased managerial ownership. Eq. 12 and 13 are estimated to determine the form of any non-linear relationship. Negative and positive signs on B_1 and B_2 respectively in Eq. 12 would indicate a U-shaped relationship. Negative, positive and negative signs on B_1 , B_2 and B_3 respectively in Eq. 13 would indicate two sign changes in the relationship.

$$\text{Eq.12 } \ln \text{ Expenses to Sales}_{i,t} = \theta + \beta_1 MD \%_{i,-1} + \beta_2 MD \%_{i,-1}^2 + \beta_3 Controls_i + \varepsilon_i$$

$$\text{Eq.13 } \ln \text{ Expenses to Sales}_{i,t} = \theta + \beta_1 MD \%_{i,-1} + \beta_2 MD \%_{i,-1}^2 + \beta_3 MD \%_{i,-1}^3 + \beta_4 Controls_i + \varepsilon_i$$

The squared and cubed terms of the MD ownership percentage (*MD %*, a continuous variable) are included to test Hypothesis 5.1_c, which predicts a non-linear relationship between agency costs and managerial ownership. When *MD %*, $MD \%^2$ and $MD \%^3$, are included in a single model, a high Variance Inflation Factor (VIF) indicated multicollinearity. These variables mean-centred to address this issue. VIFs estimated after included the mean

centred variables indicate no significant multicollinearity.

The hypothesised relationships between agency costs and managerial ownership in the regressions estimated using the ratio of sales to assets as a measure of agency costs are the same as in the above discussion. Since higher expenses to sales and lower sales to assets indicate higher agency costs, the predicted signs on the independent variables will be opposite to those discussed above.

The second set of hypotheses tested in this study, 5.2_b and 5.2_c, consider the relationship between agency costs and ownership concentration. The measures of agency costs are the asset utilisation and expense ratios. As in the discussion on the managerial ownership regressions, above, the regression equations which include *ln Expenses to Sales* are set out.

Hypothesis 5.2_b predicts a linear negative relationship between ownership concentration and agency costs. I test this hypothesis by estimating a series of regressions, using OLS, which include the agency cost measure as dependant variable, one or more of the measures of ownership concentration (lagged by one year) and control variables. Eqs. 14 to 19 are as follows:

$$\text{Eq.14} \quad \ln \text{ Expenses to Sales}_{i,t} = + \beta_1 \text{LGST Low}_{i,-1} + \beta_2 \text{Controls}_i + \varepsilon_i$$

$$\text{Eq.15} \quad \ln \text{ Expenses to Sales}_{i,t} = + \beta_1 \text{LGST 50}_{i,-1} + \beta_2 \text{Controls}_i + \varepsilon_i$$

$$\text{Eq.16} \quad \ln \text{ Expenses to Sales}_{i,t} = + \beta_1 \text{LGST High}_{i,-1} + \beta_2 \text{Controls}_i + \varepsilon_i$$

$$\text{Eq.17} \quad \ln \text{ Expenses to Sales}_{i,t} = + \beta_1 \ln \text{ Number of Shareholders}_{i,-1} + \beta_2 \text{Controls}_i + \varepsilon_i$$

$$\text{Eq.18} \quad \ln \text{ Expenses to Sales}_{i,t} = + \beta_1 \text{LGST Low}_{i,-1} + \beta_2 \text{LGST High}_{i,-1} + \beta_3 \text{Controls}_i + \varepsilon_i$$

$$\text{Eq.19} \quad \ln \text{ Expenses to Sales}_{i,t} = + \beta_1 \text{LGST \%}_{i,-1} + \beta_2 \text{Controls}_i + \varepsilon_i$$

If dispersed equity ownership is associated with increased agency costs, as predicted by Hypothesis 5.2_b, the coefficient on B₁ (*LGST Low*) in Eq. 14 will be positive and significant. *LGST 50* and *LGST High* variables represent concentrated ownership and a negative coefficient is predicted on these variables. Eq. 17 includes *ln Number of Shareholders*. While

shareholders should derive benefits from monitoring managers in the form of increased returns, free rider problems may inhibit active monitoring by shareholders (Shleifer and Vishny 1986). This suggests that an increased number of shareholders may be associated with less incentive to monitor and consequently higher agency costs. A positive coefficient on *ln Number of Shareholders* is consistent with Hypothesis 5.2_b. Eq. 18 includes both *LGST Low* and *LGST High*, the reference category for these dummy variables is the set of firms in which the largest shareholder owns between 31.05% and 86.32% of equity. A positive and negative coefficient respectively on *LGST Low* and *LGST High* is consistent with the prediction of Hypothesis 5.2_b. Finally, Eq. 19 includes *LGST %*, a continuous variable measuring the ownership percentage of the single largest shareholder. A negative coefficient is expected on this variable, indicating that agency costs decline as *LGST %* increases.

$$\text{Eq.20} \quad \ln \text{Expenses to Sales}_{i,t} = \partial + \beta_1 \text{LGST \%}_i + \beta_2 \text{LGST \%}_i^2 + \beta_3 \text{Controls}_i + \varepsilon_i$$

$$\text{Eq.21} \quad \ln \text{Expenses to Sales}_{i,t} = \partial + \beta_1 \text{LGST \%}_i + \beta_2 \text{LGST \%}_i^2 + \beta_3 \text{LGST \%}_i^3 + \beta_4 \text{Controls}_i + \varepsilon_i$$

Hypothesis 5.2_c posits a non-linear relationship between agency costs and ownership concentration. As the ownership share of the largest shareholder increases, the control rights associated with this shareholding confer the power to monitor and direct managers to maximise shareholder wealth or to remove managers (Shleifer and Vishny 1997). Larger shareholdings also reduce free-rider problems associated with dispersed ownership structures. Concentrated ownership, particularly where a single shareholder is dominant, facilitates the extraction of private benefits from the firm (Maury and Pajuste 2005). Eqs. 20 and 21 include the square and cube of *LGST %* to determine if a curve, with one or two turning points, is the best fit to describe the relationship between agency costs and the ownership share of the largest shareholder. As the ownership share of the largest shareholder approaches 100%, no incentive to extract private benefits at the expense of minority shareholder remains, since the costs of any “tunnelling” behaviour will accrue to the majority shareholder.

Hypothesis 5.2_c predicts a non-linear relationship between ownership concentration and agency costs. To test this hypothesis and to establish the form of any non-linear relationship,

I estimate regressions which include $LGST \%$, $LGST \%^2$ and $LGST \%^3$. VIFs in excess of 10 in these regressions indicate multicollinearity and these variables are mean-centred prior to inclusion to address this concern.

The hypothesised relationships between agency costs and ownership concentration in the regressions estimated using the ratio of sales to assets as a measure of agency costs are the same as in the above discussion. Since higher expenses to sales and lower sales to assets indicate higher agency costs, the predicted signs on the ownership variables will be opposite to those discussed above.

5.4 Results

This section presents the results of the empirical analysis described in the previous section. Descriptive statistics for the sample variables are provided in Chapter 4 (Section 4.4.3) Figures 5.1 to 5.4 show the measures of agency costs by ownership concentration and managerial ownership quartile. Pearson correlation coefficients for variables used in the analysis are provided in Table 5.2. Section 5.4.2 compares the ownership structures of high and low agency cost firms. The results of regression equations examining the relationships between agency costs, ownership structure and control variables are shown in Tables 5.5 to 5.14. In Section 5.4.7 I describe the results of an analysis on a reduced sample of firms, which excludes sample firms in which the MD is the largest single shareholder. Section 5.4.8 discusses diagnostic and sensitivity tests performed on the results.

Figures 5.1 and 5.2 show the mean expenses to sales ratio for the sample firms by MD ownership percentage quartile and by largest shareholder ownership quartile. Both figures indicate that expenses to sales decline monotonically as both MD ownership and the ownership share of the largest shareholder ownership increase. In Figure 5.1, the mean ratio of expenses to sales is 0.2769 for the lowest quartile of managerial ownership, falling to 0.1946 for the highest quartile of managerial ownership. Expenses to sales also decline with each quartile of percentage ownership of the largest single shareholder, although the

difference between the mean expenses to sales in the lowest and highest quartile is less than is the case in Figure 5.1, ranging from 0.2668 to 0.2171.

The distribution of the sales to total assets ratio across ownership quartiles does not follow the same pattern as the expenses to sales ratio. For MD ownership, shown in Figure 5.3, mean sales to total assets for the lowest quartile is 2.102, rising to 2.478 for the 3rd quartile and falling to 2.317 for the highest quartile of managerial ownership. No linear pattern is apparent in the distribution of sales to asset ratios across ownership concentration quartiles. The lowest mean sales to assets ratio is in firms in which the largest single shareholder owns less than 10.5% of equity at 2.066 and the highest mean sales to assets ratio is in firms in the second ownership concentration quartile, 2.454. Firms in the highest two quartiles have similar mean sales to assets ratios at 2.330 and 2.288.

Figure 5.1: Expenses to Sales by MD Ownership % Quartile

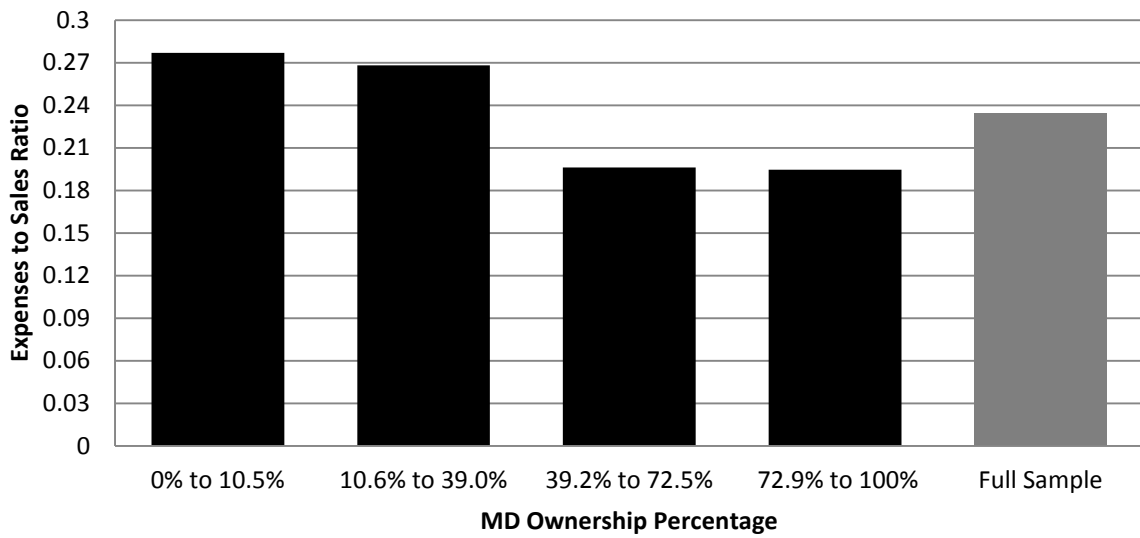


Figure 5.2: Expenses to Sales by Largest Shareholder Ownership % Quartile

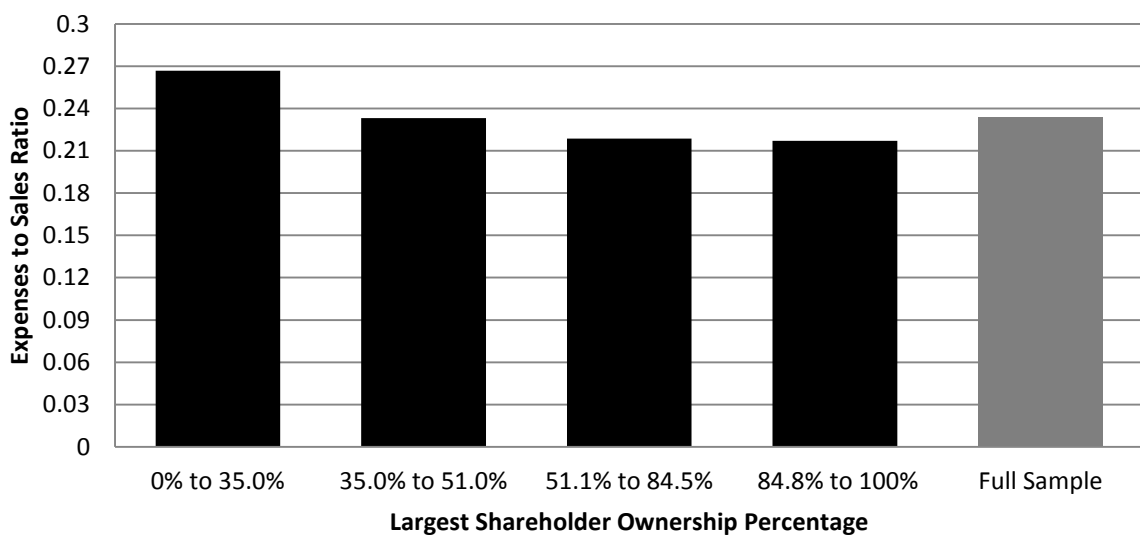


Figure 5.3: Sales to Total Assets by MD Ownership % Quartile

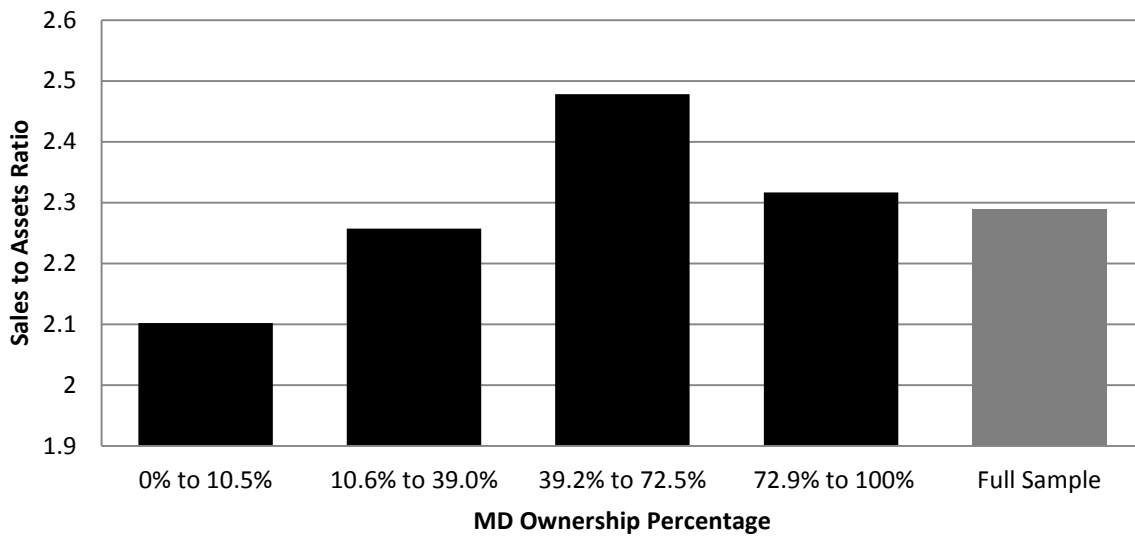


Figure 5.4: Sales to Total Assets by Largest Shareholder Ownership % Quartile



Figures 5.1 to 5.4 provide limited support for the hypothesised relationships between agency costs and ownership structure. This analysis does not control for firm characteristics other than ownership structure so caution should be exercised in interpreting the results. Figures 5.1 and 5.2 indicate that agency costs, measured using the ratio of expenses to sales, decline as both managerial ownership and ownership concentration fall. While the decline in agency

costs in both cases is monotonic, in neither case is a simple linear pattern apparent. Agency costs are significantly lower in the higher two quartiles of managerial ownership but the variation within the higher two quartiles and lower two quartiles is small. The ratio of expenses to sales declines from the lowest and second lowest ownership concentration quartiles but the difference in agency costs between the higher two quartiles is small. The relationships between agency costs measured using the sales to assets ratio and ownership structure, shown in Figures 5.3 and 5.4, are quite different to those shown in Figures 5.1 and 5.2. Measured using this proxy, agency costs decline with increasing managerial ownership to a threshold point, in the second highest quartile, and increase in the highest quartile suggesting a quadratic relationship between managerial ownership and sales to assets. No clear relationship between sales to assets and ownership concentration is discernible in Figure 5.4.

5.4.1 Correlation Analysis

Table 5.2 provides Pearson correlation coefficients for the variables used in this study. *ln Expenses to Sales* is positively correlated with two measures of ownership structure, *ln Number of Shareholders* and *MD Low*. Expenses are negatively correlated with both *LGST %* and *MD %*. Several dummy variables indicating high ownership concentration or managerial ownership, *LGST 50*, *LGST High*, *MD 50*, *MD High* and *MD LGST* are negatively correlated with expenses. The measures of agency costs, *ln Expenses to Sales* and *ln Sales to Assets* are negatively correlated, this is unsurprising since higher agency costs are indicated by higher (lower) expenses to sales (sales to assets) and vice versa. Firm size (*ln Turnover*) is negatively correlated with expenses to sales and positively correlated with sales to assets. The correlations between *ln Sales to Assets* and ownership variables are similar, though generally weaker, than those between *ln Expenses to Sales* and ownership variables. In general agency costs appear to be correlated with some but not all of the measures of ownership concentration. The directions of these correlations are consistent with lower agency costs in firms with more concentrated ownership or higher degrees of managerial ownership. As would be expected, the correlations between ownership variables are high. This is the case both within the measures of ownership concentration and managerial ownership and across these measures.

The Pearson correlation coefficients presented in Table 5.2 show that, as would be expected from the method of constructing these variables, the correlation between several of the managerial ownership variables is high. In the regression analysis that follows, models include only one of the dummy variables outlined here, with the exception of *MD High* and *MD Low*, which are both included in some models estimated. The squared and cubed terms of the MD ownership percentage (*MD %*, a continuous variable) are included to test Hypothesis 5.1c, which predicts a non-linear relationship between agency costs and managerial ownership. When *MD %*, *MD %*² and *MD %*³, are included in a single model, a high Variance Inflation Factor (VIF) indicated multicollinearity. These variables mean-centred to address this issue. VIFs estimated after included the mean centred variables indicate no significant multicollinearity.

Table 5.2: Pearson Correlation Coefficients for Agency Costs and Explanatory Variables

	In Exp. to Sales	In Sales to Assets	Leverage	In Turnover	In Age	In No. of Shrhlds	LGST %	MD %	LGST Low (D)	LGST 50 (D)	LGST High (D)	MD Low (D)	MD 50 (D)	MD High (D)	
1	In Exp. to Sales	1													
2	In Sales to Assets	-0.428*** 0.000	1												
3	Leverage	0.014 0.627	-0.009 0.759	1											
4	In Turnover	-0.285*** 0.000	0.412*** 0.000	0.014 0.634	1										
5	In Age	0.005 0.875	-0.078*** 0.007	-0.070** 0.015	-0.033 0.253	1									
6	In No. of Shrhlds	0.159*** 0.000	-0.079*** 0.006	-0.013 0.642	0.072** 0.013	0.126*** 0.000	1								
7	LGST %	-0.068** 0.019	0.015 0.608	0.002 0.938	-0.001 0.979	-0.129*** 0.000	-0.694*** 0.000	1							
8	MD %	-0.169*** 0.000	0.061** 0.034	-0.014 0.634	0.014 0.623	-0.110*** 0.000	-0.505*** 0.000	0.612*** 0.000	1						
9	LGST Low (D)	0.040 0.165	-0.056* 0.052	-0.020 0.490	0.032 0.276	0.104*** 0.000	0.557*** 0.000	-0.631*** 0.000	-0.385*** 0.000	1					
10	LGST 50 (D)	-0.063** 0.029	0.029 0.316	-0.008 0.771	0.030 0.296	-0.079*** 0.006	-0.482*** 0.000	0.855*** 0.000	0.507*** 0.000	-0.477*** 0.000	1				
11	LGST High (D)	-0.051* 0.077	-0.020 0.491	0.005 0.857	0.016 0.580	-0.096*** 0.001	-0.561*** 0.000	0.791*** 0.000	0.487*** 0.000	-0.271*** 0.000	0.568*** 0.000	1			
12	MD Low (D)	0.137*** 0.000	-0.083*** 0.004	0.025 0.390	0.017 0.561	0.082*** 0.005	0.190*** 0.000	-0.056* 0.054	-0.665*** 0.000	0.101*** 0.000	-0.032 0.274	0.019 0.511	1		
13	MD 50 (D)	-0.140*** 0.000	0.051* 0.076	-0.008 0.774	0.043 0.136	-0.080*** 0.006	-0.416*** 0.000	0.642*** 0.000	0.860*** 0.000	-0.360*** 0.000	0.696*** 0.000	0.444*** 0.000	-0.418*** 0.000	1	
14	MD High (D)	-0.104*** 0.000	0.008 0.769	-0.003 0.915	0.017 0.556	-0.087*** 0.003	-0.454*** 0.000	0.691*** 0.000	0.800*** 0.000	-0.259*** 0.000	0.539*** 0.000	0.701*** 0.000	-0.297*** 0.000	0.710*** 0.000	1
15	MD LGST (D)	-0.138*** 0.000	0.064** 0.028	-0.019 0.511	0.002 0.941	-0.066** 0.022	-0.265*** 0.000	0.196*** 0.000	0.752*** 0.000	-0.160*** 0.000	0.132*** 0.000	0.129*** 0.000	-0.715*** 0.000	0.564*** 0.000	0.408*** 0.000

5.4.2 Univariate Analysis

The first stage in the analysis is a mean comparison of the ownership characteristics of sample firms with above and below median values of the agency cost measures: Expense to Sales ratio and Sales to Assets ratio. Firms with above (below) median Sales to Assets ratios are classified here as low (high) agency cost firms. Firms with below (above) median Expense to Sales ratio are classified as low (high) agency cost firms. The hypotheses outlined in Section 5.2 predict that firms with more concentrated ownership and a higher degree of managerial ownership will exhibit lower agency costs. Table 5.3 shows the results of a mean comparison of sample firms partitioned at the median value of the Sales to Assets ratio. In each case the difference in means is the mean value for Low Agency firms minus the mean value for High Agency firms. The tests for the statistical significance of differences for the continuous variables (*MD %*, *LGST %*, and *No. of Shareholders*) are one tailed t-tests and Wilcoxon rank-sum tests. For the dummy variables (all remaining variables) the mean value is the proportion of observations coded one and the test statistic is a z score indicating whether the proportions are equal. The predicted sign of the difference in means is based on the hypotheses outlined in Section 5.2.

Table 5.3: Ownership Characteristics of High and Low Agency Cost Firms. Sample Partitioned by Sales to Assets Ratio

	Low Agency (n = 597)	High Agency (n= 596)	Difference in Means	Predicted sign of difference	t-test for difference in means (1-tailed)	Wilcoxon rank-sum test (1-tailed)	Test for Difference in Proportions z score
	Mean	Mean					
MD %	0.455	0.405	0.049	+	2.501***	2.827***	
LGST %	0.587	0.583	0.004	+	0.285	0.557	
No of Shareholders	6.376	9.063	-2.686	-	-4.136***	-2.124**	
MD Low	0.203	0.267	-0.064	-			-2.612***
MD 50	0.391	0.334	0.058	+			2.086**
MD High	0.226	0.219	0.006	+			0.263
MD LGST	0.677	0.588	0.087	+			3.145***
LGST Low	0.164	0.215	-0.051	-			-2.231**
LGST 50	0.496	0.489	0.006	+			0.203
LGST High	0.226	0.251	-0.025	+			-1.034

*** p<0.01, ** p<0.05, * p<0.1

Several differences between the mean values of ownership and governance variables are statistically significant. Higher managerial ownership appears to be associated with lower agency costs. This is evidenced by higher managerial ownership (*MD %*), with a mean MD ownership percentage of 45.5% in the low agency cost firms, compared to 40.5% in the high agency cost firms. A lower proportion of low agency firms are managed by an MD in the *MD Low* category and a higher proportion of these firms have an MD as the largest single shareholder (*MD LGST*) or owning in excess of 50% of equity (*MD 50*). The association between ownership concentration and agency costs appears less pronounced. Significantly more firms exhibiting high agency costs have dispersed ownership relative to the sample average, indicated by the largest single shareholder being classified as *LGST Low*. The mean number of shareholders is higher in high agency firms. No other measures of ownership concentration differ significantly between the samples.

Table 5.4 shows the results of partitioning the sample into high and low agency cost firms based on above and below the sample median Expense to Sales ratio respectively and comparing the ownership and governance characteristics. The statistical approach is the same as described for the analysis reported in Table 5.3.

Table 5.4: Ownership Characteristics of High and Low Agency Cost Firms. Sample Partitioned by Expense to Sales Ratio

	Low Agency (n = 596)	High Agency (n= 597)	Difference in Means	Predicted sign of difference	t-test for difference in means (1-tailed)	Wilcoxon rank-sum test (1-tailed)	Test for Difference in Proportions z score
	Mean	Mean					
MD %	0.476	0.384	0.092	+	4.654***	4.814***	
LGST %	0.595	0.575	0.020	+	1.252	1.533*	
No of Shareholders	6.233	9.202	-2.969	-	-4.578***	-4.032***	
MD Low	0.187	0.281	-0.093	-			-3.809***
MD 50	0.419	0.306	0.113	+			4.056***
MD High	0.25	0.196	0.054	+			2.241**
MD LGST	0.691	0.575	0.117	+			4.182***
LGST Low	0.181	0.198	-0.016	-			-0.723
LGST 50	0.517	0.469	0.047	+			1.650*
LGST High	0.243	0.234	0.009	+			0.3557

*** p<0.01, ** p<0.05, * p<0.1

The results presented in Table 5.4 are similar to those presented in Table 5.3. Higher managerial ownership appears to be associated with lower agency costs. The mean ownership percentage of the MD of low agency firms is significantly higher than low agency cost firms at 47.6% compared to 38.4%. Compared to high agency cost firms, low agency cost firm have a lower proportion of MDs owning no equity or a low equity percentage in the firm (*MD Low*) and higher proportions of MDs being the largest single shareholder (*MD LGST*), owning in excess of 50% of equity (*MD 50*) and owning a high percentage of equity (*MD High*). The association between ownership concentration and agency costs appears relatively weak. *LGST %*, the number of shareholders and *LGST 50* differ significantly between the low and high agency cost samples, in each case the low agency cost sample exhibits more concentrated ownership. In the case of *LGST %*, the difference is significant at a 10% level.

Overall, these results provide support for the hypotheses predicting a negative relationship between managerial ownership and agency costs. The univariate relationships between both measures of agency costs and the measures of managerial ownership are consistent with the predictions of Hypothesis 5.1_a, that high agency cost firms will exhibit lower managerial ownership. There is less support in these results that increased ownership concentration, or shareholder monitoring, is associated with lower agency costs as predicted by Hypothesis 5.2_a, although the differences between the samples that are significant are consistent with the predictions of Hypothesis 5.2_a. The second stage of the analysis examines these relationships using a multivariate regression approach, controlling for other firm characteristics.

5.4.3 Multivariate Analysis

In this section the results of estimating the regression equations described in Section 5.2 are outlined. Two sets of regressions are estimated, the first set regresses the two measures of agency costs on a range of dummy variables indicating aspects of managerial ownership and on the percentage of equity owned by the MD, its squared and cubic term. As described in Section 5.3, lagged ownership variables are used to address concerns that ownership and agency costs may be simultaneously determined.

5.4.4 Managerial Ownership and Agency Costs

Hypotheses 5.1_b and 5.1_c concern the relationships between managerial ownership and agency costs. Increased managerial ownership should serve to align the interests of managers and non-managing shareholders and reduce the marginal benefit to managers of self-interested behaviour. Conversely, increasing managerial ownership beyond a threshold may entrench managers, insulating them from shareholder discipline and facilitating self-interested behaviour. Finally where managerial ownership approached 100%, the incentive to appropriate firm resources should dissipate as ownership and control is unified. These factors suggest several possible forms for the relationship, if any, between managerial ownership and agency costs. The nature of this relationship is examined by estimating OLS regression equations 6 to 13, in which two measures of agency costs are regressed on lagged dummy and continuous variables representing aspects of managerial ownership and control variables. Table 5.5 shows the results of regressing dummy variables representing low and high levels of managerial ownership on the expense to sales ratio. The results of regressing continuous variables *MD* % and its squared and cubed term on the expense to sales ratio are reported in Table 5.6. Tables 5.7 and 5.8 report the results of regressions of the dummy and continuous managerial ownership variables, respectively, on the sales to assets ratio.

A plot of the residuals from estimating equation Eq. 10 is included in Figure 10.1 in the Appendix for illustration. Inspection of the residuals, plotted against the fitted values of the regressions, indicate possible heteroskedacity in the distribution of errors. The distributions of residuals from the remaining estimations also suggest heteroskedacity. The results of White tests (White 1980) confirm this. All standard errors reported are therefore estimated using the Huber White Sandwich Estimator to allow for heteroskedacity in the data.

Table 5.5: OLS Regressions, Expenses to Sales on Lagged Managerial Ownership and Control Variables (1)

VARIABLES	Predicted Sign	(1) Expenses to Sales	(2) Expenses to Sales	(3) Expenses to Sales	(4) Expenses to Sales	(5) Expenses to Sales
Industry (D)	?	Yes	Yes	Yes	Yes	Yes
Ln Turnover	-	-0.298*** (0.039)	-0.289*** (0.039)	-0.292*** (0.039)	-0.295*** (0.039)	-0.296*** (0.039)
Ln Age	?	-0.004 (0.029)	-0.001 (0.029)	0.000 (0.029)	-0.001 (0.029)	-0.008 (0.029)
Leverage	-	0.014 (0.019)	0.015 (0.018)	0.016 (0.018)	0.014 (0.018)	0.014 (0.019)
MD Low (D)	+	0.289*** (0.059)				0.236*** (0.062)
MD 50 (D)	-		-0.249*** (0.053)			
MD High (D)	?			-0.252*** (0.061)		-0.181*** (0.064)
MD LGST (D)	-				-0.253*** (0.052)	
Constant		1.224*** (0.451)	1.266*** (0.447)	1.258*** (0.450)	1.401*** (0.447)	1.262*** (0.450)
F		14.22***	13.23***	13.25***	14.30***	13.69***
Observations		1,193	1,193	1,193	1,193	1,193
Adjusted R ²		0.142	0.142	0.138	0.142	0.167

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The dependant variable is **Expenses to Sales**, which is the natural log of Administration and Distribution Expenses divided by Sales.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover.

Ln Age is the natural log of the number of years since firm incorporation.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

MD Low is a dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.

MD 50 is a dummy variable coded one where the MD's equity ownership percentage is greater than 50%.

MD High is a dummy variable coded one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation.

MD LGST is a dummy variable coded one where the MD is the largest single shareholder in the firm.

(D) indicates a dummy variable.

Table 5.5 shows the results of estimating five models, which include the natural log of the expense to sales ratio as a measure of agency costs. A higher value for the dependant variable is consistent with higher agency costs. Model 1 includes *MD Low*. Hypothesis 5.1_b predicts a positive coefficient on *MD Low*, indicating that agency costs, measured here as the ratio of expenses to sales, are higher where MD ownership percentage is zero or low (relative to the

sample mean). This variable is intended to capture the effect of a high degree of divergence between the interests of shareholders and managers. The results indicate that firms managed by MD's owning less than 8.59% have expenses to sales ratios significantly higher than firms in which the MD has an intermediate or high level of ownership.

Several control variables are also significant. Size is measured as the natural log of Turnover. Expenses are lower in larger firms, consistent with the effect of economies of scale. Industry is controlled for by including 9 dummy variables denoting one-digit SIC codes (code 4 is excluded to avoid perfect multicollinearity). Several industry variables are statistically significant. Neither firm age nor leverage is significantly related to agency costs. The magnitude and significance of the control variable coefficients are similar in each specification.

Model 2 examines the effect on agency costs of firms of an MD having a majority shareholding in the firm. Hypothesis 5.1_b predicts that the coefficient on *MD 50* will be negative, indicating that firms managed by an MD owning a majority of equity will have lower expenses to sales than firms managed by a minority shareholding MD. The coefficient is negative and significant. If the relationship between managerial ownership is negative and linear as predicted by Hypothesis 5.1_b, negative coefficients are predicted for *MD High* and *MD LGST* in Models 3 and 4, which are coded one where the MD's ownership percentage is greater than 77.65% and where the MD is the largest single shareholder in the firm, respectively. If the relationship is non-linear, as predicted by Hypothesis 5.1_c, the coefficients, if significant could be either positive or negative depending on the precise form of the relationship. The results suggest that the relationship may be linear in form, both *MD High* and *MD LGST* are significant and negative, indicating that agency costs are lower for firms in which the MD is the largest single shareholder and for firms in which the MD owns a high percentage of equity (>77.65%). Comparing the magnitude of the coefficients on *MD 50* and *MD High* indicates that the reduction in agency costs associated with majority equity ownership by the MD and very levels of MD ownership are similar. Model 5 includes both *MD Low* and *MD High* (the remaining dummy variables are excluded due to the high correlation with *MD High*). The results are consistent with a linear, negative relationship between managerial ownership and agency costs.

