Group versus Individual Compensation Schemes for Senior Executives and Firm Performance

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CERTIFICATE OF AUTHORSHIP / ORIGINALITY

I certify that the work in this thesis has not previously been submitted for a degree, nor has it been submitted as part of requirements for a degree, except as fully acknowledged within the text.

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Abstract

This thesis investigates the compensation of senior executives directly below the CEO level. Specifically, it addresses two questions. First, the firm characteristics associated with the choice of individual versus group compensation schemes for senior executives (Chapter Two). Second, to provide evidence on the firm performance consequences associated with the choice of individual versus group compensation schemes for those executives (Chapter Three).

Based on a sample of 303 listed Australian firms for the period 2003 to 2005 (590 firm years), the key findings are: (I) individual compensation schemes are adopted by firms where individual senior executive inputs and outputs are separable and observable, and group compensation schemes are adopted where there are efficiencies from senior executive co-operation and interdependencies between executives; (II) on average there is no difference between the performance of these firms, regardless of their compensation scheme choice; (III) firms that choose compensation schemes not consistent with the firm's characteristics suffer lower subsequent performance.

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Chapter 1: Introduction

1.1 Objectives

This thesis investigates the compensation of senior executives directly below the CEO level, who report directly to the CEO. Although there is extensive literature focusing on CEO compensation, the question of how senior executives below the CEO level are compensated, and whether there are consequences for firm performance, has received considerably less attention. A unique issue that arises when compensating members of senior executive teams is how compensation schemes are structured relative to each other. On one hand, senior executives may be compensated independently of other senior executives, with incentive compensation linked to individual performance (individual compensation schemes). On the other hand, compensation may be jointly determined with other senior executives, with incentive compensation linked to shared performance objectives such as share price or firm-wide profit (group compensation schemes).

Accordingly, this thesis has two objectives. First, to investigate the firm characteristics associated with the choice of individual versus group compensation schemes for senior executives. Second, to provide evidence on the firm performance consequences associated with the choice of individual versus group compensation schemes for those executives.

1.2 Motivation for the Research

The motivation for this thesis is twofold. First, despite many years of public and academic scrutiny, relatively little is known about the determinants of compensation contracts for senior executives directly below CEO level. Although the link between the economic determinants of CEO compensation levels and structure has been extensively

evaluated (e.g. Hermalin & Wallace 2001; Core, Holthausen & Larcker 1999; Core & Guay 1999; Wright 2005), the economic determinants of compensation schemes for senior executives below the CEO level has received much less attention.[1] This is despite evidence that these senior executives are important to the firm, both economically and strategically. For example, Bebchuk and Grinstein (2005) find the sum of the top five executives' compensation packages (excluding the CEO) in the US increased from 5.0% to 9.8% of net income between 1993–5 and 2001–3. Less than 40% of this increase is explained by factors such as increasing firm size, market performance and industry factors.[2] Similar findings are in the extant literature (e.g. Datta, Iskander-Datta & Raman 2004; Hillegeist & Penalva 2004; Core & Larcker 2002).[3]

The economic significance of senior executives' compensation is also reflected in public policy concerns. This is evidenced by steadily increasing disclosure requirements for executive compensation in Australia and the United States, largely due to concern with the appropriateness of senior executives' compensation contracts. For example, as a response to such concerns, Australia has recently introduced a requirement for a non-binding resolution by shareholders on senior executives' compensation packages.[4]

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[1] Further, the link between firm performance and CEO compensation has also been extensively documented (e.g. Murphy 1999; Core, Guay & Larcker 2003; Bushman, Indjejikian & Smith 1996; Jensen & Murphy 2004; Matolcsy & Wright 2006).

[2] They also find that increased use of options in compensation packages does not explain the increasing levels of senior executive team compensation.

[3] Core and Larcker (2002) and Hillegeist and Penalva (2004) find that the level of senior executives' equity ownership and equity compensation incentives are positively associated with improvements in firm performance.

[4] The introduction in 2005 of a non-binding vote on Australian senior executives' compensation contracts by shareholders makes this study timely. This was introduced with the *Corporate Law Economic Reform Program (Audit Reform and Corporate Disclosure) Act 2004* (CLERP 9). Reports on investors exercising the new non-binding vote on remuneration packages indicate that some investors are exercising this right. 35% of investors voted against the remuneration report for Investa Property Group; 19% voted against Rinker's remuneration report; 11% voted against West Australian Newspapers remuneration report (Durie 2005). GlaxoSmithKline altered its CEO remuneration package after shareholders exercised a non-binding vote against the package (Sykes 2005).

Accordingly, the focus of this thesis is on senior executive compensation and the appropriateness of different compensation schemes. Although some studies have investigated senior executive compensation, they are usually limited to the level of total compensation or equity-based compensation, whilst not addressing the structure of compensation schemes. An exception is Bushman, Indjejikian and Smith (1995), who investigate group versus individual compensation for divisional managers in divisional firms. Perhaps one reason for the paucity of evidence on this issue is limited data availability (Bushman & Smith 2001). For example, Bushman et al (1995) rely on limited, proprietary survey data in their study of division managers. In another related study, Keating (1997) uses survey data and is limited to a sample of firms with a divisional structure, limiting the generalizability of the findings. Increased disclosure of senior executives' compensation schemes as a consequence of recent changes to reporting requirements in Australia has resulted in increased availability of reliable data.[5]

Second, the literature has not resolved the question of whether adopting different compensation schemes for senior executives is associated with long term corporate performance.[6] Whilst a number of studies have investigated the pay performance association between the levels of total compensation or equity-based compensation awarded to executives (e.g. Murphy 1999; Prendergast 1999; Core, Guay & Larcker 2003; Ittner, Lambert & Larcker 2003; Jensen & Murphy 2004), the question of whether alternative compensation schemes are associated with subsequent corporate

[5] The compensation details disclosed in Annual Reports are also more reliable than survey data because they are subject to independent auditing.

[6] Notable exceptions are Main, O'Reilly and Wade (1993) and Carpenter and Sanders (2004). Main et al (1993) find a positive association between a proxy for individual compensation schemes and average firm ROA. On the other hand, also using proxy data, Carpenter and Sanders (2004) do not find support for individual compensation scheme as a predictor of firm performance in complex firms that require increased co-operation between senior executives.

performance remains open. This issue is relevant for market participants and regulators, who have voiced concerns over current senior executive compensation practices.[7]

1.3 Key Findings

Evidence is presented in this thesis based on a sample of 303 listed Australian firms, for the period 2003 to 2005 (590 firm years). The compensation and other data for senior executives is drawn from the UTS 'Who Governs Australia' database. The senior executives are a combination of the five highest paid and the five most powerful senior executives.[8] Financial statement and share price data is sourced from Aspect – Huntley databases and the Share Price and Price Relative (SPPR) data base.

An analysis of the firm characteristics associated with compensation scheme choice is undertaken in Chapter Two. This shows that individual compensation schemes are adopted by firms where individual senior executive inputs and outputs are separable and observable; and that group compensation schemes are adopted where there are efficiencies from senior executive co-operation, and interdependencies between executives. Chapter Three investigates whether there is a firm performance consequence for firms that choose group or individual compensation schemes for senior executives.

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[7] For example: the Counterparty Risk Management Policy Group III report (CRMPG-III 2008), Containing Systematic Risk: The Road to Reform, identified executive compensation as one of the top five contributors to the 2008 financial crisis. CRMPG-III consists of representatives from the major British and US investments banks who produced the report in respond to the 2008 financial crisis and provide advice as to what steps could be taken by the private sector to reduce the frequency and severity of future shocks. In response to the CRMPG-III report, the UK based Financial Services Authority began the process of investigating 'best practice' guidelines and audits for executive compensation packages, with application to capital markets (Financial Stability Forum 2008; Durkin 2009). Similar actions with respect to executives compensation have been taken by the Australian Prudential Regulation Authority (Durkin 2009).

[8] The reason for the combination of both the highest paid as well as the most powerful senior executives is because of a nuance in the *Corporations Act 2001* (Cth) and the accounting standards. Section 300A (1C) of the *Corporations Act 2001* requires disclosures for the five highest paid executives, as well as executive directors. Whereas AASB 1046 (12.1.14) requires disclosures for the five executives 'with the greatest authority for managing the economic entity', as well as executive directors.

Consistent with firms choosing compensation schemes that are on average efficient, there is no difference in performance between firms that choose group versus individual compensation schemes. However, there is evidence that firms choosing compensation contracts for senior executives that are not consistent with the firm's characteristics (inefficient compensation contacts) suffer lower subsequent performance. The lower performance is economically significant, with firms identified as having inefficient compensation contracts having 4.3% lower ROE the following year.

1.4 Contributions of the Research

This study makes a number of contributions to the literature. First, the study contributes to the ongoing debate surrounding the determination of appropriate corporate governance mechanisms in the presence of agency conflicts, specifically executive compensation schemes. Chapter Two provides a framework for evaluating the structure of senior executives' compensation within an agency framework, by providing a model that estimates the type of compensation schemes adopted by firms using firm characteristics. This contributes to contracting theory by explaining, and providing evidence on, why firms choose group versus individual compensation schemes for senior executives. This study extends Bushman et al (1995) by considering executives beyond divisional executives in divisional firms, and also by investigating the firm performance consequences for the choice between group versus individual compensation.

Second, Chapter Three contributes to the literature on senior executive compensation by providing evidence that there is an economically significant firm performance consequence for choosing a compensation scheme that is not consistent with the firm's characteristics. This finding provides insight into the economic

importance of senior executives and how they are compensated, whilst calling into question the proposition that the costs of free riding outweigh the benefits of group compensation in all cases. Further, although firms with inefficient compensation schemes have lower performance, the lack of a direct association between compensation scheme choice and firm performance is consistent with the proposition that on average firms contract efficiently with senior executives.

Third, the thesis contributes to the practitioner literature. The findings are relevant as the practitioner-based literature offers conflicting guidance on the efficiency of group versus individual compensation schemes (e.g. Weitzel 2002; Lawford 2003; Parker, McAdams & Zielinski 2000; Eppler & Sukowski 2000; Jarzabkowski & Searle 2004).[9] By providing empirical evidence on the firm characteristics associated with compensation scheme choice for senior executives, Chapter Two identifies factors that can be used by practitioners in guiding the structuring of executive compensation schemes. By providing a framework to assess the performance effects of senior executives' compensation schemes, evaluation and design of senior executives' compensation contracts is enhanced for those firms that have compensation contracts which are not consistent with the firms' characteristics. This thesis also allows for critical evaluation of the practitioner-based literature, which is relevant considering the conflicting guidance offered.

1.5 Structure of the Thesis

The structure of the thesis is as follows. Chapter Two addresses the first objective of the thesis, to investigate firm characteristics associated with the choice of individual versus group compensation schemes for senior executives below the CEO. The chapter

[9] A discussion of this is provided in Autrey (2005).

develops and tests the theory and empirical proxies used in the empirical model. Chapter Three addresses the second objective of the thesis, to determine whether there is a firm performance consequence for firms that choose group or individual compensation schemes for senior executives. Chapter Four contains a summary of the thesis and conclusion, the limitations, as well as implications of the findings for future research, including some potential areas for future work.

Chapter 2: Economic Determinants of Group versus Individual Compensation Schemes for Senior Executives

2.1 Introduction

This chapter investigates the determinants of compensation schemes for senior executives. Although there is an extensive literature investigating the determinants of CEO compensation schemes, the question of how executives directly below the CEO are compensated has received less attention. A unique issue that arises when compensating members of senior executive teams is how compensation schemes are structured. On one hand, senior executives may be compensated independently from other senior executives, with incentive compensation linked to individual performance (individual compensation schemes). On the other hand, compensation may be jointly determined with other senior executives, with incentive compensation linked to shared performance objectives such as share price or firm-wide profit (group compensation schemes). Accordingly, the objective of this chapter is to investigate the firm characteristics associated with the choice of individual versus group compensation schemes for senior executives directly below the CEO level.

The primary motivation is that, despite both public and academic scrutiny, relatively little is known about how senior executives below the CEO are compensated. Although the link between the economic determinants of CEO compensation levels and structure has been extensively evaluated (e.g. Hermalin & Wallace 2001; Core, Holthausen & Larcker 1999; Core & Guay 1999; Wright 2005), the economic determinants of compensation schemes for senior executives below the CEO level has received much less attention. This is despite evidence that these senior executives are important to the firm both economically and strategically. For example, Bebchuk and

Grinstein (2005) find the sum of the top five executives' compensation packages in the US increased from 5.0% to 9.8% of net income between 1993–5 and 2001–3. Less than 40% of this increase is explained by factors such as increasing firm size, market performance and industry factors.[10] Extant literature has offered limited explanation of the determinants of alternative compensation schemes for senior executives.[11] The lack of empirical evidence on the appropriateness of different compensation schemes limits critical evaluation of the appropriateness of senior executives' compensation.

Contributing to the lack of empirical research on senior executives' compensation has been limited data availability (Bushman & Smith 2001), necessitating the use of proprietary and survey data sets.[12] Changes in disclosure requirements have increased the transparency of senior executives compensation contracts in Australian Annual Reports (Clarkson, Lammerts Van Bueren & Walker 2006). Consequently, increased disclosure of senior executives' compensation schemes has resulting in increased availability of reliable data, allowing for investigation of those executives using data previously unavailable.[13]

Evidence presented in this chapter is based on a sample of 590 firm year observations drawn from the ASX Top 500 firms for the period 2003 to 2005 (303

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[10] They also find that increased use of options in compensation packages does not explain the increasing levels of senior executive team compensation. Also, Core and Larcker (2002) and Hillegeist and Penalva (2004) find that the level of senior executives' equity ownership and equity compensation incentives are positively associated with improvements in firm performance.

[11] Two studies that do address this issue are Main, O'Reilly and Wade (1993) and Carpenter and Sanders (2004). Main et al (1993) find a positive association between a proxy for individual compensation schemes and average firm ROA. On the other hand, Carpenter and Sanders (2004) find support against their proxy for individual compensation scheme as a predictor of firm performance in complex firms that require increased co-operation between senior executives.

[12] Bushman, Indjejikian and Smith (1995) are typical of studies that address executive compensation below the CEO level. They rely on limited, proprietary survey data in their study of division managers. Keating (1997) also used survey data and is limited to a sample of firms with a divisional structure, reducing the generalizability of results.

[13] The compensation details disclosed in Annual Reports are also more reliable than survey data because they are subject to independent auditing.

unique firms). Firms characterised by increased observability of senior executives' inputs (effort) and output are proxied by the level geographic diversification, level of functional organisational structure, level of capital expenditure, and whether firms disclose a central management function (head office). Consistent with the theory development, Australian data provides evidence of individual compensation schemes being adopted by firms where individual senior executives' inputs and outputs are separable and observable. Further, group compensation schemes are adopted where there are efficiencies from senior executives' co-operation and interdependencies between executives.

This chapter contributes to the literature by developing a new proxy to identify group versus individual compensation schemes for the senior executives. Although there has been an increase in the level of disclosure of executive compensation contracts, the lack of precision in disclosures, as well as cross-sectional variation in disclosure quality, introduces a level of subjectivity in identifying the type of compensation scheme in place. To address the problem of subjectivity in assessing the extent to which firms adopt group versus individual compensation schemes, the proxy developed is a measure of the level similarity in the form of executives' bonus compensation payments within firms. The proxy is robust to alternative specifications and tests.

This chapter also contributes to contracting theory by considering the relative costs and benefits to firms of the choice between two different compensation schemes for senior executives, group versus individual. This extends Bushman et al's (1995) findings by specifically exploring the nature of the free riding problem in the context of group versus individual compensation schemes, and by investigating the senior executives just below the CEO from a broad cross-section of firms, as opposed to

focusing on divisional managers in divisional firms. By providing empirical evidence of an association between firm characteristics and group versus individual compensation schemes, this chapter adds to the literature on the determinants of senior executives' compensation contracts more generally.

Second, this chapter contributes to the ongoing regulatory debate surrounding the determination of appropriate corporate governance mechanisms, particularly executive compensation schemes. Public policy concern with senior executives' compensation is evidenced by legislation enacted to increase disclosure requirements for executive compensation, and the requirement for a non-binding resolution by shareholders on those compensation packages.[14] However, the efficiency of these regulatory developments has received limited attention in the literature. This study provides a framework for evaluating the structure of senior executives' compensation, within an agency framework, by evaluating the type of compensation schemes that is consistent with a firm's characteristics.

Third, this study contributes to the practitioner literature by investigating the circumstances under which group or individual compensation schemes are predominantly used by firms for senior executives. This contribution is relevant to practitioners because the practitioner-based literature offers conflicting guidance on the efficiency of group versus individual compensation schemes (Autrey 2005). Some of the practitioner-based literature champions the role of group compensation schemes to improve group task performance (Weitzel 2002; Lawford 2003). Others argue that it is

[14] The introduction in 2005 of a non-binding vote on Australian senior executives compensation contracts by shareholders makes this study timely (introduced with CLERP 9). Reports on investors exercising the new non-binding vote on remuneration packages indicate that some investors are exercising this right. 35% of investors voted against the remuneration report for Investa Property Group; 19% voted against Rinker's remuneration report; 11% voted against West Australian Newspapers remuneration report (Durie 2005). GlaxoSmithKline altered its CEO remuneration package after shareholders exercised a non-binding vote against the package (Sykes 2005).

necessary to combine both group and individual compensation schemes to induce increased group task performance (Parker, McAdams & Zielinski 2000). Others fail to consider compensation contracts at all when considering group task performance (Eppler & Sukowski 2000; Jarzabkowski & Searle 2004). By providing empirical evidence on the firm characteristics associated with compensation scheme choice for senior executives, this study identifies factors that can be used by practitioners in guiding the structuring of executive compensation schemes, and also allows a critical evaluation of the practitioner-based literature.

The remainder of this chapter is organised as follows. Section 2 reviews relevant literature and develops the theory. Section 3 describes the research design. Section 4 reports the results and section 5 contains the conclusions and limitations.

2.2 Theory Development and Hypotheses

2.2.1 Agency Theory and CEO Compensation Schemes

Consistent with a significant body of literature evaluating executive compensation schemes, and the choice of governance mechanisms more generally, this study adopts an agency theory perspective of the firm.[15] The agency perspective views the firm as a 'nexus of contracts' between the various providers of factors of production, with control of the factors of production residing with the firm's management (Jensen & Meckling 1976). This is problematic as the separation of ownership and management (control)

[15] An alternative to the agency perspective is the Managerial Power and Rent Extraction view of the firm (Bebchuk, Fried & Walker 2002). This view of the firm assumes that 'boards do not operate at arm's length in devising executive compensation arrangements; rather, executives have power to influence their own pay, and use that power to extract rents' (Bebchuk et al 2002, p.1). From this perspective, executives and boards collude to extract rents and to 'camouflage' this activity (ibid.). Although the findings from this thesis contribute to this perspective, it is beyond this thesis to articulate the overlap between the Managerial Power and Rent Extraction perspective and the broader contracting literature, especially Agency theory.

exposes the owners of the factors of production (principals) to the risk of opportunistic behaviour by managers (agents), with resultant loss in firm value being described as an agency cost (Fama & Jensen 1983). Subject to economic constraints, the firm minimizes total agency costs by enacting bonding and monitoring mechanisms.

Executive compensation schemes are one such bonding mechanism, and although there is an extensive literature investigating the determinants of CEO compensation schemes, the question of how executives directly below the CEO are compensated has received less attention. A unique issue that arises when compensating members of senior executive teams (as opposed to individuals) is how compensation schemes are structured, and whether this varies across the team. On one hand, senior executives may be compensated independently from other senior executives, with incentive compensation linked to individual performance (individual compensation schemes). On the other hand, compensation may be jointly determined with other senior executives, with incentive compensation linked to shared performance objectives such as share price or firm-wide profit (group compensation schemes). Problematically, the extant analytical and empirical literature provides only limited insight into the relation between senior executives' compensation scheme choice (group versus individual compensation) and specific firm characteristics.[16] However, the relation between CEO compensation and firm characteristics has been considered extensively, and the findings from this literature likely have relevance to the structuring of senior executives' compensation.

A substantial portion of the literature evaluating CEO compensation contracts is based on the premise that the CEO is employed with the primary objective of

[16] Key exceptions are Main, O'Reilly and Wade (1993), Henderson and Fredrickson (2001) and Carpenter and Sanders (2004) who consider tournament and equity theory with limited success. Also, Bushman et al (1995) considers group versus individual compensation for divisional managers, within a responsibility accounting framework.

maximizing shareholder value.[17] However, assuming CEOs are rational, they have incentives to take actions that maximise their own utility, sometimes to the detriment of shareholders (Jensen & Meckling 1976). The extant literature has investigated the role of compensation contracts in aligning shareholder and CEO interests by minimising goal discongruence.

One of the key findings from the CEO compensation literature is that there is significant variation in compensation contract design. Although most firms offer base salary, cash bonus and equity based compensation, the level and structure of CEO pay varies across firms, industries and countries (Murphy 1999; Wright 2005). Reasons for the variation in level and structure can be explained in part by the different incentives induced by variation in compensation contract design. Cash bonuses are usually designed to provide incentives to focus on short-term performance, which is reflected in a link to short-term performance criteria (generally over a one year period) (Murphy 1999). Equity based compensation is usually designed to provide incentives to focus on long-term performance, and this manifests in scheme characteristics such as delayed vesting of options in an effort to provide long-term performance criteria (Haugen & Senbet 1981; Murphy 1999).[18] Given the variation in compensation structures and related incentives, firms have the opportunity to customise the CEO's compensation contracts to minimise agency costs.

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[17] This study does not attempt to provide a review of this literature. For comprehensive reviews of the executive compensation literature see Murphy (1999); Prendergast (1999); Bushman and Smith (2001); Conyon, Peck and Read (2001); Core, Guay and Larcker (2003) and Jensen and Murphy (2004).

[18] In some cases options are issued in the money as a reward for prior performance (Matolcsy, Riddell & Wright 2007). Also, even though both cash bonus and equity based compensation contracts encourage CEOs to take positive actions, albeit focusing on different issues, in some circumstances these compensation contracts provide incentives for CEOs to take actions that do not benefit shareholders (Murphy 1999). For example, using performance benchmarks provides an incentive for the CEO to influence the benchmark setting process. Granting executive options provides an incentive for the CEO to encourage investment into risky projects (Wright 2005) or backdate options (Lie 2005), thereby increasing the value of the option contract.

Empirical evidence suggests that the underlying characteristics of the firm determine the nature of CEO compensation contracts (Core, Holthausen & Larcker 1999; Wright 2005).[19] For example, a number of studies have explored which firm characteristics influence the relative reliance placed on accounting versus equity-based measures of CEO performance. A key finding is that stock base measures are more informative about the actions CEOs take in exercising firm specific growth opportunities, relative to accounting based measures. This finding is reflected in an association between levels of equity-based compensation and the investment opportunities available to the firm (Smith & Watts 1992; Gavier & Gaver 1993).

Further, firms with weaker governance structures are exposed to higher agency cost due to relatively less monitoring (Core et al 1999). These costs include opportunistic actions by the executives, such as greater CEO compensation and lower firm performance (Core et al 1999). In cases, where monitoring of the CEO is difficult, such as low informativeness of inputs and outputs or weaker governance, firms are more likely to offer stock options as a bonding mechanism, reducing the need for direct monitoring (Wright 2005). Consistent with firms contracting efficiently, firms also re-adjust CEO equity incentives toward 'efficient' levels as firm characteristics change over time (Core & Guay 1999). In addition, firms place greater emphasis on options over cash compensation where the firm is cash constrained or where there is favourable accounting treatment of option grants (Core, Guay & Larcker 2003; Matolcsy & Wright 2006). In summary, the empirical evidence supports the proposition that CEO compensation contracts are influenced by the firm characteristics which affect the benefits to the firm from the specific incentives induced by the contracts, the relative

[19] An efficient compensation contract is where agency costs are minimized given the costs of the contract (Jensen & Meckling 1976).

cost of the contract, the prevalence of agency problems, and the relative substitutability of monitoring over bonding contracts (Core, Guay & Larcker 2003).

Given that agency problems also extend to the executives just below the CEO level, the above findings are equally likely to apply to those executives. However, the above literature has focused on the CEO and has paid limited attention to the unique agency problems associated with senior executives below the CEO level. While the CEO is held to be ultimately accountable, in the modern corporation the management function typically rests with a senior executive team.[20] Accordingly, the issue of how compensation schemes for senior executive teams are structured to minimise agency costs is an import topic, which requires address.

2.2.2 Agency Theory and Senior Executive Compensation Schemes

Although the agency problems arising with respect to the CEO extend to the senior executives below the CEO, the agency problems associated with separation of ownership and control are increased by the delegation of decision making to various levels of management within the firm (Jensen & Meckling 1992). The reasons for the existence of delegated decision-making in firms provide insight into the agency problems associated with the senior executives below the CEO level (Jensen & Meckling 1992; Christie, Joye & Watts 2003). As people have physical limits to the amount of knowledge storage and information processing capacity, they are unable to process limitless information efficiently (March & Simon 1958; Simon 1955, 1959).[21]

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[20] For example, in the failed company HIH, it was 'common for monumental decisions to be made on a collective or collegiate basis, or at least after interaction with other managers' (Corporations and Markets Advisory Committee 2005)

[21] This concept was developed by Simon (1955, 1959) and March and Simon (1958) and labelled Bounded Rationality. Bounded Rationality has been studied in a variety of contexts in both the management and psychological literature (Gigerenzer & Selten 1999).

This gives rise to decentralised decision-making, as it is not efficient to assign all decisions in the firm to the CEO. This is because the CEO lacks the knowledge required and the information processing capacity to make all decisions in the firm efficiently (Jensen & Meckling 1992; Christie, Joye & Watts 2003). [22]

According to Christie et al (2003), efficient delegation of decision-making occurs where decision making rights are distributed among the executives who have the requisite specialist knowledge, and incentives to make decisions in the interests of shareholders. As is the case for the delegation of decision rights from shareholders to CEO, Agency problems occur in firms where executives with decision rights do not have the requisite knowledge or without appropriate incentives, which are manifest in poor decisions leading to costs to the firm. These costs can be reduced by transferring knowledge to the decision makers or by decentralising decision rights to those with the requisite knowledge (Christie et al 2003). The prevalence of these agency problems at the level below the CEO is likely to induce firms to employ bonding and monitoring mechanisms to reduce the agency costs.

Where decision making is delegated to lower level executives, the ability of the board of directors and CEO to effectively monitor those executives is greatly diminished, because of information asymmetries. Where monitoring is impaired, the issue of what type of compensation scheme that provides the appropriate incentive to reduce these agency costs is of paramount importance. Hence, compensation schemes may be designed to encourage goal congruence between the senior executives and the CEO, or between the senior executives and shareholders (e.g. by using options or

[22] In an economy-wide context, the alienability of ownership and decision rights solves problems associated with a centralised economy by means of the price mechanism and capital markets (Jensen & Meckling 1992).

equity), or generally within the executive team (e.g. group compensation scheme). Although Jensen and Meckling (1992) argue that individual or group compensation schemes may be efficient to minimise these agency problems within the firm, as yet, the circumstances where these schemes would be appropriate for senior executives have received limited attention.[23] Empirically investigating the costs and benefits, and in turn firm characteristics of different compensation schemes is difficult as some firms choose elements of both schemes (Bushman & Smith 2001; Clinch 1991; Bushman et al 1995). For simplicity in theory development and testing, where this thesis refers to a firm having a compensation scheme (group or individual), it is where that compensation scheme is the one predominantly relied on for senior executives. It is beyond the scope of this thesis to specify the relative weighting of each scheme.

2.2.3 Senior executives compensation where individual effort is observable

The economics literature (Holmstrom 1979; Alchian & Demsetz 1972) provides insight into the circumstances where individual compensation schemes may be efficient for senior executives, at the level directly below the CEO. Information economics has investigated the conditions under which contracting on measures that reflect individual effort (input) are efficient (Holmstrom 1979).[24] Holmstrom (1979) proposes the

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[23] Individual compensation schemes include: individual performance evaluation schemes (Bushman, Indjejikian & Smith 1996), schemes where the senior executive team members do not have the same performance measures as each other or tournament incentive schemes (Lazear & Rosen 1981). Group compensation schemes exist where each executive's compensation is not independent of compensation for other senior executives. Included in group compensation schemes are: profit sharing schemes or schemes where the senior executive team is paid using common performance measures or structures (Bushman, Indjejikian & Smith 1995; Bushman & Smith 2001).

[24] In firms characterised by separation of ownership and control, the owners of the firm can diversify their risk by holding a portfolio. Problematically, when firms contract with an agent on output alone, the agent bears 100% of the risk and will demand a high payoff to compensate for the extra risk. It is efficient for firms to design compensation schemes that contain other measures of executive effort to reduce the level of compensation tied to output alone. By reducing the level of output related compensation risk, firms reduce the risk premium demanded by senior executives (Holmstrom 1979).

'informativeness principle', whereby in cases where measures of performance that provide information about executive effort are obtainable efficiently, then those performance measures should be included in compensation schemes.

The CEO compensation literature supports the relevance of this concept of informativeness to explaining compensation structures. Because the CEO is responsible for the entire entity, separable measures of CEO output are easily identified. Therefore, the question becomes that of the efficiency of different measures of CEO output in capturing CEO input (Ittner, Lambert & Larcker 2003). However, the efficiency of different performance measures for executives below the CEO is problematic due to a lack of readily available, and separable, measures of output. For example, firm-level measures will contain information about both the executives and the CEO's effort and output.

When an executive's output is separable from other executives, individual compensation may be efficient. This is because where an individual's effort (input) and related output of a task are separable, they are also observable (Alchian & Demsetz 1972).[25] In these cases, it is efficient for the principal to contract on that individual's output, where that output provides information about the individual's effort. The principal can also contract on the individual's inputs, because there are performance measures that are separable to that individual which reflect individual effort. Rewards can then be distributed to executives who are responsible for the output, or can be based on observed input.

As discussed above, the informativeness suggests that individual compensation schemes are more appropriate for the senior executives in firms where there are

[25] Separable in this context means that the output of an executive's effort is distinguishable from the output of effort by other executives.

separable measures of output (or effort). Bushman et al (1995) find that this is not an issue for divisional manager compensation for firms comprised of discrete divisions, where there are clear lines of responsibility and separate measures of division performance available, as well as few interdependencies (or synergies) between divisions.[26] Consistent with the informativeness principle, they find that individual compensation schemes are used more frequently than group compensation schemes for division managers in firms with discrete divisions, because divisional performance measures are more informative about the senior executive's effort than aggregate firm performance.[27] This study extends Bushman et al (1995) by investigating executives above the divisional manager level, and by considering firms beyond those with a divisional structure only.

In summary, consistent with the above theory development, it is expected that the informativeness principle extends beyond divisional managers in divisional firms, to senior executives more generally. Hence, firms are likely to adopt individual compensation schemes for the senior executives where their inputs and outputs are separable and observable.

2.2.4 Senior executives' compensation where individual effort is not observable

Establishing compensation schemes for integrated firms is problematic. Unlike CEOs of these firms, separable measures of performance for individual senior executives are not necessarily readily observable. Many firms are not structured along divisional lines only, and many senior executives are not divisional executives (e.g.

[26] In these firms, decisions are assigned to the executives who have the specialised knowledge necessary to manage the discrete business unit (division) (Christie et al 2003).

[27] This proposition is also consistent with findings by Keating (1997), who also considers individual versus group (aggregate) performance evaluation for divisional managers.

firms with a matrix structure may have senior executives with a combination of functional and divisional responsibility; also the CIO may not be a division manager, having responsibility for a department only). In these circumstances any performance measure is impacted by a number of factors, including cost allocations or transfer pricing, and the efforts of other senior executives; that may lead to free riding by executives. Free riding in this context would be where executives provide less relative effort to group tasks, whilst receiving the associated rewards linked to shared (group) performance.