Table 5.6: OLS Regressions, Expenses to Sales on Lagged Managerial Ownership and Controls (2)

VARIABLES	Predicted Sign	(1) Expenses to Sales	(2) Expenses to Sales	(3) Expenses to Sales
Industry (D)	?	Yes	Yes	Yes
Ln Turnover	-	-0.293*** (0.038)	-0.294*** (0.038)	-0.295*** (0.038)
Ln Age	?	-0.010 (0.029)	-0.011 (0.029)	-0.011 (0.029)
Leverage	-	0.014 (0.019)	0.014 (0.019)	0.014 (0.019)
MD %	-	-0.447*** (0.074)	-0.489*** (0.079)	-0.417* (0.226)
MD % ²	+		0.345 (0.255)	0.409 (0.318)
MD % ³	-			-0.364 (1.103)
Constant		1.249*** (0.443)	1.227*** (0.445)	1.229*** (0.446)
F		14.65***	13.86***	13.09***
Observations		1,193	1,193	1,193
Adjusted R ²		0.143	0.144	0.143

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Expenses to Sales**, which is the natural log of Administration and Distribution Expenses divided by Sales.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover.

Ln Age is the natural log of the number of years since firm incorporation.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

MD % is the percentage of equity owned by the MD (centred)

(D) indicates a dummy variable.

Table 5.6 addresses the same question as Table 5.5. In this case, a continuous measure of MD ownership is used to explore the linearity or otherwise of the relationship between managerial ownership and agency costs. Model 1 includes the linear term, MD %, only while Models 2 and 3 add quadratic and cubic terms²⁸. The results of estimating Model 1 confirms the results shown in Table 5.5, that the expense to sales ratio declines as managerial ownership increases. The results shown in Models 2 and 3 provide no evidence for the existence of a non-linear relationship between the ratio of expenses to sales and MD ownership. The results

²⁸ As described in Section 5.3, MD % is centred and MD %² and MD %³ are computed based on the centred value before including in the regressions to address multicollinearity. This approach is followed in all regressions which include squared and cubed terms. Where turning points are discussed in the analysis of non-linear regressions, the turning point is computed after adjusting for mean centering.

in Table 5.6 support Hypothesis 5.1_b, that there is a linear, negative relationship between agency costs and managerial ownership. Hypothesis 5.1_c is not supported by these results.

Table 5.7: OLS Regressions, Sales to Total Assets on Lagged Managerial Ownership and Controls

VARIABLES	Predicted Sign	(1) Sales to Total Assets	(2) Sales to Total Assets	(3) Sales to Total Assets	(4) Sales to Total Assets	(5) Sales to Total Assets
Industry (D)	?	Yes	Yes	Yes	Yes	Yes
Ln Turnover	+	0.337*** (0.040)	0.335*** (0.040)	0.336*** (0.040)	0.336*** (0.040)	0.338*** (0.040)
Ln Age	?	-0.065*** (0.022)	-0.069*** (0.022)	-0.070*** (0.022)	-0.068*** (0.022)	-0.066*** (0.022)
Leverage	+	-0.012 (0.019)	-0.013 (0.018)	-0.014 (0.018)	-0.013 (0.018)	-0.012 (0.019)
MD Low (D)	-	-0.108** (0.046)				-0.116** (0.048)
MD 50 (D)	+		0.037 (0.038)			
MD High (D)	?			0.009 (0.045)		-0.026 (0.047)
MD LGST (D)	+				0.060 (0.040)	
Constant		-2.803*** (0.456)	-2.803*** (0.458)	-2.796*** (0.458)	-2.842*** (0.456)	-2.798*** (0.456)
F		16.96***	16.35***	16.35***	16.52***	15.93***
Observations		1,193	1,193	1,193	1,193	1,193
Adjusted R ²		0.215	0.212	0.211	0.213	0.215

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Sales to Total Assets**, which is the natural log of Sales divided by Total Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover.

Ln Age is the natural log of the number of years since firm incorporation.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

MD Low is a dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.

MD 50 is a dummy variable coded one where the MD's equity ownership percentage is greater than 50%.

MD High is a dummy variable coded one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation.

MD LGST is a dummy variable coded one where the MD is the largest single shareholder in the firm.

(D) indicates a dummy variable.

The second measure of agency costs used in this study is the ratio of sales to assets. Tables 5.7 and 5.8 show the results of estimating regressions in which the natural log of the sales to total assets ratio is regressed on the same measures of managerial ownership and control variables as in Table 5.5 and 5.6. This analysis assumes that a lower sales to assets ratio

indicates greater agency costs. The predictions of Hypotheses 5.1_b and 5.1_c are similar to those discussed in the section relating to the expense ratio, above. Increased managerial ownership, by aligning the interests of managers with those of shareholders should reduce agency costs. Beyond a threshold level of managerial ownership, agency costs may increase as managers become entrenched and their ability to engage in self-interested behaviour increases. A further threshold point may exist in the relationship, as managerial ownership approached 100% the divergence between shareholder and manager interests ceases to exist.

The results of estimating models including the four dummy variables measuring MD ownership are shown in Table 5.7. *MD Low* is the only ownership coefficient which is a significant predictor of the sales to assets ratio. The results in Model 1 are consistent with Hypothesis 5.1_b, that firms managed by MD's owning no, or a low percentage (<8.59%), of the firm's equity will exhibit higher agency costs. However the statistically insignificant coefficients on *MD 50* and *MD High* are contrary to the predictions of Hypothesis 5.1_b. There is no evidence in these results to support the contention that the relationship between managerial ownership and agency costs, measures by the sales to assets ratio, is nonlinear (Hypothesis 5.1_c). Several control variables are significant predictors of the sales to assets ratio. The efficiency of asset utilisation declines with firm age and increases with firm size. Several industry dummies are also significant in these specifications. It is notable in the results that leverage is not a significant predictor of either measure of agency costs.

Table 5.8 includes the percentage ownership share of the MD as a continuous variable as well as its squared and cubed term. Hypothesis 5.1_b predicts a positive coefficient on *MD %* in Model 1. Hypothesis 5.1_c predicts positive and negative coefficients on *MD %* and *MD %²* respectively in Model 2 or positive, negative and positive coefficients on *MD %*, *MD %²* and *MD %³* respectively in Model 3, depending on the precise form of any non-linear relationship. Both *MD %* and *MD %²* in Model 2 are statistically significant and have the predicted sign. These results indicate that the sales to assets ratio increases with *MD %* below a value for MD ownership of 56.9% and declines with increasing managerial ownership above this level. This result is consistent with Hypothesis 5.1_c, that the relationship is non-linear, with a single turning point.

Table 5.8: OLS Regressions, Sales to Total Assets on Lagged Managerial Ownership and Controls (2)

VARIABLES	Predicted Sign	(1) Sales to Total Assets	(2) Sales to Total Assets	(3) Sales to Total Assets
Industry (D)	?	Yes	Yes	Yes
Ln Turnover	+	0.336*** (0.040)	0.338*** (0.040)	0.338*** (0.039)
Ln Age	?	-0.067*** (0.022)	-0.066*** (0.022)	-0.066*** (0.022)
Leverage	+	-0.013 (0.018)	-0.012 (0.019)	-0.012 (0.019)
MD %	+	0.085 (0.057)	0.151** (0.061)	0.121 (0.159)
MD % ²	-		-0.548*** (0.189)	-0.575** (0.237)
MD % ³	+			0.153 (0.786)
Constant		-2.803*** (0.456)	-2.768*** (0.455)	-2.769*** (0.454)
F		16.46***	16.06***	15.06***
Observations		1,193	1,193	1,193
Adjusted R ²		0.213	0.224	0.220

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Sales to Total Assets**, which is the natural log of Sales divided by Total Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover.

Ln Age is the natural log of the number of years since firm incorporation.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

MD % is the percentage of equity owned by the MD (mean-centred)

(D) indicates a dummy variable.

Hypotheses 5.1_b and 5.1_c posit a linear and non-linear relationship respectively between agency costs and managerial ownership. The evidence presented in Tables 5.5 to 5.8 provides mixed support for these. It is notable that the two agency cost variables, the expense ratio and the asset utilisation ratio, appear to be systematically different in their relationships with managerial ownership.

For the expense ratio, the results shown in Table 5.5 and 5.6 are consistent with a linear, negative relationship between increasing MD ownership and agency costs. These results are similar to those reported by Ang et al. (2000) and Fleming et al. (2005) in US and Australian samples of private firms. Firms with low MD ownership (<8.59%) exhibit higher expenses

per unit of sales, firms with high MD ownership, defined as either >50% or >77.63% of equity owned by the MD, exhibit lower expense ratios. Firms in which the MD is the largest single shareholder also exhibit lower expenses compared to other firms. The results in Table 5.7 provide further confirmation for this and do not indicate any non-linearity in the relationship between MD ownership and expenses. These results suggest that increased alignment between managers and shareholders reduces agency costs. There is no evidence that managerial entrenchment (Fama and Jensen 1983) is associated with a positive relationship between the expense ratio and managerial ownership at high levels of managerial ownership.

The relationship between managerial ownership and agency costs measured by asset utilisation differs markedly from that described above. The results in Table 5.8 indicate that in firms with a low degree of MD ownership (<8.59%), sales are lower per unit of assets than in firms with an intermediate or high levels of MD ownership. Asset utilisation is not significantly different in firms with high MD ownership compared to those with low or intermediate degrees of MD ownership, nor is it significantly different in firms in which the MD is the largest single shareholder. The results shown in Table 5.8 suggest that a curve, with a turning point at 56.9% of equity owned by the MD, describes the relationship between asset utilisation and MD ownership. Increasing managerial ownership below this threshold is associated with increasing asset utilisation, above this threshold the relationship is reversed and increasing managerial ownership is associated with reduced sales to assets. This finding is consistent with Hypothesis 5.1_c.

In summary, the results presented above suggest that the relationship between managerial ownership and agency costs differs for each of the measures of agency costs used. The expense ratio, which indicates the extent to which expenses per unit of sales are controlled, declines linearly with increasing managerial ownership. This finding supports Hypothesis 5.1_b. This suggests, with respect to the control of expenses per unit of sales, that increasing managerial ownership effectively aligns manager and shareholder interests. There is no evidence to support Hypothesis 5.2_c in the context of the expense ratio, managerial entrenchment does not appear to be manifested in excessive operating expenses or managerial extravagance. In contrast, when agency costs are measured using the asset utilisation ratio, a

non-linear relationship is evident. Sales per unit of assets are positively associated with managerial ownership to 56.9% and negatively thereafter. This non-linear relationship is supportive of Hypothesis 5.1_c and not of Hypothesis 5.1_b, in the context of the asset utilisation ratio. Managerial entrenchment effects are evident in the asset utilisation ratio.

This finding, that managerial entrenchment is associated with lower sales per unit of assets but not higher expenses per unit of sales suggests that managers with dominant shareholdings extract private benefits of control that are associated with reduced asset utilisation but not increased expense ratios. One possible explanation for this is that there may be a greater degree of information asymmetry between shareholders and managers with respect to firms' investment decisions compared to operating expenses. Operating expenses are explicitly detailed in the firms financial statements available to shareholders, whereas inefficient investments made by the firm may be less visible to shareholders. One type of inefficient investment that may deliver private benefits to managers is investments in diversifying assets reduces both asset utilisation and firm specific risk. The following section investigates the relationship between firm diversification and managerial ownership and the sales to assets ratio and firm diversification

5.4.5 Managerial Ownership and Firm Diversification

Firm investments in assets that reduce firm specific risk, even at a cost to firm performance, may be a rational action for managers whose portfolio wealth is undiversified. One means for undiversified managers of reducing exposure to firm-specific risk is for the firm to diversify its business activities. Data on the portfolio diversification of MDs in the sample firms is not available. If it is assumed that the extent to which managers' portfolio wealth is diversified is negatively related to their ownership stake in the firm, then they may act to reduce portfolio risk by diversifying the operations of the firm. There is evidence from public firms of a positive relationship between high insider ownership and sectoral diversification (Chen and Yu 2012). There is also significant empirical evidence on the existence of a "diversification discount", that is that diversified firms are valued at a discount to matched single industry firms (Ammann, Hoechle and Schmid 2012). If managers' investment decisions are

influenced by risk aversion, I would expect that the extent of firm diversification would be greater at high levels of managerial ownership. To examine the relationship between sectoral diversification and managerial ownership, I test for a linear or quadratic (U-shaped) relationship between firm diversification and managerial ownership by estimating regressions 22 and 23. The dependant variable, a measure of firm diversification, is the natural log of the number of individual 2007 SIC codes the firm submits in its Annual Return, returned to the Companies Office²⁹. For example, for a firm reporting three SIC codes (including its primary SIC code), this variable takes a value of $\ln(3)$. The variable is log-transformed because I expect the marginal risk reduction from further sectoral diversification to decline as the number of sectors the firm operates in increases. Firms are required to disclose the SIC codes which correspond to the business activities of the firm in the Annual Return. The control variables included in the models are firm age, size, leverage and industry.

$$\text{Eq.22} \quad \ln \text{ Number of SIC}_{i,t} = \partial + \beta_1 \text{MD \%}_{i,-1} + \beta_2 \text{Controls}_i + \varepsilon_i$$

$$\text{Eq.23} \quad \ln \text{ Number of SIC}_{i,t} = \partial + \beta_1 \text{MD \%}_{i,-1} + \beta_2 \text{MD \%}_{i,-1}^2 + \beta_3 \text{Controls}_i + \varepsilon_i$$

Table 5.9 shows the results of estimating Eq. 22 and 23. The coefficients on the MD % and MD %², indicate that the relationship between managerial ownership and diversification is U-shaped and switches signs at 60% MD ownership. This level of MD ownership is similar to the point at which entrenchment effects are observed in Table 5.8. Table 5.10 shows the results of estimating model (2), Table 5.8, but including the natural log of the number of SIC 2007 codes for each firm as an explanatory variable.

²⁹ The number of SIC codes a firm includes in its Annual Return is a crude measure of sectoral diversification, since the proportions of business assets devoted to each activities in each SIC code is not disclosed.

Table 5.9: OLS Regressions, Managerial Ownership and Diversification

VARIABLES	Predicted Sign	(1) Number of SIC Codes	(2) Number of SIC Codes
Industry (D)	?	Yes	Yes
Ln Turnover	+	0.044*** (0.010)	0.043*** (0.010)
Ln Age	?	-0.003 (0.010)	-0.003 (0.010)
Leverage	?	0.016** (0.008)	0.016** (0.008)
MD %	+, -	-0.033 (0.024)	-0.050* (0.026)
MD % ²	+		0.147* (0.084)
Constant		0.470*** (0.121)	0.460*** (0.121)
F		4.55***	5.65***
Observations		1,193	1,193
Adjusted R ²		0.038	0.041

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is the **natural log of the number of 2007 SIC codes** disclosed in the firm's Annual Return

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover.

Ln Age is the natural log of the number of years since firm incorporation.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

MD % is the percentage of equity owned by the MD (mean-centred)

(D) indicates a dummy variable.

Table 5.10: OLS Regressions, Agency Costs, Managerial Ownership and Diversification

VARIABLES	Predicted Sign	(1) Sales to Total Assets
Industry (D)	?	Yes
Ln Turnover	+	0.346*** (0.040)
Ln Age	?	-0.073*** (0.022)
Leverage	?	-0.087*** (0.028)
MD %	+	0.151** (0.061)
MD % ²	-	-0.541*** (0.189)
Ln No SIC 2007	-	-0.136** (0.060)
Constant		-2.684*** (0.439)
F		15.70***
Observations		1,193
Adjusted R ²		0.236

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
The dependant variable is **Sales to Total Assets**, which is natural log of Sales divided by Total Assets.
Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.
Ln Turnover is the natural log of turnover.
Ln Age is the natural log of the number of years since firm incorporation.
Leverage is Total Debt/Total Debt plus Shareholders Funds.
MD % is the percentage of equity owned by the MD (mean-centred)
Ln No SIC 2007 is the natural log of the number of 2007 SIC codes disclosed in the firm's Annual Return
(D) indicates a dummy variable.

The results indicate a negative relationship between asset utilisation and diversification. The coefficients on both MD % and MD %² remain significant and the signs as the same as in Table 5.8. These coefficients, adjusted for the effects of mean centering, imply a threshold point of 57.1% in the MD ownership/asset utilisation relation after controlling for diversification.

5.4.6 Ownership Concentration and Agency Costs

The second set of hypotheses, 5.2_b and 5.2_c, concern the relationship between ownership concentration and agency costs. Concentrated ownership may influence agency costs in at

least two ways. Hypothesis 5.2_b predicts a negative relationship between ownership concentration and agency costs as increasing ownership concentration should increase the ability of shareholders to monitor the behaviour of managers. Since the cash-flow benefits from reducing agency costs accrue to shareholders proportionate to their shareholding, increased ownership concentration also reduces free rider problems which may inhibit costly monitoring. Hypothesis 5.2_c posits a non-linear relationship between ownership concentration and agency costs. Majority shareholders, who own less than 100% of equity, may exercise a degree of control over the firm disproportionate to their cash-flow rights. This form of ownership structure gives rise to the ability in dominant shareholders to direct firms to engage in behaviours which benefit majority owners at the expense of minority owners. Once the ownership share of the largest single shareholder increases beyond a point at which they exercise effective control of the firm, this effect may dominate, leading to a positive relationship between increasing ownership concentration and agency costs.

Hypotheses 5.2_b and 5.2_c are tested by estimating equations 14 to 21 using OLS. These models include one of the two measures of agency costs, the expenses to sales ratio and the sales to assets ratio as dependent variables. The results of this analysis are shown in Tables 5.11 to 5.14. Table 5.11 includes *ln Expenses to Sales* as the dependent variable and the three dummy variables outlined above as well as *ln Number of Shareholders* as predictors. An increase in the expenses to sales ratio is interpreted as indicating higher agency costs. Hypothesis 5.2_b predicts a positive coefficient on *LGST Low*, indicating that where the largest shareholder's ownership percentage is less than 30.72%, the ratio of expenses to sales is higher. The results confirm this effect in the data. The coefficients on *LGST 50* and *LGST High* indicate that high ownership concentration is associated with lower expenses, as predicted by Hypothesis 5.1_b. The magnitude of the coefficients, -0.126 and -0.132, indicate that the effect of both on the expenses to sales ratio is similar. The number of shareholders is positively related to agency costs. This result is also consistent with Hypothesis 5.1_b. In Model 5, which includes both *LGST Low* and *LGST High*, only *LGST High* is statistically significant.

Table 5.11: OLS Regressions, Expenses to Sales on Lagged Ownership Concentration and Controls (1)

VARIABLES	Predicted Sign	(1) Expenses to Sales	(2) Expenses to Sales	(3) Expenses to Sales	(4) Expenses to Sales	(5) Expenses to Sales
Industry (D)	?	Yes	Yes	Yes	Yes	Yes
In Turnover	-	-0.296*** (0.039)	-0.292*** (0.039)	-0.293*** (0.039)	-0.311*** (0.038)	-0.295*** (0.039)
In Age	?	0.005 (0.029)	0.005 (0.029)	0.004 (0.029)	-0.015 (0.029)	0.001 (0.029)
Leverage	-	0.017 (0.017)	0.016 (0.018)	0.017 (0.018)	0.017 (0.018)	0.017 (0.017)
LGST LOW (D)	+	0.120* (0.065)				0.088 (0.067)
LGST 50 (D)	-		-0.126** (0.051)			
LGST HIGH (D)	-			-0.132** (0.061)		-0.110* (0.062)
In Number of Shareholders	+				0.165*** (0.026)	
Constant		1.212*** (0.452)	1.249*** (0.449)	1.232*** (0.452)	1.215*** (0.439)	1.236*** (0.453)
<i>F</i>		12.08***	12.26***	13.45***	16.52	11.55***
Observations		1,193	1,193	1,193	1,193	1,193
Adjusted R ²		0.118	0.120	0.119	0.145	0.120

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Expenses to Sales**, which is the natural log of Administration and Distribution Expenses divided by Sales.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

In Turnover is the natural log of turnover.

In Age is the natural log of the number of years since firm incorporation.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

LGST Low is a dummy variable coded one where the largest single shareholder's ownership percentage is less than the sample mean minus one standard deviation.

LGST 50 is a dummy variable coded one where the largest single shareholder's equity ownership percentage is greater than 50%.

LGST High is a dummy variable coded one where the largest single shareholder's ownership percentage is greater than the sample mean plus one standard deviation.

In Number of Shareholders is the natural log of the number of shareholders.

(D) indicates a dummy variable.

Table 5.12 includes the percentage of equity owned by the largest single shareholder and its squared and cubed term to investigate whether the relationship between the expenses to sales ratio is non-linear, as predicted by Hypothesis 5.2c. *LGST %* is mean-centred prior to computing $LGST \%^2$ and $LGST \%^3$ to reduce multicollinearity in the models estimated.³⁰ The results from estimating Models 1 and 2, the significant negative coefficient on *LGST %* and

³⁰ *LGST %*, *LGST %2* and *LGST %3* each had a Variance Inflation Factor (VIF) significantly in excess to 10, indicating multicollinearity in the model. VIFs for the mean-centred variables are each below 10 in models 2 and 3, Table 5.11.

the insignificant coefficient on $LGST \%^2$ in Model 2 confirm the results shown in Table 5.11 and do not provide any support for Hypothesis 5.2c. It does not appear that increasing ownership concentration is associated with agency costs expropriation or “tunnelling” behaviour, when agency costs are measured using the expenses to sales ratio.

Table 5.12: OLS Regressions, Expenses to Sales on Lagged Ownership Concentration and Controls (2)

VARIABLES	Predicted Sign	(1) Expenses to Sales	(2) Expenses to Sales	(3) Expenses to Sales
Industry (D)	?	Yes	Yes	Yes
In Turnover	-	-0.295*** (0.039)	-0.295*** (0.039)	-0.296*** (0.039)
In Age	?	-0.000 (0.029)	-0.001 (0.029)	-0.003 (0.029)
Leverage	-	0.016 (0.018)	0.016 (0.018)	0.017 (0.018)
LGST %	-	-0.273*** (0.093)	-0.285*** (0.095)	-0.145 (0.250)
LGST % ²	+		0.233 (0.383)	0.210 (0.387)
LGST % ³	-			-1.015 (1.701)
Constant		1.230*** (0.449)	1.223*** (0.449)	1.239*** (0.450)
F		12.41***	11.56***	10.97***
Observations		1,193	1,193	1,193
Adjusted R ²		0.123	0.122	0.121

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Expenses to Sales**, which is the natural log of Administration and Distribution Expenses divided by Sales.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

In Turnover is the natural log of turnover.

In Age is the natural log of the number of years since firm incorporation.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

LGST % is the percentage of equity owned by the largest single shareholder.

(D) indicates a dummy variable.

Table 5.13: OLS Regressions, Sales to Total Assets on Lagged Ownership Concentration and Controls (1)

VARIABLES	Predicted Sign	(1) Sales to Total Assets	(2) Sales to Total Assets	(3) Sales to Total Assets	(4) Sales to Total Assets	(5) Sales to Total Assets
Industry (D)	?	Yes	Yes	Yes	Yes	Yes
In Turnover	+	0.338*** (0.040)	0.335*** (0.040)	0.336*** (0.040)	0.343*** (0.040)	0.339*** (0.040)
In Age	?	-0.066*** (0.022)	-0.069*** (0.022)	-0.072*** (0.022)	-0.060*** (0.022)	-0.068*** (0.022)
Leverage	+	-0.014 (0.018)	-0.013 (0.018)	-0.014 (0.018)	-0.014 (0.018)	-0.014 (0.017)
LGST LOW (D)	-	-0.113** (0.046)				-0.133*** (0.047)
LGST 50 (D)	+		0.035 (0.037)			
LGST HIGH (D)	+			-0.037 (0.045)		-0.069 (0.047)
In Number of Shareholders	-				-0.068*** (0.020)	
Constant		-2.807*** (0.457)	-2.808*** (0.458)	-2.784*** (0.459)	-2.800*** (0.453)	-2.792*** (0.458)
F		16.89***	16.40***	16.52***		16.11***
Observations		1,193	1,193	1,193	1,193	1,193
Adjusted R ²		0.215	0.212	0.212	0.220	0.220

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Sales to Total Assets**, which is the natural log of Sales divided by Total Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

In Turnover is the natural log of turnover.

In Age is the natural log of the number of years since firm incorporation.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

LGST Low is a dummy variable coded one where the largest single shareholder's ownership percentage is less than the sample mean minus one standard deviation.

LGST 50 is a dummy variable coded one where the largest single shareholder's equity ownership percentage is greater than 50%.

LGST High is a dummy variable coded one where the largest single shareholder's ownership percentage is greater than the sample mean plus one standard deviation.

In Number of Shareholders is the natural log of the number of shareholders.

(D) indicates a dummy variable.

The ratio of sales to assets is the measure of agency cost used in the regressions shown in Tables 5.13 and 5.14. Hypothesis 5.2_b predicts a negative coefficient on *LGST Low*, indicating that firms with dispersed ownership (relative to the sample mean) will exhibit higher agency costs. This hypothesis predicts positive coefficients on *LGST 50* and *LGST High*, indicating that majority ownership by an individual and concentrated ownership is associated with lower agency costs. The number of shareholders is used an alternative measure of ownership concentration, a positive relationship between *In Number of*

Shareholders and agency costs is predicted. The results of Model 1 indicate that low ownership concentration is associated with higher agency costs, firms in which the largest single shareholder owns less than 30.72% have significantly lower sales, scaled by total assets, compared to firms in which the largest single shareholder owns in excess of 30.72% of equity. The hypothesised negative relationship between the number of shareholders and asset utilisation is also evident in Model 4, indicating that a higher number of shareholders is associated with lower sales per unit of assets. *LGST 50* and *LGST High* do not have any statistically significant relationship with asset utilisation. The evidence presented in Table 5.13 is weakly supportive of Hypothesis 5.2_b, that agency costs are negatively and linearly related to ownership concentration.

In Table 5.14 I present the results of estimating regression equations in which the sales to assets ratio is regressed on the continuous variable *LGST %*, *LGST %²* and *LGST %³*. These variables are mean-centred as discussed earlier. The evidence does not support Hypothesis 5.2_c, that there is a non-linear relationship between agency costs and ownership concentration. These are also inconsistent with Hypothesis 5.2_b, there does not appear to be a significant linear relationship between agency costs, measured using the ratio of sales to assets, and ownership concentration.

Table 5.14: OLS Regressions, Sales to Total Assets on Lagged Ownership Concentration and Controls (2)

VARIABLES	Predicted Sign	(1) Sales to Total Assets	(2) Sales to Total Assets	(3) Sales to Total Assets
Industry (D)	?	Yes	Yes	Yes
In Turnover	+	0.336*** (0.040)	0.339*** (0.040)	0.340*** (0.040)
In Age	?	-0.069*** (0.022)	-0.066*** (0.022)	-0.064*** (0.022)
Leverage	+	-0.013 (0.018)	-0.014 (0.018)	-0.014 (0.018)
LGST %	+	0.047 (0.070)	0.097 (0.070)	-0.074 (0.184)
LGST % ²	-		-0.948*** (0.284)	-0.921*** (0.284)
LGST % ³	+			1.238 (1.277)
Constant		-2.799*** (0.458)	-2.772*** (0.456)	-2.792*** (0.455)
<i>F</i>		16.37***	16.24***	15.37***
Observations		1,193	1,193	1,193
Adjusted R ²		0.212	0.220	0.220

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Sales to Total Assets**, which is the natural log of Sales divided by Total Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

In Turnover is the natural log of turnover.

In Age is the natural log of the number of years since firm incorporation.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

LGST % is the percentage of equity owned by the largest single shareholder.

(D) indicates a dummy variable.

Hypothesis 5.2_b predicts a linear negative relationship between agency costs and ownership concentration. Where agency costs are measured using the expense ratio, the evidence provided in Tables 5.11 and 5.12 provides strong support for this hypothesis. Firms in which the largest shareholder owns less than 31.05% (*LGST Low*) exhibit significantly higher expenses per unit of sales compared to firms in which the largest shareholder's. Firms in which the largest shareholder owns more than 50% or 86.32% (*LGST 50* and *LGST High* respectively) exhibit significantly lower expenses. These findings are consistent with the efficacy of shareholder monitoring being positively related to ownership concentration. The observed positive relationship between the number of shareholders and the expense ratio is also consistent with this interpretation. Table 5.12 includes a continuous measure of ownership concentration, *LGST %* and its square and cube. The significant negative coefficient on *LGST %* in Columns 1 and 2 and the insignificant coefficients on the

polynomial terms, $LGST \%^2$ and $LGST \%^3$, provide further support for Hypothesis 5.2_b. There is no evidence to support Hypothesis 5.2_c, that increased ownership concentration beyond a threshold is associated with increased agency costs.

When agency costs are measured using the asset utilisation ratio, a different relationship to ownership costs is evident. Tables 5.13 and 5.14 report the results of this analysis. Dispersed ownership, defined as the largest shareholder owning less than 31.05% of the equity in the firm, is associated with significantly lower asset utilisation. This is consistent with agency costs being inversely related to ownership concentration, as predicted by Hypothesis 5.2_b. Contrary to the hypothesised results, *LGST High* and *LGST 50* are not statistically significant predictors of the asset utilisation ratio. The negative relationship between the number of shareholders and the asset utilisation ratio is consistent with Hypothesis 5.2_b. There is no evidence to support Hypothesis 5.2_c in the results.

5.4.7 Ownership Concentration and Agency Costs. Analysis of Reduced Sample

The preceding analysis is conducted on a sample in which the largest single shareholder is the MD in the majority of firms. The effect of ownership concentration and managerial ownership on agency costs may be conflated in this sample of firms. A sub-sample of 438 firms is constructed by culling the 755 firms in which the MD is the largest single shareholder. The analysis described in Section 5.4.6 above is repeated on this sample of firms. The characteristics of this are described and compared to the full sample in Table 5.15, Panels A and B respectively. Tables 5.16 and 5.17, show the results of testing Hypotheses 5.2_b and 5.2_c on this reduced sample.

Table 5.15: Summary Statistics for Reduced Sample and Comparison of Characteristics of Full and Reduced Samples

Panel A: Summary Statistics for Reduced Sample					
VARIABLES	N	mean	sd	min	max
Expense to Sales Ratio	438	0.272	0.358	0.00863	5.627
Sales to Assets Ratio	438	2.209	1.827	0.0140	18.30
Leverage	438	0.384	2.162	-16.57	41.11
Turnover (GBP th.)	438	118,586	250,267	25,090	2,918,887
Age (Years)	438	30.76	26.36	2.274	123
Number of Shareholders	438	10.76	13.84	1	90
LGST %	438	51.4	27.5	5.4	100
		Coded 1		% Coded 1	
LGST Low (D)	438	119		27.2	
LGST 50 (D)	438	178		40.6	
LGST High (D)	438	73		16.7	

Panel B: Comparison of Characteristics of Full and Reduced Samples						
VARIABLES	Full Sample (n = 1,193)	Reduced Sample (MD LGST = 0) (n = 438)	Difference in Means	t-test for difference in means (2-tailed)	Wilcoxon rank-sum test (2-tailed)	Test for Difference in Proportions z score
Expense to Sales Ratio	0.234	0.272	0.0382	1.997**	3.148***	
Sales to Assets Ratio	2.288	2.209	-0.079	-0.843	-2.037**	
Leverage	0.350	0.384	0.033	0.374	-0.786	
Turnover (GBP th.)	102,548	118,586	16,038	1.449	-0.666	
Age (Years)	27.22	30.76	3.493	2.643***	1.582	
Number of Shareholders	7.719	10.76	3.041	4.524***	6.207***	
LGST %	58.6	51.4	-7.1	-4.611***	-4.728***	
LGST Low (D)	0.189	0.272	0.082			3.604***
LGST 50 (D)	0.492	0.406	-0.086			-3.106***
LGST High (D)	0.238	0.166	-0.072			-3.123***

The reduced sample differs from the full sample in a number of respects. Firms, in which the MD is not the largest shareholder, have higher agency costs measured as higher expenses per unit of sales and lower sales per unit of expenses. Sales to Assets are lower in the reduced sample firms. This is consistent with the evidence presented in Section 5.4.4. These firms also differ predictably in their ownership structures. The mean shareholding of the largest single shareholder in the full sample is 58.6% compared to 51.4% in the reduced sample. Significantly more (fewer) reduced sample firms have a *LGST* % more than one standard

deviation below (above) the sample mean and fewer reduced sample firms have a single shareholder than owns in excess of 50% of the firm's equity.

Tables 5.16 and 5.17 replicate the analysis shown in Tables 5.11 to 5.14 using the reduced sample. The hypothesised relationships are the same as discussed in Section 5.4.6. If increased ownership concentration increases the ability and incentive of shareholders to monitor managers, I expect that increasing ownership concentration will be associated with reduced agency costs and that the relationship may be non-linear if expropriation effects dominate monitoring effects at higher levels of ownership concentration.