Insights into the nature of the free riding problem, and its resolution are provided by Holmstrom (1979, 1982) and Alchian and Demsetz (1972). Free riding (shirking) is a problem in joint production environments where executives' efforts (input) are related and output is not separable to individual executives. This circumstance results in a lack of observability of individual effort, making pay-performance contracts difficult to specify or enforce. The lack of a direct pay for performance relation also reduces the positive motivation to increase effort, and provides an incentive to shirk, because it is difficult to detect whether the executive is putting in sufficient effort. Alchian and Demsetz (1972) and Holmstrom (1982) further propose that free riding is a necessary response by individuals to firm integration, especially in large groups where the shared output relative to each individual's input effort decreases. Their solution to the free riding problem involves increasing the level of costly monitoring and bonding, such as increased monitoring or provision of residual claims on ownership to participants and mangers.[28]

[28] Offering diluted residual claims also induces agents to shirk, reducing the efficiency of this solution (Jensen & Meckling 1976)

However, there are three reasons why the costs from free riding may not necessarily outweigh the benefits of group compensation for senior executives' in integrated firms. First, group compensation schemes provide an incentive for mutual monitoring, because each executive's payoff is related to other executives' efforts. If one executive shirks, other executives have an incentive, and legitimacy, to monitor and discipline the free rider in order to increase the value of their own compensation claim (Fama & Jensen 1983).[29] Second, the board of directors, or the CEO, are in a position to take action to reduce the free rider problem; such as adjusting the size of the senior executive team. Alternatively, the firm could also purchase greater monitoring to detect shirking in large executive teams who do have a group compensation scheme, such as more auditing or independent directors. In support of these arguments, the existence of partnerships provides evidence of the relative efficiency of group compensation schemes in some cases (Kendel & Lazear 1992).

Third, group compensation schemes provide an incentive for executive team members to engage in co-operative behaviour to increase group performance, because a reward is received contingent on satisfying a common goal (Autry 2005). Group compensation schemes also produce an incentive for executives to increase effort on knowledge sharing, and engage in group based innovations, where doing so is likely to increase group performance (Wruck & Jensen 1994; Drake, Haka & Ravenscroft 1999).[30] These incentives have been identified in the management, and management

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[29] The mutual monitoring of fellow executives may be more efficient than other corporate governance monitoring mechanisms in some circumstances, contingent on the proximity and intimate knowledge of the firm held by senior executives relative to the board of directors and shareholders.

[30] Porter (1996) argues that integration efficiencies (synergies) resulting from co-ordinated effort to reduce cost, share knowledge and implement strategies are a necessary condition for firms to face competition. Other writers who consider 'fit' to be essential to sustainable competitive advantage include Chandler (1962), Miles and Snow (1978), Mintzberg (1979), Beer (1980), Nadler and Tushman (1988) and Beer, Voelpel, Leibold and Tekie (2005).

accounting, literature (Hamilton, Nickerson & Owan 2003; Kandel & Lazear 1992; Weiss 1987).[31]

Further insight into why group compensation schemes are more efficient than individual compensation in some circumstances is gained by consideration of the specific incentives induced by individual compensation schemes. Individual compensation schemes provide added incentives for executives to act in self interest, and therefore expend effort on achieving individual or fractional goals. The effort expended on individual goals, rather than common goals, is at the expense of effort on collaboration and co-ordination (Wruck & Jensen 1994; Hambrick 1995; Main, O'Reilly & Wade 1993; Carpenter & Sanders 2004).[32] Furthermore, under an individual compensation scheme, executives also have an incentive to inflate the perceived value of their contribution to any joint production process, whilst minimizing the contribution

[31] Extant empirical evidence suggests that group compensation is an efficient contracting choice over individual compensation schemes in some cases (Kandel & Lazear 1992; Hambrick 1995; Hamilton, Nickerson & Owan 2003). Kandel and Lazear (1992) also provide empirical evidence that employees are influenced by peer pressure from fellow employees and that peer pressure is a more effective motivator in firms where profits are shared. Hambrick (1995) reports that in one large US company, the CEO adopted a group compensation scheme in order to increase the level of co-operation and co-ordination within the senior executive team, leading to increased collaboration and 'success in their market' within a three year period. Hamilton, Nickerson and Owan (2003) found that in one large US manufacturing plant, highly productive employees were more likely to voluntarily switch from an individual piece rate compensation scheme to a group compensation schemes when given the choice. There was no difference in turnover rates for highly productive workers, despite receiving an average drop in pay of 8%. Average staff turnover rates (a measure of job satisfaction) decreased and productivity increased significantly with the voluntary adoption of a group compensation scheme in this case. Despite the separability of input and output to individuals, group compensation in this case was an efficient choice over individual compensation. Although these studies provide empirical evidence that using group compensation is not necessarily inefficient because of the free-rider effect, it is not clear whether the findings from these studies are generalizable to senior executive teams. Welbourne and Gomez Mejia (1995) provide a review of the literature on group compensation.

[32] At the level of employees, Drago and Garvey (1997) show that individual compensation schemes lead to a decrease in co-operative behaviour. However they fail to find a positive relation between profit sharing and a measure of helping efforts. Further, the budgeting literature identifies a number of agency costs where executives act in self interest to achieve individual goals, such as the problems of political game playing and putting slack into the budget among other things (Merchant & Van der Stede 2003). For example, if a firm is considering building a new factory, executives may play political games to have the factory built within their own territory or in another's territory based on the impact on their own performance evaluation. Under a group compensation scheme, executives have an incentive to locate the factory in the most efficient location, leading to achievement of group performance targets.

of others, in an effort to increase individual rewards. These actions reduce the observability of individual executive efforts, further reducing the pay performance relation between individual effort and individual performance, increasing the demand for costly monitoring (Alchian & Demsetz 1972). The incentives induced by individual compensation schemes suggest that there are costs associated with using them in a joint production environment.

In summary, on one hand, in firms where there are separable and observable measures available for senior executive's inputs and outputs, individual compensation schemes are likely to be more efficient in that group as there is a closer pay for performance relation, with individual effort associated with individual performance. On the other hand, the above discussion suggests that where senior executives' efforts are related (interdependent) group compensation schemes are likely to be more efficient than individual compensation schemes, with individual effort associated with group performance. In integrated firms, where senior executives' efforts are interdependent, and there are benefits to the firm from senior executive team co-operation; group compensation may reduce some of the agency costs associated with disparate incentives within the senior executive team. Further, when executive effort is interdependent, it is more difficult to separate individual input and output, which according to the informativeness principle, would make individual compensation less efficient relative to group compensation (Bushman et al 1995). Accordingly:

H_1: Firms adopt individual, as opposed to group, compensation schemes for senior executives where their inputs and outputs are separable and observable, such as firms with low levels of integration.

2.3 Data and Research Design

2.3.1 Data and sample selection

The sample is taken from all firms in the Top 500 Australian firms (All Ordinaries index) for the period 2003 to 2005. Financial services firms and trusts are excluded because they are subject to different reporting and corporate governance requirements.[33] Firms with Annual Reports in foreign currency are also excluded for comparability reasons, as are firms where data was not available. Table 2.1 presents the sample selection process.

Table 2.1 Panel A reports the sample selection reconciliation. The sample is reduced by limited data availability and disclosure, particularly for 2003 where 121 firms are excluded due to at least one independent variable not being disclosed in the Annual Report, in comparison to 29 exclusions for 2004. The increase in disclosure between 2003 and 2004 is consistent with Clarkson, Lammerts Van Bueren and Walker (2006), who document an increase in CEO disclosure quality over time for Australian companies, including a comparable increase between 2003 and 2004. The final sample is reduced by 102 firm years where no incentive compensation was paid to any of the senior executives in that year. The final sample is comprised of 590 firm years. Of the 303 unique firms in the sample of 590 firm years, only 76 firms appear in all three years.

[33] For example, the Australia Prudential Regulation Authority (APRA) imposes further regulation on the Australian financial services industry. For this reason they are likely to have distinct financial or economic characteristics that may not be comparable cross-sectionally. Trusts are subject to different corporate governance mechanisms including different oversight structures (board of directors among others). The senior executives are often paid by external parties, perhaps causing differences between trusts and other companies in term of compensation structure and disclosures.

Table 2.1 Sample selection and industry representation

Panel A: Sample selection

Descriptions	2003	2004	2005	Total firm years
Population of all firms appearing in All Ordinaries Index	493	496	485	1474
Less firm years:				
Financial Services Firm	(108)	(116)	(114)	(338)
Trusts, Firm delisted or merged, Stock is not ordinary share capital or Annual Report in Foreign Currency	(58)	(60)	(37)	(155)
Data on Less than three executives disclosed in the Annual Report	(45)	(34)	(32)	(111)
Available Sample	282	286	302	870
At least one independent variable not disclosed in the Annual Report	(121)	(29)	(28)	(178)
No Executive received incentive compensation during year	(48)	(28)	(26)	(102)
Final Sample[34]	113	229	248	590

Panel B: Industry representation

Industry	Number of firm years	Percentage of sample
Energy	33	5.6%
Materials	132	22.4%
Industrials	99	16.8%
Consumer Discretionary	125	21.2%
Consumer Staples	50	8.5%
Health Care	74	12.5%
Information Technology	52	8.8%
Telecommunications Services	16	2.7%
Utilities	9	1.5%
Total	590	100%

[34] Due to data deletions, of the 303 unique firms in the sample, only 76 firms appear in all years.

Table 2.1 Panel B reports that the sample is from a range of different industries, reducing the potential for industry bias. The largest representation is from the Materials and Consumer Discretionary industries, making up 22.4% and 21.2% of the sample respectively.

Executive compensation and corporate governance data is drawn from the UTS 'Who Governs Australia' database, and Financial Statement data is collected from Aspect – Huntly databases. Identified outliers and missing variables were investigated for data errors and updated. Consistent with other studies using corporate governance and other firm specific data, variables with extreme observations have been winsorised to three standard deviations, to reduce the influence of outliers on reported results (e.g. Larcker, Richardson & Tuna 2007).

2.3.2 Research Design

To test whether firm characteristics differ between firms that choose predominately group or individual compensation schemes, the firm characteristics are analysed first by univariate tests, and then by multivariate tests.

The proxy developed to test the Hypothesis is a categorical binary measure (1 = group, 0 = individual), as the independent variable is a choice variable, being whether firms offer predominantly group or individual compensation schemes to senior executives. Therefore, a pooled cross sectional logit model is appropriate to estimate the probability that firm characteristics are associated with firms adopting group versus individual compensation schemes (Wright 2005). Equation 2.1 specifies the model and control variables. As the purpose of this model is to test the association between compensation contract choice and firm characteristics, unless specified in the model,

RHS variables for are taken from the previous year. Descriptions of the variables are detailed below.

$$\begin{aligned} CScheme_{it} = {} & \alpha_0 + \alpha_1 GEOSEG_{i,t-1} \\ & + \alpha_2 FUNCST_{i,t} + \alpha_3 CAPEX_{i,t} + \alpha_4 HOASSET_{i,t-1} \\ & + \alpha_5 SIZE_{i,t-1} + \alpha_n INDUSTRY_{i,t} + \alpha_n YEAR_{i,t} + \varepsilon_{i,t} \end{aligned} \qquad 2.1$$

A pooled cross sectional logit model with Petersen (2009) clustered standard errors is also tabulated, as there is a potential misspecification error that would reduce the reliability of ordinary standard errors (Petersen 2009; Core, Guay & Verdi 2008). Specifically, the model treats each observation as independent, even when the residuals from the same firm are positively related across years (time series dependence), or across firms (cross-sectional dependence) (Petersen 2009). The resulting increase in sample size, relative to independent observations, produces standard errors that are biased downward, increasing the potential for failure to reject the Hypothesis (Petersen 2009). On the other hand, when the model is well specified, the ordinary standard errors remain unbiased (Petersen 2009). To adjust for any resulting lack of independence between error terms, the standard errors are clustered by firm and by year, using Petersen's (2009) method.

However, there are a number of limitations to Petersen's (2009) method. First, if residuals are negatively correlated within clusters, ordinary regression may overstate the true standard error, increasing the likelihood of falsely rejecting the Hypothesis (Sribney 2007; Petersen 2009). In calculating clusters, negatively related residuals cancel each other out, reducing the standard errors produced by clustering (Sribney

2007). Second, the calculation of Petersen standard errors involves adding the variance matrices of two regressions, each clustered along one dimension each (Thompson 2006). The variance matrix from a pooled regression is then subtracted from the summed variance matrix. A problem occurs when either of the regressions used to estimate the clustered standard errors excludes a variable in the estimation, or calculates a very low standard error for a coefficient, or fails to calculate a standard error for a coefficient. In these cases, the standard errors for some variables are cancelled out in the process of summing and subtracting the three different variance matrices. As there is little guidance in the literature on how to report or deal with these issues, both models are tabulated (a pooled logit model, and a pooled logit model with Petersen (2009) clustered standard errors).[35]

2.3.3 Estimating the group versus individual compensation scheme proxy (CScheme)

There are inherent problems in classifying different types of compensation schemes awarded to senior executives using publicly available data, because Annual Reports do not consistently disclose the specifics of incentive schemes, only the amounts and categories actually paid.[36] Therefore, it is necessary to develop an

[35] For a recent analysis of the methods proposed in the literature to control for time series and cross-sectional dependence of residuals, see Petersen (2009).

[36] The following extracts from Bridgestone Australia Ltd and Adelaide Brighton Ltd are two examples of firms with specific disclosure where they mention information useful in classifying them as being predominantly group or individual compensation for senior executives. Bridgestone Australia Ltd (BDS 2004) disclose that for the Specified Executives, 'remuneration packages are reviewed with due regard to performance of the individuals and other relevant factors'. Although individual performance is evidently important in setting executives remuneration, it is unclear whether the other factors include group performance measures. Also, the relevant weighting of individual and other relevant factors are not disclosed. On the other hand, Adelaide Brighton Ltd (ABC 2005) require common performance targets to be met before any short term or long term incentive compensation is awarded to senior executives. A Profit Before Tax hurdle must be reached for short term incentives to be awarded. A total shareholder return and/or an earnings per share hurdle must be reached for long term compensation to be awarded. The Annual Report also specifies that 'participation in the LTI arrangements is only offered to the Managing Director and senior executives who are able to influence the generation of shareholder wealth

empirical proxy to estimate the type of compensation scheme used.[37] The proxy developed, CScheme, is based on observed variation in compensation between members of senior executive teams, and the empirical and theory literature that has found systematic differences between the incentives and awarding of cash bonus versus equity-based compensation (Murphy 1999; Haugen & Senbet 1981; Core et al 1999; Matolcsy & Wright 2006).

Figure 2.1 depicts the structure of the typical executive bonus plan as reported by Murphy 2001 (also used by Indjejikian & Nana 2002).

Figure 2.1 summarises the finding that incentive compensation is usually only awarded once pre-specified criteria, or benchmarks are satisfied (Murphy 1999, 2001; Indjejikian & Nana 2002). These include option contracts where executives must satisfy minimum performance thresholds for the option to be valuable, such as the exercise price. Therefore, firms with empirical differences in incentive compensation payments between different members of the senior executive team indicate different incentive, performance evaluation and reward structures for those executives (Core et al 1999; Matolcsy & Wright 2006). This is because either the executives receive incentive compensation based on different performance hurdles or executives receive different

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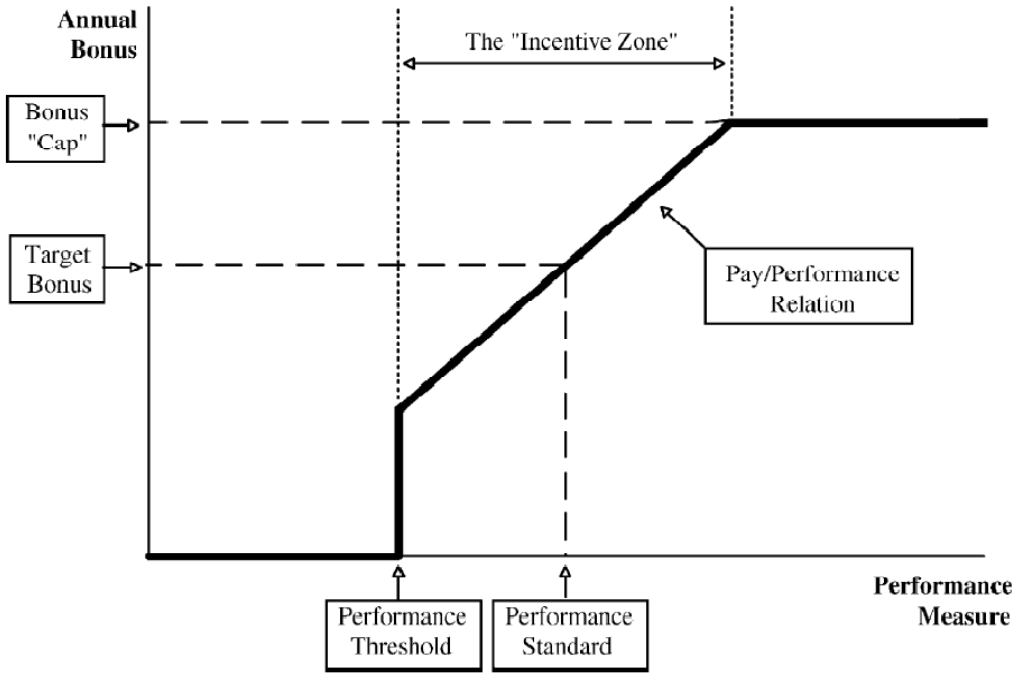
and thus have a direct impact on the Group's performance against the relevant performance hurdles.' In this case, although it looks like the firm has predominantly a group compensation scheme, it is unclear whether all, or only part, of the senior executive team are included in the scheme. In both these cases, although the disclosures are detailed relative to other firms, there is a high level of subjectivity in classifying them as having predominantly a group or individual compensation scheme. Many firms contain contradictory information about the dominant focus of their executive compensation contracts, claiming to be both mainly focused on group, and individualistic at the same time.

[37] Extant literature does not provide a publicly available empirical proxy for group types of compensation schemes. Keating (1997) used a survey to collect division managers perceptions on the extent to which various performance measures were used by their supervisors to evaluate their performance. Bushman et al (1995) uses proprietary survey data obtained from Hewitt Associates LLC. Bushman et al (1995) unit of analysis is individual Group CEO, Division CEO or Plant managers and uses their perception of the average proportion of above level and at their level information used to evaluate the average manager at their level. Hamilton et al (2003) case company uses a group output piece rate versus and individual piece rate scheme. Despite the lack of a publicly available empirical proxy for a general group or individual compensation scheme, it is possible to ex post asses the variation between senior executives compensation from Annual Report disclosures, as discussed in the text.

types of incentive compensation with different incentives attached, such as equity compensation versus cash bonus plans. On the other hand, firms with little difference between executive team member compensation payments are evidence of similar performance evaluation and reward structures.[38]

Figure 2.1 A Typical Executive Annual bonus Plan



Note: from Murphy (2001, p. 251).

In summary, similar compensation structures are consistent with groups of executives being remunerated on common performance measures (group compensation scheme). Whereas, different compensation structures are consistent with different

[38] For example, Argo Investments Limited discloses that 30% of senior executives' short term bonus is group compensation. As expected, four out of the top five executives were paid a cash bonus in 2004 and 2005. Ausmelt Limited report that short term bonuses are paid out of a bonus pool established upon achievement of a companywide performance target. The pool is distributed based upon individual performance evaluation. No executives received a cash bonus or were granted options in 2005.

performance evaluation and reward structures being used for those executives, and is consistent with executives being rewarded under an individual, rather than group compensation scheme (as some executives have not been awarded bonuses or incentive payments). [39]

CScheme (Common compensation structure): The proxy, CScheme, is calculated by first identifying the types of bonus compensation awarded (cash bonus and/or equity-based compensation) for each of the senior executives. For each firm, the percentage of executives having the same type of compensation is calculated, providing a continuous measure of how similar compensation scheme type is between the senior executive team. For example, if two executives receive both a cash bonus and equity-based compensation, and one executive receives only a cash bonus, whereas a fourth executive receives equity-based compensation only, then the value would be 50% (executives with same type / total executives = 2/4 = .5 executives with same type of bonus compensation), where the percentage of executives with the same compensation structure is grouped into deciles.

Table 2.2 provides descriptive statistics for the percentage of executives that have common compensation structures, firms are grouped into deciles, and Figure 2.2 depicts those statistics.

[39] Due to the lack of precision offered by using proxy data, two alternative proxies are developed in this study to identify which compensation scheme is predominantly used for senior executives. Table 2.8 contains a summary of these variables. The results for the alternative proxies, CScheme2 and CScheme3, are reported in Appendix A.

Table 2.2 Descriptive statistics for the percentage of executives receiving the same type of bonus compensation (cash bonus and/or equity compensation)

Deciles range (%)	Frequency (No. of firm years)	Percent	Cumulative Percent
<= 0.20	34	5.8	5.8
0.21 - 0.30	25	4.2	10.0
0.31 - 0.40	43	7.3	17.3
0.41 - 0.50	58	9.8	27.1
0.51 - 0.60	59	10.0	37.1
0.61 - 0.70	65	11.0	48.1
0.71 - 0.80	84	14.2	62.4
0.81 - 0.90	88	14.9	77.3
0.91+	134	22.7	100.0
Total	590	100.0	

This is a frequency table with firms split into deciles, based on the percentage of executives receiving comparable bonus compensation. The percentage of executives receiving comparable bonus compensation (cash bonus and/or equity-based compensation), is calculating by first identifying the incentive compensation type given to each of the senior executives for a given firm, divided by total senior executives disclosed.[40]

Table 2.2 reports the number of firms, where the percentage of executives receiving the same type of compensation is grouped into deciles. The first row of Table 2.2 combines the first two deciles, reporting that there are 34 firms who pay less than 20% of their senior executives the same type of incentive compensation. The top decile is the largest group, with 158 firms paying over 90% of their executives the same type of incentive compensation. This means that if one executive received a cash bonus, and/or equity-based compensation, then all of the executives received the same. Firms where no executive receives any bonus or incentive compensation are excluded due to ambiguity in determining the compensation scheme type.

[40] To test whether there is a relation between compensation type over time, a limited subsample of compensation schemes of executives from 2004 was compared with their scheme in 2002. Using available data on 62 firms, the proportion of executives receiving a certain compensation type in 2002 is significantly correlated with the same compensation type in 2004 (.531using a Spearman's Correlation, p. > 0.01).

Figure 2.2 Frequency of firms with the percentage of executives receiving the same type of bonus compensation divided into deciles

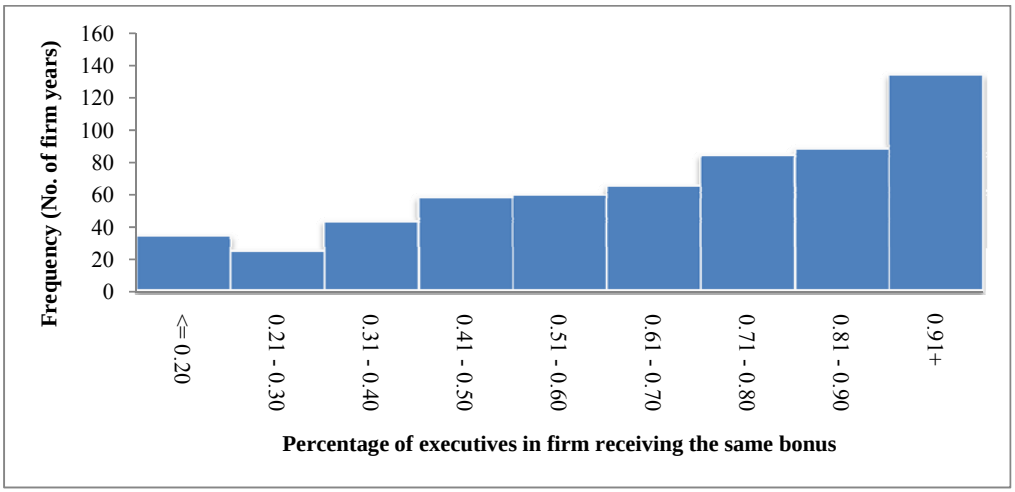


Figure 2.2 is based on Table 2.2, using the full sample of 590 firm years. The percentage of executives receiving comparable bonus compensation (cash bonus and/or equity-based compensation), is calculating by first identifying the incentive compensation type given to each of the senior executives for a given firm, divided by total senior executives disclosed.

The data from Table 2.2 is depicted in Figure 2.2. It is evident from Figure 2.2 that there is a distribution of firms with different compensation schemes, with more than 77% of firms paying at least one executive differently to the rest of the executives. For at least 27% of the sample, 50% of the executives do not receive the same type of compensation as other executives in the firm, providing evidence that many firms do not have group compensation schemes in place.

Given that senior executives in US firms are almost uniformly offered stock options, or equivalent equity based compensation (Murphy, 1999), the level of variation in Australian firms may appear anomalous. However, as reported by Matolcsy and Wright (2007), the result is not unusual as one third of Australian CEO's are offered cash incentives only, whilst two thirds are offered equity based compensation, which contrasts with Murphy (1999). Further, the reasons for the increased level of variation in Australia versus the US have been explored (Wright, 2005; Matolcsy and Wright,

2006). The reasons include differences in the treatment of options for tax purposes, making option grants relatively cheaper for US firms (Matolcsy and Wright, 2006).

The categorical variable (CScheme) is calculated by first ranking firms, based the percentage of executives with common compensation structures, and then removing the middle thirty-three percent of firms. The third with the closest similarity in compensation structures is given a value of one, firms with the greatest level of diversity between senior executives compensation are given a value of zero (0 = individual, 1 = group). The reason the middle thirty-three percent are excluded is because it is difficult to classify them as having relatively more or less individual or group compensation, and therefore including them would introduce unnecessary noise into the empirical model.[41] Removing difficult to classify firms is consistent with other studies with comparable measurement issues (e.g. Gaver & Gaver 1993).

2.3.4 Experimental variable definitions

As discussed in the theory development, there are a number of characteristics of the firm that are likely to determine in which cases a group versus individual compensation scheme is more appropriate. The separability and observability of senior executives' inputs and outputs, and the level of firm integration, is estimated using: the level of geographic segmentation; the level of functional senior executive team structure; the level of capital expenditure; and the disclosure of a central management function. The following section develops these firm characteristics and specifies the empirical proxies.

[41] Due to rounding, thirty-seven percent are actually removed from the sample. Sensitivity testing using other cut-offs for removal do not change the reported results.

Geographic segmentation (GEOSEG): Australian publicly listed firms are required to make detailed geographic segment disclosures, based upon the internal reporting used by the firm.[42] Therefore, by definition, segment reporting reflects how the company is organised and managed (AASB 1005). The method adopted in this study to proxy for the level of geographic diversification is the number of different geographic segments disclosed in the notes to the financial statements.[43] The log of the number of segments is used as it provides a closer match with a normal distribution, so as not to violate regression assumptions. The intuition behind this proxy stems from firms having more information about the input and output of individual executives. This is because different factors that influence specific geographic segment performance are reflected in geographic segment reporting, including individual executive input, thereby increasing the separability of input and output to such executives.[44]

Functional structure (FUNCST): The measure used to estimate functional structure is based on the proportion of functional senior executives, relative to total senior executives disclosed in the Annual Report. First, functional executives are identified from their title indicating that they have functional responsibilities, or if disclosed, their responsibilities as disclosed in the Annual Report (e.g. the heads of the

[42] According to AASB 1005 (2003) the preparation of segment disclosures first involves 'identifying business and geographical segments based on internally reported information' and secondly, determining the materiality of those segment (Eddy, Arthur & Knapp 2001).

[43] There are two studies that do consider the relation between a firm's industry diversification strategy, being related or diversified, and compensation structure at the divisional manager level (Bushman et al 1995; Keating 1997). Although these studies are consistent with the theory development above, they do not specifically address senior executive compensation at the level just below the CEO. Also, due to differences in reporting of industry diversification between the US and Australia, the proxy used in these studies is not available for an Australian sample. This is because the Australian industry code only specifies the main business the firm operates in, as opposed to the US where several industry codes are available per company. Further, both these studies are limited to a sample of multi divisional firm, which reduces the generalizability of results.

[44] For example, an Australian firm who diversifies to Japan would need senior executive decision makers who know the Japanese market and can make judgments about risks and returns to the investment. They would also need to know Japanese customs and culture to adequately assess the divisional, plant and other managers in the Japanese segment. It would be efficient to contract with the senior executive team member who specialised in Japanese business, based upon the performance of the Japanese segment.

marketing, finance, sales, or production departments are classified as being functional executives). The variable is calculated as the number of executives with functional responsibilities, divided by total executives. For example, if a company has a CFO, CIO, Marketing executive and two executives of discrete business units, the variable would be 60% (3 / 5 = .6). This is because the CFO and CIO and Marketing managers are generally functionally specialised or heads of large functional departments such as finance, information technology or marketing. The intuition behind this proxy is that functional executives input and output are not readily observed, as their efforts are integrated across business units and thus reflected in total firm performance. Further, there is likely to be benefits to the firm from these executives co-operating with, and sharing their specialized knowledge with the other executives.[45]

Level of capital expenditure (CAPEX): The measure used to approximate the level of CAPEX is the change in Total Assets divided by opening Total Assets (Henderson & Fredrickson 1996). Robustness testing includes using a measure of capital investment derived from the cash flow statement. There are two reasons why group compensation schemes may be efficient for firms with large capital expenditures. First, the quality of large capital budgeting decisions is likely to be enhanced from increased co-operation and information sharing between senior executives, during the

[45] Firms that are organised around, or have executive teams organised around, a functional structure, rather than divisional, are more likely to have joint decision making within the senior executive team. Where firms are organised around functional lines, there is a need for the executives to share knowledge necessary for efficient decision making. Much knowledge and firm specific technology such as market trends, innovations in production and distribution and forecast data is distributed among different functional departments. For important strategic decisions, the specialised information and perspective of functionally specialised executives, add to the quality of decisions made. As such the quality of joint decision making is likely to increase, where functionally specialised executives contribute their knowledge. If using group compensation increases the effectiveness of integrated decision making through increased incentives to co-operate, then group compensation schemes will be efficient for senior executive teams organised around a functional organisational structure. On the other hand, individual compensation schemes provide incentives for rational senior executives to contribute to joint decision only to the extent that is necessary to satisfy the individual compensation scheme.

decision-making stage.[46] Second, there is a need for integration between individual executives, departments or business units in the implementation stage of large capital investment projects.[47]

Central management function (HOASSET): Another measure of firm integration is the firms' central management function (head office). The proxy is a dummy variable based on whether assets are specifically allocated to a central management function (head office) in the Annual Report primary segment disclosure note. This discloser is a signal that the firm has a material level of its assets that are not readily allocated to any specific segment, other than a centralised management function. The intuition behind this measure is that where a firm has a co-ordination mechanism, such as a head office, it indicates there is a need for integration across departments or business units. In cases where there is a material central management function, the

[46] Large capital expenditures are an indication that important decisions, essential to the firm's competitive advantage and subsequent performance have been made, requiring increased senior executive team involvement (Henderson & Fredrickson 1996). Also, capital investment decisions often involve non-routine decisions requiring increased information sharing between decision makers (Henderson & Fredrickson 1996), as well as a need for co-ordinated effort in evaluating the available investment opportunity set. Therefore, a compensation scheme that encourages increased information sharing and co-ordination between senior executives would be beneficial. For the above reasons, group compensation schemes are more likely to be appropriate where the senior executive teams are involved in making large capital budgeting decisions, that are going to impact overall firm performance, because of the greater agency costs of suboptimal decision making. It is also likely that use of group compensation over individual compensation schemes may reduce some of the dysfunctional behaviour and inefficient decision making associated with capital budgeting decisions, as identified in the capital budgeting literature (Merchant & Van der Stede 2003).