Table 5.16: Reduced Sample. OLS Regressions, Expenses to Sales on Lagged Ownership Concentration and Controls

VARIABLES	Predicted Sign	(1) Expenses to Sales	(2) Expenses to Sales	(3) Expenses to Sales	(4) Expenses to Sales	(5) Expenses to Sales	(6) Expenses to Sales	(7) Expenses to Sales	(8) Expenses to Sales
Industry (D)	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
In Turnover	-	-0.258*** (0.055)	-0.259*** (0.055)	-0.260*** (0.055)	-0.259*** (0.055)	-0.258*** (0.055)	-0.258*** (0.055)	-0.259*** (0.055)	-0.258*** (0.055)
In Age	?	0.012 (0.043)	0.010 (0.043)	0.014 (0.043)	0.015 (0.043)	0.014 (0.043)	0.014 (0.043)	0.013 (0.043)	0.008 (0.043)
Leverage	-	0.008 (0.014)	0.008 (0.013)	0.008 (0.013)	0.008 (0.013)	0.008 (0.013)	0.008 (0.013)	0.008 (0.013)	0.009 (0.013)
LGST LOW (D)	+	-0.067 (0.092)			-0.043 (0.096)				
LGST 50 (D)	-		0.029 (0.084)						
LGST HIGH (D)	-			0.119 (0.108)	0.105 (0.113)				
In Number of Shareholders	+					0.109*** (0.041)			
LGST %	-						0.141 (0.149)	0.146 (0.150)	0.497 (0.406)
LGST % ²	+							0.317 (0.614)	0.115 (0.637)
LGST % ³	-								-2.482 (2.683)
Constant		0.980 (0.631)	0.972 (0.637)	0.962 (0.636)	0.959 (0.636)	0.887 (0.643)	0.969 (0.635)	0.962 (0.638)	0.994 (0.637)
<i>F</i>									
Observations		438	438	438	438	438	438	438	438
Adjusted R ²		0.099	0.098	0.108	0.099	0.113	0.100	0.099	0.098

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. These models are estimated on a reduced sample, omitting firms in which the MD is the largest single Shareholder.

The dependant variable is **Expenses to Sales**, which is the natural log of Administration and Distribution Expenses divided by Sales.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

In Turnover is the natural log of turnover. **In Age** is the natural log of the number of years since firm incorporation. **Leverage** is Total Debt/Total Debt plus Shareholders Funds.

LGST Low is a dummy variable coded one where the largest single shareholder's ownership percentage is less than the sample mean minus one standard deviation.

LGST 50 is a dummy variable coded one where the largest single shareholder's equity ownership percentage is greater than 50%.

LGST High is a dummy variable coded one where the largest single shareholder's ownership percentage is greater than the sample mean plus one standard deviation.

In Number of Shareholders is the natural log of the number of shareholders. **LGST %** is the percentage of equity owned by the largest single shareholder. **(D)** indicates a dummy variable.

Table 5.17: Reduced Sample. OLS Regressions, Sales to Total Assets on Lagged Ownership Concentration and Controls

VARIABLES	Predicted Sign	(1) Sales to Total Assets	(2) Sales to Total Assets	(3) Sales to Total Assets	(4) Sales to Total Assets	(5) Sales to Total Assets	(6) Sales to Total Assets	(7) Sales to Total Assets	(8) Sales to Total Assets
Industry (D)	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
In Turnover	+	0.309*** (0.067)	0.306*** (0.067)	0.305*** (0.068)	0.310*** (0.067)	0.315*** (0.066)	0.306*** (0.067)	0.312*** (0.068)	0.311*** (0.068)
In Age	?	-0.028 (0.036)	-0.032 (0.035)	-0.035 (0.035)	-0.031 (0.035)	-0.025 (0.035)	-0.030 (0.035)	-0.027 (0.035)	-0.022 (0.035)
Leverage	+	-0.003 (0.011)	-0.002 (0.011)	-0.002 (0.011)	-0.003 (0.010)	-0.002 (0.011)	-0.002 (0.011)	-0.002 (0.010)	-0.002 (0.010)
LGST LOW (D)	-	-0.155** (0.072)			-0.178** (0.075)				
LGST 50 (D)	+		0.046 (0.066)						
LGST HIGH (D)	+			-0.040 (0.088)	-0.099 (0.091)				
In Number of Shareholders	-					-0.100*** (0.035)			
LGST %	+						0.107 (0.121)	0.084 (0.120)	-0.266 (0.302)
LGST % ²	-							-1.373*** (0.489)	-1.171** (0.497)
LGST % ³	+								2.477 (2.050)
Constant		-2.626*** (0.775)	-2.632*** (0.784)	-2.592*** (0.785)	-2.607*** (0.781)	-2.559*** (0.760)	-2.618*** (0.778)	-2.586*** (0.783)	-2.619*** (0.785)
F		9.32***	8.92***	8.89***	8.74***	9.84***	8.95***	9.08***	8.59***
Observations		438	438	438	438	438	438	438	438
Adjusted R ²		0.198	0.191	0.190	0.199	0.208	0.191	0.206	0.207

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. These models are estimated on a reduced sample, omitting firms in which the MD is the largest single Shareholder.

The dependant variable is **Sales to Total Assets**, which is the natural log of Sales divided by Total Assets. **Industry** is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

In Turnover is the natural log of turnover. **In Age** is the natural log of the number of years since firm incorporation. **Leverage** is Total Debt/Total Debt plus Shareholders Funds.

LGST Low is a dummy variable coded one where the largest single shareholder's ownership percentage is less than the sample mean minus one standard deviation.

LGST 50 is a dummy variable coded one where the largest single shareholder's equity ownership percentage is greater than 50%.

LGST High is a dummy variable coded one where the largest single shareholder's ownership percentage is greater than the sample mean plus one standard deviation.

In Number of Shareholders is the natural log of the number of shareholders. **LGST %** is the percentage of equity owned by the largest single shareholder. **(D)** indicates a dummy variable.

The results shown in Table 5.16 suggest that the relationship between the expenses to sales ratio and ownership concentration in the reduced sample appears to differ from that in the full sample (Table 5.11 and 5.12). In the full sample regressions, the coefficients on each of *LGST Low*, *LGST 50* and *LGST High* are significantly different from zero and have the signs predicted by Hypothesis 5.2_b, suggesting a significant monitoring role is played by the largest shareholder. In the reduced sample, none of these variables are significantly related to the expenses to sales ratio. The continuous measure, *LGST %*, which is negatively related to expenses to sales in the full sample, consistent with Hypothesis 5.2_b, is not statistically significant in the reduced sample. The natural log of the number of shareholders is the only measure of ownership concentration/dispersion which is associated with expenses to sales in the reduced sample. The positive coefficient on this variable is consistent with the predictions of Hypothesis 5.2_b. These results suggest that measured by the expenses to sales ratio, ownership concentration when considered separately from managerial ownership, is only weakly related to agency costs.

The analysis shown in Table 5.17 replicates that shown in Tables 5.13 and 5.14 but is estimated on the reduced sample firms. *LGST Low* is negatively related to Sales to Assets, indicating greater agency costs in firms in which the largest single shareholder holds less than 30.72% or equity compared firms in which ownership is more concentrated. The coefficient on *ln Number of Shareholders* is also consistent with increasing agency costs as ownership becomes more dispersed. The results shown in Models 6-8 do not provide support for either of Hypotheses 5.2_b or 5.2_c. The results of this analysis indicate that the relationship between ownership concentration and agency costs, measured using the sales to asset ratio, is similar in both samples.

These results should be interpreted with caution since the significantly smaller sample size in this analysis will result in increased standard errors. The two samples also vary in several significant respects, such as the expenses to sales ratio and firm age, as well as ownership structure. Finally the reduced sample includes only “non-owner managed” private firms (defined as firms in which the MD is not the largest single shareholder), which is an unusual

corporate form in the sample, and the relationship between agency costs and ownership structure in these firms may not be generalizable to the broader population of private firms.

5.4.8 Diagnostics and Sensitivity Tests

I perform a number of additional tests on the data as discussed below to confirm that the results are robust to the exclusion of influential observations and that multicollinearity is not a significant concern. I also examine whether the results are robust to an alternative definition of the expenses to sales ratio.

Table 5.2 provides Pearson correlation coefficients for agency cost, ownership and control variables for the sample firms. It is evident that several of the explanatory variables exhibit high correlations with other explanatory variables. The ownership variables are generally highly correlated with one another, given the method of constructing these variables, this is expected. A high degree of correlation between explanatory variables gives rise to concerns about multicollinearity. Multicollinearity can lead to unstable coefficient estimates and inflated standard errors. To examine whether multicollinearity is a significant issue in the data I compute Variance Inflation Factors (VIFs) after estimating each regressions. A VIF for a variable below 10 indicates that multicollinearity is a potential problem in the data (Kleinbaum et al. 2013). In general only one ownership variable is included in each regression specification. Two exceptions to this are models in which MD Low and MD High or *LGST Low* and *LGST High* are included. Computing VIFs following estimation of these models indicates that multicollinearity is not a concern in these models. The second exception is models including either *MD %* or *LGST %* and polynomial terms. Computing VIFs for these regressions indicates significant multicollinearity. To address this, these variables are mean-centred prior to computing the polynomial terms and including in the regressions. VIFs computed after mean-centering indicate that multicollinearity is no longer a concern. Mean (max) VIFs for each regression model estimated ranges from is 1.05 to 1.91 (1.10 to 7.50) and indicate that multicollinearity is not a significant concern in this data.

F-statistics shown indicate that each model is statistically significant. I also examine whether the results are affected by influential observations. I estimate the Cook's Distance for each observation, which measures the extent to which regression coefficients change when that observation is excluded. The exclusion of observations with a Cook's Distance less than 1 will not lead to significant changes in parameter estimates (Kleinbaum et al. 2013). One observation has a Cook's Distance in excess of 1 (1.825). No other observations have a Cook's Distance approaching 1. To ensure the findings are not materially influenced by this observation, I exclude it from the sample and re-estimate each model. In each case the results were the same as the results when the observation is included. Based on this I conclude that the models estimated are not excessively affected by influential observations.

The ratio of expenses to sales, one of the two measures of agency costs used here, is defined as the sum of Distribution and Administration Expenses, divided by Total Sales. Distribution and Administration Expenses include remuneration paid to directors of the firm. The results presented in Chapter 6 indicate a relationship between directors' remuneration and the shareholding of the MD (see for example results presented in Table 6.12). Owner-managers may substitute dividends or retained earnings for direct remuneration, leading to a spurious association between expenses, when directors' remuneration is included, and managerial ownership being incorrectly attributed to agency costs. To test if this factor is influencing the results presented in Tables 5.7 and 5.8, I estimate regressions 14 to 21, after subtracting Total Director's Remuneration³¹ from Administration and Distribution Expenses to compute the expense ratio. This approach to computing Administration expenses is consistent with that used by Ang et al. (2000) and Fleming et al. (2005). The mean value of the expense ratio after subtracting Directors' Remuneration is 0.219 and the standard deviation of this measure is 0.299. This variable is log transformed before inclusion in the analysis. The results are shown in Table 5.18. These results are very similar to those shown in Tables 5.7 and 5.8, indicating that the inclusion of Directors' Remuneration in the expense ratio does not materially change the findings.

³¹ Total Directors Remuneration comprises Total Directors Fees plus Pension Contributions plus Other Emoluments.

Table 5.18: OLS Regressions, Expenses to Sales on Lagged Managerial Ownership and Controls. Alternative Definition of Expenses

VARIABLES	Predicted Sign	(1) Expenses to Sales	(2) Expenses to Sales	(3) Expenses to Sales	(4) Expenses to Sales	(5) Expenses to Sales	(6) Expenses to Sales	(7) Expenses to Sales	(8) Expenses to Sales
Industry (D)	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ln Turnover	-	-0.280*** (0.039)	-0.271*** (0.038)	-0.274*** (0.039)	-0.276*** (0.039)	-0.278*** (0.039)	-0.274*** (0.038)	-0.276*** (0.038)	-0.276*** (0.038)
Ln Age	?	-0.007 (0.031)	-0.003 (0.031)	-0.002 (0.032)	-0.004 (0.031)	-0.011 (0.032)	-0.013 (0.031)	-0.014 (0.031)	-0.014 (0.031)
Leverage	-	0.017 (0.020)	0.019 (0.019)	0.020 (0.019)	0.018 (0.020)	0.018 (0.020)	0.018 (0.020)	0.017 (0.020)	0.017 (0.020)
MD Low (D)	+	0.297*** (0.062)				0.250*** (0.065)			
MD 50 (D)	-		-0.249*** (0.056)						
MD High (D)	-			-0.237*** (0.065)		-0.161** (0.067)			
MD LGST (D)	-				-0.252*** (0.055)				
MD %	-						-0.438*** (0.078)	-0.488*** (0.084)	-0.490** (0.246)
MD % ²	+							0.422 (0.268)	0.420 (0.332)
MD % ³	-								0.008 (1.184)
Constant		0.936** (0.450)	0.979** (0.448)	0.966** (0.451)	1.113** (0.448)	0.969** (0.450)	0.959** (0.444)	0.932** (0.446)	0.932** (0.446)
<i>F</i>									
Observations		1,190	1,190	1,190	1,190	1,190	1,190	1,190	1,190
Adjusted R ²		0.125	0.124	0.119	0.124	0.130	0.133	0.135	0.135

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The dependant variable is **Expenses to Sales**, which is the natural log of Administration and Distribution Expenses (less Directors Remuneration), divided by Sales. **Industry** is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover. **Ln Age** is the natural log of the number of years since firm incorporation. **Leverage** is Total Debt/Total Debt plus Shareholders Funds.

MD Low is a dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.

MD 50 is a dummy variable coded one where the MD's equity ownership percentage is greater than 50%.

MD High is a dummy variable coded one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation.

MD LGST is a dummy variable coded one where the MD is the largest single shareholder in the firm.

MD % is the percentage of equity owned by the MD (centred). **(D)** indicates a dummy variable.

5.5 Discussion and Conclusions

This study investigates the relationship between agency costs and ownership structure in UK private firms. It extends studies by Ang et al. (2000) and Singh and Davidson (2003), who report negative relationships between managerial ownership and ownership concentration and the magnitude of agency costs in private and public firms by testing whether the relationship is reversed at high levels of managerial ownership and ownership concentration. The study therefore tests the predictions of the “managerial entrenchment” hypothesis (Fama and Jensen 1983) as well as those of the “convergence of interests” hypothesis (Jensen 1993) in private firms. It also investigates the relationship between ownership concentration and agency costs in private firms, testing both the “monitoring” hypothesis (Fama and Jensen 1983), which predicts a negative relationship between concentration and agency costs and the “expropriation” or “tunnelling” hypothesis (Shleifer and Vishny 1986), which predicts higher agency costs in the presence of dominant shareholders.

The results indicate that firms with expense ratios and asset utilisation ratios, above and below the mean respectively, indicating high agency costs, exhibit significantly lower managerial ownership and ownership concentration across a range of measures, compared to firms with lower agency costs. These results are comparable to those reported by Ang et al. (2000) and Fleming et al. (2003), in similar analyses of US and Australian private firms respectively. Managerial ownership, measured here as the percentage of equity owned by the MD, is significantly related to both measures of agency costs. The expense ratio declines with increasing managerial ownership and is significantly lower in firms, in which the MD is largest single shareholder compared to other firms. There is no evidence of a reversal of this relationship at higher levels of MD ownership, reflecting managerial entrenchment. This finding is also consistent with Ang et al. (2000) and Fleming et al. (2003). The relationship between the asset utilisation ratio and managerial ownership is non-linear and indicates diminishing sales per unit of assets as the MD ownership percentage increases beyond 56.9%. This finding is consistent with the predictions of the managerial entrenchment hypothesis. These results indicate that managerial entrenchment dominates alignment effects at a higher level in private firms than in public firms in the UK. Florackis (2005), for example, reports

that in publicly traded firms, ownership by executive directors³² is negatively associated with agency costs below 43% and positively associated above this level.

That managerial entrenchment is evident in the ratio of sales to assets but not the ratio of expenses to sales can be interpreted in a number of ways. Entrenched managers may cause the firm to make investments, which are intended to increase the manager's value to the firms, rather than maximise the value of residual claimants, and consequently increase the cost to shareholders of replacing them (Shleifer and Vishny 1989). This behaviour may be consistent with the lower asset utilisation observed at higher levels of managerial ownership, however the point at which asset utilisation begins to decline, at 56.9% MD ownership, implies that the cost of this behaviour is borne primarily by the MD themselves, as the largest single residual claimant on the firm's cash-flows. A second possible explanation of this non-linear relationship is managerial risk aversion. Managers, who are undiversified by virtue of their large shareholding in the firm, may make diversifying investments with the objective of reducing their exposure to firm specific risk. The evidence presented that the relationship between diversification and managerial ownership is similar, in terms of the turning points, to that between asset utilisation and managerial ownership suggests that investment decisions may partially explain the observed lower asset utilisation at higher levels of managerial ownership. A significant caveat associated with this argument is that I am assuming a negative relationship between the ownership share of the MD and the extent to which their portfolio wealth is diversified. The data available does not allow for this assumption to be tested. This result supports and extends the findings of Keasey et al. (1994), who report that directors' ownership is associated first with increasing ROA, until a point where 68% of equity is owned by directors of the firm, after which point ROA declines. The evidence presented here indicates that this decline in firm performance is due to asset utilisation rather than control of expenses, such as perquisites or managerial compensation.

An implication of these results is that minority shareholders in firms owned primarily by the MD incur significant agency costs, which may be partially related to investment decisions. While expenses per unit of sales decline with increasing MD ownership, the magnitude of the

³² Note that this is a much broader definition of managerial ownership than is used in the present study.

reduction in agency costs is similar in firms with an MD owning >50% of equity and in firms with an MD owning >77.63% (MD High). This suggests that the increase in agency costs reflected in the declining asset utilisation at high levels of MD ownership may not be offset by lower expenses due to increasing levels of MD ownership in this range of ownership.

Ownership concentration appears to be weakly related to agency costs in private firms. When firms in which the MD is the largest single shareholder are excluded, agency costs, using both measures, decline as the number of shareholders increases. Asset utilisation is significantly lower in firms where the largest shareholder owns less than 31.05%. This is consistent with the operation of free rider effects, where the incentive of a shareholder to monitor the firm declines as their shareholding declines. This finding is consistent with existing research in both public firms (see for example Yafeh and Yosha 1996) and private firms (see for example Ang et al. 2000), in which concentrated ownership reduces agency costs. No evidence is found in the data to support the argument that large shareholders expropriate or “tunnel” resources from the firm for private benefit.

**Chapter 6 Ownership Structure and Executive Compensation in
Private Firms**

6.1. Introduction

The second empirical chapter in this thesis examines the relationships between firm performance, ownership structure and the directors' remuneration in private firms. Executive compensation has been the subject of intense debate both academically and in wider society for the past number of decades. Two general issues have exercised researchers and commentators: the level of compensation paid to senior executives, in particular Chief Executive Officers, and the extent to which the compensation awarded reflects the performance of the companies they manage. Empirical research in the area has focussed almost exclusively on executive compensation in public firms, and within these, on a sub-set of the largest US public firms.³³ Relatively little is known about the structure and determinants of executive compensation in private firms, despite the important role they play in the economy.

Private firms provide an interesting context for investigating the role of ownership structure in determining compensation and pay-performance sensitivity. The existing empirical literature in this area is generally consistent in reporting that concentrated ownership and increased managerial ownership function as monitoring and alignment mechanisms to reduce excessive compensation and to align compensation with performance. The context for these studies, publicly listed firms with many shareholders, differs qualitatively from the universe of private firms. In private firms, such as are included in the present sample, firms are typically owned by fewer than five shareholders and dominant shareholders, who's shareholdings exceed of 50%, are the norm. In this context, managerial entrenchment, rather than a separation of ownership and control, is likely to be the primary agency problem. Increased ownership concentration may be associated with increased agency costs. Studying how compensation is related to ownership structure in private firms allows a consideration of how very high levels of ownership concentration interact with managerial behaviour.

³³ Much of the existing research on executive compensation uses the Standard & Poors ExecuComp database as a source, which provides compensation and other data for S&P 1500 firms (Cadman, Klasa and Matsunga 2010).

This study investigates the cross-sectional relationships between firms' performance, executive compensation and ownership structure in 2012 in a sample of 1217 private UK firms. Three sets of hypotheses are tested. These concern the relationship between the level of executive compensation and ownership structure, the sensitivity of compensation to firm performance, specifically lagged Return on Assets, and whether this sensitivity is moderated by ownership concentration and managerial equity ownership. This study uses an instrumental variables approach to control for the endogenous nature of the relationship between executive pay and firm performance.

The results indicate firstly that directors' remuneration is strongly related to firm performance in private firms. This relationship remains significant after controlling for various firm characteristics and ownership structure. The limited existing evidence on pay-performance sensitivity in private firms is mixed, with some studies reporting a positive pay performance relation (e.g. Michiels et al. 2012) and others reporting no significant relationship (e.g. Banhoj et al. 2010). The results further suggest that the relationship between ownership concentration and the level of remuneration is non-linear. At low levels of concentration, the relationship is negative, the relationship reverses once the ownership share of the largest owner exceeds 30% and reverses again as the largest owners share increases beyond 75%. The relationship between managerial ownership and remuneration is similar. These results are consistent with alignment effects prevailing at lower levels of ownership concentration and managerial ownership but entrenchment effects dominating beyond a certain point. At very high levels of ownership concentration and managerial ownership the incentive to divert firm resources from shareholders declines.

Ownership concentration moderates the pay-performance relationship. As ownership concentration increases, the sensitivity of remuneration to performance declines. I also examine whether increased managerial ownership is associated with lower pay-performance sensitivity. The evidence presented suggests that managerial ownership also plays a moderating role in the pay-performance relationship. These findings are consistent with the argument that private firms use directors' compensation as a means of aligning the incentives of managers with those of shareholders but that entrenched managers structure remuneration to be insensitive to firm performance.

This chapter is organised as follows. Section 6.2 presents the hypotheses derived from the literature reviewed in Chapter 2. In section 6.3 the empirical method used to test these hypotheses is outlined. Section 6.4 presents the results of regressions, which investigate the relationship between firm performance, remuneration and ownership structure. Results of sensitivity tests are also provided in this section. The chapter concludes with a discussion of these results and conclusions in section 6.5.

6.2 Hypotheses

This section sets out the hypotheses that are tested in the empirical analysis that follows. The development of the hypotheses are outlined in detail in Chapter 2, this section restates the hypotheses to be tested.

***H6.1:** Directors' remuneration is positively related to firm performance.*

***H6.2_a:** The level of directors' remuneration will be lower in firms where ownership is concentrated compared to firms where ownership is dispersed.*

***H6.2_b:** Pay-performance sensitivity will be lower in firms where ownership is concentrated compared to firms where ownership is dispersed.*

***H6.3_a:** The level of directors' remuneration will be lower in firms where the degree of managerial ownership is high compared to firms where the degree of managerial ownership is low.*

***H6.3_b:** The relationship between the level of directors' remuneration and managerial ownership will be non-linear in nature.*

H6.3_c: *Pay-performance sensitivity will be lower in firms where the degree of managerial ownership is high compared to firms where the degree of managerial ownership is low.*

6.3. Empirical Method

The nature of the hypothesised relationship between firm performance and compensation is discussed and an empirical approach to test the hypotheses, developed in Chapter 2 and restated in section 6.2, is outlined in this section. The variables used in this analysis are discussed in Chapter 4 (Section 4.5). Descriptive statistics for this sample are provided in Table 4.5. Table 6.1 provides definitions of the variables used in the analysis presented in this chapter.

Table 6.1: Definition of Variables used in Executive Compensation Tests

Variables	Definition
Dirs. Remun.	Directors' Remuneration. Total Directors' Fees plus Pension Contributions plus Other Emoluments. Natural log transformed.
ROA ₋₁	Return on Assets. Profit or Loss before Tax divided by Total Assets. Lagged (by one period)
MD %	Percentage shareholding of the MD.
MD Low (D)	Dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.
MD 50 (D)	Dummy variable coded one where the MD's equity ownership percentage is greater than 50%.
MD High (D)	Dummy variable coded one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation.
MD LGST (D)	Dummy variable coded one where the MD is the largest single shareholder in the firm.
LGST %	Percentage shareholding of the Largest Shareholder.
LGST Low (D)	Dummy variable coded one where the largest single shareholder's ownership percentage is less than the sample mean minus one standard deviation.
LGST 50 (D)	Dummy variable coded one where the largest single shareholder's equity ownership percentage is greater than 50%.
LGST High (D)	Dummy variable coded one where the largest single shareholder's ownership percentage is greater than the sample mean plus one standard deviation.
Turnover	Total Sales. The natural log of this measure is used.
Industry	10 Dummy variables based on one-digit 2007 SIC classification.
Firm Age	Years since incorporation. Natural log transformed.
Number of Subsidiaries	The number of subsidiaries the firm has. Natural log transformed.
Dividends Paid	Dividends paid in the last year. Natural log transformed.
<i>Instruments for ROA</i>	
Leverage ₋₁	(Total Debt) divided by (Total Debt plus Shareholders Funds). Lagged (by one period)
FAI ₋₁	Fixed Asset Intensity. (Fixed Assets) divided by (Turnover). Lagged (by one period)

Three broad hypotheses are tested in this study. Firstly that directors' remuneration in the sample firms is sensitive to firm performance, measured as the prior year's ROA. Secondly that the level of directors' remuneration varies with the extent of ownership concentration and managerial ownership and finally that the sensitivity of pay to firm performance varies with ownership concentration and managerial ownership.

6.3.1 Endogeneity and the Instrumental Variables Approach

The causal relationship between firm performance and executive compensation is unlikely to be straightforward. Theory and empirical evidence suggest that shareholders may design compensation contracts to align the interests of executives with their own (Conyon and Murphy 2000) but also that the greater alignment of interests, through for example, performance-linked pay, may result in better firm performance (Mishra, Chandra and Nielsen 2000). Causation may run from firm performance to executive remuneration and in the opposite direction simultaneously. Unobserved heterogeneity, where omitted variables influence both firm performance and executive remuneration, is a further potential source of endogeneity. The effect of endogeneity, where the error term is correlated with the (endogenous) independent variable, is that coefficients estimated using Ordinary Least Squares (OLS) will be biased and inconsistent. This issue must be addressed if a compelling argument is to be made about causality between firm performance and executive compensation. An instrumental variable (IV) approach, such as Two Stage Least Squares (2SLS) addresses this (Bascle 2008). The 2SLS regression approach is commonly used in the corporate finance and accounting literature where independent variables are endogenous.

6.3.2 2SLS: First Stage Regressions

In the 2SLS models estimated in this study, the first stage in each case is an OLS regression where the endogenous variable ($ROA_{i,t}$) is regressed on the instruments. In the second stage of the 2SLS the fitted values of $ROA_{i,t}$ from the first stage are included in place of the observed values of $ROA_{i,t}$ and the regression equation of interest is estimated. Valid instruments must satisfy two conditions, they must be *relevant*, that is the instruments must be strongly correlated with the endogenous variable being instrumented, and they must be *exogenous*, that is uncorrelated with the error term.

The choice of appropriate instruments for endogenous variables is a critical aspect of IV estimation. The conditions of relevance and exogeneity will often conflict and variables which are highly relevant may not be entirely exogenous and variables which are exogenous may not be sufficiently relevant to be appropriate instruments. Tests to confirm the validity of the instruments used are discussed in the diagnostic section (Section 6.4.8).

Two instruments are employed for $ROA_{i,t}$ in this study, $Leverage_{i,t}$ (Total Debt/Total Equity) and $Fixed Asset Intensity_{i,t}$ (Fixed Assets/Sales). I expect leverage to be negatively correlated with ROA (Rajan and Zingales 1995). Michaelas, Chittenden and Poutziouris (1999) and Brav (2009) show that this negative relationship between leverage and ROA is evident in private UK firms. Leverage is used as an instrument for ROA in similar empirical studies (Michiels et al. 2012 and Banhoj et al. 2010). I do not expect leverage to influence Directors' Remuneration other than through its effects on firm profitability, in other words leverage is not expected to be correlated with the error term in the equation of interest. The second instrument used is Fixed Asset Intensity. ROA has been found to be related to Capital Intensity (Selling and Stickney 1989). I do not expect that fixed asset intensity is correlated with directors' remuneration, other than through its correlation with ROA.

Equation 24 shows the first stage of the 2SLS regression, in which predicted values for the instrumented variable (ROA) are generated by estimating an OLS regression which includes

the instrumental variables (Leverage and Fixed Asset Intensity) and the exogenous predictors (that is the explanatory variables other than ROA included in the structural equations to be estimated).

$$\text{Eq.24} \quad ROA_i = \delta + \beta_1 \text{Leverage}_i + \beta_2 \text{Fixed Asset Intensity}_i + \beta_3 \text{Exogenous predictors}_i + \varepsilon_i$$

6.3.3 2SLS Second Stage Regressions

A series of regression equations are specified to test the hypotheses developed in section 6.2. In each case the fitted value of ROA_{-1} , estimated from the first stage of the 2SLS, shown in Eq. 24, is included in the place of ROA_{-1} .

Hypothesis 6.1 predicts a positive relationship between ROA_{-1} and directors remuneration. To test this I estimate the following 2SLS regression:

$$\text{Eq.25} \quad \ln \text{Dirs Remun}_i = \delta + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 \text{Controls}_i + \varepsilon_i$$

Hypothesis 6.1 predicts a positive, significant coefficient on β_1 in equation 25. This would indicate positive pay-performance sensitivity, controlling for other firm characteristics empirically found to be correlated with executive pay.

Hypothesis 6.2_a considers the influence of ownership concentration on the level of compensation. Ownership concentration is measured using a number of variables as discussed in Section 4.3.2. The basic measure of ownership concentration is the shareholding of the single largest shareholder in the firm, *LGST %*. From this measure a series of dummy variables are constructed to capture aspects of ownership concentration. These variables are

LGST Low, *LGST 50* and *LGST High* and are defined in Table 6.1. *LGST Low* indicates low ownership concentration and *LGST 50* and *LGST High* indicate highly concentrated ownership. To test whether ownership concentration is associated with lower levels of compensation, controlling for firm performance and other firm characteristics outlined in Section 4.5.3, I estimate the following 2SLS regressions (Equations 30 and 31 are estimated to allow for a non-linear relationship between concentration and compensation):

$$\text{Eq.26} \quad \ln Dirs Remun_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 LGST Low_i + \beta_3 Controls_i + \varepsilon_i$$

$$\text{Eq.27} \quad \ln Dirs Remun_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 LGST 50_i + \beta_3 Controls_i + \varepsilon_i$$

$$\text{Eq.28} \quad \ln Dirs Remun_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 LGST High_i + \beta_3 Controls_i + \varepsilon_i$$

$$\text{Eq.29} \quad \ln Dirs Remun_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 LGST \%_i + \beta_3 Controls_i + \varepsilon_i$$

$$\text{Eq.30} \quad \ln Dirs Remun_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 LGST \%_i + \beta_3 LGST \%^2_i + \beta_4 Controls_i + \varepsilon_i$$

$$\text{Eq.31} \quad \ln Dirs Remun_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 LGST \%_i + \beta_3 LGST \%^2_i + \beta_4 LGST \%^3_i + \beta_5 Controls_i + \varepsilon_i$$

For equations 26 to 28, which each include a dummy variable indicting an aspect of ownership concentration, the coefficient β_2 is of primary interest. For equations 26 to 28, a negative relationship between ownership concentration and the level of remuneration would be indicated by positive, negative, negative and negative values of β_2 respectively. Equations 30 and 31 include quadratic terms and a cubic term to capture a non-linear relationship between ownership concentration and remuneration.

Ownership concentration may moderate the pay-performance relationship. Hypothesis 6.2_b predicts that increased ownership concentration will be associated with lower pay performance sensitivity. The same measures of ownership concentration are used to test this hypothesis as are discussed above. I examine the moderating effect, if any, of ownership concentration by interacting ROA_{-1} and measures of ownership concentration. Four 2SLS models are estimated, as follows (2nd stage regressions only shown):

$$\text{Eq.32} \quad \ln Dirs\ Remun_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 LGST\ Low_i + \beta_3 ROA_{-1,i} * \widehat{LGST\ Low}_i + \beta_4 Controls_i + \varepsilon_i$$

$$\text{Eq.33} \quad \ln Dirs\ Remun_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 LGST\ 50_i + \beta_3 ROA_{-1,i} * \widehat{LGST\ 50}_i + \beta_4 Controls_i + \varepsilon_i$$

$$\text{Eq.34} \quad \ln Dirs\ Remun_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 LGST\ High_i + \beta_3 ROA_{-1,i} * \widehat{LGST\ High}_i + \beta_4 Controls_i + \varepsilon_i$$

$$\text{Eq.35} \quad \ln Dirs\ Remun_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 LGST\ \%_i + \beta_3 ROA_{-1,i} * \widehat{LGST\ \%}_i + \beta_4 Controls_i + \varepsilon_i$$

The first stage regressions for each of the above specifications treats the interaction term between ROA_{-1} and the ownership concentration variable as endogenous. Instrument used for the endogenous interaction terms are *Fixed Asset Intensity₋₁* and *Leverage₋₁* interacted with the relevant ownership concentration variable. The coefficients on the interaction terms in each of the specifications are of primary interest. Coefficients significantly different from zero will indicate that ownership concentration moderates the pay-performance relationship in the sample firms. If high ownership concentration reduces pay-performance sensitivity as predicted in hypothesis 6.2_b, β_3 will be negative in equations 33, 34 and 35. If low ownership concentration (compared to high or intermediate levels of ownership concentration) moderates pay-performance sensitivity β_3 in equation 32 will be significantly different from zero.

In 775 of the 1217 firms in the sample the MD is the largest single shareholder. Examining the relationship between the largest single shareholder's ownership and remuneration may therefore confuse the effects of managerial ownership with ownership concentration. To attempt to disentangle these effects I separately examine the sub-sample of firms, in which the MD is not the largest shareholder³⁴. The mean ownership share of the largest shareholder in this sample is 51.6%. *LGST High* (*LGST Low*) in this sample are dummy variables coded one where the largest shareholder's shareholding is greater (less) than 78.7% (24.2%). The analysis described above is repeated on this reduced sample to provide further evidence on Hypotheses 6.2_a and 6.2_b.

Hypotheses 6.3_a and 6.3_b investigate the effect of managerial ownership on the level of directors' remuneration. The percentage of equity owned by the MD (*MD %*) is used as the first measure of managerial ownership and a number of dummy variables are constructed

³⁴ Descriptive statistics for both the full sample and the reduced sample are provided in Section 4.5.4.

based on this percentage to reflect differing levels of managerial ownership. These are *MD Low*, *MD 50*, *MD High* and *MD Largest*. These variables are defined in Table 6.1 and discussed in section 4.3.1 To test the relationship between managerial ownership and the level of directors' remuneration in the sample firms (Hypotheses 6.3_a and 6.3_b) I estimate the following 2SLS regressions.

$$\text{Eq.36} \quad \ln Dirs \text{ Remun}_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 MD \text{ Low}_i + \beta_3 Controls_i + \varepsilon_i$$

$$\text{Eq.37} \quad \ln Dirs \text{ Remun}_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 MD \text{ 50}_i + \beta_3 Controls_i + \varepsilon_i$$

$$\text{Eq.38} \quad \ln Dirs \text{ Remun}_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 MD \text{ High}_i + \beta_3 Controls_i + \varepsilon_i$$

$$\text{Eq.39} \quad \ln Dirs \text{ Remun}_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 MD \text{ LGST } \%_i + \beta_3 Controls_i + \varepsilon_i$$

$$\text{Eq.40} \quad \ln Dirs \text{ Remun}_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 MD \%_i + \beta_3 Controls_i + \varepsilon_i$$

$$\text{Eq.41} \quad \ln Dirs \text{ Remun}_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 MD \%_i + \beta_3 MD \%_i^2 + \beta_4 Controls_i + \varepsilon_i$$

$$\text{Eq.42} \quad \ln Dirs \text{ Remun}_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 MD \%_i + \beta_3 MD \%_i^2 + \beta_4 MD \%_i^3 + \beta_5 Controls_i + \varepsilon_i$$

Hypothesis 6.3_a predicts a negative relationship between managerial ownership and the level of directors' remuneration. If this is the case, the signs on β_2 coefficients in Eq. 36 to 40 will be positive, negative, negative, negative and negative respectively. Equations 41 and 42 allow for a non-linear relationship between managerial ownership and remuneration. Hypothesis 6.3_b predicts negative and positive coefficients on β_2 and β_3 respectively in Equation 41, indicating that remuneration rises and then falls as entrenchment effects dominate beyond a certain point. Equation 42 includes a cubic term to allow for excessive remuneration to decline as cash-flow and control rights converge when managerial ownership approaches 100%.

Hypothesis 6.3_c predicts that managerial ownership will moderate the pay-performance relationship. I test this hypothesis by including interaction terms between ROA_{-1} and measures of managerial ownership in regressions. These regressions are shown in equations 43 to 47 below. The approach used is the same as that used to test hypothesis 6.2_b.

$$\text{Eq.43} \quad \ln Dirs \text{ Remun}_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 MD \text{ Low}_i + \beta_3 \widehat{ROA}_{-1,i} * MD \text{ Low}_i + \beta_4 Controls_i + \varepsilon_i$$

$$\text{Eq.44} \quad \ln Dirs \text{ Remun}_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 MD 50_i + \beta_3 ROA_{-1,i} * \widehat{MD} 50_i + \beta_4 Controls_i + \varepsilon_i$$

$$\text{Eq.45} \quad \ln Dirs \text{ Remun}_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 MD High_i + \beta_3 ROA_{-1,i} * \widehat{MD} High_i + \beta_4 Controls_i + \varepsilon_i$$

$$\text{Eq.46} \quad \ln Dirs \text{ Remun}_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 MD LGST_i + \beta_3 ROA_{-1,i} * \widehat{MD} LGST_i + \beta_4 Controls_i + \varepsilon_i$$

$$\text{Eq.47} \quad \ln Dirs \text{ Remun}_i = \partial + \beta_1 \widehat{ROA}_{-1,i} + \beta_2 MD \%_i + \beta_3 ROA_{-1,i} * \widehat{MD} \%_i + \beta_4 Controls_i + \varepsilon_i$$

A significant coefficient on the interaction term in each equation indicates a moderating effect of managerial ownership. If low (as compared with intermediate or high) levels of managerial ownership moderates the pay-performance relationship, the coefficient on β_2 in Eq. 43 will be significant. Each of the four other equations examine whether high or increasing managerial ownership moderates this relationship. Negative, significant coefficients on the interaction terms in each of Eq. 44 to 47 will indicate that high levels of managerial ownership are associated with lower pay-performance sensitivities.

6.4 Results

This section presents the results of the empirical analysis described in the previous section. Descriptive statistics for the full sample and reduced sample variables are provided in Chapter 4 (Section 4.5.4). Pearson correlation coefficients for variables used in the analysis are provided in Table 6.2 and 6.3. The regressions examining pay-performance sensitivity and the effect of ownership concentration on the level and sensitivity to performance of directors' remuneration are presented in Tables 6.4 to 6.10. The results of regressions examining the relationship between managerial ownership and directors' remuneration are shown in Tables 6.11 to 6.13. Section 6.4.8 discusses diagnostic and sensitivity tests performed on the results.

6.4.1 Correlation Analysis

This section presents Pearson Correlation Coefficients for variables in the study sample (Table 6.2) and the reduced sample (Table 6.3). In the study sample, all explanatory variables except *ROA_t* are correlated with *ln Dirs. Remun.* *ln Turnover*, *ln Age*, *ln No. of Subsidiaries* and *ln Dividend Paid* are positively correlated with Directors Remuneration. Both ownership variables, the percentage ownership share of the MD and the largest single shareholder are negatively correlated with *ln Dirs. Remun.* Correlations between variables in the reduced sample are similar, although neither *MD %* nor *ln Age* are significantly related to *ln Dirs. Remun.* in this sample. The negative correlations between both ownership structure variables and Directors' Remuneration are consistent with the predications of Hypotheses 6.2_a and 6.3_a.

Table 6.2: Pearson Correlation Coefficients for Directors' Remuneration and Explanatory Variables. Full Sample

Pearson Correlation Coefficients: Full Sample										
	In Dirs. Remun.	ROA ₋₁	ln Turnover	No. of Directors	ln Age	ln No of Subsidiaries	ln Dividend Paid	Largest Shldr %	MD %	
1	In Dirs. Remun.	1								
2	ROA ₋₁	0.043	1							
		-0.135								
3	ln Turnover	0.231***	0.059**	1						
		0.000	0.041							
4	No. of Directors	0.379***	-0.059**	0.122***	1					
		0.000	0.040	0.000						
5	ln Age	0.106***	-0.077***	-0.026	0.226***	1				
		0.000	0.007	0.364	0.000					
6	ln No of Subsidiaries	0.123***	-0.118***	0.249***	0.220***	0.032	1			
		0.000	0.000	0.000	0.000	-0.266				
7	ln Dividend Paid	0.147***	0.292***	0.088***	0.100***	0.088***	0.019	1		
		0.000	0.000	0.002	0.000	0.002	0.499			
8	Largest Shldr %	-0.147***	0.042	-0.020	-0.365***	-0.124***	-0.219***	-0.151***	1	
		0.000	0.143	0.484	0.000	0.000	0.000	0.000		
9	MD %	-0.157***	0.029	-0.005	-0.312***	-0.110***	-0.182***	-0.169***	0.609***	1
		0.000	0.317	-0.868	0.000	0.000	0.000	0.000	0.000	

*** p<0.01, ** p<0.05, * p<0.1

Table 6.3: Pearson Correlation Coefficients for Directors' Remuneration and Explanatory Variables. Reduced Sample

Pearson Correlation Coefficients: Reduced Sample									
	Ln Dirs. Remun.	ROA ₋₁	Ln Turnover	No. of Directors	ln Age	ln No of Subsidiaries	Ln Dividend Paid	Largest Shldr %	MD %
1 Ln Dirs. Remun.	1								
2 ROA ₋₁	0.062	1							
	-0.193								
3 Ln Turnover	0.293***	0.035	1						
	0.000	0.469							
4 No. of Directors	0.323***	-0.019	0.163***	1					
	0.000	0.689	0.001						
5 ln Age	0.066	-0.067	-0.020	0.145***	1				
	0.167	0.157	0.682	0.002					
6 ln No of Subsidiaries	0.086*	-0.089*	0.338***	0.235***	0.024	1			
	0.072	0.062	0.000	0.000	0.611				
7 Ln Dividend Paid	0.165***	0.322***	0.111**	0.062	0.085*	0.059	1		
	0.001	0.000	0.020	0.192	0.076	0.214			
8 Largest Shldr %	-0.121**	0.077	-0.079*	-0.331***	-0.130***	-0.276***	-0.088*	1	
	0.011	0.107	0.096	0.000	0.006	0.000	0.064		
9 MD %	0.050	0.078	-0.025	0.031	-0.055	-0.104**	-0.022	-0.204***	1
	-0.295	0.100	0.606	0.522	0.253	0.029	0.641	0.000	

6.4.2. 2SLS Regression Results

The hypotheses outlined in section 6.2 are tested by estimating a series of 2SLS regressions with *ln Dirs. Remun.* as the dependant variable. The first hypothesis, 6.1, predicts that directors' remuneration is an increasing function of firm performance after controlling for other firm characteristics and is tested by regressing measures of remuneration on firm performance and control variables. The results of this analysis are presented in Table 6.4 (Column 1). The second set of hypotheses, 6.2_a and 6.2_b, predict that the level and sensitivity to firm performance of directors remuneration respectively are related to ownership concentration. These are tested by including a range of ownership concentration variables in the remuneration/performance regressions and by interacting measures of ownership concentration with firm performance to establish whether ownership concentration moderates the pay/performance relationship. The results of these regressions are presented in Tables 6.6 to 6.10. Finally I examine whether managerial ownership influences the level of remuneration or pay-performance sensitivity. This is tested using the same approach as outline for ownership concentration. Tables 6.11, 6.12 and 6.13 present the results of these tests.

6.4.3 Firm Performance and Directors Remuneration

The first column in Table 6.4 provides the result of a regression of *ln Dirs. Remun.* on lagged *ROA* and control variables. If directors' remuneration is sensitive to firm performance I expect a positive significant coefficient on *ROA₋₁*. The coefficient is positive and significant at the 1% level. The remaining columns in Table 6.4 and the results of estimating all of the outlined regressions on both the full sample and the reduced sample indicate that the magnitude of the coefficient on *ROA₋₁* remains stable after controlling for various ownership characteristics. These results suggest that, despite highly concentrated ownership structures and high levels of managerial ownership evident in the sample firms – private firms exhibit significant pay-performance sensitivity.

Table 6.4: 2SLS Regressions, Performance, Ownership Concentration and the Level of Total Directors' Remuneration (1)

VARIABLES	Predicted Sign	(1) ln Dirs. Remun	(2) ln Dirs. Remun	(3) ln Dirs. Remun	(4) ln Dirs. Remun	(5) ln Dirs. Remun
ROA ₋₁	+	2.667*** (0.935)	2.671*** (0.934)	2.685*** (0.934)	2.627*** (0.935)	2.630*** (0.933)
Industry (D)	?	No	No	No	No	No
ln Turnover	+	0.348*** (0.059)	0.346*** (0.059)	0.342*** (0.059)	0.355*** (0.059)	0.348*** (0.059)
ln Age	?	0.064 (0.045)	0.065 (0.045)	0.063 (0.045)	0.063 (0.045)	0.062 (0.045)
ln No. of Subsidiaries	+	0.038 (0.048)	0.043 (0.048)	0.046 (0.048)	0.031 (0.048)	0.045 (0.048)
ln Dividend Paid	?	0.021 (0.016)	0.023 (0.016)	0.022 (0.016)	0.020 (0.016)	0.021 (0.016)
No. Directors	+	0.238*** (0.019)	0.241*** (0.019)	0.242*** (0.019)	0.231*** (0.019)	0.236*** (0.020)
LGST Low (D)	+		-0.078 (0.113)			-0.024 (0.125)
LGST 50 (D)	-			0.087 (0.086)		0.183* (0.107)
LGST High (D)	-				-0.142 (0.100)	-0.249** (0.114)
Constant		0.277 (0.650)	0.281 (0.650)	0.259 (0.651)	0.282 (0.650)	0.250 (0.649)
Observations		1,217	1,217	1,217	1,217	1,217
Wald chi ²		284.45***	286.33***	287.87***	291.59***	295.03***
First Stage F-statistic		153.15	153.11	153.83	153.16	153.74

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **ln Dirs. Remun** which is natural log of Total Directors' Remuneration.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

ln Turnover is the natural log of turnover.

ln Age is the natural log of the number of years since firm incorporation.

ln No. of Subsidiaries is the natural log of the number of subsidiaries.

ln Dividend Paid is the natural log of the dividend paid

No. Of Directors is the total number of directors in the firm.

LGST Low is a dummy variable coded one where the largest single shareholder's ownership percentage is less than the sample mean minus one standard deviation.

LGST 50 is a dummy variable coded one where the largest single shareholder's equity ownership percentage is greater than 50%.

LGST High is a dummy variable coded one where the largest single shareholder's ownership percentage is greater than the sample mean plus one standard deviation.

LGST % is the percentage of equity owned by the largest single shareholder.

Instruments for **ROA₋₁**, included in the first stage of the 2SLS regression are:

Fixed Asset Intensity₋₁

Leverage₋₁ is Total Debt/Total Debt plus Shareholders Funds.

(D) indicates a dummy variable.

Size, measured by the log of Turnover, has the expected positive significant relationship with remuneration in all specification. Since *ln Dirs. Remun.* is the aggregate remuneration paid to all directors in the firm it would be expected to be an increasing function of the number of directors and this is the case in the results shown. The number of subsidiaries in the firm is included as a measure of the complexity of the firm, albeit a noisy proxy for this. There is no significant relationship between this and remuneration. Remuneration is not significantly related to industry in any specification.

6.4.4 Firm Performance and Directors' Remuneration. OLS Regressions

The evidence from existing research on pay-performance sensitivity in unlisted firms discussed in Chapter 2 is conflicting, with some studies not finding a significant relationship between pay and performance (Ke et al. (1999), Banhoj et al. (2010) and one recent study documenting a positive relationship between pay and performance (Michiels et al. 2012). A significant difference between studies in this area is that some treat firm performance as an endogenous variable and estimate the pay-performance relationship using instrumental variables (Banhoj et al. (2010) and Michiels et al. 2012), whereas Ke et al. (1999) treat firm performance as an exogenous variable. This difference in approach may contribute to the apparent contradiction in empirical findings. To examine the effect of this difference in approach I estimate equation 25 using OLS. The result of this analysis is shown in Table 6.5.

These results are notably different to the results of 2SLS regressions shown in Column 1 of Tables 6.6. When the endogenous nature of the relationship between firm performance and pay is not accounted for in the empirical approach, the aggregate level of directors' remuneration is not sensitive to firm performance. This illustrates that using a methodology which ignores the endogenous nature of the relationship between pay and performance may result in misleading findings and suggests that methodological differences may account for some of the conflicting results in the existing literature on pay-performance sensitivity in private firms.

Table 6.5: OLS Regressions, Firm Performance and the Level of Directors' Remuneration

VARIABLES	(1) ln Dirs. Remun
ROA ₋₁	0.426 (0.420)
Industry (D)	No
Ln Turnover	0.376*** (0.058)
Ln Age	0.050 (0.045)
Ln No. of Subsidiaries	0.002 (0.046)
Ln Dividend Paid	0.043*** (0.014)
No. Directors	0.233*** (0.019)
Constant	0.211 (0.647)
Observations	1,217
R-squared	0.190

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Ln Dirs. Remun** which is natural log of Total Directors' Remuneration

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover.

Ln Age is the natural log of the number of years since firm incorporation.

Ln No. of Subsidiaries is the natural log of the number of subsidiaries.

Ln Dividend Paid is the natural log of the dividend paid

No. Of Directors is the total number of directors in the firm.

(D) indicates a dummy variable.

6.4.5 Ownership Concentration and Directors' Remuneration

The second set of hypotheses examines the effect of ownership concentration on the level of remuneration and on the sensitivity of remuneration to performance. Hypothesis 6.2_a predicts that higher ownership concentration, by facilitating more effective shareholder monitoring of management, will be associated with lower executive compensation. Four measures of ownership concentration are used here. The first is the percentage of equity owned by the largest, individual shareholder in the firm. The remaining three measures are dummy variables based on this ownership percentage. *LGST Low* (*LGST High*) are dummy variables, coded one where the largest single shareholder's ownership percentage is less (more) than the sample mean minus (plus) one standard deviation and zero otherwise. *LGST 50* is a dummy

variable coded one where the largest shareholder owns a majority (>50%) of the equity in the firm and coded zero otherwise.

The results of this analysis are shown in Tables 6.6 and 6.8. Table 6.6 includes dummy variables indicating high or low ownership concentration. Column 1 includes *LGST Low*, which indicates a low level of ownership concentration. Hypothesis 6.2_a predicts a positive coefficient on *LGST Low*, indicating that remuneration is higher where ownership is dispersed. This relationship is not evident. The hypothesis predicts negative coefficients on *LGST 50* and *LGST High*, with majority control by a single shareholder and extreme ownership concentration expected to be associated with lower remuneration. The only significant relationship between concentration and remuneration is shown in Column 4, in which all the variables indicating aspects of concentration are included except *LGST %*. This variable is excluded due to a Variance Inflation Factor (VIF) of 14.38 when it is included, which indicates multicollinearity in the model. It is analysed separately and the results provided in Table 6.7. In this model *LGST 50* is positively related to remuneration and *LGST High* is negatively associated with remuneration. This suggests a non-linear relationship may exist between ownership concentration and remuneration. Majority equity ownership by a single shareholder is associated with increased remuneration but very high ownership concentration (a single shareholder owning in excess of 86.44% of equity) is associated with lower remuneration.

Table 6.7 includes the percentage ownership share of the largest shareholder and its squared and cubed terms. *LGST %* is not significant in the first specification, indicating there is not a significant linear relationship. When the squared term is also included both terms are significant. The coefficients on *LGST %* and *LGST %²* indicate that remuneration first increases with increasing ownership concentration and but once the ownership share of the largest shareholder increases beyond 60.3%, increasing ownership concentration is negatively related to remuneration. Column 3 reports the results of testing for a cubic relationship between ownership concentration and remuneration.

Table 6.6: 2SLS Regressions, Performance, Ownership Concentration and the Level of Total Directors' Remuneration (1)

VARIABLES	Predicted Sign	(1) ln Dirs. Remun	(2) ln Dirs. Remun	(3) ln Dirs. Remun	(4) ln Dirs. Remun
ROA ₋₁	+	2.671*** (0.934)	2.685*** (0.934)	2.627*** (0.935)	2.630*** (0.933)
Industry (D)	?	No	No	No	No
ln Turnover	+	0.346*** (0.059)	0.342*** (0.059)	0.355*** (0.059)	0.348*** (0.059)
ln Age	?	0.065 (0.045)	0.063 (0.045)	0.063 (0.045)	0.062 (0.045)
ln No. of Subsidiaries	+	0.043 (0.048)	0.046 (0.048)	0.031 (0.048)	0.045 (0.048)
ln Dividend Paid	?	0.023 (0.016)	0.022 (0.016)	0.020 (0.016)	0.021 (0.016)
No. Directors	+	0.241*** (0.019)	0.242*** (0.019)	0.231*** (0.019)	0.236*** (0.020)
LGST Low (D)	+	-0.078 (0.113)			-0.024 (0.125)
LGST 50 (D)	-		0.087 (0.086)		0.183* (0.107)
LGST High (D)	-			-0.142 (0.100)	-0.249** (0.114)
Constant		0.281 (0.650)	0.259 (0.651)	0.282 (0.650)	0.250 (0.649)
Observations		1,217	1,217	1,217	1,217
Wald chi ²		286.33***	287.87***	291.59***	295.03***
First Stage F-statistic		153.11	153.83	153.16	153.74

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **ln Dirs. Remun** which is natural log of Total Directors' Remuneration.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

ln Turnover is the natural log of turnover.

ln Age is the natural log of the number of years since firm incorporation.

ln No. of Subsidiaries is the natural log of the number of subsidiaries.

ln Dividend Paid is the natural log of the dividend paid

No. Of Directors is the total number of directors in the firm.

LGST Low is a dummy variable coded one where the largest single shareholder's ownership percentage is less than the sample mean minus one standard deviation.

LGST 50 is a dummy variable coded one where the largest single shareholder's equity ownership percentage is greater than 50%.

LGST High is a dummy variable coded one where the largest single shareholder's ownership percentage is greater than the sample mean plus one standard deviation.

Instruments for **ROA₋₁**, included in the first stage of the 2SLS regression are:

Fixed Asset Intensity₋₁

Leverage₋₁ is Total Debt/Total Debt plus Shareholders Funds.

(D) indicates a dummy variable.

Table 6.7: 2SLS Regressions, Performance, Ownership Concentration and the Level of Total Directors' Remuneration (2)

VARIABLES	Predicted Sign	(1) ln Dirs. Remun	(2) ln Dirs. Remun	(3) ln Dirs. Remun
ROA ₋₁	+	2.662*** (0.933)	2.650*** (0.933)	2.608*** (0.929)
Industry (D)	?	No	No	No
ln Turnover	+	0.349*** (0.059)	0.351*** (0.059)	0.352*** (0.059)
ln Age	?	0.064 (0.045)	0.067 (0.045)	0.060 (0.045)
ln No. of Subsidiaries	+	0.036 (0.048)	0.044 (0.048)	0.042 (0.048)
ln Dividend Paid	?	0.021 (0.016)	0.022 (0.016)	0.019 (0.016)
No. Directors	+	0.236*** (0.020)	0.237*** (0.020)	0.235*** (0.020)
LGST %	-	-0.042 (0.161)	1.375* (0.789)	-4.874** (2.430)
LGST % ²	+		-1.147* (0.624)	11.366*** (4.636)
LGST % ³	-			-7.214*** (2.645)
Constant		0.300 (0.657)	-0.097 (0.692)	0.790 (0.764)
Observations		1217	1217	1217
Wald chi ²		286.38	293.02***	301.74***
First Stage F-statistic		153.92	154.74	154.99

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **ln Dirs. Remun** which is natural log of Total Directors' Remuneration.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

ln Turnover is the natural log of turnover.

ln Age is the natural log of the number of years since firm incorporation.

ln No. of Subsidiaries is the natural log of the number of subsidiaries.

ln Dividend Paid is the natural log of the dividend paid

No. Of Directors is the total number of directors in the firm.

LGST % is the percentage of equity owned by the largest single shareholder.

Instruments for **ROA₋₁**, included in the first stage of the 2SLS regression are:

Fixed Asset Intensity₋₁

Leverage₋₁ is Total Debt/Total Debt plus Shareholders Funds.

(D) indicates a dummy variable.

In this specification the coefficients on *LGST %*, *LGST %²* and *LGST %³* are significant, indicating that remuneration is cubically related to ownership. Remuneration declines as the ownership share of the largest shareholder increases to 30%, after this point remuneration increases with increased concentration until the ownership share of the largest shareholder is 75%. Increasing ownership concentration beyond this point is associated with falling remuneration.

On balance, the evidence does not support hypothesis 6.2_a, there does not appear to be a linear negative relationship between ownership concentration and remuneration. These

findings contrast with much existing research (e.g. Hartzell & Starks 2003, Ozkan 2011), using samples drawn from public firms where ownership concentration is negatively related to the level of executive remuneration. The results indicate that the monitoring effect evident in public firms dominates until largest shareholder ownership concentration reaches 30%. Between 30% and 75% ownership entrenchment effects are dominant. Beyond this “entrenchment zone”, the separation between majority and minority shareholders declines as the majority shareholder’s cash-flow rights begin to approach 100% and the incentive to divert firm resources through compensation consequently reduces.

Hypothesis 6.2_b considers the effect of ownership concentration on the pay-performance sensitivity in sample firms. The hypothesis predicts that ownership concentration moderates the pay-performance relationship, such that firms with higher ownership concentration will exhibit lower pay-performance sensitivity. Two arguments can be advanced as to why high ownership concentration will be associated with lower pay-performance sensitivity. More concentrated ownership should facilitate more effective monitoring of managers by shareholders and decrease the requirement to align interests through pay-performance sensitivity. Alternatively, if the firm’s largest shareholder is the MD, they will control the pay setting process and have little incentive to make pay contingent on performance. This is tested by interacting $ROA_{i,t}$ with the ownership variables discussed above and estimating equations 32 to 35.

Table 6.8: 2SLS Regression, Ownership Concentration and the Sensitivity of Directors' Remuneration to Firm Performance

VARIABLES	Predicted Sign	(1) Ln Dirs. Remun	(2) Ln Dirs. Remun	(3) Ln Dirs. Remun	(4) Ln Dirs. Remun
ROA ₋₁	+	2.713*** (0.957)	4.597*** (1.422)	3.439*** (1.093)	6.138*** (2.325)
Industry (D)	?	No	No	No	No
Ln Turnover	+	0.346*** (0.059)	0.347*** (0.060)	0.352*** (0.059)	0.341*** (0.059)
Ln Age	?	0.064 (0.046)	0.073 (0.046)	0.069 (0.045)	0.061 (0.046)
Ln No. of Subsidiaries	+	0.043 (0.048)	0.041 (0.049)	0.033 (0.048)	0.040 (0.048)
Ln Dividend Paid	?	0.023 (0.017)	0.020 (0.016)	0.018 (0.016)	0.020 (0.016)
No. Directors	+	0.241*** (0.019)	0.243*** (0.020)	0.229*** (0.020)	0.233*** (0.020)
ROA ₋₁ * LGST Low (I)	+	-0.458 (3.336)			
LGST Low (D)		-0.041 (0.293)			
ROA ₋₁ * LGST 50 (I)	-		-3.617** (1.78)		
LGST 50 (D)			0.478** (0.191)		
ROA ₋₁ * LGST High (I)	-			-3.114* (1.872)	
LGST High (D)				0.245 (0.205)	
ROA ₋₁ * LGST % (I)	-				-5.427* (3.281)
LGST %					0.572* (0.332)
Constant		0.274 (0.653)	0.003 (0.673)	0.235 (0.653)	-1.606** (0.693)
Observations		1,217	1,217	1,217	1,217
Wald chi ²		288.32	285.70***	288.85***	320.41***
First Stage F-statistic		36.11	69.33	70.23	64.31

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Ln Dirs. Remun** which is natural log of Total Directors' Remuneration.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover.

Ln Age is the natural log of the number of years since firm incorporation.

Ln No. of Subsidiaries is the natural log of the number of subsidiaries.

Ln Dividend Paid is the natural log of the dividend paid

No. Of Directors is the total number of directors in the firm.

LGST Low is a dummy variable coded one where the largest single shareholder's ownership percentage is less than the sample mean minus one standard deviation.

LGST 50 is a dummy variable coded one where the largest single shareholder's equity ownership percentage is greater than 50%.

LGST High is a dummy variable coded one where the largest single shareholder's ownership percentage is greater than the sample mean plus one standard deviation.

Instruments for **ROA₋₁**, included in the first stage of the 2SLS regression are:

LGST % is the percentage shareholding of the largest single shareholder.

Fixed Asset Intensity₋₁

Leverage₋₁ is Total Debt/Total Debt plus Shareholders Funds.

(D) indicates a dummy variable.

(I) indicates an interaction variable.

The results of this analysis are presented in Table 6.8. In each of the four models shown, the variable of interest is the interaction term. A statistically significant coefficient will indicate that the relevant ownership variable moderates the relationship between pay and performance. A positive coefficient is predicted on the variable $ROA_{-1} * LGST Low (I)$, which would indicate that where the ownership share of the largest shareholder is in the lowest 21% of the distribution, directors' remuneration will be more sensitive to performance than for the remaining firms. This is not supported by the results in model 1, *LGST Low* does not play a moderating role in the sample firms. For each of the remaining models a negative coefficient is predicted. The remaining interaction terms are all significant and all have the predicted signs. In model 2, which measures the effect of the presence of a single majority shareholder, the coefficient on ROA_{-1} is 4.597 where there is no majority shareholder and 0.980 ($4.597 - 3.617$) where there is a majority shareholder. The results from models 3 and 4 are similar. Firms with a majority shareholder owning in excess of 86% of equity (*LGST High*) have remuneration which is significantly less sensitive to firm performance than other firms. The final model indicates that pay-performance sensitivity declines as the ownership share of the largest shareholder increases. These results strongly support hypothesis 6.2_b, that concentrated ownership is associated with lower pay-performance sensitivity.

6.4.6 Ownership Concentration and Remuneration. Analysis of Reduced Sample

The preceding analysis is conducted on a sample in which the largest single shareholder is the MD in the majority of firms. The effect of ownership concentration and managerial alignment is likely to be conflated in this sample of firms. A sub-sample of 442 firms is constructed by culling firms in which the MD is the largest shareholder. The analysis described above is repeated on this sample of firms. The characteristics of these two samples are described and compared in Chapter 4 (Section 4.5.4). Table 6.9 shows the results of testing Hypothesis 6.2_a on this reduced sample. *LGST High*, a dummy variable indicating a high level of ownership concentration is the only significant predictor. Remuneration is significantly lower in the 20.6% of firms in which the largest shareholder owns in excess of 78.7%. When "owner-managed" firms are excluded there is limited evidence of a linear, negative, between ownership concentration and directors' remuneration. Table 6.10 shows the results of testing hypothesis 6.2_b on the reduced sample. The only significant moderator of the pay-

performance relationship is *LGST High*, which is associated with significantly lower pay-performance sensitivity.

These results should be interpreted with caution since the significantly smaller sample size in this analysis will increase standard errors. The two samples also vary in several significant respects, such as size and number of directors, which are themselves correlated with remuneration. Finally the reduced sample includes only “non-owner managed” private firms, which is an unusual corporate form and the relationship between remuneration and ownership structure in these firms may not be generalizable to the broader population of private firms.

Table 6.9: 2SLS Regressions, Performance, Ownership Concentration and the Level of Total Directors' Remuneration. Reduced Sample

VARIABLES	Predicted Sign	(1) Ln Dirs. Remun	(2) Ln Dirs. Remun	(3) Ln Dirs. Remun	(4) Ln Dirs. Remun	(5) Ln Dirs. Remun	(6) Ln Dirs. Remun	(7) Ln Dirs. Remun
ROA ₋₁	+	3.177** (1.431)	3.149** (1.443)	3.183** (1.429)	3.015** (1.424)	2.928** (1.441)	3.150** (1.422)	3.018** (1.446)
Industry (D)	?	No	No	No	No	No	No	No
Ln Turnover	+	0.461*** (0.087)	0.459*** (0.087)	0.459*** (0.087)	0.470*** (0.087)	0.467*** (0.087)	0.464*** (0.087)	0.467*** (0.087)
Ln Age	?	0.044 (0.067)	0.045 (0.067)	0.044 (0.067)	0.037 (0.066)	0.035 (0.066)	0.041 (0.067)	0.042 (0.066)
Ln No. of Subsidiaries	+	-0.060 (0.072)	-0.052 (0.072)	-0.053 (0.073)	-0.074 (0.072)	-0.054 (0.073)	-0.070 (0.073)	-0.063 (0.073)
Ln Dividend Paid	?	0.021 (0.026)	0.023 (0.027)	0.021 (0.026)	0.023 (0.026)	0.026 (0.026)	0.021 (0.026)	0.026 (0.027)
No. Directors	+	0.176*** (0.028)	0.180*** (0.029)	0.179*** (0.029)	0.167*** (0.029)	0.173*** (0.029)	0.172*** (0.029)	0.171*** (0.029)
LGST Low (D)	+		-0.097 (0.163)			-0.087 (0.183)		
LGST 50 (D)	-			0.058 (0.139)		0.161 (0.173)		
LGST High (D)	-				-0.261 (0.180)	-0.381* (0.204)		
LGST %	-						-0.151 (0.260)	1.158 (1.206)
LGST % ²	+							-1.120 (1.002)
Constant		-0.391 (0.970)	-0.387 (0.969)	-0.414 (0.971)	-0.355 (0.965)	-0.399 (0.964)	-0.296 (0.983)	-0.638 (1.028)
Observations		442	442	442	442	442	442	442
Wald chi ²		109.43***	111.12***	109.92***	112.39***	116.42***	109.66***	113.11***
First Stage F-statistic		60.29	60.32	60.49	60.13	59.33	61.22	59.51

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Ln Dirs. Remun** which is natural log of Total Directors' Remuneration.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover.