[47] The implementation of large capital investments is likely to increase senior executives' interdependencies through increased co-ordination needs throughout the firm. This is because capital expenditures require vertical co-ordination along the supply chain as new technologies and processes are integrated (Fry 1982; Michel & Hambrick 1992; Thompson 1967). The need to integrate large capital investments increases the importance of co-operation in sharing knowledge, resources and skills between the senior executive team, across different parts of the organization (Wood 1986; Henderson & Fredrickson 1996). These factors suggest that group compensation schemes will be efficient the greater the level of capital expenditure, because of the need for integration, and the positive benefits to the firm from increased co-operation between senior executives. For example, during a capital budgeting meeting involving integrated decision making, one executive may come up with a suggestion for a strategic acquisition, another executive may provide the technical knowledge to plan the strategy, another executive provides market knowledge and another executive may provides technical knowledge. The output of the new strategy is reflected in total firm performance. The overall output of the management process in this case is not separable, despite the inputs being somewhat observable.

separability of input and output diminishes for senior executives as they become involved across several business segments.

2.3.5 Control variables definitions

There are a number of other factors that may explain variation in compensation scheme choice, which are included in the multivariate tests.

Firm size (SIZE): Given that a firm's internal structure becomes more complicated the larger the firm, there is likely a change in the firm's information environment. One implication of this is that measures of individual performance for senior executives would be influenced by the contribution of a greater number of factors in larger firms, suggesting that there are less informative measures of individual inputs and outputs. The implication is that larger firms are more likely to adopt group, rather than individual compensation schemes. However, larger firms also have properties that extend beyond firm complexity, making it a noisy measure of a firm's information environment. For example, firm size has been used as a proxy for political costs, growth and investment opportunities, and difficulty in direct monitoring by the board of directors (Watts & Zimmerman 1986; Gaver & Gaver 1993; Smith & Watts 1992; Eaton & Rosen 1983; Bushman, Indjejikian & Smith 1996). Although a positive relation between firm size and group versus individual compensation would support the Hypothesis, the noise in firm size makes it difficult to articulate exactly what is being measured. Accordingly, firm size is included in the model as a control variable only. Firm size is measured as the natural log of market capitalization.

Industry classification (INDUSTRY): Industry grouping is generally associated with variation in compensation structure (Murphy 1999). It is expected that because different industries have different economic characteristics, there may be an association

between industry type and executive compensation scheme. Industry dummies are used to capture industry fixed effects.

Year (YEAR): There may be a time series bias where firms systematically select the same type of compensation in any year. A dummy variable is added for each year to adjust for any time-specific fixed effect.[48]

2.3.6 Descriptive statistics

Descriptive statistics on the independent variables are provided in Table 2.3.

Table 2.3 Descriptive statistics for the Pooled Sample of 590 firms for the period 2003 to 2005

	Full Sample (n. 590)						
	Mean	Median	Std. Dev.	Min	Q1	Q3	Max
GEOSEG	2.22	2	1.476	1	1	3	10
FUNCST	0.339	0.333	0.218	0	0.182	0.458	1
CAPEX	0.156	0.081	0.295	-0.479	-0.015	0.300	0.746
HOASSET	0.15	0	0.36	0	0	0	1
SIZE (000's)	1,376,188	229,687	4,890,408	525	95,251	992,250	63,500,000

Variable definitions:

GEOSEG = the sum of the number of geographic segments disclosed in the notes to the annual report (for statistical test GEOSEG is logged using the natural log);

FUNCST = the number of functional executives on the executive team divided by total senior executives. Functional executives are those where the annual report identifies them as having functional responsibility such as being responsible for functional departments. For example, marketing, finance, operations or research and development;

CAPEX = is measured by dividing the change in total assets by opening total assets;

HOASSET = 1 for any firm reporting assets specifically allocated to a central management function (head office) in the annual report segment disclosure, 0 otherwise;

SIZE = Market capitalization.

Table 2.3 shows that the median firm has a market capitalization of $229 million at the beginning of the year, has 2 geographic segments, has 33% of their senior executives functionally specialized, and had an increase of 8.1% Total Assets over the

[48] This would be the case where firms copy other firms contracting choices, without considering the economic merit of those choices. It is beyond the scope of this thesis to explore this institutional type of interpretation.

year. 15% of the sample specifically allocates assets to a head office in their segment disclosure note. Also, each of the variables has a degree of variation, as reflected in the standard deviations. However, GEOSEG and SIZE are clearly skewed to the right, with a maximum of 10 geographic segments reported and the largest firm having a market capitalization of 63.5 billion dollars. Therefore, GEOSEG and SIZE are logged for statistical test. In summary, the sample includes a diverse range of firms, providing variation in the sample, allowing for tests of the Hypothesis. The correlations between the independent variables are reported in Table 2.4.

Table 2.4 Correlation table for the Pooled Sample of 590 firms for the period 2003 to 2005

		GEOSEG	FUNCST	CAPEX	HOASSET	SIZE
GEOSEG	Correlation	1	-.117**	-.149**	.058	.223**
	(p-value)		*(0.004)*	*(0.000)*	*(0.162)*	*(0.000)*
FUNCST	Correlation	-.107**	1	.086*	.012	-.069
	(p-value)	*(0.009)*		*(0.037)*	*(0.777)*	*(0.095)*
CAPEX	Correlation	-.138**	.078	1	-.034	-.065
	(p-value)	*(0.001)*	*(0.059)*		*(0.408)*	*(0.115)*
HOASSET	Correlation	.067	.024	-.028	1	.040
	(p-value)	*(0.105)*	*(0.557)*	*(0.504)*		*(0.331)*
SIZE	Correlation	.197**	-.056	-.043	.041	1
	(p-value)	*(0.000)*	*(0.172)*	*(0.294)*	*(0.325)*	

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively
#, ##, ### Indicates one-tailed significance at the 10, 5, and 1 percent levels, respectively
The top right of the table reports Pearson correlation coefficients and bottom left Spearman correlation coefficients.

All aggregated firm year observations are from the sample of 590 firm years. Reported results exclude firms where no senior executive receive any incentive compensation or where one or more variables were missing.

Variable definitions:

GEOSEG = the sum of the number of geographic segments disclosed in the notes to the annual report (for statistical test GEOSEG is logged using the natural log);

FUNCST = the number of functional executives on the executive team divided by total senior executives. Functional executives are those where the annual report identifies them as having functional responsibility such as being responsible for functional departments. For example, marketing, finance, operations or research and development;

CAPEX = is measured by dividing the change in total assets by opening total assets;

HOASSET = 1 for any firm reporting assets specifically allocated to a central management function (head office) in the annual report segment disclosure, 0 otherwise;

SIZE = Market capitalization, logged using the natural log.

Table 2.4 reports a number of associations between the independent variables. The level of diversification (GEOSEG) is negatively associated with the level of functional structure (FUNCST) (-0.117, p. 0.004), the level of capital expenditure (CAPEX) (-.149, p. <0.001), and positively associated with SIZE (0.223, p. <0.001). FUNCST and CAPEX are also positively associated (0.086, p. 0.037). The existence of multiple correlations between the independent variables may introduce a multicollinearity problem. As all correlations are below 0.8, it is unlikely that the multicollinearity bias is material (Hinton, Brownlow, McMurray & Cozens 2004, p. 323), although this does bias the Hypothesis tests against finding a result.[49]

2.4 Results and discussion

2.4.1 Univariate tests

Univariate tests provide mixed support for the Hypothesis that firms adopt individual, as opposed to group, compensation schemes for the senior executives where their inputs and outputs are separable and observable, such as firms with low levels of integration. However, as discussed below, the univariate tests are biased by correlations between the independent variables. Table 2.5 reports the univariate tests.

[49] Collinearly diagnostics show that the VIF factor is less than 1.58 for all independent variables in Equation 2.1 (using OLS regression), suggesting that although multicollinearity is present, the level of multicollinearity is not likely to disturb the direction of coefficients in a regression estimation model.

Table 2.5 Univariate test of economic determinants of group versus individual compensation scheme companies

	Individual compensation firms (n. 187)			Group compensation firms (n. 185)			Difference in means			Mann-Whitney U test	
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	t-statistic	*(p-value)*		*(p-value)*	
GEOSEG	2.28	2	1.53	2.19	2	1.513	0.765[a]	*(0.222)*		*(0.202)*	
FUNCST	0.321	0.286	0.216	0.358	0.333	0.219	-1.646	*(0.050)*	##	*(0.036)*	##
CAPEX	0.131	0.082	0.304	0.161	0.087	0.278	-0.983	*(0.163)*		*(0.230)*	
SIZE (000's)	546,748	159,762	11,715,809	2,790,629	437,831	8,336,091	-7.063[a]	*(0.000)*	***	*(0.000)*	***

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively
#, ##, ### Indicates one-tailed significance at the 10, 5, and 1 percent levels, respectively
[a] p-value is based on the logged value for firm size.

All aggregated firm year observations are from the sample of 590 firm years. Reported results exclude firms where no senior executive receive any incentive compensation or where one or more variables were missing.

Variable definitions:

CScheme = is calculating by first identifying the incentive compensation type (cash bonus and/or equity-based compensation) given to each of the senior executives. The percentage of executives having the same type of compensation is then calculated for each firm. CScheme is a categorical variable and is calculated by splitting the sample into thirds. The middle third is excluded. The third with the executive compensation with the closest compensation structures given a value of 1 (group compensation scheme), firms with the greatest level of variation between senior executives compensation are given a value of 0 (individual compensation scheme).

GEOSEG = the sum of the number of geographic segments disclosed in the notes to the annual report (for statistical test GEOSEG is logged using the natural log);

FUNCST = the number of functional executives on the executive team divided by total senior executives. Functional executives are those where the annual report identifies them as having functional responsibility such as being responsible for functional departments. For example, marketing, finance, operations or research and development;

CAPEX = is measured by dividing the change in total assets by opening total assets;

SIZE = Market capitalization. logged using the natural log.

Table 2.5 reports the Mean, Median and Standard Deviations for the independent variables (except for HOASSET), grouped by compensation scheme. The sample size is reduced to 372 firm years, with 187 and 185 firm years for individual and group compensation firms respectively. This is because the calculation of CScheme requires the exclusion of the middle third of firms. Due to 33% falling in the middle of a number of identical observations, slightly more than 33% are excluded. The descriptive statistics reveal that all of the independent variables are in the predicted direction. However, the only independent variable that is significant in the univariate tests is FUNCST, which is

significantly different at the 5% level in both tests. Table 2.6 also reveals that HOASSET is in the predicted direction, but there is no significant difference between the groups using a Chi Square test. On balance, although the direction of the independent variables is supportive of the Hypothesis, the results are inconclusive. The result can be explained in part by considering the firm size effect.

Table 2.6 Univariate test comparing HOASSET for group versus individual compensation scheme companies

CScheme	No HOASSET	HOASSET	Total
Individual	200	30	230
Group	182	35	217
Total	382	65	447
Pearson Chi-Square			0.855
(p-value)			*(0.355)*

All aggregated firm year observations are from the sample of 590 firm years. Reported results exclude firms where no senior executive receive any incentive compensation or where one or more variables were missing.

Variable definitions:

CScheme = is calculating by first identifying the incentive compensation type (cash bonus and/or equity-based compensation) given to each of the senior executives. The percentage of executives having the same type of compensation is then calculated for each firm. CScheme is a categorical variable and is calculated by splitting the sample into thirds. The middle third is excluded. The third with the executive compensation with the closest compensation structures given a value of 1 (group compensation scheme), firms with the greatest level of variation between senior executives compensation are given a value of 0 (individual compensation scheme).

HOASSET = a dummy variable for any firm reporting assets specifically allocated to a central management function (head office) in the annual report segment disclosure.

The problem with interpreting the univariate tests arises because SIZE is positively correlated with GEOSEG, and negatively correlated with CAPEX (see Table 2.4). SIZE is also significantly greater for group compensation scheme firms, at the <0.001 percent level. This finding suggests that the correlations with SIZE biases the univariate tests for GEOSEG and CAPEX. Therefore, a more robust test of the Hypothesis needs to be multivariate, in order to control for the firm size effect.

2.4.2 Multivariate test: main results

The differences in firm characteristics between the group versus individual compensation scheme groups are investigated using multivariate tests, as reported in Table 2.7.

Table 2.7 Logit Regressions Examining the Impact of Firm Characteristics on the choice between Group Versus Individual Compensation for the Senior Executives, where the dependent variable is CScheme

Dependent Variable: CScheme

		Pooled Logit			Pooled Logit with Clustered Standard Errors [a]		
Variable	Predicted Sign	Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		-10.702	*(0.000)*	***	-10.702	*(0.000)*	***
GEOSEG	-	-0.563	*(0.028)*	##	-0.563	*(0.060)*	#
FUNCST	+	1.114	*(0.021)*	##	1.114	*(0.000)*	###
CAPEX	+	0.270	*(0.259)*		0.270	*(0.219)*	
HOASSET	+	0.229	*(0.244)*		0.229	*(0.304)*	
SIZE		0.562	*(0.000)*	***	0.562	*(0.000)*	***
Energy		0.417	*(0.544)*		0.417	*(0.397)*	
Materials		-0.135	*(0.761)*		-0.135	*(0.640)*	
Industrials		0.233	*(0.625)*		0.233	*(0.462)*	
Consumer Discretionary		-0.122	*(0.787)*		-0.122	*(0.714)*	
Consumer Staples							
Health Care		-1.008	*(0.044)*	**	-1.008	*(0.006)*	***
Information Technology		-0.049	*(0.929)*		-0.049	*(0.888)*	
Telecommunications Services		-0.088	*(0.909)*		-0.088	*(0.911)*	
Utilities		-1.492	*(0.260)*		-1.492	*(0.405)*	
Year 2003		-0.039	*(0.907)*		-0.039		
Year 2005		0.051	*(0.841)*		0.051		
N		372			372		
Chi-square		70.8	*(0.000)*	***			
-2 Log likelihood		444.9					
Cox & Snell R Square		17.30%					
Nagelkerke R Square		23.10%					
No. firm Clusters					249		
No. year clusters					3		
Percentage Correct:							
Individual compensation		68.40%					
Group compensation		65.40%					
Total		66.90%					

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively

#, ##, ### Indicates one-tailed significance at the 10, 5, and 1 percent levels, respectively
All aggregated firm year observations are from the sample of 590 firm years. Reported results exclude firms where one or more variables were missing.
[a] The coefficients for the Pooled Logit with Clustered Standard errors are the same as for the Pooled Logit Model. Standard errors are clustered by firm (249 groups) and by year (3 groups), using the Petersen (2009) method, as modified for Logit Regression by Jingling Guan and Mitchell Petersen.[50]

Variable definitions:

CScheme =	is calculating by first identifying the incentive compensation type (cash bonus and/or equity-based compensation) given to each of the senior executives. The percentage of executives having the same type of compensation is then calculated for each firm. CScheme is a categorical variable and is calculated by splitting the sample into thirds. The middle third is excluded. The third with the executive compensation with the closest compensation structures given a value of 1 (group compensation scheme), firms with the greatest level of variation between senior executives compensation are given a value of 0 (individual compensation scheme).
GEOSEG =	the natural log of the sum of the number of geographic segments disclosed in the notes to the annual report;
FUNCST =	the number of functional executives on the executive team divided by total senior executives. Functional executives are those where the annual report identifies them as having functional responsibility such as being responsible for functional departments. For example, marketing, finance, operations or research and development;
CAPEX =	is measured by dividing the change in total assets by opening total assets;
HOASSET =	a dummy variable for any firm reporting assets specifically allocated to a central management function (head office) in the annual report segment disclosure;
SIZE =	the natural log of market capitalization;
INDUSTRY =	a dummy variable for each industry:
YEAR =	a dummy variable for each year.

Table 2.7 reports estimations of logit regressions examining the impact of firm characteristics on the choice between group versus individual compensation for senior executives, where the dependent variable is CScheme. CScheme, has a value of 1 for group, and 0 for individual compensation scheme groups. The multivariate model is has a significant Chi-square test (p. <0.001), and has explanatory power, with a Nagelkerke R Square of 23.10%. As predicted, GEOSEG is negative and significant at the 5% level (-0.563, p. 0.028). Consistent with the univariate results, FUNCST is also significant and in the predicted direction at the 5% level. Although in the predicted direction, both CAPEX and HOASSET are not significant. As all the independent variables are in the predicted direction, and FUNCST and GEOSEG are significant, the results support the

[50] I would like to thank Jingling Guan and Mitchell Petersen for making the STATA code publically available, accessed 5 February 2009 via: http://www.kellogg.northwestern.edu/faculty/petersen/htm/papers/se/se_programming.htm

Hypothesis, that firms adopt individual, as opposed to group, compensation schemes for senior executives where their inputs and outputs are separable and observable, such as firms with low levels of integration.

Consistent with univariate tests, SIZE is positive and significant. Firms in the Health Care sector are more likely to have individual, as opposed to group compensation schemes for senior executives, as the industry dummy is negative and significant at the 5% level. However, theory does not provide an explanation for this. The remainder of the control variables are not significant.

Table 2.7 also reports the results for a Pooled Logit model with Petersen (2009) clustered standard errors. An issue with interpreting the results from an estimation of Petersen (2009) standard errors is that there is no generally accepted way of reporting for differences in the adjusted R square, Chi-Square test, and other statistics. Independent estimation of the individual models (not tabulated), reveals that the Chi Square test and Nagelkerke R Square's are either identical, or comparable to the reported Pooled Logit model results. Therefore, the results are not reported. The main feature of this model is that the coefficients are identical to the Pooled Logit model, although the p-values are different. The p-values for Petersen standard errors are only marginally different to those from the Pooled Logit model, with variation both above and below the Pooled Logit p-values. Therefore, there is no need to re-discuss the direction of the coefficients. However the missing p-values for the year dummies requires explanation.

The reason for the missing p-values for the year dummies is understood by considering the how Petersen (2009) estimates standard errors are estimated. The estimation involves estimating the Pooled Logit Model three times, first by clustering the standard errors by firm, then by time, and lastly estimating robust standard errors.

The variance matrices for each of the estimations are then aggregated, by summing the variance matrices for the two clustered models, then subtracting the robust standard error variance matrix. Consistent with Petersen's (2009) method controlling for time effects, the time specific dummy standard errors drop out of the estimation, and as such, p-values are not reported.

The p-values are reported based on the Petersen (2009) standard errors, and are estimated using 249 firm, and 3 year clusters. This means that from the available sample of 372 firm years, there are 249 unique firms, reducing concern about correlation in residuals between firms entering the sample more than once.

The reported p-value for GEOSEG decreases in significance from 0.028 to 0.060, meaning that the result remains significant at the 10% level. Whereas the p-value for FUNCST increases in significance from 0.021 to <0.001, meaning that the result become more significant. As discussed in Section 2.3.1, there are a number of possible explanations for this increase (which is reflective of a decrease in the standard error). First, the residuals may be negatively correlated within clusters (Petersen 2009), causing a reduction in the standard error when the negatively related residuals cancel each other out (Sribney 2007). Second, random variation in the data may be causing the difference.

Following Sribney (2007), the Pooled Model was estimated using robust standard errors (untabulated) and the results are comparable with the standard equation.[51] The robust standard errors are slightly larger than the pooled standard errors, providing support that the Pooled Logit model is well specified (Sribney 2007). Therefore, the second possibility, random variation in the data, is the most likely explanation (Sribney 2007). This is consistent with the relative differences in standard errors between the

[51] Sribney (2007) suggest this method as a test of which explanation is most likely.

pooled logit with and without Petersen standard errors being both positive and negative. As there is little guidance in the literature on how to report or deal with these issues, both models are tabulated.

In summary, as all the independent variables are in the predicted direction, and GEOSEG and FUNCST are both significant, on balance, the results confirm the Hypothesis that firms adopt individual, as opposed to group, compensation schemes for senior executives where their inputs and outputs are separable and observable, such as firms with low levels of integration. To the extent that SIZE proxies for the independent variables, SIZE provides further support for the Hypothesis.

2.4.3 Multivariate test: alternative specification

As the model includes variables that have been untested in the context of the Hypothesis, a number of different specifications are developed for both dependent and independent variables to assess the robustness of the results.

Table 2.8 reports a summary of the two alternative proxies used to estimate group versus individual compensation schemes.

The two alternative proxies detailed in Table 2.8 are based on the level of incentive compensation (CScheme2), and level of total compensation (CScheme3). Problematically, the level of incentive and total compensation are likely to be influenced by other factors not included in the main test of the Hypothesis. These factors may include factors such as the individual executive's appetite for risk, as well as the talent of, and personal wealth of the executive's (e.g. Murphy 1999; Core, Guay & Larcker 2003; Jensen & Murphy 2004). As such, without readily available proxies to control for these factors, the main proxy (CScheme) is more reliable for the Hypothesis tests. Despite this, the Hypothesis tests are replicated with both CScheme2 and

CScheme3 independently. The results (reported in Appendix A) do not change the conclusions from the main test.

Table 2.8 Alternate proxies for classifying firms with predominantly group or individual compensation schemes for senior executives

Variable	Description
CScheme2: Variation between senior executives' incentive compensation relative to base salary (percentages).	The percentage of total incentive compensation relative to base pay is calculated for each executive: (cash bonus + equity-based compensation) / Base Salary. A measure of variation between the senior executives is calculated for each firm using the following formula: Range of Incentive compensation percentage for senior executives / Mean Incentive compensation percentage for senior executives. Firms are ranked according to the level of variation between executives. The middle thirty three percent are removed. Firms with the least (greatest) variation between executives are classified as having a group (individual) compensation scheme. Results for this proxy are reported in Appendix A
CScheme3: Variations in senior executives total compensation 'levels' for the year.	The total level of compensation paid is calculated for each senior executive: Base Salary + Cash Bonus + Equity-based compensation. This is total compensation excluding termination or retirement benefits. A measure of variation between the senior executives is calculated for each firm using the following formula: Range of Level of Total Compensation for executives / Mean Level of Total Compensation for executives. Firms are ranked according to the level of variation between executives. The middle thirty three percent are removed. Firms with the least (greatest) variation between executives are classified as having a group (individual) compensation scheme. Results for this proxy are reported in Appendix A

The alternative proxies do however provide the opportunity to triangulate the validity of CScheme, as well as to create a composite proxy based on all three proxies. Table 2.9 reports the results from a test of association between CScheme and the alternative proxies, CScheme2 and CScheme3.

Table 2.9 Crosstab table of CScheme and alternative proxies for CScheme

Panel A: Crosstab table of CScheme and alternative proxies for CScheme

	CScheme2 and CScheme3 combined [a]		
CScheme	Individual	Group	Total
Individual	168	18	186
Group	26	151	177
Total	194	169	363
Pearson Chi-Square			208.5
(p-value)			*(0.000)****

Panel B: Directional Measures for CScheme and the alternative proxies for CScheme

	Lambda	Goodman and Krushal tau
Value	0.746	0.574
(p-value)	(0.000)***	*(0.000)****

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively
All aggregated firm year observations are from the sample of 590 firm years. Reported results exclude firms where no senior executive receive any incentive compensation or where one or more variables were missing.
[a] For the sample of firms, both CScheme2 and CScheme3 classify the same firms as having predominantly group or individual compensation.

Variable definitions:

CScheme = is calculating by first identifying the incentive compensation type (cash bonus and/or equity-based compensation) given to each of the senior executives. The percentage of executives having the same type of compensation is then calculated for each firm. CScheme is a categorical variable and is calculated by splitting the sample into thirds. The middle third is excluded. The third with the executive compensation with the closest compensation structures given a value of 1 (group compensation scheme), firms with the greatest level of variation between senior executives compensation are given a value of 0 (individual compensation scheme).

CScheme2 = is estimated by first calculating the percentage of total incentive compensation relative to base pay for each executive: (cash bonus + equity-based compensation) / Base Salary. A measure of variation between the senior executives is calculated for each firm using the following formula: Range of Incentive compensation percentage for senior executives / Mean Incentive compensation percentage for senior executives. Firms are ranked according to the level of variation between executives. The middle thirty three percent are removed. Firms with the least (greatest) variation between executives are classified as having a group (individual) compensation scheme.

CScheme3 = is estimated by first calculating the total level of compensation paid for each senior executive: Base Salary + Cash Bonus + Equity-based compensation. This is total compensation excluding termination or retirement benefits. A measure of variation between the senior executives is calculated for each firm using the following formula: Range of Level of Total Compensation for executives / Mean Level of Total Compensation for executives. Firms are ranked according to the level of variation between executives. The middle thirty three percent are removed. Firms with the least (greatest) variation between executives are classified as having a group (individual) compensation scheme.

Table 2.9 reports that there is a significant positive relation between CScheme and the alternative proxies, CScheme2 and CScheme3. The results for CScheme2 and

CScheme3 are combined as they both identify the same firms as having group versus individual compensation for the CScheme sample. Both the Goodman and Krushal tau and Lamda tests show a strong relation between proxies. The associations are significant and indicate that there is between 74.6% to 57.4% reduction in error in predicting the value of CScheme using CScheme2 or CScheme3 over what would be expected by chance. These tests provide supporting evidence that the proxy CScheme is capturing the level of variation in compensation contracts between senior executives within firms.

The Hypothesis is retested using a combined proxy, based on CScheme, CScheme2 and CScheme3. The results are reported in Table 2.10.

Table 2.10 reports estimations of logit regressions examining the impact of firm characteristics on the choice between group versus individual compensation for senior executives, where the dependent variable is a combined proxy based on CScheme, CScheme2 and CScheme3. The dependent variable is based on firms where all three methods predict the same compensation scheme (1 = group, and 0 = individual compensation). The results are consistent with the reported results for CScheme; providing further support that CScheme is capturing the level of variation in compensation contracts between senior executives within firms. All the independent variables are in the predicted direction, with GEOSEG and FUNCST significant (albeit at the 10% level for FUNCST in the Pooled Logit model). Firm SIZE is also positive and significant. Unlike the main results reported in Table 2.7, the Health Care industry segment dummy is not significant. In summary, the Hypothesis is supported by the results in Table 2.10.

Table 2.10 Logit Regression Examining the Impact of Firm Characteristics on the choice between Group Versus Individual Compensation for the Senior Executives, where the dependent variable is a combined proxy based on CScheme, CScheme2 and CScheme3

Dependent Variable: Combined proxy based on CScheme, CScheme2 and CScheme3

Variable	Predicted Sign	Pooled Logit			Pooled Logit with Clustered Standard Errors [a]		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		-13.855	*(0.000)*	***	-13.855	*(0.000)*	***
GEOSEG	-	-0.871	*(0.014)*	##	-0.871	*(0.001)*	###
FUNCST	+	1.047	*(0.076)*	#	1.047	*(0.000)*	###
CAPEX	+	0.226	*(0.334)*		0.226	*(0.277)*	
HOASSET	+	0.016	*(0.486)*		0.016	*(0.476)*	
SIZE		0.722	*(0.000)*	***	0.722	*(0.000)*	***
Energy		1.557	*(0.325)*		1.557	*(0.356)*	
Materials		0.171	*(0.898)*		0.171	*(0.898)*	
Industrials		0.022	*(0.987)*		0.022	*(0.982)*	
Consumer Discretionary		0.233	*(0.863)*		0.233	*(0.871)*	
Consumer Staples		1.424	*(0.313)*		1.424	*(0.404)*	
Health Care		-0.748	*(0.587)*		-0.748	*(0.625)*	
Information Technology		0.576	*(0.675)*		0.576	*(0.588)*	
Telecommunications Services		0.726	*(0.692)*		0.726	*(0.659)*	
Utilities							
Year 2003							
Year 2004		0.185	*(0.676)*		0.185	.	
Year 2005		-0.119	*(0.789)*		-0.119	*(0.077)*	*
N		242			242		
-2 Log likelihood		-132.62					
Cox & Snell R Square		25.20%					
Nagelkerke R Square		33.60%					
No. firm Clusters					180		
No. year clusters					3		
Percentage Correct:							
Individual compensation		75.60%					
Group compensation		70.60%					
Total		73.10%					

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively

#, ##, ### Indicates one-tailed significance at the 10, 5, and 1 percent levels, respectively

Reported p-values are based on the Wald statistic and reported as one sided where the coefficient is in the predicted direction, two sided otherwise.

All aggregated firm year observations are from the sample of 590 firm years. Reported results exclude firms where no senior executive receive any incentive compensation or where one or more variables were missing.

[a] The coefficients for the Pooled Logit with Clustered Standard errors are the same as for the Pooled Logit

Model. Standard errors are clustered by firm (249 groups) and by year (3 groups), using the Petersen (2009) method, as modified for Logit Regression by Jingling Guan and Mitchell Petersen.[52]

Variable definitions:

Dependent Variable	1 if CScheme, CScheme2 and CScheme3 all identify the compensation as predominantly group, 0 where all three identify compensation as predominantly individual.
CScheme =	is calculating by first identifying the incentive compensation type (cash bonus and/or equity-based compensation) given to each of the senior executives. The percentage of executives having the same type of compensation is then calculated for each firm. CScheme is a categorical variable and is calculated by splitting the sample into thirds. The middle third is excluded. The third with the executive compensation with the closest compensation structures given a value of 1 (group compensation scheme), firms with the greatest level of variation between senior executives compensation are given a value of 0 (individual compensation scheme).
CScheme2 =	is estimated by first calculating the percentage of total incentive compensation relative to base pay for each executive: (cash bonus + equity-based compensation) / Base Salary. A measure of variation between the senior executives is calculated for each firm using the following formula: Range of Incentive compensation percentage for senior executives / Mean Incentive compensation percentage for senior executives. Firms are ranked according to the level of variation between executives. The middle thirty three percent are removed. Firms with the least (greatest) variation between executives are classified as having a group (individual) compensation scheme.
CScheme3 =	is estimated by first calculating the total level of compensation paid for each senior executive: Base Salary + Cash Bonus + Equity-based compensation. This is total compensation excluding termination or retirement benefits. A measure of variation between the senior executives is calculated for each firm using the following formula: Range of Level of Total Compensation for executives / Mean Level of Total Compensation for executives. Firms are ranked according to the level of variation between executives. The middle thirty three percent are removed. Firms with the least (greatest) variation between executives are classified as having a group (individual) compensation scheme.
GEOSEG =	the natural log of the sum of the number of geographic segments disclosed in the notes to the annual report;
FUNCST =	the number of functional executives on the executive team divided by total senior executives. Functional executives are those where the annual report identifies them as having functional responsibility such as being responsible for functional departments. For example, marketing, finance, operations or research and development;
CAPEX =	is measured by dividing the change in total assets by opening total assets;
HOASSET =	a dummy variable for any firm reporting assets specifically allocated to a central management function (head office) in the annual report segment disclosure;
SIZE =	the natural log of market capitalization;
INDUSTRY =	a dummy variable for each industry:
YEAR =	a dummy variable for each year.

2.4.4 Robustness testing

A number of other robustness tests are estimated, but the results are not reported.

To test for the sensitivity of the model to exclusion of the middle thirty-three percent of firms, a number of tests are performed. First, several alternative

[52] I would like to thank Jingling Guan and Mitchell Petersen for making the STATA code publically available, accessed 5 February 2009 via:
http://www.kellogg.northwestern.edu/faculty/petersen/htm/papers/se/se_programming.htm

specifications of the number of firms to exclude from CScheme are tested, including a simple 50/50 split of the variable. Second, a continuous variable is used in an OLS model, instead of the Logit model. The continuous proxy is the raw percentage of senior executives with the same type of incentive compensation (cash and/or equity-based). The multivariate test are replicated with the continuous proxy, both including and excluding the middle thirty-three percent of firms that were excluded in the main tests. The results from these tests are consistent with the reported results. However the significance of the coefficients are predictably reduced when the middle third of firms are included in the estimated regression, consistent with the proposition that including firms which are difficult to classify introduces noise into the model.