Ln Age is the natural log of the number of years since firm incorporation.

Ln No. of Subsidiaries is the natural log of the number of subsidiaries.

Ln Dividend Paid is the natural log of the dividend paid

No. Of Directors is the total number of directors in the firm.

LGST Low is a dummy variable coded one where the largest single shareholder's ownership percentage is less than the sample mean minus one standard deviation.

LGST 50 is a dummy variable coded one where the largest single shareholder's equity ownership percentage is greater than 50%.

LGST High is a dummy variable coded one where the largest single shareholder's ownership percentage is greater than the sample mean plus one standard deviation.

Instruments for **ROA₋₁**, included in the first stage of the 2SLS regression are:

LGST % is the percentage shareholding of the largest single shareholder.

Fixed Asset Intensity₋₁

Leverage₋₁ is Total Debt/Total Debt plus Shareholders Funds.

(D) indicates a dummy variable.

(I) indicates an interaction variable.

Table 6.10: 2SLS Regression, Ownership Concentration and the Sensitivity of Directors' Remuneration to Firm Performance. Reduced Sample

VARIABLES	Predicted Sign	(1) Ln Dirs. Remun	(2) Ln Dirs. Remun	(3) Ln Dirs. Remun	(4) Ln Dirs. Remun
ROA ₋₁	+	3.530** (1.433)	3.354* (1.847)	4.501*** (1.640)	5.089 (3.394)
Industry (D)	?	No	No	No	No
Ln Turnover	+	0.458*** (0.087)	0.460*** (0.089)	0.465*** (0.088)	0.465*** (0.088)
Ln Age	?	0.044 (0.066)	0.045 (0.067)	0.038 (0.067)	0.047 (0.067)
Ln No. of Subsidiaries	+	-0.045 (0.072)	-0.056 (0.076)	-0.073 (0.073)	-0.078 (0.074)
Ln Dividend Paid	?	0.024 (0.027)	0.022 (0.026)	0.024 (0.026)	0.022 (0.026)
No. Directors	+	0.183*** (0.029)	0.179*** (0.029)	0.161*** (0.029)	0.169*** (0.030)
ROA ₋₁ * LGST Low (I)	+	-3.387 (5.462)			
LGST Low (D)		0.160 (0.434)			
ROA ₋₁ * LGST 50 (I)	-		-0.370 (2.657)		
LGST 50 (D)			0.093 (0.287)		
ROA ₋₁ * LGST High (I)	-			-6.710** (2.925)	
LGST High (D)				0.378 (0.333)	
ROA ₋₁ * LGST % (I)	-				-3.410 (5.140)
LGST %					0.141 (0.509)
Constant		-0.438 (0.968)	-0.449 (1.005)	-0.392 (0.971)	-0.462 (1.016)
Observations		442	442	442	442
Wald chi ²		113.5	109.78	115.38	109.16
First Stage F-statistic		9.70	28.29	25.63	25.20

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Ln Dirs. Remun** which is natural log of Total Directors' Remuneration.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover.

Ln Age is the natural log of the number of years since firm incorporation.

Ln No. of Subsidiaries is the natural log of the number of subsidiaries.

Ln Dividend Paid is the natural log of the dividend paid

No. Of Directors is the total number of directors in the firm.

LGST Low is a dummy variable coded one where the largest single shareholder's ownership percentage is less than the sample mean minus one standard deviation.

LGST 50 is a dummy variable coded one where the largest single shareholder's equity ownership percentage is greater than 50%.

LGST High is a dummy variable coded one where the largest single shareholder's ownership percentage is greater than the sample mean plus one standard deviation.

Instruments for **ROA₋₁**, included in the first stage of the 2SLS regression are:

LGST % is the percentage shareholding of the largest single shareholder.

Fixed Asset Intensity₋₁

Leverage₋₁ is Total Debt/Total Debt plus Shareholders Funds.

(D) indicates a dummy variable.

(I) indicates an interaction variable.

6.4.7 Managerial Ownership and Directors' Remuneration

The final set of hypotheses, 6.3_a, 6.3_b and 6.3_c examine the relationship between firm performance, remuneration and managerial ownership. Increasing managerial ownership should more closely align the interests of shareholders and executives by reducing the marginal benefit to executives of self-interested behaviour, including excessive remuneration. Firms with an increasing level of managerial ownership therefore should derive progressively less benefit from making pay contingent on firm performance. Since dividends and retained earnings are attributed pro-rata to shareholders, increasing managerial ownership also increases the extent to which dividends and retained earnings substitute for remuneration for managers. This further suggests a negative relationship between the level of remuneration and managerial ownership.

Hypothesis 6.3_a predicts a lower level of executive compensation in firms with a high degree of managerial ownership. Four measures of managerial ownership are constructed from the percentage of equity owned by the MD. *MD Low* (*MD High*) are dummy variables, coded one where the MD's ownership percentage is less (more) than the sample mean minus (plus) one standard deviation and zero otherwise. *MD 50* is a dummy variable coded one where the MD owns a majority (>50%) of the equity in the firm and coded zero otherwise. *MD LGST* is a dummy variable coded one where the MD is the largest shareholder in the firm. Hypothesis 6.3_b predicts that this alignment effect will be overtaken by an entrenchment effect beyond a threshold shareholding.

Table 6.11: 2SLS Regression, Managerial Ownership and the Level of Total Directors' Remuneration (1)

VARIABLES	Predicted Sign	(1) Ln Dirs. Remun	(2) Ln Dirs. Remun	(3) Ln Dirs. Remun	(4) Ln Dirs. Remun	(5) Ln Dirs. Remun
ROA ₋₁	+	2.676*** (0.936)	2.665*** (0.935)	2.665*** (0.935)	2.683*** (0.935)	2.684*** (0.934)
Industry (D)	?	No	No	No	No	No
Ln Turnover	+	0.348*** (0.059)	0.351*** (0.059)	0.351*** (0.059)	0.350*** (0.059)	0.347*** (0.059)
Ln Age	?	0.062 (0.045)	0.064 (0.045)	0.064 (0.045)	0.062 (0.045)	0.063 (0.045)
Ln No. of Subsidiaries	+	0.034 (0.048)	0.035 (0.048)	0.034 (0.048)	0.031 (0.048)	0.035 (0.048)
Ln Dividend Paid	?	0.020 (0.016)	0.020 (0.016)	0.020 (0.016)	0.018 (0.016)	0.018 (0.016)
No. Directors	+	0.237*** (0.019)	0.235*** (0.019)	0.234*** (0.019)	0.231*** (0.019)	0.231*** (0.020)
MD Low (D)	+	0.080 (0.098)				-0.087 (0.135)
MD 50 (D)	-		-0.046 (0.088)			0.103 (0.131)
MD High (D)	-			-0.085 (0.102)		-0.088 (0.138)
MD LGST (D)	-				-0.163* (0.086)	-0.242* (0.129)
Constant		0.279 (0.650)	0.278 (0.650)	0.282 (0.650)	0.412 (0.654)	0.479 (0.658)
Observations		1,217	1,217	1,217	1,217	1,217
Wald chi ²		288.42***	286.54***	290.26***	291.54***	293.38***
First Stage F-statistic		153.08	153.22	152.92	152.86	153.82

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Ln Dirs. Remun** which is natural log of Total Directors' Remuneration.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover.

Ln Age is the natural log of the number of years since firm incorporation.

Ln No. of Subsidiaries is the natural log of the number of subsidiaries.

Ln Dividend Paid is the natural log of the dividend paid

No. Of Directors is the total number of directors in the firm.

MD Low is a dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.

MD 50 (D) is a dummy variable coded one where the MD's equity ownership percentage is greater than 50%.

MD High is a dummy variable coded one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation.

MD LGST (D) is a dummy variable coded one where the MD is the largest single shareholder in the firm.

Instruments for **ROA₋₁**, included in the first stage of the 2SLS regression are:

Fixed Asset Intensity₋₁

Leverage₋₁ is Total Debt/Total Debt plus Shareholders Funds.

(D) indicates a dummy variable.

Table 6.12: 2SLS Regression, Managerial Ownership and the Level of Total Directors' Remuneration (2)

VARIABLES	Predicted Sign	(1) Ln Dirs. Remun	(2) Ln Dirs. Remun	(3) Ln Dirs. Remun
ROA ₋₁	+	2.672*** (0.935)	2.665*** (0.936)	2.676*** (0.934)
Industry (D)	?	No	No	No
Ln Turnover	+	0.354*** (0.059)	0.355*** (0.059)	0.351*** (0.059)
Ln Age	?	0.062 (0.045)	0.063 (0.045)	0.062 (0.045)
Ln No. of Subsidiaries	+	0.029 (0.048)	0.029 (0.048)	0.031 (0.048)
Ln Dividend Paid	?	0.018 (0.016)	0.018 (0.016)	0.017 (0.016)
No. Directors	+	0.230*** (0.020)	0.230*** (0.020)	0.232*** (0.020)
MD %	-	-0.183 (0.126)	0.006 (0.417)	-1.611 (0.983)
MD % ²	+		-0.193 (0.407)	4.443* (2.591)
MD % ³	-			-3.154* (1.742)
Constant		0.349 (0.652)	0.312 (0.657)	0.416 (0.659)
Observations		1,217	1,217	1,217
Wald chi ²		288.42***	286.54***	293.48***
First Stage F-statistic		153.08	153.22	152.92

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Ln Dirs. Remun** which is natural log of Total Directors' Remuneration.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover.

Ln Age is the natural log of the number of years since firm incorporation.

Ln No. of Subsidiaries is the natural log of the number of subsidiaries.

Ln Dividend Paid is the natural log of the dividend paid

No. Of Directors is the total number of directors in the firm.

MD % is the percentage of equity owned by the MD

Instruments for **ROA₋₁**, included in the first stage of the 2SLS regression are:

Fixed Asset Intensity₋₁

Leverage₋₁ is Total Debt/Total Debt plus Shareholders Funds.

(D) indicates a dummy variable.

Tables 6.11 and 6.12 show the results of this analysis. If higher managerial ownership is associated with lower remuneration, a positive coefficient is predicted for *MD Low* and negative coefficients for the remaining ownership variables. Only the *MD LGST* variable is a significant predictor or *ln Dirs. Remun*. Aggregate directors' remuneration is lower in firms where the MD is the largest single shareholder. This effect remains significant where all dummy variables are included in the model (column 5). These results are somewhat consistent with the predictions of hypothesis 6.3_a although they do not suggest a strong

relationship between managerial ownership and remuneration. Hypothesis 6.3_a is weakly supported by these results.

Table 6.12 includes the ownership share of the MD as a predictor of remuneration along with its squared and cubic terms to capture a non-linear relationship between MD ownership and remuneration as predicted in Hypothesis 6.3_b. Neither term is significant in models 1 and 2. Model 3 includes the cube of MD % and both the quadratic and cubed terms are significant in this model. The relationship shown here between managerial ownership and remuneration is similar to that described earlier between ownership concentration and remuneration. Given the overlap between MDs and largest shareholders this is unsurprising. The coefficient on MD % is not significant, although the p-value of 0.101 indicates it is very close to being statistically significant. The results indicate that remuneration declines as MD ownership increases to 25%, the relationship then reverses and remuneration is positively associated with MD ownership until it reaches 70% and then declines as MD ownership increases. This pattern is consistent with the alignment of manager and shareholder interests until 25% MD ownership. An “entrenchment zone” is apparent between 25% and 70%, where remuneration increases with increasing MD ownership. The negative relationship beyond 70% MD ownership is consistent with the divergence between MD and shareholder interests declining (as the MD’s ownership share approaches 100%) and a consequent decline in the incentive to divert firm resources from shareholders through compensation.

Table 6.13: 2SLS Regression, Managerial Ownership and the Sensitivity of Directors' Remuneration to Firm Performance

VARIABLES	Predicted Sign	(1) Ln Dirs. Remun	(2) Ln Dirs. Remun	(3) Ln Dirs. Remun	(4) Ln Dirs. Remun	(5) Ln Dirs. Remun
ROA ₋₁	+	2.400** (1.088)	4.274*** (1.207)	3.441*** (1.068)	3.467** (1.400)	3.849*** (1.231)
Industry (D)	?	No	No	No	No	No
Ln Turnover	+	0.343*** (0.058)	0.342*** (0.059)	0.342*** (0.059)	0.344*** (0.058)	0.349*** (0.061)
Ln Age	?	0.061 (0.099)	0.064 (0.099)	0.069 (0.045)	0.075 (0.099)	0.064 (0.046)
Ln No. of Subsidiaries	+	0.039 (0.047)	0.048 (0.048)	0.045 (0.047)	0.037 (0.047)	0.024 (0.049)
Ln Dividend Paid	?	0.019 (0.016)	0.015 (0.016)	0.017 (0.016)	0.016 (0.016)	0.023 (0.017)
No. Directors	+	1.617*** (0.116)	1.630*** (0.121)	1.619*** (0.120)	1.584*** (0.118)	0.230*** (0.020)
ROA ₋₁ * MD Low (I)	+	1.199 (1.857)				
MD Low (D)		-0.032 (0.197)				
ROA ₋₁ * MD 50 (I)	-		-3.454** (1.742)			
MD 50 (D)			0.336* (0.192)			
ROA ₋₁ * MD High (I)	-			-2.135 (1.903)		
MD High (D)				0.196 (0.211)		
ROA ₋₁ * MD LGST (I)	-				-1.036 (1.746)	
MD LGST (D)					-0.053 (0.185)	
ROA ₋₁ * MD % (I)	-					-2.717 (2.014)
MD %						0.024 (0.201)
Constant		-1.078* (0.645)	-1.240* (0.656)	-1.146* (0.652)	-1.009 (0.662)	0.297 (0.670)
Observations		1,217	1,217	1,217	1,217	1217
Wald chi ²		323.55***	321.58***	321.63***	326.45***	276.75***
First Stage F-statistic		68.45	69.68	72.25	69.82	24.53

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Ln Dirs. Remun** which is natural log of Total Directors' Remuneration.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover.

Ln Age is the natural log of the number of years since firm incorporation.

Ln No. of Subsidiaries is the natural log of the number of subsidiaries.

Ln Dividend Paid is the natural log of the dividend paid

No. Of Directors is the total number of directors in the firm.

MD Low is a dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.

MD 50 (D) is a dummy variable coded one where the MD's equity ownership percentage is greater than 50%.

MD High is a dummy variable coded one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation.

MD Largest (D) is a dummy variable coded one where the MD is the largest single shareholder in the firm.

MD % is the percentage of equity owned by the MD

Instruments for **ROA₋₁**, included in the first stage of the 2SLS regression are:

Fixed Asset Intensity₋₁

Leverage₋₁ is Total Debt/Total Debt plus Shareholders Funds.

(D) indicates a dummy variable. **(I)** indicates an interaction variable.

Table 6.13 shows the results of testing hypothesis 6.3_c. Four interaction terms are included. The first, $ROA_{i,t} * MD\ Low$, tests whether a low level of managerial ownership, where the MD owns less than 8.69% of equity, moderates the relationship between firm performance and directors remuneration. The coefficient on this term is not significantly different from zero, indicating that there is no significant difference in pay-performance sensitivity between the 23.2% of firms that are in this category and the remaining firms. The interactions between $MD\ High$, $MD\%$ and $MD\ LGST$ and $ROA_{i,t}$ are not significant. The coefficient on the $ROA_{i,t} * MD\ 50$ term is significant at the 5% level. The sign and magnitude of this coefficient indicates the difference in the slope of the relationship between performance and pay in firms between firms with and without a majority equity owning MD. For firms which do not have a majority equity owning MD the slope on the relationship between $ROA_{i,t}$ and aggregate directors' remuneration is 4.274, whereas for firms in which the MD owns in excess of 50% of equity, this slope is significantly less steep at 0.820 (4.274 – 3.454). These results provide some limited support for hypothesis 6.3_b, that increased managerial ownership moderates pay-performance sensitivity but this effect is only evident at the 50% ownership threshold.

6.4.8 Diagnostic and Sensitivity Tests

This section outlines diagnostic tests performed on the results shown. These tests address the validity of the instrumental variables approach used, the exclusion of outliers and multicollinearity.

The validity of the 2SLS approach used to test the hypothesis in this study rests on two key assumptions, that the instruments are relevant, that is correlated with the endogenous variable and that they are uncorrelated with the error term in the structural model. The first of these assumptions can be tested directly. The second assumption cannot be tested directly but on the assumption that one of the instruments used is valid, the validity of the remaining instruments can be tested. Analysis of the results of the first stage of each 2SLS regression indicates that the instruments used are sufficiently relevant to avoid problems associated with weak instruments.

The first stage F-statistics, reported for each model in the relevant table of 2SLS regression results, range from 9.70 to 153.74. The first stage F statistic of 9.70 is from the estimation of Equation 32. The next lowest F-statistic is 24.53. 2SLS estimation using weak instruments, with F-statistics of less than 10, may perform worse than OLS estimation (Stock, Wright and Yogo 2002). An additional test of the relevance of instruments is to examine the r-squared statistics from the first stage regression. The first-stage partial r-squared values indicate the percentage of the variation of the instrumented variable explained by the instrumental variables (Leverage and Fixed Asset Intensity interacted with the relevant ownership variable) in the first-stage regression model. The lowest partial r-squared statistic is 0.093 and results from estimating fitted values for $ROA_{i,t} * LGST Low$, using $FAI_{i,t} * LGST Low$ and $Leverage_{i,t} * LGST Low$ as instruments, for use in Equation 32. Every other first stage regression has a partial r-squared statistic in excess of 0.179. The only equations which gives rise to weak instrument concerns is equation 32, when estimated on the reduced sample.

While the exogeneity of the instruments cannot be tested directly, if more instruments that endogenous regressors are available (if the model is “over-identified”), tests of the over-identifying restriction may be performed. Sargan and Basman tests compare the predicted values of the endogenous regressors generated by each instrument individually. If all instruments are valid, each instrument should generate consistent estimates. The null hypothesis is that the instruments are valid. Sargan and Basman chi-squared tests were performed on the results of each 2SLS regression and in all cases the test statistic was not statistically significant, indicating instruments are valid. Given valid instruments, Durbin and Wu-Hausman tests can be used to establish whether $ROA_{i,t}$ is in fact endogenous in the model. The results of both tests indicate that $ROA_{i,t}$ is endogenous in each model estimated.

The analysis described in sections 6.3 and 6.4 is performed after winsorising $ROA_{i,t}$ and the instruments used for $ROA_{i,t}$: *Fixed Asset Intensity*_{*i,t*} and *Leverage*_{*i,t*} at the 5th and 95th percentiles. This process was undertaken to reduce the effect of outliers. As well as arising from extreme observations in the data, outliers may arise from the data collection

process. In compiling the FAME database, Bureau van Dyke, use company returns filed with the UK Companies Office. Companies are not required to file returns electronically so there is a possibility of error in the transcription of the information to electronic form. I examine the effect of this procedure by repeating parts of the preceding analysis on unwinsorised data. The regression models which are reported in Tables 6.6, 6.8, 6.11 and 6.13 are estimated using the unwinsorised values of $ROA_{i,t}$ and the unwinsorised excluded instruments. The results of this are reported in Tables 10.1 to 10.4, which are included in the Appendix.

There are several notable differences in the results of the analysis on the unwinsorised compared to those reported in section 6.4. Firstly, the magnitude of the coefficient on the $ROA_{i,t}$ term in each specification is significantly lower than in the analysis of the winsorised data. Estimating equation 25, for example, in which *ln Dirs. Remun.* is regressed on $ROA_{i,t}$ and control variables, using winsorised data yields a coefficient on $ROA_{i,t}$ of 2.667 compared to 1.167 using unwinsorised variables (both are significant at a 1% level). This difference is evident in every specification, when a range of ownership characteristics are controlled for. There are also differences in the significance of a number of variables. When the effect of ownership concentration on the sensitivity of pay to performance is tested using the winsorised data, Table 6.8 shows that $ROA_{i,t}$ interacted with each of *LGST 50*, *LGST High* and *LGST %* is statistically significant, providing strong evidence of a moderating effect of ownership concentration on pay-performance sensitivity. When the analysis is repeated on the unwinsorised data, as shown in Table 10.2, only the coefficient on $ROA_{i,t} * LGST High$ is significantly different from zero, suggesting a weaker moderating role for ownership concentration. Table 10.4 reports the results of estimating the moderating effect of managerial ownership on the pay-performance relationship using unwinsorised variables, the equivalent table for winsorised data is 6.13. Based on the results of the winsorised data, there is some evidence that managerial ownership plays a moderating role. The coefficient on $ROA_{i,t} * MD 50$ is negative and significant. This relationship is not evident in the unwinsorised data. These significant differences between the results before and after addressing the outliers in the data suggest that outliers in the data have a significant on the results. I also repeated the analysis after winsorising $ROA_{i,t}$ and the instruments at the 1st and 99th percentile. The results of this analysis are largely identical to those from the unwinsorised data.

Table 6.14: Pearson Correlation Coefficients for Ownership Variables

		Pearson Correlation Coefficients: Full Sample								
		LGST %	LGST Low (D)	LGST 50 (D)	LGST High (D)	MD %	MD Low (D)	MD 50 (D)	MD High (D)	MD LGST (D)
1	LGST %	1								
2	LGST Low (D)	-0.631*** 0.000	1							
3	LGST 50 (D)	0.839*** 0.000	-0.501*** 0.000	1						
4	LGST High (D)	0.789*** 0.000	-0.268*** 0.000	0.536*** 0.000	1					
5	MD %	0.611*** 0.000	-0.385*** 0.000	0.490*** 0.000	0.488*** 0.000	1				
6	MD Low (D)	-0.054* 0.057	0.103*** 0.000	-0.032 0.268	0.018 -0.535	-0.664*** 0.000	1			
7	MD 50 (D)	0.641*** 0.000	-0.361*** 0.000	0.716*** 0.000	0.443*** 0.000	0.858*** 0.000	-0.416*** 0.000	1		
8	MD High (D)	0.690*** 0.000	-0.258*** 0.000	0.507*** 0.000	0.703*** 0.000	0.798*** 0.000	-0.294*** 0.000	0.706*** 0.000	1	
9	MD LGST (D)	0.198*** 0.000	-0.156*** 0.000	0.129*** 0.000	0.136*** 0.000	0.742*** 0.000	-0.705*** 0.000	0.553*** 0.000	0.398*** 0.000	1

*** p<0.01, ** p<0.05, * p<0.1

A high level of correlation between explanatory variables gives rise to concerns about multicollinearity, which can lead to inflated standard errors and unstable parameter estimates. The Pearson Correlation Coefficients provided in Tables 6.2 and 6.3 show significant correlations between several explanatory variables. For example, *Ln Turnover* is correlated with the *No. of Directors*, *ln No. of Subsidiaries* and *ln Dividend Paid*. *No. of Directors* is correlated with all other explanatory variables. Table 6.14 shows the Pearson Correlation Coefficients between the ownership variables used in this study. Significant correlations are evident between almost every pair of variables shown. To establish whether multicollinearity is a concern in this study, Variance Inflation Factors (VIFs) are estimated following each regression. A VIF in excess of 10 indicates that multicollinearity is a potential issue in the data (Kleinbaum et al. 2013). The highest VIF computed was 1.86 in the model shown in Table 6.4, Column (5). Multicollinearity does not appear to be problematic in the models estimated.

6.5 Discussion and Conclusions

This study examines the relationships between firm performance, executive compensation and ownership structure, which have been the focus of many studies in the context of large public firms, in the relatively unexamined universe of private firms. Consistent with the literature on public firms I document a strong, positive relation between accounting performance and executive compensation. The small number of existing studies on pay-performance sensitivity in private firms report conflicting results on this question. Researchers reporting no significant relation between pay and performance (e.g. Banhoj et al. 2010 and Ke et al. 1999) have argued that the high level of ownership concentration and managerial equity ownership predominant in private firms means that this class of firms do not benefit from the “alignment of interests” effect of contingent compensation contracts. It is worth noting that these two studies, which examine private firm compensation and do not find evidence of a significant relation between pay and performance both use smaller samples than the studies reporting a significant positive relationship and one (Ke et al. 1999) uses an OLS approach, whereas analysis of the nature of the causal relationship reported here indicate that this relationship is endogenous and using an OLS approach may result in biased coefficients. This study uses a large sample

(relative to other studies in the area) and controls for the endogeneity of the relation between pay and performance. I argue that the result of this study provide strong evidence for the proposition that private firms do exhibit agency problems and use the mechanism of contingent compensation contracts to address this.

Existing research on private firms indicates that managerial ownership and compensation are negatively related. Cole and Mehran (2013) and Gao and Li (2014) for example document a negative relationship between CEO ownership and compensation in US private firms. Tests for a linear relationship between remuneration and managerial ownership in the sample firms provide limited evidence for a linear, negative relationship. Directors remuneration is significantly lower in firms in which the MD is the largest single shareholder. *MD Low*, *MD 50* and *MD LGST*, however, are not significantly associated with directors' remuneration in the sample firms. There is evidence for a non-linear, cubic, relationship between compensation and MD ownership. Compensation declines with increasing managerial ownership below 25%, increases with managerial ownership between 25% and 75% and declines thereafter. This is consistent with alignment effects up to MD ownership of 25% and entrenchment effects dominating between 25% and 75% ownership. Within this range, the cash-flow and control rights of managers diverge significantly. This divergence may incentivise and enable the diversion of firm resources from shareholders to managers through compensation. Pay-performance sensitivity in the sample firms is significantly lower in firms in which the MD owns a majority of equity. This result is consistent with Michiels et al. (2012), who report that pay-performance sensitivity is lower in US firms in which the CEO is a member of a controlling family.

The level and sensitivity to firm performance of compensation is related to ownership concentration in the sample firms. In the full sample, directors' remuneration is higher in firms in which the largest single shareholder owns in excess of 50% of the equity and lower where they own in excess of 86.44%. The results provided suggest that ownership concentration (measured as the percentage ownership share of the largest shareholder) and compensation are cubically related. Directors remuneration falls with an increasing ownership share of the largest shareholder up to 30%, rises as the ownership share increases to 75% and declines thereafter. Pay is significantly less sensitive to performance

where ownership is more concentrated. To attempt to disentangle the effects of managerial ownership and ownership concentration, this analysis is repeated on a reduced sample of firms, omitting those in which the MD is the largest single shareholder. The relationship between ownership concentration and compensation is evident in this sample but is weaker than in the full sample. The level of compensation is lower in firms in which ownership is highly concentrated (where the ownership share of the largest shareholder exceeds 86.44%). This is consistent with evidence from public firms (see for example Hartzell and Starks 2003). There is no evidence in this analysis for a non-linear relationship between the level of compensation and ownership concentration. The moderating effect of ownership concentration in the pay-performance relation is also evident in the reduced sample. Firms in which ownership is highly concentrated exhibit significantly lower pay-performance sensitivity compared to other firms. These results suggest that concentrated ownership performs a monitoring role in the setting of compensation in private firms, with the increased monitoring ability of large shareholders reducing the level of compensation and reducing the requirement to align managerial interests with those of shareholders through performance contingent pay.

Chapter 7

**Ownership Structure and Earnings Management in
Private Firms**

7.1 Introduction

The third empirical chapter in this thesis is concerned with the relationship between earnings management and managerial ownership in the sample firms. A substantial literature examines earnings management and various aspects of ownership structure in public firms. Several studies have documented the existence of earnings management in private firms and generally report that it is more pervasive than in public firms in a range of institutional settings (Ball and Shivakumar 2005, Burgstahler et al. 2006). Few studies in this area examine the role that managerial ownership may play in influencing earnings management behaviour. Two fundamental research questions are addressed in this study, to what extent, if any, does earnings management behaviour vary with managerial ownership in private firms and do private firms exhibit opportunistic earnings management behaviour.

Firms may make accounting choices, which are within the discretion allowed to firms by Generally Accepted Accounting Practices (GAAP), that change the reported earnings of the firm without altering the firm's underlying cash-flows. Accounting choices about accruals such as the level of bad debt provisions and the timing of revenue recognition provide scope for earnings management. Since accounting accruals reverse over time, in that any earnings increasing (decreasing) accruals choices made by the firm will unwind in the future and result in reported earnings decreasing (increasing), the effect of earnings management through accruals is to shift earnings through time rather than fundamentally change the cash-flows of the firm. However, if the allocation of firm cash-flows between different stakeholders in the firm depends in part on contracts based on the firm's reported earnings (such as managers' employment or compensation contracts) then accrual based earnings management may have real cash-flow effects for stakeholders. Accrual-based earnings management is not necessarily evidence of self-serving behaviour on the part of managers, possible motivations to manage reported earnings by manipulating accruals to serve shareholder interests include signalling private information about expected future cash-flows to shareholder, or to influence third parties such as creditors, suppliers, employees.

This study examines how earnings management, measured here as discretionary accruals estimated using a modified-Jones approach, vary with the shareholding of the Managing Director. The results of this analysis indicate that discretionary accruals are non-linearly related to managerial ownership and follow a U-shaped pattern, with discretionary accruals lowest in firms where the MD owns approximately 44% of the equity in the firm. This relationship is only evident in firms reporting income increasing discretionary accruals, no statistically significant relationship is found in firms engaging in income decreasing earnings management. There is limited evidence that Big 4 auditors constrain earnings management in the sample firms, a negative relationship is found between income decreasing discretionary accruals and Big 4 auditor status. The second part of the empirical analysis focuses on those firms in which income increasing discretionary accruals are observed. The results suggest that firms with low managerial ownership engage in a greater degree of earnings management to increase reported profit when faced with poor performance compared to firms with intermediate or high levels of managerial ownership. This finding is consistent with opportunistic managerial behaviour.

This study makes two contributions to the literature on earnings management. First it extends empirical work by Ball and Shivakumar (2005), Burgstahler et al. (2006) and others which documents the magnitude of earnings management in private firms and compares it to that of public firms, by exploring how the use of discretionary accruals varies with managerial ownership in private firms. Secondly this study contributes to the literature on opportunistic managerial behaviour by showing that the high degree of ownership concentration and insider ownership prevalent in private firms does not prevent the type of earnings management choices made by managers when faced with poor firm performance documented in public firms by Chung et al. (2002), Peasnell et al. (2005) and others.

This chapter is organised as follows. Section 7.2 restates the hypotheses derived from the literature reviewed in Chapter 2. In section 7.3 the empirical method used to test these hypotheses is outlined. Section 7.4 presents the results of estimating two sets of

regressions, which establish the relationship between managerial ownership and earnings management and test whether earnings management in a sub-sample of firms is driven by managerial opportunism. The chapter concludes with a discussion of these results and conclusions in section 7.5.

7.2. Hypotheses

This section sets out the hypotheses that are tested in the empirical analysis that follows. The development of the hypotheses are outlined in detail in Chapter 2, this section restates the hypotheses to be tested.

H7.1_a Discretionary accruals are negatively related to managerial equity ownership.

H7.1_b Discretionary accruals and managerial ownership exhibit a U-shaped relationship. As managerial ownership increases, discretionary accruals first decline and then increase.

H7.2: Firms with an MD owning a low shareholding will exhibit a higher degree of income increasing earnings management to meet performance benchmarks, compared with firms managed by an MD owning an intermediate or high shareholding.

7.3. Empirical Method

The empirical approach used to test the hypotheses outlined in the previous section is described in this section. The source of data, data collection process and the sample is described in detail in Chapter 4. Table 7.1 provides definitions of the variables used in the empirical analysis that follows.

Table 7.1: Definition of Variables used in Earnings Management Tests

Variables	Definition
DAC	Discretionary accruals scaled by lagged total assets. Estimated using the modified Jones model.
ROA	Return on Assets. Profit or Loss after Tax divided by Total Assets.
Turnover	Total Sales. Natural log transformed.
Leverage	(Total Debt) divided by (Total Debt plus Shareholders Funds ₀)
Firm Age	Years since incorporation. Natural log transformed.
Growth	(Total Assets ₀ - Total Assets ₋₁)/ Total Assets ₋₁
Big 4 (D)	Dummy variable taking the value of one where the firm is audited by a Big 4 accounting firm.
MD %	Percentage shareholding of the MD.
MD Low (D)	Dummy variable taking the value of one where the MD's ownership percentage is less than the sample mean MD ownership minus one standard deviation and zero otherwise.
MD High (D)	Dummy variable taking the value of one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation and zero otherwise.
MD 50 (D)	Dummy variable taking the value of one where the MD's ownership percentage is greater than 50% and zero otherwise.
CF Loss (D)	Dummy variable taking the value of one where Cash-flow from Operating Activities (CF) ₀ < 0 and zero otherwise.
CF Fall (D)	Dummy variable taking the value of one where CF ₀ < CF ₋₁ and zero otherwise.