The model may also be sensitive to alternative specification of the RHS variables, and to multicollinearity. Details of the alternative proxies are provided in Table 2.11.

Table 2.11 describes a number of the alternative proxies and control variables included in the robustness testing. An alternative proxy is used for GEOSEG, CAPEX and HOASSET, and the model is re-estimated substituting the alternative proxies. The results remain consistent with those reported with substitution of the alternative proxies, and control variables. To investigate the effect of any multicollinearity, the model was replicated with one independent variable at a time, and without year and industry controls. The results remain unchanged, suggesting that the model is robust to multicollinearity.

Table 2.11 Alternative proxies for firm characteristics that are expected to determine the efficiency of group versus individual compensation schemes for senior executives

Variable	Variable Name	Proxy Used	Predicted sign (+ is group and – is individual)
Geographic segmentati-on	GEOHERF	Geographic diversification is measured using a Herfindahl index of diversification calculated using the geographic segment disclosure note. This measure is consistent with that used by Bushman, Chen, Engel and Smith (2004). The index is calculated using the sum of the square of each geographic segment sales. The sum the squares is then divided by the square of total firm sales, providing a measure of geographic segmentation between 0 and 1. The index approaches 0 the greater the level of diversification.	+
CAPEX	CFCAPEX	Total cash expended on property plant and equipment from the cash flow statement divided by opening Total Assets.	+
Inter-segment Interdepend-encies: Geographic and Industry Segment interdepend-ence	INTSAL	Interdependencies related to inter-segment transactions is measured using the greater of geographic or industry segment sales eliminated on consolidation (Bushman et al 1995). The measure is the proportion of inter-segment sales to total sales. Segment interdependencies arise where the business segments are related, allowing for synergies such as transfer of knowledge and resources between segments. Further, as the level of interdependencies increases, the level of separability of effort (input) and output of those responsible for managing the segments decreases (Bushman et al *19*95).[53]	+
	INTAS	The proportion of inter-segment assets to total assets in the segment disclosure note. The larger of geographic or industry inter-segment assets.	+
Central management function	$HOASSET^{Cont}$	The proportion of assets specifically allocated to a central management function (head office) to total assets in the annual report segment disclosure.	+
Control variable	EXECEQ	Executive share ownership is measured using the average shares controlled by disclosed senior executives (except the CEO) during the year, divided by the number of shares outstanding.	
Control variable	CEOEQ	Total shares controlled by the CEO during the year divided by the number of shares outstanding.	

[53] Keating (1997) and Bushman, Indjejikian and Smith (1995) find a positive association between the level of weight placed on group relative to individual compensation for division managers and interdependence between divisions. Both of these studies are limited in their generalizability because they both focus on firms organized around divisions. Bushman et al (1995) and Keating (1997) is also limited to divisional manager compensation, limiting the generalizability to senior executives. This study extends Bushman et al (1995) and Keating (1997) in two main ways. First, this study increased the generalizability and importance of their findings by placing the contracting problem of manger interdependencies in the broader context of senior executives. This study also increases the generalizability of their results by studying a wider range of firms by addressing firms beyond those with division structure only. Secondly, this study draws on a broader theory base in developing predictions allowing predictions about factors beyond inter-segment sales between divisions.

2.5 Conclusion and limitations

The objective of this chapter was to investigate the firm characteristics associated with the choice of individual versus group compensation schemes for the senior executives directly below the CEO. Using contracting theory, it was predicted that individual compensation schemes are adopted by firms where individual senior executive's input and outputs are separable and observable. It was also predicted that group compensation schemes are adopted where there are expected efficiencies from senior executive co-operation and interdependencies between executives, such as in integrated firms (integrated firms are expected to benefit from increased co-operation between senior executives induced through group compensation). As this is the first study to explicitly investigate the firm characteristics associated with the choice between group versus individual compensation schemes for the senior executives just below the CEO level empirically, it was necessary to develop a new proxy for the type of compensation scheme in place.

The empirical evidence is based on a sample of 590 firm years drawn from the Top 500 Australian firms for the period 2003 to 2005. The data presented provides evidence in support of the Hypothesis. Firms that choose individual compensation have a greater level of geographic segmentation, consistent with the Hypothesis that firms adopt individual compensation schemes for senior executives where their inputs and outputs are separable and observable. Both univariate and multivariate tests provide support for the Hypothesis in terms of the level of functional structure, being positively related to group compensation schemes. Support is not offered for the Hypothesis where the level of firm integration is estimated using the disclosure of a central management function (head office), or the level of capital expenditure.

There are a number of limitations to this chapter. One limitation is the use of a new empirical proxy for a senior executive contracting mechanism that has not been tested in the literature previously. Also, the empirical proxy does not discriminate between groups of executives that are not offered the compensation type, as opposed to those who did not earn incentive compensation. However the result do suggest that the model has empirical validity, as the model has explanatory power, and the results are consistent with prior research despite different specifications for the independent and dependent variables (Bushman et al 1995).

Another limitation is the comparison of two types of compensation only, where other mechanisms may act as substitutes. For example, coordination mechanisms such as regular management meetings may be used by some firms to increase information sharing, instead of group compensation. Although this is a limitation, it biases away from finding a result.

The implications of the findings from this chapter are explored further in Chapter Three, where firm performance consequences of the choice between group versus individual compensation schemes for senior executives are investigated. First, Chapter Three simply compares the subsequent performance for firms identified in this chapter as having predominantly a group or individual compensation scheme. Second, Chapter Three uses the model developed in this chapter to estimate a benchmark compensation contract. The subsequent performance of firm identified as having a compensation contract that deviates from the benchmark contract is evaluated.

Chapter 3: Performance Consequences of Group versus Individual Compensation Schemes for Senior Executives

3.1 Introduction

This chapter investigates the performance consequences of compensation schemes for the senior executives. Although there is an extensive literature investigating the performance consequences of CEO compensation schemes, the link between pay and performance for the executives below the CEO has received less attention. Accordingly, the first objective of this chapter is to provide evidence on whether the choice of group versus individual compensation schemes leads to different firm performance. The second objective is to investigate whether firms that choose compensation schemes for senior executives that are not consistent with the firm's characteristics have lower subsequent performance.

The primary motivation is the lack of empirical evidence on whether adopting different compensation schemes for senior executives is associated with long term corporate performance. Despite most senior executive compensation studies focusing on CEO compensation, recent literature has acknowledged the possible influence other senior executives may have on firm performance (e.g. Datta, Iskander-Datta & Raman 2004; Hillegeist & Penalva 2004; Core & Larcker 2002). However, most studies that do consider the senior executives beyond the CEO focus on the level of total compensation or equity incentives only (Ittner, Lambert & Larcker 2003; Hillegeist & Penalva 2004; Frye 2004; Bebchuk & Grinstein 2005).[54] This is despite evidence that the choice of

[54] Notable exceptions are Main, O'Reilly and Wade (1993) and Carpenter and Sanders (2004). Main et al (1993) find a positive association between individual compensation schemes and average firm ROA. On the other hand, Carpenter and Sanders (2004) find support against individual compensation

compensation scheme, group versus individual, may have consequences for firm performance (Bushman, Indjejikian & Smith 1995; Keating 1997; also see Chapter Two of this thesis).[55]

Further, direct tests of the association between compensation and performance are difficult to conduct and interpret, stemming from different opinions about the efficiency of the executive compensation market. If the market is efficient and all firms contract optimally, there will be no association between compensation and performance as all firms would have chosen the optimal compensation scheme for their firm (Demsetz & Lehn 1985; Core & Guay 1999). However, recent literature has relaxed some of the strict assumptions of early studies. Although these papers assume that on average firms contract efficiently with executives, stickiness in recontracting allows compensation contracts to drift from efficiency over time for some firms (Core, Holthausen & Larcker 1999; Core & Larcker 2002; Ittner, Lambert & Larcker 2003).[56] The authors use firm characteristics to estimate 'efficient' benchmark compensation contracts, allowing for the identification of firms with contracts that deviate from those benchmarks. They provide evidence to support the proposition that firms with inefficient compensation contracts (those that deviate from the benchmark) suffer from lower subsequent firm performance.[57] This chapter extends this literature by considering group versus individual compensation contracts in this context.

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scheme as a predictor of firm performance in complex firms that require increased co-operation between senior executives.

[55] The literature has also provided some evidence that using a group compensation scheme is efficient at the employee level in some cases (Welbourne & Gomez Mejia 1995). For example, Hamilton, Nickerson and Owan (2003) found that in one large US manufacturing plant, productivity increased significantly with the adoption of a group compensation scheme.

[56] An efficient compensation contract is where agency costs are minimized given the costs of the contract (Jensen & Meckling 1976).

[57] Empirical evidence supports this proposition in the case of CEO compensation (Core & Guay 1999; Core, Holthausen, Larcker 1999; Ittner, Lambert & Larcker 2003; Matolcsy & Wright 2006).

The evidence is based on 372 firm years from the Top 500 Australian firms for the period 2003 to 2005, being a subset of the sample used in Chapter Two. The evidence reveals no association between the choice of group versus individual compensation schemes and firm performance. This finding is consistent with the proposition that, on average, firms contract efficiently with the senior executives. To address the second objective, the model developed in Chapter Two is used to identify firms with compensation schemes that are not consistent with their firm characteristics. Evidence is provided that firms choosing compensation contracts for the senior executives that are not consistent with their firm's characteristics (inefficient compensation contracts) suffer lower subsequent performance. The lower performance is economically significant, with firms identified as having inefficient compensation contracts having on average 4.3% lower ROE the following year.

This chapter contributes to the literature on senior executive compensation by providing empirical evidence on the firm performance consequences of group versus individual compensation schemes for senior executives. Although the finding of no association between compensation scheme choice and firm performance is consistent with firms on average contracting efficiently with executives, the lower subsequent performance for firms that choose compensation schemes that are not consistent with firm characteristics suggests that some firms do not have optimal contracts at a given point in time. These findings have relevance to academics, shareholders and regulators by making them better informed as to the efficiency of different compensation scheme choices for senior executives, as well as the limitations of a 'one size fits all' approach

to regulation.[58] The findings also give insight into the economic significance of the senior executive team.

A contribution is also made to the practitioner based literature by providing a framework to evaluate senior executives' compensation schemes. By providing evidence on factors that influence the performance effects of senior executives' compensation schemes, evaluation and design of senior executives' compensation contracts is enhanced for those firms that have compensation contracts that are not consistent with the firm's characteristics. The findings from this chapter suggest that the factors explored in Chapter Two may also be generalized to other settings with subsequent research.

The remainder of this study is organised as follows. Section 2 develops the theory and reviews relevant literature. Section 3 describes the research design. Section 4 reports the results and section 5 contains the conclusions.

3.2 Literature review and theory development

3.2.1 Executive compensation and firm performance

Consistent with Chapter Two, an agency theory perspective is adopted for this chapter, whereby efficient contracts (including compensation contracts) that reduce agency costs are important in ensuring firm survival and performance (Fama & Jensen

[58] For example: the Counterparty Risk Management Policy Group III report (CRMPG-III 2008), Containing Systematic Risk: The Road to Reform, identified executive compensation as one of the top five contributors to the 2008 financial crisis. CRMPG-III consists of representatives from the major British and US investments banks who produced the report in respond to the 2008 financial crisis and provide advice as to what steps could be taken by the private sector to reduce the frequency and severity of future shocks. In response to the CRMPG-III report, the UK based Financial Services Authority began the process of investigating 'best practice' guidelines and audits for executive compensation packages, with application to capital markets (Financial Stability Forum 2008; Durkin 2009). Similar actions with respect to executives compensation have been taken by the Australian Prudential Regulation Authority (Durkin 2009).

1983).[59] Although agency theory suggests that senior executive compensation schemes are important in minimising agency cost, and in turn a firm's competitive position in the market (Fama & Jensen 1983), to date the literature has not explained or empirically tested the impact that group versus individual compensation schemes have on senior executive team dynamics and resulting firm performance.

The question of how to provide CEOs incentives to maximise firm performance has been addressed extensively in the literature (Murphy 1999; Core et al 2003), and the findings from this literature have implications for the executives below the CEO level. Despite conflicts in the early literature, empirical evidence suggests that firms on average set CEO pay according to the characteristics of the firm.[60] For example, Core and Guay (1999) find that firms grant equity to CEOs to maintain efficient levels of incentives, which are consistent with the firm characteristics. They also find that firms with 'weaker governance structures' pay CEOs higher levels of compensation, and in turn, have lower subsequent firm performance. Other empirical studies also support the proposition that firms have lower subsequent performance where CEO compensation is not efficient, as predicted by the firm's characteristics (Ittner, Lambert & Larcker 2003; Matolcsy & Wright 2006). These studies suggest that inefficient compensation and poor performance are manifestations of agency costs, due to inefficient contracting practices.

A number of subsequent studies have extended the findings from the CEO compensation literature to address other senior executives' compensation, below the CEO level. After controlling for firm characteristics, this literature finds empirical support for an association between firm performance and mandatory increases in

[59] An efficient compensation contract is where agency costs are minimized given the costs of the contract (Jensen & Meckling 1976).

[60] See Hermalin and Wallace (2001) for a discussion of conflicts in the earlier literature.

senior executive stock ownership (Core & Larcker 2002), executive stock options granted (Hanlon, Rajgopal & Shevlin 2003), and the level of stock option incentives (Hillegeist & Penalva 2004; Cheng & Farber 2008). Frye (2004) finds mixed evidence of such an association. However, she does not control for firm characteristics associated with equity-based compensation levels. The above literature suggests that how senior executives are compensated influences firm performance. Although this literature has made progress in explaining levels of compensation, especially the equity component, to date the efficiency of different compensation schemes for senior executives has received limited attention.[61]

3.2.2 Use of individual and group compensation schemes and firm performance

Problematically, theories of efficient contracting make direct tests involving the firm performance consequences of different types of compensation schemes difficult to interpret. Agency theory suggests that firms select compensation schemes to maximise firm performance, where marginal benefit equals marginal costs (an 'efficient' compensation scheme) (Demsetz & Lehn 1985). Therefore, if firms on average choose efficient compensation schemes, being consistent with the firm's characteristics, performance, on average, will be maximised for all firms. If firm performance is maximised for all firms, there will be no systematic difference in performance between firms, regardless of the compensation scheme in place (Core & Guay 1999; Bushman & Smith 2001; Ittner et al 2003; Matolcsy & Wright 2006).[62]

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[61] It is interesting to note that where CEO and top five executives' compensation are compared, the firm performance effect is stronger for the top five executives (Core & Larcker 2002).

[62] Firm performance models that are not well specified may produce a spurious association between firm performance and compensation scheme choice, such as cases where there is a common factor associated with both firm performance and compensation scheme choice.

As discussed in Chapter Two, there are two competing arguments as to how to structure senior executives' compensation schemes. On one hand, senior executives may be compensated on individual performance, increasing the pay performance link between individual effort and individual output (individual compensation scheme).[63] Chapter Two provides empirical evidence that individual compensation schemes are adopted by firms where individual senior executive's input (effort) and outputs are separable and observable. Therefore, in some cases it may be efficient to compensate senior executives based predominately on individual performance. On the other hand, individual executives may be compensated on group performance, increasing the pay performance link between group effort and output (group compensation scheme).[64] Chapter Two also provides empirical evidence that group compensation schemes are adopted by firms where there are efficiencies from senior executive co-operation and interdependencies between executives, such as in integrated firms. Therefore, in some cases it may be efficient to compensate individual executives predominately based on group performance.

Given that Chapter Two demonstrated an association between the choice of compensation scheme (group versus individual) and firm characteristics, firm performance is unlikely to be systematically different between firms that have either compensation scheme in place. This is because on average, firms have chosen the

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[63] For example, Bridgestone Australia Ltd (BDS 2004) disclose that for the Specified Executives 'remuneration packages are reviewed with due regard to performance of the individuals and other relevant factors'. Therefore individual performance is important in setting executives remuneration, with other factors also considered.