7.3.1 Regression Analysis

To test the first hypothesis I estimate an OLS regression, regressing discretionary accruals on the percentage ownership of the MD, its quadratic term and control variables. Ownership variables are lagged by one period.

This model is shown in Eq. 48 and 49

$$\text{Eq.48} \quad DAC_i = \delta + \beta_1 MD\%_i + \beta_2 Controls_i + \varepsilon_i$$

$$\text{Eq.49} \quad DAC_i = \delta + \beta_1 MD\%_i + \beta_2 MD\%_i^2 + \beta_3 Controls_i + \varepsilon_i$$

I first estimate Eq.48, which includes a linear $MD \%$ term to determine whether discretionary accruals are a linear function of managerial ownership, as reported by Warfield et al. (1995). I then estimate Eq.49, including the term $MD \%^2$. The hypotheses set out earlier predict a negative coefficient on B_1 where the quadratic ownership term is excluded. Where the quadratic term is included, the hypotheses predict a negative coefficient on B_1 and a positive coefficient on B_2 , indicating that the magnitude of discretionary accruals falls then rises as managerial ownership increases. These two regressions are estimated on the full sample, the sub-sample of firms engaging in income increasing earnings management and the sub-sample of firms engaging in income decreasing earnings management.

The second hypothesis is based on an expectation that MDs, due to contractual relationships with their employer which relate, either explicitly or implicitly, outcomes such as compensation or tenure to reported financial performance, have an incentive to manage earnings upwards where they fall below particular thresholds. I expect the strength of these incentives to vary inversely with the shareholding of the MD.

To test this I estimate OLS regressions which include interactions between variables measuring managerial ownership and variables measuring poor firm performance. Equations 50 to 55 below include combinations of three ownership variables ($MD \%$, $MD High$ and $MD Low$) and two firm performance variables ($CF Loss$ and $CF Fall$)

$$\text{Eq.50} \quad DAC_i = \partial + \beta_1 MD\%_i + \beta_2 CF LOSS_i + \beta_3 MD\%_i * CF LOSS_i + \beta_4 Controls_i + \varepsilon_i$$

$$\text{Eq.51} \quad DAC_i = \partial + \beta_1 MD Low_i + \beta_2 CF LOSS_i + \beta_3 MD Low_i * CF LOSS_i + \beta_4 Controls_i + \varepsilon_i$$

$$\text{Eq.52} \quad DAC_i = \partial + \beta_1 MD High_i + \beta_2 CF LOSS_i + \beta_3 MD High_i * CF LOSS_i + \beta_4 Controls_i + \varepsilon_i$$

$$\text{Eq.53} \quad DAC_i = \partial + \beta_1 MD\%_i + \beta_2 CF FALL_i + \beta_3 MD\%_i * CF FALL_i + \beta_4 Controls_i + \varepsilon_i$$

$$\text{Eq.54} \quad DAC_i = \partial + \beta_1 MD Low_i + \beta_2 CF FALL_i + \beta_3 MD Low_i * CF FALL_i + \beta_4 Controls_i + \varepsilon_i$$

$$\text{Eq.55} \quad DAC_i = \partial + \beta_1 MD High_i + \beta_2 CF FALL_i + \beta_3 MD High_i * CF FALL_i + \beta_4 Controls_i + \varepsilon_i$$

The main variables of interest are the interaction terms, which indicate whether the slope for the variable *CF Loss* or *CF Fall* differs depending on the level of managerial ownership i.e. whether the percentage shareholding of the MD moderates the relationship between a cash flow loss/fall and the use of income increasing earnings management. For Eq. 50, the hypotheses predict a negative, significant, coefficient on β_3 , indicating that the slope of the relationship between *CF Loss* and *DAC* declines as managerial share ownership increases. A positive coefficient is predicted for β_3 in Eq. 51, indicating that firms in which the MD's share ownership is more than one standard deviation less than the sample mean, engage in more earnings management when firm performance is poor (i.e. when *CF Loss* = 1) than firms with higher managerial ownership. Eq. 52 is similar to Eq. 51 but includes *MD High*, rather than *MD Low*, which indicates a firm in which the MD's share ownership is more than one standard deviation greater than the sample mean. There is no a priori expectation of the earnings management behaviour of firms with high MD ownership when firm performance is poor, but a significant positive coefficient is not expected on β_3 in Eq. 52. Eq. 53 to 55 replicate the first set of equations but include *CF Fall*, rather than *CF Loss*, as a measure of poor firm performance. The predictions for the signs on coefficients are the same as those in Eq. 50 to 52.

7.4. Results

This section presents the results of the empirical analysis described in the previous section. Descriptive statistics for the sample variables are provided in Chapter 4 (Section 4.6.3). Tables 7.3 to 7.7 present the results of multivariate regressions examining the relationships between *DAC*, lagged managerial ownership, poor firm performance and control variables. Section 7.4.6 describes diagnostic and sensitivity tests performed on the results.

Table 7.2: Pearson Correlation Coefficients for Discretionary Accruals and Explanatory Variables (Full Sample)

		Pearson Correlation Coefficients: Full Sample											
		Disc. Accruals	Return on Assets	In Turnover	Leverage	Ln Firm Age	Growth	Big 4 (D)	MD %	MD Low (D)	MD High (D)	CF Loss (D)	CF Fall (D)
1	Disc. Accruals	1											
2	Return on Assets	0.061* 0.050	1										
3	In Turnover	-0.014 0.651	-0.042 0.183	1									
4	Leverage	-0.057* 0.067	-0.295*** 0.000	0.028 0.362	1								
5	Ln Firm Age	-0.131*** 0.000	-0.005 0.877	-0.018 0.571	-0.247*** 0.000	1							
6	Growth	0.196*** 0.000	0.268*** 0.000	0.080** 0.010	-0.076** -0.014	-0.036 -0.244	1						
7	Big 4 (D)	-0.054* 0.084	-0.093*** 0.003	0.193*** 0.000	0.054* -0.080	-0.031 -0.326	-0.024 -0.451	1					
8	MD %	0.052* 0.092	0.049 0.115	-0.008 0.802	0.026 -0.409	-0.119*** 0.000	0.024 -0.443	-0.070** -0.024	1				
9	MD Low (D)	-0.016 0.605	-0.073** 0.019	0.025 0.432	-0.023 -0.466**	0.091*** -0.003	-0.045 -0.146	0.095*** -0.002	-0.669*** 0.000	1			
10	MD High (D)	0.046 0.139	-0.003 0.917	-0.005 0.881	0.021 -0.491*	-0.088*** -0.005	-0.020 -0.526	-0.051 -0.102	0.792*** 0.000	-0.29*** 0.000	1		
11	CF Loss (D)	0.183*** 0.000	-0.198*** 0.000	-0.054* 0.083	-0.059* -0.057	-0.019 -0.553	-0.039 -0.216	0.039 -0.212	-0.109*** 0.000	0.087*** -0.005	-0.069** -0.026	1	
12	CF Fall (D)	0.065* 0.038	-0.099*** 0.001	-0.026 0.405	-0.078** -0.012	-0.021 -0.501	-0.057* -0.069	0.004 -0.888	-0.038 -0.226	0.022 -0.484	-0.026 -0.408	0.357 0.000	1

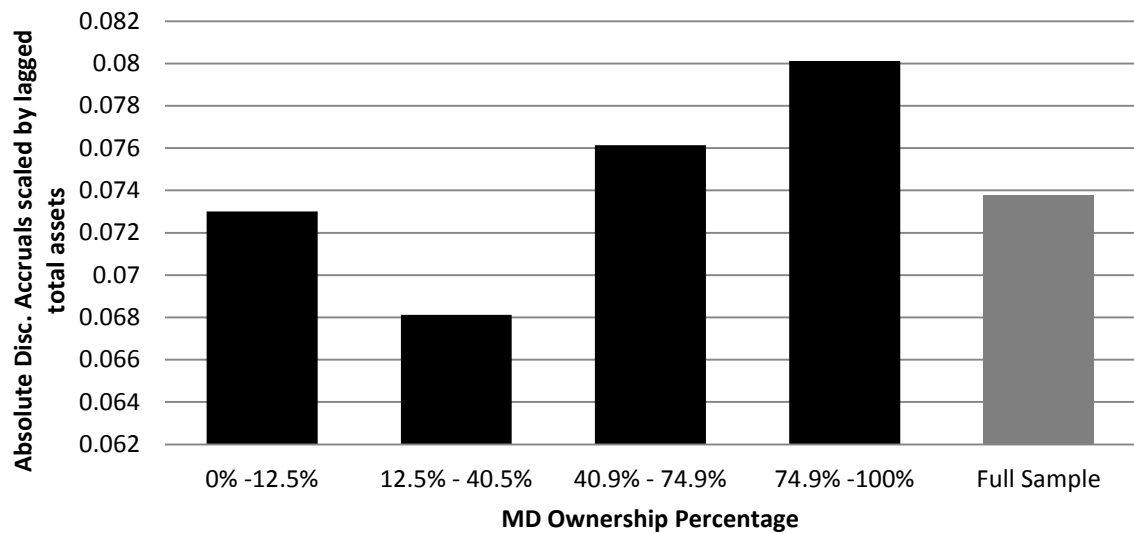
*** p<0.01, ** p<0.05, * p<0.1

In the full sample and both sub-samples, the three managerial ownership variables indicate a high level of share ownership by the MD. In the full sample, the mean shareholding of the MD (*MD %*) is 44.2% but with a significant minority (22.69%) of firms managed by an outsider or low shareholding MDs (with less than 9.96% shareholding). The majority (55%) of firms are managed by an MD owning a shareholding between 9.96% and 78.48%. *MD High* and *MD Low* represent the extremes of insider ownership in the sample. *CF Loss* and *CF Fall* indicate firms which underperform based on two cash-flow measures. 45% of firms report a fall in cash flow from operating activities and 14.06% of firms report a negative cash flow from operating activities.

Pearson correlation coefficients for the full sample are presented in Table 7.2. Equivalent tables for the income increasing and decreasing samples are presented in the Appendix (Tables 10.5 and 10.6). In the full sample the magnitude of *DAC* is positively correlated with *ROA* and *Growth*. *DAC* is also positively related to the measures of poor firm performance, *CF Loss* and *CF Fall*, which indicate current year cash-flow from operation is negative and lower than the previous year respectively. Managerial equity ownership is positively related to *DAC* when measured as a continuous variable but there is no significant correlation between the dummy variables representing the extremes of high and low MD ownership. *Big 4*, *ln Age* and *Leverage* are negatively correlated with *DAC*.

Figure 7.1 shows absolute discretionary accruals by MD percentage equity ownership quartile in the sample firms. As a percentage of lagged total assets *DAC* are highest in firms in the top quartile of MD ownership, at 8%. *DAC* decline to 6.8% in firms where MD ownership is between 12.5% and 40.5% and are higher, at 7.3% in the bottom quartile of firms by MD ownership.

Figure 7.1: Absolute Discretionary Accruals by MD Ownership % Quartile



7.4.1 Regression Analysis

Two sets of OLS regressions are estimated to address the hypotheses developed in Section 7.2. I begin by regressing the absolute value of discretionary accruals, *DAC*, on the ownership percentage of the MD and its squared term and control variables. These results are presented in Table 7.3. These regressions are estimated separately on the full sample, the income increasing sample and the income decreasing sample to determine whether firms' managerial ownership has a differential relation to income increasing and income decreasing earnings management. Further analysis on these samples is reported in Tables 7.4 and 7.5. The second stage of the analysis focusses on the income increasing subsample of firms, where opportunistic earnings management behaviour is expected to be most readily identifiable. I regress the absolute value of *DAC* on dummy variables indicating high or low managerial ownership and poor cash-flow performance. The hypotheses predict that if opportunistic earnings management is evident in the sample firms, then firms with a low-equity ownership MD will engage in a greater degree of earnings management when firm performance is poor compared to firms with a high-equity ownership MD. The results of the second set of regressions are presented in Tables

7.6 and 7.7. Tests of the effect of ownership concentration on this relationship are reported in Table 7.8.

Inspection of the residuals, plotted against the fitted values of the regressions, from estimating the OLS regressions indicate possible heteroskedacity in the distribution of errors. The distributions of residuals from the remaining estimations are qualitatively similar. The results of the White (White 1980) test confirm this. All standard errors reported are estimated using the Huber White Sandwich Estimator to allow for heteroskedacity in the data.

7.4.2 Managerial Ownership and Discretionary Accruals

Table 7.3 provides the results of regressions testing for linear and non-linear relationships between *DAC* and managerial ownership. Columns 1 and 2 show the results from the full sample, columns 3 and 4 show the results from the income increasing sub-sample and columns 5 and 6 show the results from the income decreasing sample. Hypotheses 1_a and 1_b predict a negative sign on the coefficient *MD %* in columns 1, 3 and 5, and negative and positive signs respectively on coefficients *MD %* and *MD %²* in columns 2, 4 and 6.

There is no evidence to support Hypothesis 7.1_a, that there is a linear, negative relationship between managerial ownership and the extent of earnings management. The *MD %* term is not significant in any model. There is limited evidence to support Hypothesis 7.1_b, signs on the *MD %* and its quadratic term are negative and positive respectively and statistically significant for the income increasing discretionary accruals sample. This indicates that discretionary accruals fall and then rise as managerial ownership rises. The coefficients on the *MD %* and *MD %²* indicate that the lowest discretionary accruals are used by firms with 43.96% MD ownership. The same signs are reported on the coefficients in the full sample but they are not significantly different from zero.

Table 7.3: OLS Regressions, Discretionary Accruals on Managerial Ownership and Controls

VARIABLES	Predicted Sign	(1)	(2)	(3)	(4)	(5)	(6)
		Full Sample		Income Increasing Sample		Income Decreasing Sample	
		DAC	DAC	DAC	DAC	DAC	DAC
Growth	?	0.102*** (0.023)	0.102*** (0.023)	0.088*** (0.032)	0.092*** (0.032)	0.121*** (0.033)	0.121*** (0.033)
Leverage	?	-0.025** (0.011)	-0.024** (0.011)	-0.015 (0.014)	-0.015 (0.014)	-0.031* (0.017)	-0.032* (0.017)
Ln Turnover	-	-0.004 (0.003)	-0.004 (0.003)	-0.005 (0.004)	-0.006 (0.004)	-0.004 (0.004)	-0.004 (0.004)
Big 4 (D)	-	-0.008 (0.005)	-0.008 (0.005)	-0.002 (0.007)	-0.002 (0.007)	-0.015** (0.008)	-0.015** (0.008)
ROA	?	-0.009 (0.049)	-0.005 (0.049)	-0.159** (0.069)	-0.139** (0.069)	0.166** (0.068)	0.165** (0.067)
Industry (D)	?	Yes	Yes	Yes	Yes	Yes	Yes
Ln Age	?	-0.011*** (0.003)	-0.011*** (0.003)	-0.010*** (0.003)	-0.010*** (0.003)	-0.012*** (0.004)	-0.012*** (0.004)
MD %	-	0.005 (0.007)	-0.031 (0.025)	0.009 (0.010)	-0.080** (0.034)	0.000 (0.010)	0.035 (0.037)
MD % ²	+		0.037 (0.025)		0.091*** (0.035)		-0.034 (0.037)
Constant		0.158*** (0.033)	0.164*** (0.032)	0.167*** (0.043)	0.183*** (0.042)	0.150*** (0.050)	0.146*** (0.049)
F		3.71***	3.70***	2.09***	2.19***	2.91***	2.75***
Observations		1,028	1,028	518	518	510	510
Adjusted R ²		0.071	0.072	0.045	0.057	0.118	0.118

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Columns (1) and (2) perform regressions on full sample, columns (3) and (4) perform regressions on firms with Income Increasing Discretionary Accruals only and columns (5) and (6) perform regressions on firms with Income Decreasing Discretionary Accruals only

DAC is the absolute value of discretionary accruals estimated using the modified Jones approach.

Growth is the one-year percentage growth in Total Assets.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

Ln Turnover is the natural log of the current year turnover.

Big 4 is a dummy variable taking a value of one if the firm's current auditor is a Big 4 firm.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Age is the natural log of the number of years since firm incorporation.

MD % is the percentage shareholding of the Managing Director, **MD %²** is its square.

(D) indicates a dummy variable, **(I)** indicates an interaction variable.

In the income decreasing sample the signs on these coefficients are reversed but again they are not significantly different from zero. These results suggest that the relationship between managerial ownership and income increasing discretionary accruals may differ

from that between managerial ownership and income decreasing discretionary accruals, although given there is no statistically significant in the income decreasing sample caution should be exercised when interpreting this difference.

Several of the control variables included are also significant in the models. *Growth* is positively related to *DAC* in each sample. *Leverage* is negatively related to *DAC*, although this relationship is not significant in the income increasing sample. *Big 4* auditor status is negatively related to *DAC* only in the income decreasing sample. Firm age is negatively related to *DAC*, older firms use less discretionary accruals and this relationship is significant in each sample. *ROA* is negatively related to *DAC* in both subsamples.

Some studies have reported a cubic relationship between managerial ownership and earnings quality or related measures. Lennox (2005), for example, reports that audit firm quality and managerial ownership in UK private firms are cubically related. Teshima and Shuto (2008) document a cubic relationship between discretionary accruals and directors' ownership. These studies report that earnings quality/audit quality first improves, then disimproves and then improves again as insider ownership increases. To test whether a cubic relationship exists between discretionary accruals and managerial ownership I include the cube of *MD %*, as well as the squared term, and estimate the following OLS regression:

$$\text{Eq.56} \quad DAC_i = \theta + \beta_1 MD\%_i + \beta_2 MD\%_i^2 + \beta_3 MD\%_i^3 + \beta_4 Controls_i + \varepsilon_i$$

As is the case for regressions 48 and 49, this is estimated on the full sample, income increasing sample and income decreasing sample. The results of these regressions are presented in Table 7.4.

Table 7.4: OLS Regressions, Discretionary Accruals on Managerial Ownership and Controls. Testing for a Cubic Relationship

VARIABLES	Predicted Sign	(1) Full Sample DAC	(2) Income Increasing Sample DAC	(3) Income Decreasing Sample DAC
Growth	?	0.102*** (0.023)	0.092*** (0.032)	0.122*** (0.033)
Leverage	?	-0.024** (0.011)	-0.015 (0.014)	-0.032* (0.017)
Ln Turnover	-	-0.004 (0.003)	-0.006 (0.004)	-0.004 (0.004)
Big 4 (D)	-	-0.008 (0.005)	-0.002 (0.007)	-0.015** (0.008)
ROA	?	-0.005 (0.049)	-0.139** (0.069)	0.165** (0.068)
Industry	?	Yes	Yes	Yes
Ln Age	?	-0.011*** (0.003)	-0.010*** (0.003)	-0.012*** (0.004)
MD %	-	-0.035 (0.057)	-0.071 (0.077)	0.018 (0.082)
MD % ²	+	0.047 (0.151)	0.065 (0.197)	0.012 (0.225)
MD % ³	-	-0.007 (0.104)	0.018 (0.134)	-0.032 (0.156)
Constant		0.164*** (0.033)	0.182*** (0.042)	0.148*** (0.050)
F		3.49***	2.08***	2.60***
Observations		1,028	518	510
Adjusted R ²		0.071	0.055	0.117

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Column (1) performs regression on full sample, column (2) perform regression on firms with Income Increasing Discretionary Accruals only and column (3) performs regressions on firms with Income Decreasing Discretionary Accruals only

DAC is the absolute value of discretionary accruals estimated using the modified Jones approach.

Growth is the one-year percentage growth in Total Assets.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

Ln Turnover is the natural log of the current year turnover.

Big 4 is a dummy variable taking a value of one if the firm's current auditor is a Big 4 firm.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Age is the natural log of the number of years since firm incorporation.

MD % is the percentage shareholding of the Managing Director. **MD %²** is its square, and **MD %³** is its cube.

(D) indicates a dummy variable.

None of the managerial ownership coefficients are significantly different from zero in any sample. These results indicate that there is not a cubic relationship between managerial ownership and discretionary accruals in the sample firms.

7.4.3 Managerial Ownership and Discretionary Accruals: An Alternative Model Specification

Regression equations 48 and 49 include continuous variables measuring the percentage ownership of the MD. The results presented in Table 7.3 indicate that there is no significant relationship between discretionary accruals and managerial ownership in the full sample or in the sample of firms with income decreasing discretionary accruals and a statistically significant, non-linear (U-shaped) relationship between *DAC* and managerial ownership in the income increasing sample. To examine whether other aspects of managerial ownership, not captured by the continuous measures included here are related to *DAC*, I estimate regressions including dummy variables representing managerial ownership. Three dummy variables are used to represent aspects of managerial ownership. *MD 50*, a dummy variable taking a coded one when the MD owns more than 50% of equity in the firm and zero otherwise, captures the effect of an MD who exercises majority control. The presence or lack of a majority equity owning MD, marking the threshold at which the MD effectively exercises complete control over the firm, may be associated with different levels of discretionary accruals. Based on the discussion of the empirical literature in Chapter 2 (Section 2.4.2), it is also plausible that firms with particularly high or low levels of managerial ownership may exhibit differing earnings management behaviour. *MD High* and *MD Low* are dummy variables coded one where MD equity ownership is more than one standard deviation above or below the sample mean respectively.

Equations 57, 58 and 59 each include one of the dummy variables outlined above and are each estimated on the full sample, income increasing sample and income decreasing samples.

$$\text{Eq.57} \quad DAC_i = \partial + \beta_1 MD\ 50_i + \beta_2 Controls_i + \varepsilon_i$$

$$\text{Eq.58} \quad DAC_i = \partial + \beta_1 MD\ High_i + \beta_2 Controls_i + \varepsilon_i$$

$$\text{Eq.59} \quad DAC_i = \partial + \beta_1 MD\ Low_i + \beta_2 Controls_i + \varepsilon_i$$

The results of estimating equations 57, 58 and 59 are shown in Table 7.5. This analysis confirms that there is no significant relationship between managerial ownership and discretionary accruals in either the Full Sample or the Income Decreasing Sample. None of the three dummy variables indicating majority MD ownership, high or low ownership respectively are significant predictors of *DAC*. For the income increasing sample, shown in Columns 4, 5 and 6, only *MD High* is significantly related to the magnitude of *DAC*. Firms in which the MD is a dominant owner (where MD ownership is greater than 78.48% of equity) appear to use higher levels of discretionary accruals. *MD 50* and *MD Low* are both positively, but insignificantly, related to *DAC*.

As outlined in Chapter 2, empirical evidence in this area suggests that managers engage in earnings management through the use of discretionary accruals for a wide range of reasons, not necessarily opportunistic. To investigate whether there is evidence of opportunistic behaviour evident in the sample firms I focus the second stage of the analysis on circumstances where managers may have a particular incentive to manage earnings. Firms facing a cash-flow loss or decline relative to the previous year may choose to mask this underperformance through the use of income increasing discretionary accruals if doing so diverts firm resources from shareholders to managers or reduces the likelihood of shareholders increasing the monitoring of managers.

Table 7.5: OLS Regressions, Discretionary Accruals on Managerial Ownership and Controls. Alternative Specifications

VARIABLES	Predicted Sign	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Full Sample			Income Increasing Sample			Income Decreasing Sample		
		DAC	DAC	DAC	DAC	DAC	DAC	DAC	DAC	DAC
Growth	?	0.102*** (0.023)	0.102*** (0.023)	0.102*** (0.023)	0.089*** (0.033)	0.091*** (0.032)	0.088*** (0.033)	0.121*** (0.033)	0.122*** (0.033)	0.121*** (0.033)
Leverage	?	-0.025** (0.011)	-0.025** (0.011)	-0.025** (0.011)	-0.015 (0.014)	-0.015 (0.014)	-0.014 (0.014)	-0.031* (0.016)	-0.031* (0.017)	-0.031* (0.017)
Ln Turnover	-	-0.004 (0.003)	-0.004 (0.003)	-0.004 (0.003)	-0.005 (0.004)	-0.005 (0.004)	-0.006 (0.003)	-0.004 (0.004)	-0.004 (0.004)	-0.004 (0.004)
Big 4 (D)	-	-0.008 (0.005)	-0.008 (0.005)	-0.008 (0.005)	-0.002 (0.007)	-0.001 (0.007)	-0.003 (0.007)	-0.015** (0.007)	-0.016** (0.008)	-0.015** (0.008)
ROA	?	-0.010 (0.049)	-0.008 (0.049)	-0.007 (0.049)	-0.157** (0.070)	-0.153** (0.069)	-0.151** (0.070)	0.163** (0.068)	0.167** (0.068)	0.165** (0.067)
Industry (D)	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ln Age	?	-0.011*** (0.003)	-0.011*** (0.003)	-0.012*** (0.003)	-0.010*** (0.003)	-0.010*** (0.003)	-0.011*** (0.003)	-0.011*** (0.004)	-0.012*** (0.004)	-0.011*** (0.004)
MD 50 (D)	-	0.008 (0.005)			0.007 (0.007)			0.007 (0.008)		
MD High (D)	-		0.005 (0.006)			0.017** (0.009)			-0.008 (0.008)	
MD Low (D)	+			0.003 (0.005)			0.008 (0.008)			-0.006 (0.008)
Constant		0.159*** (0.033)	0.160*** (0.033)	0.161*** (0.033)	0.170*** (0.043)	0.166*** (0.043)	0.176*** (0.043)	0.151*** (0.050)	0.152*** (0.050)	0.152*** (0.050)
F		6.03***	3.73***	3.77***	2.53***	2.78***	2.53***	5.35***	5.34***	5.30***
Observations		1,028	1,028	1028	518	518	518	510	510	510
Adjusted R ²		0.073	0.071	0.071	0.045	0.052	0.045	0.120	0.120	0.120

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Columns (1), (2) and (3) perform regressions on full sample, columns (4), (5) and (6) perform regressions on firms with Income Increasing Discretionary Accruals only and columns (7), (8) and (9) perform regressions on firms with Income Decreasing Discretionary Accruals only

DAC is the absolute value of discretionary accruals estimated using the modified Jones approach.

Growth is the one-year percentage growth in Total Assets.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

Ln Turnover is the natural log of the current year turnover.

Big 4 is a dummy variable taking a value of one if the firm's current auditor is a Big 4 firm.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Age is the natural log of the number of years since firm incorporation.

MD 50 Dummy variable coded one where the MD's equity ownership percentage is greater than 50%.

MD Low Dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.

MD High Dummy variable coded one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation.

CF LOSS is a dummy variable taking the value of 1 if the firm reports a negative Cash Flow from Operations in the current year.

(D) indicates a dummy variable,

7.4.4 Managerial Ownership and Discretionary Accruals when Cash-Flow from Operations is Negative

Tables 7.6 and 7.7 show the results of regressions which include interactions between managerial ownership and variables indicating poor firm cash-flow performance. It is expected that MDs who own relatively little (or no) equity have an incentive to mask poor firm performance since they are less entrenched and subject to shareholder monitoring to a greater extent than MDs who own a high percentage of equity. If the effect of masking poor performance is to increase compensation or reduce the likelihood of dismissal by misleading shareholders as to the true economic performance of the firm, then managers are behaving opportunistically. MDs who own a high percentage (or all) of the firm's equity do not have such an incentive. Therefore a significant difference is expected in the earnings management behaviour of firms with low and high equity owning MDs, when faced with a cash-flow loss.

Table 7.6 presents the results of regressions including the *CF Loss* measure. Model 1 includes an interaction between *MD %* and *CF Loss*. The significant negative coefficient on this variable indicates a difference in the magnitude of income increasing *DAC* in the event of a cash-flow loss between firms with differing levels of *MD %*. As the MD ownership percentage increases, firms use less income increasing discretionary accruals when facing a cash flow loss. The results shown in column 2 provide support for this interpretation. Where *MD Low* is equal to zero (i.e. the $MD \% > 9.96\%$) the slope on the *CF Loss* dummy variable is -0.039, indicating a negative relationship between cash-flow losses and *DAC*, whereas where *MD Low* is equal to one (i.e. $MD \% < 9.96\%$) coefficient on *CF Loss* is + 0.048. The coefficient on the interaction between *MD High* and *CF Loss* is not significant. These results are consistent with Hypothesis 7.2, which predicts that firms managed by MDs owning less than 9.96% of equity ($MD Low = 1$) will manage earnings upwards in response to poor firm performance to a greater degree than firms owned by MD's with equity ownership greater than 9.96%.

Table 7.6: OLS Regressions, Income Increasing Discretionary Accruals on CF LOSS, Managerial Ownership and Controls

VARIABLES	Predicted Sign	(1) DAC	(2) DAC	(3) DAC
Growth	?	0.080** (0.031)	0.078** (0.031)	0.088*** (0.032)
Leverage	?	-0.016 (0.014)	-0.017 (0.014)	-0.015 (0.015)
Ln Turnover	-	-0.005 (0.004)	-0.006* (0.003)	-0.005 (0.004)
Big 4 (D)	-	-0.002 (0.007)	-0.004 (0.007)	-0.002 (0.007)
ROA	?	-0.142** (0.072)	-0.140* (0.072)	-0.139* (0.072)
Industry (D)	?	Yes	Yes	Yes
Ln Age	?	-0.010*** (0.003)	-0.011*** (0.003)	-0.010*** (0.003)
MD %	?	0.015 (0.010)		
CF Loss (D)	?	0.035 (0.026)	-0.039*** (0.011)	0.014 (0.020)
MD %*CF Loss (I)	-	-0.119** (0.054)		
MD Low (D)	?		0.000 (0.007)	
MD Low*CF Loss (I)	+		0.087*** (0.031)	
D MD High (D)	?			0.019** (0.009)
MD High*CF Loss (I)	?			-0.049 (0.036)
Constant		0.161*** (0.043)	0.183*** (0.042)	0.162*** (0.044)
F		2.07***	2.72***	1.97***
Observations		518	518	518
Adjusted R ²		0.053	0.060	0.051

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

DAC is the absolute value of income increasing discretionary accruals estimated using the modified Jones approach.

Growth is the one-year percentage growth in Total Assets.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

Ln Turnover is the natural log of the current year turnover.

Big 4 is a dummy variable taking a value of one if the firm's current auditor is a Big 4 firm.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Age is the natural log of the number of years since firm incorporation.

MD % is the percentage shareholding of the Managing Director.

MD Low Dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.

MD High Dummy variable coded one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation.

CF LOSS is a dummy variable taking the value of 1 if the firm reports a negative Cash Flow from Operations in the current year.

(D) indicates a dummy variable, **(I)** indicates an interaction variable.

7.4.5 Managerial Ownership and Discretionary Accruals when Cash-Flow from Operations Falls

The second measure of poor firm performance, and thus an incentive to manage earnings, used is a decline in Cash-Flow from Operations. This is measured as a dummy variable taking the value of one if Cash Flow from Operations_t is lower than Cash Flow from Operations_{t-1}. Table 7.7 reports the results of regressions including *CF Fall* as a predictor of *DAC*.

The interpretation of the results presented in Table 7.7 is similar to that of those presented in Table 7.6, although in general, the magnitudes of the coefficients of interest are lower. *MD % * CF Fall* is negative but it is not significant. As predicted in Hypothesis 7.2, the coefficient on *MD Low * CF Fall*, is positive and significant. This provides further evidence of opportunistic earnings management by MDs who own low/no equity. Similarly to the results reported in Table 7.6, the *MD High * CF Loss* coefficient is not significantly different from zero. The difference between slopes on the interaction terms *MD Low * CF Loss* and *MD Low * CF Fall* (0.087 compared to 0.037), indicates a greater difference in managerial behaviour when faced with a loss rather than a fall in cash flows. These results provide further support for Hypothesis 7.2.

Table 7.7: OLS Regressions, Income Increasing Discretionary Accruals on CF FALL, Managerial Ownership and Controls

VARIABLES	Predicted Sign	(1) DAC	(2) DAC	(3) DAC
Growth	?	0.086*** (0.032)	0.085*** (0.032)	0.089*** (0.032)
Leverage	?	-0.016 (0.014)	-0.015 (0.014)	-0.017 (0.014)
Ln Turnover	-	-0.006* (0.004)	-0.007* (0.003)	-0.006 (0.004)
Big 4 (D)	-	-0.002 (0.007)	-0.002 (0.007)	-0.001 (0.007)
ROA	?	-0.181*** (0.069)	-0.166** (0.069)	-0.175** (0.069)
Industry (D)	?	Yes	Yes	Yes
Ln Age	?	-0.010*** (0.003)	-0.011*** (0.003)	-0.010*** (0.003)
MD %	?	0.015 (0.012)		
CF Fall (D)	?	-0.002 (0.011)	-0.024*** (0.008)	-0.014* (0.007)
MD %*CF Fall (I)	-	-0.026 (0.022)		
MD Low (D)	?		-0.004 (0.009)	
MD Low*CF Fall (I)	+		0.037** (0.015)	
MD High (D)	?			0.014 (0.010)
MD High*CF Fall (I)	?			0.010 (0.019)
Constant		0.178*** (0.044)	0.195*** (0.044)	0.177*** (0.045)
F		2.22***	2.43***	2.37***
Observations		518	518	518
Adjusted R ²		0.050	0.059	0.054

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

DAC is the absolute value of income increasing discretionary accruals estimated using the modified Jones approach.

Growth is the one-year percentage growth in Total Assets.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

Ln Turnover is the natural log of the current year turnover.

Big 4 is a dummy variable taking a value of one if the firm's current auditor is a Big 4 firm.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Age is the natural log of the number of years since firm incorporation.

MD % is the percentage shareholding of the Managing Director.

MD Low Dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.

MD High Dummy variable coded one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation.

CF FALL is a dummy variable taking the value of 1 if $CF_0 < CF_{-1}$.

(D) indicates a dummy variable, **(I)** indicates an interaction variable.

7.4.6 Diagnostics and Sensitivity Tests

I perform a number of additional tests on the data as discussed below to confirm that the results are robust to the exclusion of outliers and influential observations and that multicollinearity is not a significant concern. I also consider the possible effects of a ownership concentration on the relationship between managerial ownership and discretionary accruals.

The Pearson correlation coefficients provided in Table 7.2 indicate that several of the explanatory variables used in the study are highly correlated. The three variables measuring MD ownership, *MD%*, *MD Low* and *MD High*, are highly correlated however since each of these is measuring an aspect of the same underlying characteristic this is expected and since only one will appear in any regression the correlation between these variables will not give rise to multicollinearity. The correlation coefficients between *ROA* and several other firm characteristics, *ln Turnover*, *Leverage* and *Growth*, *CF Loss* and *CF Fall* are all significant. *Leverage* is correlated with firm age, *Growth* and *Big 4*. The mean (max) VIFs for each regression model estimated ranges from is 1.10 to 1.23 (1.26 to 2.30) and indicate that multicollinearity is not a significant concern in this data.

F-statistics shown indicate that each model is statistically significant. I also examine whether the results are affected by influential observations. I estimate the Cook's Distance for each observation, which measures the extent to which regression coefficients change when that observation is excluded. The exclusion of observations with a Cook's Distance less than 1 will not lead to significant changes in parameter estimates (Kleinbaum et al. 2013). No observations have a Cooks Distance approaching 1, the largest Cook's Distance calculated is 0.0931. Based on this I conclude that the models estimated are not excessively affected by influential observations.

Extreme observations are evident in the distribution a number of variables. Total Assets₋₁, in particular, has a minimum observation of £10 (mean £53,737 and standard deviation

£112,905 in thousands of GBP). This is of concern for two reasons. The small number of extreme observations suggests that there may be errors in the FAME database in variable values. Since companies in the UK do not have to file accounts electronically with the Companies Office, there is potential for error in the transcription and compiling of this data in electronic form. Secondly, since several variables in this study are scaled by Total Assets (either current year or lagged) scaling issues arise due to the effect of outliers in this variable. *Growth*, for example, which measures the growth in total assets from t-1 to t, ranges from -0.9991 to 31,657,999. To address this several variables in the study, *DAC*, *Leverage*, *ROA* and *Growth*, are winsorised at the 1st and 99th percentile. All of the preceding analysis is undertaken using winsorised data. To examine the effect of this procedure on the results, the analysis reported in Tables 7.6 and 7.7 is repeated using unwinsorised variables. The results of this analysis are presented in Tables 10.7 and 10.8, included in the Appendix. In each case the sign, magnitude and significance levels of the coefficients of interest are similar to those reported in Tables 7.6 and 7.7. The only difference of note in these results is a much reduced adjusted r-squared, indicating that substantially less of the variance in *DAC* is explained by the unwinsorised predictors.

Several studies have reported a relationship between ownership concentration or the presence of institutional shareholders and discretionary accruals. Chung et al. (2002) for example report that the presence of institutional shareholders deters managers from engaging in opportunistic, income increasing earnings management. Velury and Jenkins (2006) similarly report that institutional ownership is associated with higher quality earnings. Yeo et al. (2002) document a positive relationship between non-managing block-holders and earnings quality in Singaporean firms, which generally have high levels of insider ownership. Conversely Zhong, Gribben and Zheng (2007) find that the presence of a non-managing block-holder, defined as an outside shareholder owning in excess of 5% of equity, is associated with an increase in income increasing DA, when a firm is faced with declining pre-managed earnings. The authors call this the “exacerbating effect” and suggest it may reflect the greater threat posed to the position of managers by block-holders, relative to smaller shareholders, and a consequent incentive to manage the perceptions of blockholders.

It is possible that the results presented in tables 7.6 and 7.7, which indicate that managers owning no equity or relatively low levels of equity engage in earnings management when faced with declining or negative cash flow performance, may change if ownership concentration is controlled for. To examine the effect of ownership concentration on opportunistic managerial behaviour I estimate regressions identical to those shown in Table 7.6, column 2 and Table 7.7, column 2 but include an additional independent variable, *Outside 50*, which is a dummy variable taking the value of one if a non-managing shareholder owns in excess of 50% of equity. This analysis is repeated using a Herfindahl Index (*HI*) calculated based on the five largest shareholders (the construction of this variable is discussed in Chapter 4, Section 4.3.2) as alternative measures of ownership concentration. The variables of most interest in these results are the interactions between *MD Low* and *CF Loss* and *CF FALL*, rather than the ownership concentration variables. If concentrated ownership exerts a monitoring effect on the opportunistic behaviour of managers or conversely exacerbates the use of earnings management I expect the coefficient on the interaction terms, *MD Low * CF Loss* and *MD Low * CF Fall* to materially differ in this specification from those shown in Tables 7.8 and 7.9. No prediction is made about the sign on the ownership concentration coefficients, *Outside 50* and *HI*.

The following OLS regressions are estimated on the income increasing sample:

$$\text{Eq.60 } DAC_i = \partial + \beta_1 MD\ Low_i + \beta_2 CF\ LOSS_i + \beta_3 MD\ Low_i * CF\ LOSS_i + \beta_4 Outside\ 50 + \beta_5 Controls_i + \varepsilon_i$$

$$\text{Eq.61 } DAC_i = \partial + \beta_1 MD\ Low_i + \beta_2 CF\ FALL_i + \beta_3 MD\ Low_i * CF\ FALL_i + \beta_4 HI + \beta_5 Controls_i + \varepsilon_i$$

$$\text{Eq.62 } DAC_i = \partial + \beta_1 MD\ Low_i + \beta_2 CF\ FALL_i + \beta_3 MD\ Low_i * CF\ FALL_i + \beta_4 Outside\ 50 + \beta_5 Controls_i + \varepsilon_i$$

$$\text{Eq.63 } DAC_i = \partial + \beta_1 MD\ Low_i + \beta_2 CF\ LOSS_i + \beta_3 MD\ Low_i * CF\ LOSS_i + \beta_4 HI + \beta_5 Controls_i + \varepsilon_i$$

Table 7.8: OLS Regressions Testing for an effect of Ownership Concentration on the Relationship between Managerial Ownership and Discretionary Accruals

VARIABLES	Predicted Sign	(1) DAC	(2) DAC	(3) DAC	(4) DAC
Growth	?	0.079** (0.031)	0.084*** (0.032)	0.086*** (0.032)	0.078** (0.031)
Leverage	?	-0.017 (0.014)	-0.016 (0.014)	-0.015 (0.014)	-0.017 (0.014)
Ln Turnover	-	-0.006* (0.003)	-0.006* (0.004)	-0.007* (0.003)	-0.006* (0.003)
Big 4 (D)	-	-0.004 (0.007)	-0.001 (0.007)	-0.002 (0.007)	-0.003 (0.008)
ROA	?	-0.140* (0.072)	-0.163** (0.069)	-0.166** (0.069)	-0.136* (0.072)
Industry (D)	?	-0.024 (0.016)	-0.021 (0.016)	-0.021 (0.015)	-0.024 (0.017)
Ln Age	?	-0.010*** (0.003)	-0.010*** (0.003)	-0.011*** (0.003)	-0.010*** (0.003)
MD Low (D)	?	0.002 (0.008)	-0.003 (0.009)	-0.003 (0.009)	0.001 (0.007)
CF Loss (D)	?	-0.038*** (0.012)			-0.037*** (0.011)
MD Low*CF Loss (I)	+	0.087*** (0.031)			0.082*** (0.031)
CF Fall (D)	?		-0.023*** (0.008)	-0.023*** (0.008)	
MD Low*CF Fall (I)	+		0.035** (0.016)	0.037** (0.015)	
Outside 50 (D)	?	-0.003 (0.010)		-0.003 (0.010)	
HI	?		0.027** (0.012)		0.027** (0.012)
Constant		0.183*** (0.042)	0.174*** (0.045)	0.195*** (0.044)	0.163*** (0.043)
F		2.61***	2.42***	2.31***	2.65***
Observations		518	514	518	514
Adjusted R ²		0.058	0.068	0.057	0.069

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

DAC is the absolute value of income increasing discretionary accruals estimated using the modified Jones approach.

Growth is the one-year percentage growth in Total Assets.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

Ln Turnover is the natural log of the current year turnover.

Big 4 is a dummy variable taking a value of one if the firm's current auditor is a Big 4 firm.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Age is the natural log of the number of years since firm incorporation.

MD Low Dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.

CF FALL is a dummy variable taking the value of 1 if $CF_0 < CF_{-1}$.

CF LOSS is a dummy variable taking the value of 1 if the firm reports a negative Cash Flow from Operations in the current year.

Outside 50 is a dummy variable taking a value of 1 if a single shareholder, other than the MD, owns >50% of equity.

HI is a Herfindahl Index computed based on the shareholdings of the 5 largest shareholders.

(D) indicates a dummy variable, **(I)** indicates an interaction variable.

Eq. 60 and 62 include the dummy variable *Outside 50* as a measure of ownership concentration. Eq. 61 and 63 include *HI* as a measure of ownership concentration. The results of this analysis are shown in Table 7.8

When *Outside 50* is included, the coefficients on the interaction terms are 0.087 (for *MD Low * CF Loss*) and 0.037 (*MD Low * CF Fall*). These compare to 0.087 and 0.037 respectively, without controlling for a non-managing majority shareholder as shown in Tables 7.8 and 7.9. *Outside 50* is not significant in either model. The analysis is repeated using *HI* as a measure of ownership concentration, the coefficients on the interaction terms in this specification are slightly lower than those shown in Tables 7.6 and 7.7, 0.082 (for *MD Low * CF Loss*) and 0.035 (*MD Low * CF Fall*). The positive, significant coefficient on *HI* suggests that increased ownership concentration is associated with higher income increasing discretionary accruals. These results suggest that controlling for ownership concentration, defined as the presence of a non-managing, majority shareholders, does not affect the relationship between managerial ownership and accruals. When ownership concentration is more broadly defined as a higher Herfindahl Index, the coefficients are marginally different, but not to the extent that changes the interpretation of the results.

7.5 Discussion and Conclusions

Earnings management, through the use of discretionary accruals, does not in itself change the cash-flows of the firm. It does affect the pattern and timing of reported earnings however and if contractual outcomes for managers depend on reported profits then earnings management can alter the allocation of firm cash-flows between managers and shareholders. This suggests that managers may behave opportunistically to manage earnings but that the incentive to divert firm resources from shareholders may only arise where managerial equity ownership falls below a certain level. This study examines whether discretionary accruals vary with managerial ownership. It differs from the existing literature addressing this relationship in focussing on private firms, which differ systematically from public firms in the UK with respect to ownership structure. It also considers whether firms with low managerial

ownership manage earnings differently to firms with intermediate or high levels of managerial ownership when faced with poor firm performance.

The results show that, considering both income increasing discretionary accruals and income decreasing discretionary accruals together, there is no statistically significant relationship with managerial ownership. This contrasts with some evidence from public firms, Warfield et al. (1995) report a linear, negative, relationship between absolute discretionary accruals, and managerial ownership. Although several studies (for example Koh 2003 and Peasnell et al. 2005) find no evidence of a significant relationship between managerial ownership and earnings management. Income increasing discretionary accruals in the sample firms, considered in isolation, are related to managerial ownership in a non-linear, U-shaped, manner. Discretionary accruals fall and then rise as managerial ownership increases, with the relationship reversing direction where the MD owns 44% of equity in the firm. Firms with both high and low levels of managerial ownership engage in more earnings management compared to firms with intermediate levels of managerial ownership. This finding is consistent with evidence from public firms in institutional settings in which managerial ownership is high, such as Asian economies (Fan and Wong 2002, Yeo et al. 2002). These results suggest that managerial entrenchment is associated with the management of earnings in private firms.

The second question addressed in this study is whether this observed earnings management behaviour is opportunistic. At high levels of managerial ownership it would seem unlikely that this behaviour is opportunistic in the sense of managers diverting firm resources since the managers are (in most cases) the largest shareholder and in some cases the only shareholder. Firms face a range of possible incentives to manage earnings including influencing third parties such as creditors, lenders, suppliers and tax authorities. I hypothesise that opportunistic earnings management would be indicated if firms with low levels of MD ownership manage earnings upward to a greater extent when faced with poor firm performance than other firms. The results suggest that this is the case. Where managerial ownership is high (greater than 78.48%) there is no significant interaction between poor firm performance and discretionary accruals. Where managerial ownership is low (below 9.96%) discretionary accruals are higher when firm performance is poor. An implication of this result

is that different factors drive earnings management behaviour where managerial ownership is high. In addition the results indicate that ownership concentration does not fulfil a significant monitoring role in preventing this opportunistic behaviour.

Chapter 8

Conclusions

8.1 Background to Study

This thesis addresses research questions concerning the relationships between ownership structure in large private firms and agency costs, executive compensation and earnings management. It provides evidence that significant agency costs exist in large private firms, evident across the three areas studied, these costs vary with managerial ownership and to a lesser extent with ownership concentration. Agency costs arise at low levels of managerial ownership and also where the manager is the dominant shareholder. Concentrated ownership, by shareholders other than the MD, reduces these agency costs.

This study contributes to addressing a significant gap in the empirical corporate finance literature, that is the paucity of research on large private firms. Private firms are the predominant corporate form in many economies, yet remain largely ignored in the literature. These firms differ markedly from public firms in their size, access to capital markets, capital structure corporate governance, quality of financial reporting and other respects. Ownership structures in private firms fundamentally differ from those in public firms. Ownership is typically highly concentrated, majority shareholders are present in half of the sample firms. Managerial ownership is also high, mean MD ownership in the study sample is 43.4%, compared to a mean CEO ownership in FTSE 350 firms of 2.29% (Gregory-Smith 2012). These differences suggest that the empirical results concerning ownership structure and its relation to agency costs, compensation and earnings management obtained from research on public firms cannot be assumed to hold for private firms.

Three distinct, but related areas, are the subjects of investigation in this thesis. Agency costs, executive compensation and earnings management. The common thread running through the thesis is the focus on ownership structure and its relation with these issues.

Agency costs arise from the separation of ownership and control and the divergent interests of shareholders and managers. Agency costs are therefore predicted to be higher in firms in which managerial ownership is low, where this separation is greater, and also where

managerial ownership is high, where the degree of separation is lower but the ability of shareholders to monitor managers is reduced due to managerial power. McKnight and Weir (2009), Florackis and Ozkan (2009) and Chang and Zhang (forthcoming) provide evidence of agency costs arising from both of these factors in public firms. Ang et al. (2000) documents significant agency costs in US private firms, manifested in declines in measures of firm efficiency in firms in which separations between owners and managers are greater. Evidence from public firms suggests that concentrated ownership reduces agency costs (Yafeh and Yosha 1996, Becker et al. 2011) but uncontested ownership by dominant shareholders is associated with increased agency costs (Morck, Wolfenson and Yeung 2005).

Executive compensation is considered in this study through the lens of the agency conflict. Agency costs may be manifested in excessive executive compensation. If structured to be sensitive to firm performance, executive compensation aligns the interests of managers with those of shareholders and reduces incentives to capture private benefits (Shleifer and Vishny 1997, Murphy 1999). In private firms, existing evidence suggests that the level of CEO pay is negatively related to CEO ownership (Cole and Mehran 2013), supporting the argument that increasing alignment is associated with lower levels of compensation. The relationship between compensation and managerial ownership may be non-linear in public firms (Ozkan 2011), reflecting the influence of managerial entrenchment. There is no extant evidence, to the best of my knowledge, on this in private firms. Michiels et al. (2012) provide indirect evidence suggesting that pay-performance sensitivity in private firms is lower where managerial ownership is higher.

By providing information about the position and performance of the firm to the suppliers of capital and other parties, financial reports constitute a critical part of the monitoring system. Firms are allowed significant discretion, within GAAP, over accounting choices which may alter reported earnings. The existing literature suggests earnings management behaviour is more prevalent when incentives to do so are high (Bergstesser and Philippon 2006, Kuang 2008). The avoidance of reporting an earnings loss or decline provides one such incentive (Peasnell et al. 2005). Several studies have reported a negative relationship between discretionary accruals and managerial ownership (Warfield et al. 1995, Gul et al. 2003) and

findings from institutional contexts where managerial ownership is high suggest that this relationship may be non-linear in form (Fan and Wong 2002, Yeo et al. 2002).

Three research questions are addressed in this thesis:

Do agency costs in large UK private firms vary with managerial ownership and ownership concentration and what are the forms of these relationships?

Is executive compensation in large UK private firms sensitive to firm performance, does it vary with ownership structure and does pay-performance sensitivity vary with ownership structure?

Does earnings management behaviour in large UK private firms vary with managerial ownership and is there evidence of managerial opportunism in the management of earnings?

8.2 Summary of Data and Variables

The research questions are addressed using a sample of 1223 large private UK firms. The sample is limited to firms classified as “Large” by Companies House, since smaller private firms are exempt from returning complete accounts. Data is collected from the FAME database, which is compiled from Annual Returns and Company Accounts filed with Companies House. Ownership data is from the Annual Return submitted in 2013 and financial and other variables are from the Annual Returns submitted in 2013 and 2014. To construct the managerial ownership variables, the identity of the MD is ascertained from Company Accounts and manually matched to the shareholder data. The fundamental measures of ownership structure used in the study are the percentage of equity owned by the MD and the percentage of equity owned by the largest shareholder. Further variables are constructed from these to capture high and low levels of managerial ownership and dispersed and concentrated ownership structures. Firms in the sample exhibit a wide range of ownership structures, the mean MD and largest shareholder ownership shares are 43.4% and 58.8% respectively. Significant numbers of the sample firms exhibit relatively dispersed ownership structures and much lower managerial ownership. In 284 firms the MD ownership

share is less than 8.8% and in 231 firms the largest shareholder owns less than 31.1% of equity in the firm.

8.2 Summary of Empirical Results

This section summarises the methodology and main findings from each of the three empirical studies.

8.2.1 Agency Costs and Ownership Structure

The first empirical study in this thesis, described in Chapter 5, investigates the relationships between agency costs and ownership structure in the sample firms. Agency costs are measured using two efficiency ratios, the expense ratio and the asset utilisation ratio, which are commonly used measures of agency costs in the empirical literature. The initial analysis is univariate, in which the sample firms are partitioned into high and low agency costs firms, based on above (below) sample median expense ratio (asset utilisation ratio) and the mean values of ownership variables in the samples are compared. High agency cost firms, in comparison to low agency cost firms, differ significantly in a number of ownership characteristics. They have a lower mean MD shareholding, significantly fewer of these firms have an MD whose ownership share is low³⁵ and more of these firms are managed by an MD owning a majority of the firm's equity. Similar results are obtained using both measures of agency costs to partition the sample. The results from comparing ownership concentration in the high and low agency cost samples indicate that ownership concentration is weakly related to agency costs in the sample firms. The mean number of shareholders is significantly higher in the high agency cost firms compared to the low agency cost firms, no other measure of ownership concentration differs significantly between the samples.

³⁵ Managerial ownership is categorised as Low (High) in the study if the ownership share of the MD is more than one standard deviation below (above) the sample mean ownership share of the MD. The same categorisation is used for ownership concentration, based on the ownership share of the largest shareholder.

The second stage of the analysis is a series of regressions, controlling for industry, firm age and size and other characteristics, to determine the associations between agency costs and ownership structure and the form of these relationships. The results indicate that the expense ratio is linearly and negatively related to managerial ownership, consistent with the “alignment of interests” hypothesis. The results of regressing the asset utilisation ratio on measures of managerial ownership indicate a non-linear relationship, with an inflection point at 56.9% (shareholding of MD), asset utilisation first increases then declines with increasing managerial ownership. This results is consistent with both the “alignment of interests” and “managerial entrenchment” hypotheses. To further investigate this non-linear relationship, the extent of firm diversification (proxied using the number of SIC codes the firm includes in its return to Companies House) is regressed on the ownership share of the MD. The results indicate that firm diversification declines and then increases with increasing managerial ownership, with an inflection point at 60% MD ownership. Firm diversification appears to be negatively related to asset utilisation.

The association between ownership concentration and agency costs is also considered. The results confirm the univariate findings that the relationship between ownership concentration and agency costs is relatively weak. An analysis of the full sample indicates that the expense ratio is linearly and negatively related to the ownership share of the largest single shareholder and positively related to the number of shareholders. The asset utilisation ratio is negatively related to the number of shareholders but not significantly related to the ownership percentage of the largest shareholder, although it is significantly lower in firms in which the ownership share of the largest shareholder is categorised as low. To disentangle the effects of the managerial ownership and ownership concentration, a sub-sample is constructed, which excludes firms in which the largest shareholder is the MD. The linear relationship between the ownership share of the largest shareholder and the expense ratio, found in the full sample, is not evident in the reduced sample. The expense ratio is positively related to the number of shareholders in the firm. The asset utilisation ratio is negatively related to the number of shareholders and is lower in firms in which the ownership share of the largest shareholder is low.

8.2.2 Executive Compensation and Ownership Structure

The second empirical study, described in Chapter 6, investigates the relationship between ownership structure and the level of executive compensation, the sensitivity of compensation to firm performance and the interaction between pay-performance sensitivity and ownership structure in the sample firms. Controlling for firm performance and other characteristics, the level of executive compensation is non-linearly related to managerial ownership. The form of this relationship is cubic, as managerial ownership increases, compensation declines, increases and declines. The inflection points are at 25% and 75% MD ownership share. These results differ from the limited existing research on the relationship between the level of compensation and managerial ownership in private firms. Cole and Mehran (2013) document a linear, negative relationship between compensation and managerial ownership in private US firms. Compensation is also related to ownership concentration. In the full sample, as the ownership share of the largest shareholder increases, compensation declines, increases and declines, with inflection points at 30% and 75%. In a reduced sample, excluding firms in which the MD is the largest shareholder, there is very limited evidence for an association between ownership concentration and the level of compensation. Pay is significantly lower in firms in which the largest shareholder's ownership share is high. No other measure of ownership concentration appears to be a significant predictor of the level of compensation in the sample firms.

Existing research on pay-performance sensitivity in private firms has yielded conflicting results, possibly reflecting different measures of the variables of interest, different institutional settings and varying methodological approaches. The most persuasive of these studies (Michiels et al. 2012) suggest that executive compensation in private firms is sensitive to firm performance. The results from this study support this finding, as in the sample firms compensation is sensitive to firm performance. Firm performance is measured as lagged ROA and to account for the endogeneity in the pay-performance relationship, an instrumental variables approach is used to estimate these regressions. Further analysis is conducted to determine if the pay-performance sensitivity in the sample firms is moderated by managerial ownership or ownership concentration. The results indicate that the pay-performance relation is significantly stronger in firms in which the MD is not a majority shareholder. This is

consistent with pay-performance sensitivity substituting for managerial ownership as an alignment mechanism. Concentrated ownership also moderates the pay-performance relation. In the reduced sample, excluding firms in which the MD is the largest single shareholder, pay-performance sensitivity is significantly lower in firms in which the largest shareholders ownership share is high. This result suggests that concentrated ownership in private firms substitutes for pay-performance sensitivity as a monitoring mechanism, rather than being complementary to it.

8.2.3 Earnings Management and Ownership Structure

The final empirical study in this thesis, described in Chapter 7, examines the relationship between earnings management and managerial ownership in the sample firms. Earnings management is measured by estimating discretionary accruals for the sample firms, using a modified-Jones approach. A univariate analysis suggests a non-linear (U-shaped) relationship between managerial ownership and discretionary accruals. However, in a multivariate analysis, when income increasing and income decreasing discretionary accruals are considered together, there is no relationship evident between discretionary accruals and managerial ownership. The analysis examines the firms exhibiting income increasing and income decreasing discretionary accruals separately. Income decreasing discretionary accruals are lower in firms audited by a Big-4 firm, are negatively related to leverage and firm age and positively related to firm performance (ROA). There is no significant relationship between managerial ownership and income decreasing discretionary accruals. Income increasing discretionary accruals are negatively related to firm performance. Managerial ownership is related to discretionary accruals in this income increasing sample and the relationship is quadratic in form. As managerial ownership increases, discretionary accruals decline and then rise, with an inflection point at 43.96%. Existing studies have documented a cubic relationship between managerial ownership and audit firm quality in private firms (Lennox 2005) and discretionary accruals in public firms (Teshima and Shuto 2008). No evidence was found in the sample firms for a cubic relationship between discretionary accruals and managerial ownership.

The sample of firms exhibiting income increasing discretionary accruals is further analysed to investigate the relationship between accruals and managerial ownership when firm performance is poor. Poor firm performance is measured by constructing dummy variables indicating negative cash-flow from operations or a fall in cash-flow from operations, relative to the previous year. The results indicate that firms in which managerial ownership is low exhibit significantly higher income increasing discretionary accruals when firm performance is poor. A similar result is obtained using both measures of poor firm performance, however the magnitude of the coefficients indicates that the effect is stronger when a cash-flow loss is experienced.

8.2.4 Overall Findings

Considering the findings presented in the three empirical studies together, a number of conclusions can be drawn regarding the associations between aspects of ownership structure and agency costs in large private firms.

First, the study provides persuasive evidence of the reduction of agency conflicts as managerial ownership increases from a low base, although this effect reverses at higher levels. Mean managerial ownership is higher in firms exhibiting low agency costs compared to firms exhibiting high agency costs. The ratio of expenses to sales declines linearly with increasing managerial ownership and the asset utilisation ratio declines with increasing managerial ownership to 56.9% MD ownership. Compensation declines with increasing managerial ownership to 25% MD ownership, the sensitivity of compensation to firm performance is significantly lower in firms where the MD is a majority shareholder, suggesting less need for this alignment mechanism at higher levels of managerial ownership. An alternative plausible explanation for this result however is that entrenched, risk averse managers structure pay to be insensitive to performance. Income increasing discretionary accruals are negatively related to managerial ownership below 44% MD ownership.

Second, this study provides evidence on the effects of managerial entrenchment in private firms in several contexts. The wide range of managerial ownership in the private firms, in contrast to public firms where managerial ownership is typically low, means that they provide a rich setting to explore the costs of managerial entrenchment. Existing evidence on managerial entrenchment, where agency costs rise as managerial ownership increases, in private firms is extremely limited. The high level of managerial ownership prevalent in private firms suggests that the ability of shareholders to effectively monitor entrenched managers will be limited, potentially resulting in significant agency conflicts in these firms. Given this high level of managerial ownership, the lack of a substantial literature in this area represents a significant gap. This study provides evidence of managerial entrenchment in several contexts. Agency costs, measured using the assets utilisation ratio, are positively related to MD ownership above 56.9%. Firm diversification, which is negatively related to asset utilisation, is positively related to managerial ownership above 60%. Executive compensation in the sample firms is positively associated with managerial ownership between 25% and 75% MD ownership. Income increasing discretionary accruals are positively associated with managerial ownership once MD ownership exceeds 43.96%. These results provide compelling evidence of a managerial entrenchment effect in private firms. At low levels of managerial ownership, agency costs, executive compensation and income increasing discretionary accruals fall as managerial ownership rises, once managerial ownership rises above a threshold, these relationships reverse.

Third, this study provides evidence that concentrated ownership appears to perform a monitoring role in private firms. Large shareholders, by virtue of their voting rights, may exert considerable control over investment decisions, expenses incurred, accounting choices, executive compensation and other policies within private firms and these shareholders should have the ability to monitor managers effectively. Since the gains from potentially costly monitoring accrue to shareholders proportionate to their shareholdings, free rider effects may deter dispersed shareholders from incurring monitoring costs but large shareholders will capture proportionately more of the gains and should be willing to bear monitoring costs. There is limited evidence of this monitoring in the present study. When firms in which the manager is the largest shareholder are excluded in order to distinguish between the effects of insider and outsider concentrated ownership, only one variable related to the largest shareholder is a significant predictor of agency costs, asset utilisation is lower in firms in

which the largest shareholder's ownership share is low. Highly concentrated ownership does not appear to significantly ameliorate agency costs. There is a positive relationship between the number of shareholders and agency costs (using both measures), a result consistent with increasing free rider problems and decreased returns to monitoring for individual shareholders as the number of shareholders increases. In this reduced sample, compensation is lower in firms in which the largest shareholder's ownership share is high but there is no evidence of a linear (or non-linear) relationship between concentration and compensation. Pay-performance sensitivity is also lower in firms in which ownership is highly concentrated, this can be interpreted as evidence that concentrated ownership substitutes for the performance based pay, an alignment mechanism. In general the evidence for the monitoring effect of concentrated ownership is limited, no evidence was found for linear, negative relationships between measures indicating agency costs and the ownership share of the largest shareholder, consistent with increasing monitoring as ownership concentration increases.

Fourth, there is very limited evidence in the results of the empirical studies to support the argument advanced by Shleifer and Vishny (1997) that dominant shareholders can use their power to extract private benefits from the firm at the expense of minority shareholders. The results from the agency cost study do not support this argument. Agency costs, measured using both the asset utilisation and expense ratios, are not positively associated with concentrated ownership at high levels of concentration and there is no evidence of a non-linear relationship between agency costs and ownership concentration. These results differ from findings reported by Nagar et al. (2011), who report significantly worse accounting performance in US private firms with a single majority shareholder compared to firms in which no shareholder owns a majority of equity. While Nagar et al. (2011) include a control variable indicating whether the manager of the firm is a shareholder, they do not include the percentage shareholding of the manager. One possible explanation for the divergent results in Nagar et al. (2011) and the present study is that the effect of high managerial ownership are conflated with those of highly concentrated ownership and that their results are evidence of managerial entrenchment rather than expropriation by majority shareholders. By examining a sample of firms in which the manager is not the largest shareholder, this study separates these effects. There is limited, and somewhat tenuous, evidence for an expropriation effect in the results of the earnings management study. Income increasing discretionary accruals are

positively related to ownership concentration, measured using a Herfindahl Index, computed using the five largest shareholdings. This analysis is performed on the full sample and may confuse the effects of managerial and non-managerial ownership. When concentration is measured using a variable indicating the presence of a non-manager majority owner, there is no evidence of a relationship between accruals and ownership concentration. This suggests that when the effects of high managerial ownership are accounted for, there is no relationship between concentrated ownership and discretionary accruals.

This study makes a number of contributions to the literature on ownership structure in large UK private firms. First, it adds to the literature on agency costs in large private firms. Prior research (Ang et al. 2000, Fleming et al. 2005) reports a linear, negative relationship between agency costs and managerial ownership in private firms. This study indicates that this relationship reverses at higher levels of managerial ownership. Second, prior research (Keasey et al. 1994) has found an inverted U-shaped relationship between ROA and managerial ownership in UK private firms. This study contributes to this literature in finding that the negative relationship between firm performance and managerial ownership at higher levels of managerial ownership relates to a decline in the efficiency of asset utilisation and not a higher level of expenses per unit of sales. Third, this study contributes to the literature on pay-performance sensitivity in large private firms. The existing literature in this area (Banghøj et al. 2010, Michiels et al. 2012) reports contrasting findings as to whether compensation is sensitive to accounting performance in private firms. This study, using a larger sample than others in this area and controlling for the endogenous nature of the pay-performance relation, presents evidence that compensation in large private firms is sensitive to firm performance. Further, this study is the first, to my knowledge, to directly consider the relationship between pay-performance sensitivity and the ownership share of the MD in private firms and finds that pay-performance sensitivity is significantly lower where the MD is a majority shareholder. Fourth, this study contributes to the literature on executive compensation and managerial ownership in large private firms. Existing research (Cole and Mehran 2013) reports a linear, negative relationship between the level of managerial ownership and compensation. This study finds that the relationship between managerial ownership and compensation is cubic in form, as managerial ownership increases, compensation declines, increases and declines.

Fifth, this study adds to the literature on managerial ownership and earnings management in private firms. Existing research (Ball and Shivakumar 2005, Burgstahler et al. 2006) documents the pervasiveness of earnings management behaviour in private firms. No existing study, to my knowledge, has considered the relationship between managerial ownership and discretionary accruals in private firms. This study finds that income increasing discretionary accruals in large private firms are related to managerial ownership in a U-shaped manner. Finally, this study contributes to the literature on opportunistic earnings management behaviour in large private firms. Existing research on public firms (Peasnell et al. 2005) finds that the likelihood of firms engaging in income increasing earnings management to avoid reporting losses or falls in earnings is negatively related to the proportion of outside directors on the board. This study adds to this literature in finding that large private firms in which managerial ownership is low engage in income increasing earnings management to a greater extent than other firms when facing cash-flow losses or declines.

In addition to contributing to the academic literature, the results of this study have implications for firms, minority shareholders and policymakers. A number of UK reports have highlighted the concern that the financing gap faced by private firms, where external equity is difficult to access, results in an excessive reliance on debt and impedes the growth of these firms³⁶. A succession of tax incentive schemes to support equity investment in private firms have been implemented in an effort to address this. The current schemes are the Enterprise Investment Scheme (EIS) and the Seed Enterprise Investment Scheme (SEIS). The results presented in this study indicate that minority shareholders in private firms face considerable agency costs, in particular where managerial ownership is very high. Rational investors, anticipating the future impact of agency costs may choose not to invest in these firms or reduce the price they pay for equity to reflect the expected costs associated with agency conflicts. These agency costs take the form of reduced efficiency of asset utilisation, increased diversification, a higher level of executive compensation and a lower level of pay-performance sensitivity in firms in which the MD is a dominant shareholder, compared to other firms. The finding that discretionary accruals are greater when managerial ownership is

³⁶ Recent reports on the this issue include *Review of Equity Investment in Small Business*. March 2015. Department of Business, Innovation and Skills and British Business Bank. *Boosting Finance Options for Business*. March 2012. Department of Business, Innovation and Skills and HM Treasury.

high may be of particular concern to these new shareholders, who are less likely than existing shareholders to be integrated into the “insider access” model through which information flows from private firms to shareholders (Ball and Shivakumar 2005). Outside investors will rely to a greater extent on financial reports to monitor the firm. Agency costs, arising both from misalignment of incentives and managerial entrenchment, may both reduce access to external equity and increase the cost of that equity for private firms. Policymakers, investors and firms should therefore consider mechanisms to improve corporate governance of private firms as an important step in addressing the financing gap.

8.3 Limitations and Avenues for Further Research

This study is subject to several limitations. These limitations arise from the methodological approaches used, characteristics of the study sample, limitations in the availability of data and the choices of variables used. This section outlines these limitations and proposes avenues for further research.

First, family control is the predominant form of corporate ownership. 70% of UK firms can be classified as “family firms”, based on majority equity ownership by members of a single family (IFERA 2003). Data on family ownership or family relationships between shareholders, and shareholders and managers, is not available for UK private firms. If members of a family have closely aligned incentives and act cohesively, the study will underestimate the effective degree of ownership concentration in the sample firms in which shareholders are related. An approach considered, when this study was being designed, was to use the surnames of shareholders and MDs to infer family relationships between shareholders and MDs. This approach was ultimately not adopted due to concerns that significant measurement error would result. Family relationships between shareholders and MDs are likely to have implications for agency costs, managerial compensation and earnings management in private firms however. Exploring the effects of family control in private firms would be a useful avenue for future research.

Second, a number of features of this study limit the generalisability of the findings presented here. The study uses cross-sectional data from sample firms' 2013 financial statements. A cross sectional approach is used because ownership data is available only for the current year in the data source used. The extent to which the findings of this study would differ if data was collected for a different sample period is unknown. The effects of changes in ownership structure cannot be measured using a cross-sectional approach. Future research could usefully, through the use of alternative data sources or repeated sampling of the data source used in this study, construct a panel data set to address the limitations in the cross sectional approach used here.

Due to exemptions available to small and medium sized firms in reporting financial and other information, the study sample is limited to "Large" private firms, as defined in the relevant legislation. Consequently, the findings cannot be generalised to the population of private firms. The study sample is concentrated in a particular industry. Table 4.1 shows the distribution of sample firms by one-digit SIC code. 48.57% of sample firms are in one-digit SIC code 4, corresponding to construction, retail and wholesale and motor vehicles. In the UK economy as a whole in the sample period, firms engaged in construction, retail and wholesale and motor vehicles accounted for a combined 28% of all registered firms³⁷. If, as is likely, the characteristics of private firms vary by industry, this over-representation of particular industries in the sample limits the extent to which the findings can be generalised across private firms in general. Data is available on the entire population of private firms, albeit it is less rich than that available for Large private firms. A study with a broader sample of private firms and limited to the available financial and ownership variables, would address the question of whether the findings presented in this study are generalisable to the population of private firms.

Third, the variable used to measure executive compensation in sample firms is Total Directors' Remuneration, which is the aggregated sum of Directors' Fees plus Pension

³⁷ UK Business: Activity, Size and Location, 2014. Office for National Statistics. Statistical Bulletin.

Contributions plus Other Emoluments for all directors of the firm.³⁸ This is an imperfect proxy for the variable of interest in this study, the compensation paid the most senior executive in the sample firm. An second compensation variable available in the data source is the total compensation paid to the Highest Paid Director (HPD). The UK Companies Acts require that the remuneration of the highest paid director be reported only where the total director's remuneration for the firm exceeds £200,000 in the reporting period. Of the total sample, 23.22% (284 firms) report aggregate directors' remuneration of less than £200,000 and therefore do not report the remuneration of the highest paid director. The use of Total Directors' Remuneration as the measure of executive compensation was based on a concern that limiting the sample to firms reporting HPD compensation would bias the sample towards larger and more profitable firms. Further research could fruitfully investigate whether a sample of large private firms reporting HPD compensation exhibited similar relationships between compensation, performance and ownership to those reported in the executive compensation study presented here.

Finally, the design of the executive compensation study presented here does not attempt to control for the influence of taxation on the level and structure of compensation paid to directors. The effects of the UK personal and corporation tax systems and the National Insurance system incentivise tax efficient structuring of compensation. In general, for a firm in which the MD is the sole shareholder, the exemption of dividend income from National Insurance contributions has the effect of incentivising dividend payments rather than directors remuneration. For these firms, in which the MD is the sole shareholder, executive compensation can be viewed as the aggregate of the directors' remuneration and dividend payments. The decision to allocate compensation in large private firms between directors remuneration and dividend payments, and the extent to which this is related to the taxation system, is an interesting avenue for further research.

³⁸ The number of directors is included as a control variable to account for the expected positive relationship between this measure of compensation and the number of directors in a firm.

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Appendix

Figure 10.1: Residuals Plotted against Fitted Values for Eq. 10

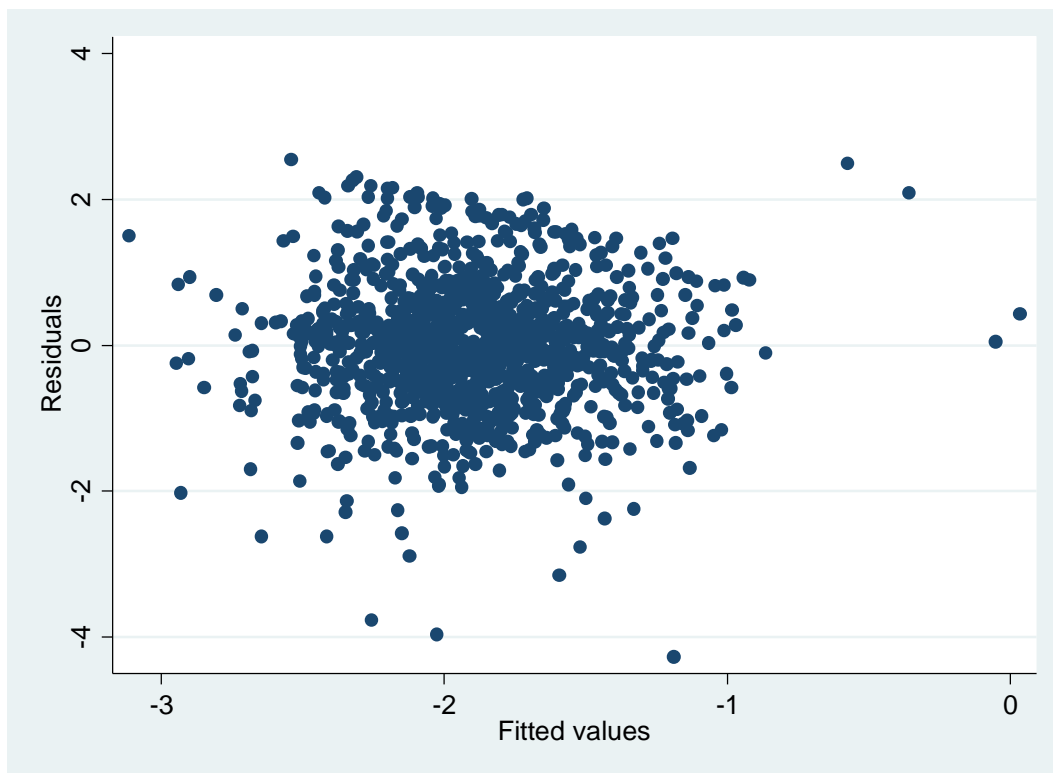


Table 10.1: 2SLS Regressions, Performance, Ownership Concentration and the Level of Total Directors' Remuneration

This table reports the results of regressions identical to those reported in Table 6.6 estimated on *unwinsorised* variables.

VARIABLES	Predicted Sign	(1) ln Dirs. Remun	(2) ln Dirs. Remun	(3) ln Dirs. Remun	(4) ln Dirs. Remun	(5) ln Dirs. Remun	(6) ln Dirs. Remun
ROA ₋₁	+	1.167*** (0.375)	1.168*** (0.374)	1.172*** (0.374)	1.145*** (0.374)	1.140*** (0.373)	1.164*** (0.374)
Industry (D)	?	No	No	No	No	No	No
ln Turnover	+	0.347*** (0.059)	0.345*** (0.059)	0.341*** (0.059)	0.355*** (0.059)	0.348*** (0.059)	0.349*** (0.059)
ln Age	?	0.058 (0.045)	0.059 (0.045)	0.058 (0.045)	0.058 (0.045)	0.056 (0.045)	0.058 (0.045)
ln No. of Subsidiaries	+	0.025 (0.046)	0.030 (0.046)	0.033 (0.047)	0.018 (0.046)	0.032 (0.047)	0.022 (0.047)
ln Dividend Paid	?	0.025* (0.015)	0.026* (0.015)	0.026* (0.015)	0.023 (0.015)	0.024 (0.015)	0.024 (0.015)
No. Directors	+	0.232*** (0.019)	0.235*** (0.019)	0.236*** (0.019)	0.224*** (0.019)	0.230*** (0.020)	0.230*** (0.020)
LGST Low (D)	+		-0.081 (0.112)			-0.026 (0.124)	
LGST 50 (D)	-			0.088 (0.085)		0.193* (0.106)	
LGST High (D)	-				-0.158 (0.099)	-0.271** (0.113)	
LGST %	-						-0.055 (0.160)
Constant		0.462 (0.653)	0.467 (0.652)	0.445 (0.653)	0.464 (0.652)	0.429 (0.651)	0.492 (0.659)
Observations		1,217	1,217	1,217	1,217	1,217	1,217
Wald chi ²		290.27***	291.99	292.06***	293.21***	299.85***	290.34***
First Stage F-statistic		155.39	156.70	155.73	155.74	156.53	156.45

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **ln Dirs. Remun** which is natural log of Total Directors' Remuneration.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

ln Turnover is the natural log of turnover.

ln Age is the natural log of the number of years since firm incorporation.

ln No. of Subsidiaries is the natural log of the number of subsidiaries.

ln Dividend Paid is the natural log of the dividend paid

No. Of Directors is the total number of directors in the firm.

LGST Low is a dummy variable coded one where the largest single shareholder's ownership percentage is less than the sample mean minus one standard deviation.

LGST 50 is a dummy variable coded one where the largest single shareholder's equity ownership percentage is greater than 50%.

LGST High is a dummy variable coded one where the largest single shareholder's ownership percentage is greater than the sample mean plus one standard deviation.

LGST % is the percentage of equity owned by the largest single shareholder.

Instruments for **ROA₋₁**, included in the first stage of the 2SLS regression are:

Fixed Asset Intensity₋₁

Leverage₋₁ is Total Debt/Total Debt plus Shareholders Funds.

(D) indicates a dummy variable.

Table 10.2: 2SLS Regression, Ownership Concentration and the Sensitivity of Directors' Remuneration to Firm Performance

This table reports the results of regressions identical to those reported in Table 6.8 estimated on *unwinsorised* variables.

VARIABLES	Predicted Sign	(1) Ln Dirs. Remun	(2) Ln Dirs. Remun	(3) Ln Dirs. Remun	(4) Ln Dirs. Remun
ROA ₋₁	+	1.239*** (0.382)	2.190** (0.935)	2.211*** (0.634)	3.001** (1.413)
Industry (D)	?	No	No	No	No
Ln Turnover	+	0.348*** (0.059)	0.341*** (0.059)	0.350*** (0.059)	0.347*** (0.059)
Ln Age	?	0.057 (0.045)	0.067 (0.046)	0.071 (0.046)	0.070 (0.046)
Ln No. of Subsidiaries	+	0.029 (0.046)	0.037 (0.047)	0.032 (0.047)	0.029 (0.047)
Ln Dividend Paid	?	0.028* (0.016)	0.021 (0.016)	0.013 (0.016)	0.017 (0.016)
No. Directors	+	0.236*** (0.019)	0.237*** (0.019)	0.219*** (0.020)	0.226*** (0.020)
ROA ₋₁ * LGST Low (I)	+	-1.232 (1.814)			
LGST Low (D)		0.018 (0.183)			
ROA ₋₁ * LGST 50 (I)	-		-1.242 (1.016)		
LGST 50 (D)			0.217 (0.135)		
ROA ₋₁ * LGST High (I)	-			-1.723** (0.785)	
LGST High (D)				0.018 (0.128)	
ROA ₋₁ * LGST % (I)	-				-2.273 (1.645)
LGST %					0.150 (0.218)
Constant		0.426 (0.656)	0.328 (0.664)	0.421 (0.659)	0.341 (0.672)
Observations		1,217	1,217	1,217	1,217
Wald chi ²		292.59***	288.98***	290.90***	287.23***
First Stage F-statistic		46.26	47.07	53.26	43.17

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Ln Dirs. Remun** which is natural log of Total Directors' Remuneration.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover.

Ln Age is the natural log of the number of years since firm incorporation.

Ln No. of Subsidiaries is the natural log of the number of subsidiaries.

Ln Dividend Paid is the natural log of the dividend paid

No. Of Directors is the total number of directors in the firm.

LGST Low is a dummy variable coded one where the largest single shareholder's ownership percentage is less than the sample mean minus one standard deviation.

LGST 50 is a dummy variable coded one where the largest single shareholder's equity ownership percentage is greater than 50%.

LGST High is a dummy variable coded one where the largest single shareholder's ownership percentage is greater than the sample mean plus one standard deviation.

LGST % is the percentage of equity owned by the largest single shareholder.

Instruments for **ROA₋₁**, included in the first stage of the 2SLS regression are:

Fixed Asset Intensity₋₁

Leverage₋₁ is Total Debt/Total Debt plus Shareholders Funds.

(D) indicates a dummy variable.

(I) indicates an interaction variable.

Table 10.3: 2SLS Regression, Managerial Ownership and the Level of Total Directors' Remuneration

This table reports the results of regressions identical to those reported in Table 6.11 estimated on *unwinsorised* variables.

VARIABLES	Predicted Sign	(1) Ln Dirs. Remun	(2) Ln Dirs. Remun	(3) Ln Dirs. Remun	(4) Ln Dirs. Remun	(5) Ln Dirs. Remun
ROA ₋₁	+	1.180*** (0.375)	1.173*** (0.375)	1.178*** (0.375)	1.196*** (0.375)	1.190*** (0.375)
Industry (D)	?	No	No	No	No	No
Ln Turnover	+	0.347*** (0.059)	0.350*** (0.059)	0.351*** (0.059)	0.349*** (0.059)	0.346*** (0.059)
Ln Age	?	0.056 (0.045)	0.058 (0.045)	0.058 (0.045)	0.056 (0.045)	0.058 (0.045)
Ln No. of Subsidiaries	+	0.022 (0.046)	0.023 (0.046)	0.021 (0.046)	0.019 (0.046)	0.023 (0.046)
Ln Dividend Paid	?	0.024 (0.015)	0.024 (0.015)	0.023 (0.015)	0.022 (0.015)	0.022 (0.015)
No. Directors	+	0.231*** (0.019)	0.230*** (0.019)	0.228*** (0.019)	0.226*** (0.019)	0.225*** (0.019)
MD Low (D)	+	0.071 (0.097)				-0.095 (0.135)
MD 50 (D)	-		-0.041 (0.088)			0.118 (0.131)
MD High (D)	-			-0.091 (0.101)		-0.107 (0.137)
MD LGST (D)	-				-0.158* (0.086)	-0.243* (0.128)
Constant		0.466 (0.653)	0.464 (0.653)	0.470 (0.653)	0.599 (0.656)	0.671 (0.660)
Observations		1,217	1,217	1,217	1,217	1,217
Wald chi ²		290.74***	290.47***	291.08***	294.29***	296.23***
First Stage F-statistic		154.84	155.63	155.03	155.26	154.74

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Ln Dirs. Remun** which is natural log of Total Directors' Remuneration.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover.

Ln Age is the natural log of the number of years since firm incorporation.

Ln No. of Subsidiaries is the natural log of the number of subsidiaries.

Ln Dividend Paid is the natural log of the dividend paid

No. Of Directors is the total number of directors in the firm.

MD Low is a dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.

MD 50 (D) is a dummy variable coded one where the MD's equity ownership percentage is greater than 50%.

MD High is a dummy variable coded one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation.

MD Largest (D) is a dummy variable coded one where the MD is the largest single shareholder in the firm.

Instruments for **ROA₋₁**, included in the first stage of the 2SLS regression are:

Fixed Asset Intensity₋₁

Leverage₋₁ is Total Debt/Total Debt plus Shareholders Funds.

(D) indicates a dummy variable.

Table 10.4: 2SLS Regression, Managerial Ownership and the Sensitivity of Directors' Remuneration to Firm Performance

This table reports the results of regressions identical to those reported in Table 6.13 estimated on *unwinsorised* variables.

VARIABLES	Predicted Sign	(1) Ln Dirs. Remun	(2) Ln Dirs. Remun	(3) Ln Dirs. Remun	(4) Ln Dirs. Remun	(5) Ln Dirs. Remun
ROA ₋₁	+	2.128*** (0.788)	1.140*** (0.402)	1.056*** (0.395)	0.758* (0.413)	0.897** (0.408)
Industry (D)	?	-0.042 (0.256)	-0.027 (0.254)	-0.044 (0.254)	-0.063 (0.255)	-0.050 (0.254)
Ln Turnover	+	0.336*** (0.060)	0.349*** (0.059)	0.350*** (0.059)	0.338*** (0.059)	0.349*** (0.059)
Ln Age	?	0.063 (0.045)	0.059 (0.045)	0.058 (0.045)	0.061 (0.045)	0.059 (0.045)
Ln No. of Subsidiaries	+	0.038 (0.048)	0.024 (0.047)	0.024 (0.046)	0.034 (0.047)	0.026 (0.047)
Ln Dividend Paid	?	0.017 (0.016)	0.024 (0.015)	0.023 (0.015)	0.017 (0.016)	0.018 (0.016)
No. Directors	+	0.229*** (0.019)	0.230*** (0.019)	0.229*** (0.019)	0.229*** (0.019)	0.225*** (0.019)
ROA ₋₁ * MD Low (I)	+	-1.328 (0.879)				
MD Low (D)		0.215 (0.137)				
ROA ₋₁ * MD 50 (I)	-		0.329 (1.011)			
MD 50 (D)			-0.076 (0.139)			
ROA ₋₁ * MD High (I)	-			1.068 (1.106)		
MD High (D)				-0.203 (0.154)		
ROA ₋₁ * MD LGST (I)	-				1.647 (1.375)	
MD LGST (D)					-0.327** (0.127)	
ROA ₋₁ * MD % (I)	-					1.590 (1.080)
MD %						-0.348** (0.168)
Constant		0.486 (0.658)	0.474 (0.653)	0.488 (0.652)	0.727 (0.664)	0.603 (0.659)
Observations		1,217	1,217	1,217	1,217	1217
Wald chi ²		287.22***	290.79***	292.62***	293.53***	292.24***
First Stage F-statistic		40.01	69.89	77.11	57.65	64.86

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The dependant variable is **Ln Dirs. Remun** which is natural log of Total Directors' Remuneration.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Turnover is the natural log of turnover.

Ln Age is the natural log of the number of years since firm incorporation.

Ln No. of Subsidiaries is the natural log of the number of subsidiaries.

Ln Dividend Paid is the natural log of the dividend paid

No. Of Directors is the total number of directors in the firm.

MD Low is a dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.

MD 50 (D) is a dummy variable coded one where the MD's equity ownership percentage is greater than 50%.

MD High is a dummy variable coded one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation.

MD Largest (D) is a dummy variable coded one where the MD is the largest single shareholder in the firm.

MD % is the percentage of equity owned by the MD

Instruments for **ROA₋₁**, included in the first stage of the 2SLS regression are:

Fixed Asset Intensity₋₁ 258

Leverage₋₁ is Total Debt/Total Debt plus Shareholders Funds.

(D) indicates a dummy variable.

(I) indicates an interaction variable.

Table 10.5: Pearson Correlation Coefficients for Discretionary Accruals and Explanatory Variables (Income Increasing DA Sample)

Pearson Correlation Coefficients: Income Increasing DA Sample		1	2	3	4	5	6	7	8	9	10	11	12
1	DAC	1											
2	Return on Assets	-0.073* 0.095	1										
3	ln Turnover	-0.016 0.709	-0.099** 0.025	1									
4	Leverage	0.003 0.938	-0.254*** 0.000	0.057 0.198	1								
5	ln Firm Age	-0.127*** 0.004	-0.029 0.506	-0.033 0.457	-0.283*** 0.000	1							
6	Growth	0.120*** 0.006	0.271*** 0.000	0.088** 0.046	-0.095** 0.030	-0.017 0.703	1						
7	Big 4 (D)	-0.010 0.815	-0.134*** 0.002	0.200*** 0.000	0.081* 0.066	-0.096** 0.029	0.015 0.741	1					
8	MD %	0.057 0.197	0.046 0.293	-0.054 0.220	0.068 0.119	-0.136*** 0.002	-0.019 0.663	-0.046 0.294	1				
9	MD Low (D)	0.030 0.490	-0.104** 0.018	0.073* 0.098	-0.037 0.394	0.074* 0.092	-0.027 0.532	0.113** 0.010	-0.673*** 0.000	1			
10	MD High (D)	0.103** 0.019	-0.040 0.368	-0.043 0.324***	0.066 0.132	-0.095** 0.029	-0.065 0.140	-0.036 0.407	0.792*** 0.000	-0.299*** 0.000	1		
11	CF Loss (D)	0.044 0.318	-0.262*** 0.000	-0.007 0.877	-0.019 0.659	0.016 0.715	-0.050 0.258	0.087** 0.048	-0.161*** 0.000	0.161*** 0.000	-0.094** 0.032	1	
12	CF Fall (D)	-0.042 0.337	-0.241*** 0.000	-0.067 0.129	-0.003 0.946	-0.028 0.519	-0.128*** 0.003	0.040 0.361	-0.083* 0.057	0.076* 0.084	-0.065 0.140	0.234*** 0.000	1

Table 10.6: Pearson Correlation Coefficients for Discretionary Accruals and Explanatory Variables (Income Decreasing DA Sample)

Pearson Correlation Coefficients: Income Decreasing DA Sample		1	2	3	4	5	6	7	8	9	10	11	12
1	DAC	1											
2	Return on Assets	0.179***	1										
		0.000											
3	ln Turnover	-0.013	0.018	1									
		0.768	0.684										
4	Leverage	-0.112***	-0.314***	-0.001	1								
		0.012	0.000	0.985									
5	ln Firm Age	-0.140***	-0.001	-0.003	-0.193***	1							
		0.001	0.976	0.944	0.000								
6	Growth	0.260***	0.238***	0.070	-0.026	-0.074*	1						
		0.000	0.000	0.114	0.551	0.094							
7	Big 4 (D)	-0.094**	-0.034	0.187***	0.013	0.047	-0.053	1					
		0.034	0.438	0.000	0.774	0.286	0.231						
8	MD %	0.047	0.041	0.043	-0.013	-0.106**	0.059	-0.094**	1				
		0.288	0.352	0.331	0.771	0.016	0.182	0.035					
9	MD Low (D)	-0.058	-0.028	-0.031	-0.016	0.116***	-0.056	0.071	-0.663***	1			
		0.187	0.527	0.491	0.723	0.009	0.208	0.108	0.000				
10	MD High (D)	-0.005	0.031	0.037	-0.024	-0.083*	0.022	-0.066	0.792***	-0.281***	1		
		0.910	0.482	0.401	0.581	0.061	0.627	0.139	0.000	0.000			
11	CF Loss (D)	0.259***	-0.251***	-0.098**	-0.042	-0.069	-0.085*	0.032	-0.105**	0.067	-0.067	1	
		0.000	0.000	0.027	0.349	0.119	0.055	0.469	0.018	0.128	0.133		
12	CF Fall (D)	0.146***	-0.064	0.004	-0.090**	-0.057	-0.066	-0.006	-0.017	-0.009	0.003	0.369***	1
		0.001	0.149	0.922	0.043	-0.202	0.139	0.896	0.698	0.834	0.947	0.000	

Figure 10.2: Residuals Plotted against Fitted Values for Eq. 53

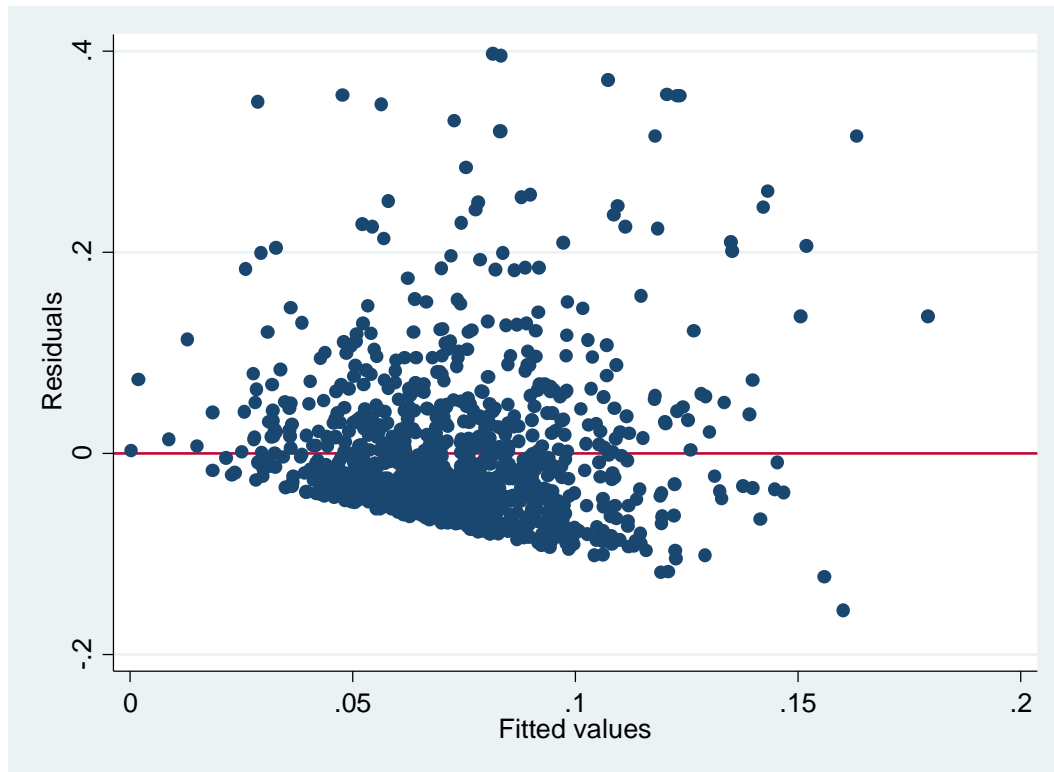


Table 10.7: OLS Regressions, Income Increasing Discretionary Accruals on CF LOSS, Managerial Ownership and Controls

This table reports the results of regressions identical to those reported in Table 7.X estimated on *unwinsorised* variables.

VARIABLES	Predicted Sign	(1) DAC	(2) DAC	(3) DAC
Growth	?	0.005 (0.011)	0.006 (0.011)	0.005 (0.011)
Leverage	?	-0.015 (0.012)	-0.016 (0.012)	-0.014 (0.012)
Ln Turnover	-	-0.004 (0.004)	-0.005 (0.004)	-0.004 (0.004)
Big 4 (D)	-	-0.003 (0.008)	-0.004 (0.008)	-0.003 (0.008)
ROA	?	-0.038 (0.052)	-0.038 (0.052)	-0.034 (0.052)
Industry (D)	?	Yes	Yes	Yes
Ln Age	?	-0.010*** (0.003)	-0.010*** (0.003)	-0.010*** (0.003)
MD %	?	0.020 (0.012)		
CF Loss (D)	?	0.048* (0.028)	-0.044*** (0.011)	0.021 (0.021)
MD %*CF Loss (I)	-	-0.154*** (0.058)		
MD Low (D)	?		-0.002 (0.007)	
MD Low*CF Loss (I)	+		0.105*** (0.034)	
D MD High (D)	?			0.023** (0.011)
MD High*CF Loss (I)	?			-0.083** (0.036)
Constant		0.146*** (0.044)	0.175*** (0.044)	0.148*** (0.046)
F		1.82**	2.46***	1.63**
Observations		518	518	518
Adjusted R ²		0.020	0.025	0.016

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

DA is the absolute value of income increasing discretionary accruals estimated using the modified Jones approach.

Growth is the one-year percentage growth in Total Assets.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

Ln Turnover is the natural log of the current year turnover.

Big 4 is a dummy variable taking a value of one if the firm's current auditor is a Big 4 firm.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Age is the natural log of the number of years since firm incorporation.

MD % is the percentage shareholding of the Managing Director.

MD Low Dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.

MD High Dummy variable coded one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation.

CF LOSS is a dummy variable taking the value of 1 if the firm reports a negative Cash Flow from Operations in the current year.

(D) indicates a dummy variable, **(I)** indicates an interaction variable.

Table 10.8: OLS Regressions, Income Increasing Discretionary Accruals on CF FALL, Managerial Ownership and Controls

This table reports the results of regressions identical to those reported in Table 7.X estimated on *unwinsorised* variables.

VARIABLES	Predicted Sign	(1) DAC	(2) DAC	(3) DAC
Growth	?	0.005 (0.011)	0.006 (0.011)	0.005 (0.011)
Leverage	?	-0.015 (0.011)	-0.015 (0.011)	-0.015 (0.011)
Ln Turnover	-	-0.005 (0.004)	-0.006 (0.004)	-0.005 (0.004)
Big 4 (D)	-	-0.002 (0.008)	-0.002 (0.008)	-0.001 (0.008)
ROA	?	-0.073 (0.051)	-0.062 (0.051)	-0.067 (0.050)
Industry (D)	?	Yes	Yes	Yes
Ln Age	?	-0.010*** (0.003)	-0.011*** (0.003)	-0.010*** (0.003)
MD %	?	0.021 (0.015)		
CF Fall (D)	?	0.000 (0.012)	-0.027*** (0.008)	-0.014* (0.008)
MD %*CF Fall (I)	-	-0.037 (0.024)		
MD Low (D)	?		-0.007 (0.009)	
MD Low*CF Fall (I)	+		0.043*** (0.016)	
MD High (D)	?			0.019 (0.013)
MD High*CF Fall	?			0.000 (0.021)
Constant		0.164*** (0.046)	0.186*** (0.047)	0.165*** (0.048)
F		1.76**	2.05***	1.82**
Observations		518	518	518
Adjusted R ²		0.015	0.021	0.017

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

DAC is the absolute value of income increasing discretionary accruals estimated using the modified Jones approach.

Growth is the one-year percentage growth in Total Assets.

Leverage is Total Debt/Total Debt plus Shareholders Funds.

Ln Turnover is the natural log of the current year turnover.

Big 4 is a dummy variable taking a value of one if the firm's current auditor is a Big 4 firm.

ROA is Return on Assets.

Industry is 10 dummy variables indicating one-digit sector under the 2007 SIC classification, SIC 4 omitted.

Ln Age is the natural log of the number of years since firm incorporation.

MD % is the percentage shareholding of the Managing Director.

MD Low Dummy variable coded one where the MD's ownership percentage is less than the sample mean minus one standard deviation.

MD High Dummy variable coded one where the MD's ownership percentage is greater than the sample mean MD ownership plus one standard deviation.

CF FALL is a dummy variable taking the value of 1 if $CF_0 < CF_{-1}$.

(D) indicates a dummy variable, **(I)** indicates an interaction variable.