[64] For example, Adelaide Brighton Ltd (ABC 2005) require common performance targets to be met before any short term or long term incentive compensation is awarded to senior executives. A Profit Before Tax hurdle must be reached for short term incentives to be awarded. A total shareholder return and/or an earnings per share hurdle must be reached for long term compensation to be awarded. The Annual Report also specifies that 'participation in the LTI arrangements is only offered to the Managing Director and senior executives who are able to influence the generation of shareholder wealth and thus have a direct impact on the Group's performance against the relevant performance hurdles.'

compensation scheme that maximises firm performance, given their firm characteristics.[65] Accordingly:

H_1: There is no association, on average, between the choice of different compensation schemes for senior executives and firm performance, where firms choose compensation schemes according to the firms' characteristics.

3.2.3 Inefficient contracting and firm performance

Although the proposition that firms choose efficient contracts on average is consistent with empirical evidence (Demsetz & Lehn 1985; Ittner et al 2003; Matolcsy & Wright 2006), it is not necessarily true that all firms have efficient contracts at any one point of time. There are three main reasons why some firms may have an inefficient compensation scheme at any given point. Efficient contracting predicts that as a firm's characteristics change, the compensation scheme should change accordingly, to induce the appropriate incentives from senior executives. However, when the compensation scheme deviates from what is efficient because of changing firm characteristics, firms are not always able to re-contract immediately, due to transaction cost and existing contract constraints (Zingales 1998; Core & Larcker 2002). The existence of transaction costs and contractual barriers also prevent those firms whose firm characteristics have changed from instantaneously recontracting, leading to some firms having inefficient compensation schemes.

Second, some firms may have inefficient compensation schemes at any point in time, because firms are constantly learning about the efficiency of their current

[65] Also, if compensation schemes are chosen by firms on a random basis, there would be no pay performance relation between compensation scheme choice and firm performance. Therefore, finding no positive association between group versus individual compensation schemes and firm performance in a direct test of association would not necessarily support efficient contracting between firms and executives (I would like to thank Greg Clinch for this insight).

contracts. Hall and Leibman (1998) and Liang and Weisbenner (2001) propose that firms are learning about efficient contracting over time, and therefore some firms will and some will not have learnt what the efficient compensation scheme is for their senior executives. Those firms that have not yet learnt which compensation scheme is most efficient may have an inefficient compensation contract in place. Third, the process by which firms arrive at an efficient compensation scheme may influence the efficiency of the scheme. For example, executives with significant bargaining power may extract economic rents from shareholders by negotiating an inefficient compensation scheme (Core et al 1999; Bebchuk, Fried & Walker 2002).[66]

Agency theory proposes that where senior executives have incentives that are not efficient, the performance of the firm suffers as a consequence. Empirical evidence provides support for the proposition that where CEO and senior executives' total compensation, or level of equity incentives, are not efficient as predicted by a firm's characteristics, firms have lower subsequent performance (Core et al 1999; Hillegeist & Penalva 2004; Matolcsy & Wright 2006).[67] The above discussion suggest that at any point in time, there will be firms that have individual (group) compensation schemes, where it would be more efficient for them to have group (individual) compensation schemes. Accordingly:

H_2: Firms that choose a compensation scheme for senior executives that is not consistent with the firm's characteristics, have lower subsequent firm performance.

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[66] This has implications for the relation between compensation contract structure and the various corporate governance mechanisms employed by the shareholders and directors to minimise agency costs. This suggests that firms with stronger corporate governance mechanisms will be subject to less rent extraction by executives. However, it is beyond this study to investigate how firms arrive at an efficient contract.

[67] The proposition that inefficient contracting mechanisms leads to poor firm performance is also consistent with a contingency theory (positive) perspective of the firm. Contingency theory proposes that where there is (is no) a fit between the firms structure and related contingencies, firm performance is enhanced (reduced) (Donaldson 2001, p. 185).

3.3 Data and Research Design

3.3.1 Data and sample selection

The sample is taken from the Top 500 Australian firms (All Ordinaries index) for the period 2003 to 2005 and is a subset of the sample used in Chapter Two. Table 3.1 presents the sample selection process.

Table 3.1 Panel A reports the sample selection reconciliation. As discussed in Section 2.3.1, the sample is reduced by limited data availability, also financial services firms and trusts are excluded. The sample is further reduced by the 218 firm years excluded in estimating the compensation scheme proxy, CScheme. The final sample is made up of 372 firm years. Of the 249 unique firms in the sample, only 19 firms appear in all three years.

Table 3.1 Panel B reports that the sample firms are from a range of different industries, reducing the potential for industry bias. The largest representation is from the Materials, and Consumer Discretionary industries, making up 22% and 21% of the sample firm years respectively.

Executive compensation data is drawn from the UTS 'Who Governs Australia' database. Financial data is collected from Aspect – Huntly databases and market data from the Share Price & Price Relative (SPPR) data base (supplied by the Centre for Research in Finance). Identified outliers were investigated for data errors and updated. Consistent with other studies using corporate governance and other firm specific data, variables with extreme observations have been winsorised to three standard deviations to reduce the influence of outliers on reported results (e.g. Larcker, Richardson & Tuna 2007).

Table 3.1 Sample selection and industry representation

Panel A: Sample selection

Descriptions	2003	2004	2005	Total firm years
Population of all firms appearing in All Ordinaries Index	493	496	485	1474
Less firm years:				
Financial Services Firm	(108)	(116)	(114)	(338)
Trusts, Firm delisted or merged, Stock is not ordinary share capital or Annual Report in Foreign Currency	(58)	(60)	(37)	(155)
Data on Less than three executives disclosed in the Annual Report	(45)	(34)	(32)	(111)
Available Sample	282	286	302	870
At least one independent variable not disclosed in the Annual Report	(121)	(29)	(28)	(178)
No Executive received incentive compensation during year	(48)	(28)	(26)	(102)
Sample for Chapter Two	113	229	248	590
Less firms excluded in estimating the type of compensation scheme	(43)	(81)	(94)	(218)
Final Sample[68]	70	148	154	372

Panel B: Industry representation

Industry	Number of firm years	Percentage of sample
Energy	18	4.8%
Materials	82	22.0%
Industrials	58	15.6%
Consumer Discretionary	78	21.0%
Consumer Staples	36	9.7%
Health Care	52	14.0%
Information Technology	31	8.3%
Telecommunications Services	13	3.5%
Utilities	4	1.1%
Total	372	100%

[68] Due to data deletions, of the 249 unique firms in the sample, only 19 firms appear in all three years.

3.3.2 Experimental design to test Hypothesis 1

Chapter Two provided evidence that firm characteristics determine the choice between group versus individual compensation schemes for the senior executive, providing an appropriate setting to test Hypothesis 1. Hence, the performance of firms identified as having predominantly group or individual compensation schemes for the senior executives are compared to each other. Testing the Hypothesis requires splitting the sample into different groups. The classification used in this chapter is the one developed in Chapter Two, CScheme. The empirical specification for CScheme is summarised below Equation 3.3 (for a detailed discussion of this proxy, see Section 2.3.3).

Consistent with prior research, firm performance is measured using both accounting and market returns (Core, Holthausen & Larcker 1999; Larcker, Richardson & Tuna 2007; Matolcsy & Wright 2006), and tested using OLS regression. [69] A dummy variable (CScheme) is added to the firm performance model to test Hypothesis 1, that on average, there is no association between the choice of different compensation schemes and firm performance where firms choose compensation schemes according to the firms' characteristics.

Where firm performance is measured using accounting measures of performance (Equation 3.1), the standard deviation of monthly stock returns (VOLATILITY) and the log of total sales ($SIZE^{Sales}$) are included as controls for risk factors associated with firm performance (Core, Holthausen & Larcker 1999; Ittner et al 2003). To control for year and industry effects, a dummy variable is added for each year and industry.

[69] The specification of the firm performance control variables and tests are based on those used by Core, Holthausen and Larcker (1999) and Larker et al (2003).

$$AccPerf_{jt+1} = \alpha_0 + \alpha_1 CScheme_{jt} + \alpha_2 VOLATILITY_{jt} + \alpha_3 SIZE^{Sales}_{jt} + \alpha_n INDUSTRY_{jt} + \alpha_n YEAR_{jt} + \varepsilon_I \quad 3.1$$

Where:

AccPerf = Accounting performance is either return on assets (ROA) or return on equity (ROE).

CScheme = Senior executives' compensation type (cash bonus and/or equity-based compensation) is identified for each of the senior executives. The percentage of executives having the same type of compensation is calculated for each firm, and the middle third is excluded. The firms with the greatest level of variation (diversity) between senior executives compensation are given a value of 0 (individual compensation), and the lowest variation 1 (group compensation).

VOLATILITY = Standard deviation of monthly stock returns for 18 months, 3 months after and 15 months prior to the earnings announcement data.

$SIZE^{Sales}$ = Log of total firm sales.

INDUSTRY = Dummy variable for each industry group.

YEAR = Dummy variable for the year compensation is awarded.

Where firm performance is measured using market performance (Equation 3.2), the standard deviation of stock returns (VOLATILITY), size ($SIZE^{Sales}$) and market to book ratio (MBOOK) are included as controls for firm risk factors associated with firm market performance (Fama & French 1992; Core et al 1999; Matolcsy & Wright 2006).

To control for year and industry effects, a dummy variable is added for each year and industry.

$$\begin{aligned} Stock\,\mathrm{Re}turn_{t+1} &= \alpha_0 + \alpha_1 CScheme_{jt} \\ &+ \alpha_2 VOLATILITY_{jt} + \alpha_3 SIZE^{Sales}{}_{jt} + \alpha_4 MBOOK_{jt} \\ &+ \alpha_n INDUSTRY_{jt} + \alpha_n YEAR_{jt} + \varepsilon_I \end{aligned} \qquad 3.2$$

Where:

StockReturn = Either the change in market value of equity (ΔMVE), or the change in market value of equity adjusted for risk (ΔMVErisk). ΔMVE is the annual market return, adjusted for dividends, franking credits and share splits; ΔMVErisk is the annual market return (ΔMVE), adjusted for risk using CAPM;

CScheme = Senior executives' compensation type (cash bonus and/or equity-based compensation) is identified for each of the senior executives. The percentage of executives having the same type of compensation is calculated for each firm, and the middle third is excluded. The firms with the greatest level of variation (diversity) between senior executives compensation are given a value of 0 (individual compensation), and the lowest variation 1 (group compensation).

VOLATILITY = Standard deviation of monthly stock returns for 18 months, 3 months after and 15 months prior to the earnings announcement data.

$SIZE^{Sales}$ = Log of total firm sales.

MBOOK = Market to Book ratio.

INDUSTRY = Dummy variable for each industry group.

YEAR = Dummy variable for each year compensation is awarded.

3.3.3 Experimental design to test Hypothesis 2

A two stage design is used to test Hypothesis 2. In the first stage, the model developed in Chapter Two is used to identify firms with inefficient compensation schemes. An inefficient compensation scheme is defined where the compensation scheme is not consistent with the firms' characteristics. In the second stage, multivariate tests are used to assess whether those firms identified in the first stage as having an inefficient compensation scheme, have suboptimal performance.[70] A pooled OLS regression model is estimated to test the Hypothesis. Consistent with Chapter Two, results are also tabulated with Petersen (2009) standard errors clustered by both firm and time.[71]

3.3.3.1 Stage 1: Benchmark compensation contract

To test Hypothesis 2, the sample is separated into two groups; those that have an efficient contract, and those that do not have an efficient contract. Using Equation 3.3, estimated using a cross sectional logit model, a benchmark compensation contract is estimated (for a detailed discussion of this model, see Section 2.3). Firms with

[70] This is consistent with recent studies that consider executive compensation and efficient contracting (Core & Larcker; 2002; Hillegeist & Penalva 2004; Larcker, Richarson & Tuna 2007; Matolcsy & Wright 2006).

[71] As discussed in Chapter Two, there is a possible econometric problem with respect to using a pooled OLS regression models as it is possible that the residuals are correlated across different firms (between firms), or across time for a given firm (within firm) (Petersen 2009). If there is independence across residuals, standard errors may be biased, confounding tests of significance.

compensation schemes that deviate from the benchmark are classified as being inefficient ($CScheme^{Ineff}$), and assigned a value of 1, 0 otherwise.

$$\begin{aligned} CScheme_{it} &= \alpha_0 + \alpha_1 GEOSEG_{i,t-1} \\ &+ \alpha_2 FUNCST_{i,t} + \alpha_3 CAPEX_{i,t} + \alpha_4 HOASSET_{i,t-1} \\ &+ \alpha_5 SIZE^{Mkt}_{i,t-1} + \alpha_n INDUSTRY_{i,t} + \alpha_n YEAR_{i,t} + \varepsilon_{i,t} \end{aligned} \qquad 3.3$$

Where:

CScheme = Senior executives' compensation type (cash bonus and/or equity-based compensation) is identified for each of the senior executives. The percentage of executives having the same type of compensation is calculated for each firm, and the middle third is excluded. The firms with the greatest level of variation (diversity) between senior executives compensation are given a value of 0, and the lowest variation 1.

GEOSEG = The level of geographic diversification is the Log of, the sum of the number of geographic segments, as disclosed in the Annual Report.

FUNCST = Functional Structure is measured by the number of functional executives on the executive team, divided by total senior executives.

CAPEX = The level of capital expenditure is measured by dividing the change in Total Assets by opening Total Assets.

HOASSET = This dummy variable is based on whether assets are specifically allocated to a central management function (head office) in the Annual Report primary segment disclosure note. 1if a head office is disclosed, 0 otherwise.

$SIZE^{Mkt}$ = Firm Size is measured using the log of market capitalization

INDUSTRY = Dummy variable for each industry

YEAR = Dummy variable for each year

3.3.3.2 Stage 2: Firm Performance

A dummy variable ($CScheme^{Ineff}$) is added to the firm performance models, to identify firms categorised in the first stage as having an inefficient compensation scheme. If $CScheme^{Ineff}$ is negative and significant, the Hypothesis is supported, that firms choosing a compensation scheme for senior executives that is not consistent with their firm characteristics, have lower subsequent performance.

Equation 3.4 is estimated to test Hypothesis 2, where firm performance is measured using accounting measures of performance. The control variables are identical to those specified for Equation 3.1.

$$AccPerf_{jt+1} = \alpha_0 + \alpha_1 CScheme^{Ineff}{}_{jt} + \alpha_2 VOLATILITY_{jt} + \alpha_3 SIZE^{Sales}{}_{jt} + \alpha_n INDUSTRY_{jt} + \alpha_n YEAR_{jt} + \varepsilon_I \quad 3.4$$

Where:

$CScheme^{Ineff}$ = Value of 1 where the firm has an inefficient compensation scheme as identified by Equation 3.3, and a value of 0 if the compensation scheme is consistent with the model.

Equation 3.5 is estimated to test Hypothesis 2, where firm performance is measured using market measures of performance. The control variables are identical to those specified for Equation 3.2.

$$Stock\,\mathrm{Re}turn_{t+1} = \alpha_0 + \alpha_1 CScheme^{Ineff}{}_{jt} + \alpha_2 VOLATILITY_{jt} + \alpha_3 SIZE^{Sales}{}_{jt} + \alpha_4 MBOOK_{jt} + \alpha_n INDUSTRY_{jt} + \alpha_n YEAR_{jt} + \varepsilon_I \qquad 3.5$$

Where:

$CScheme^{Ineff}$ = Value of 1 where the firm has an inefficient compensation scheme as identified by Equation 3.3, and a value of 0 if the compensation scheme is consistent with the model.

3.3.4 Descriptive statistics

Descriptive statistics are reported in Table 3.2.

Table 3.2 Descriptive statistics for the pooled sample of 372 firms for the period 2003 to 2005

	Full Sample (n. 372)					
Variable	**N**	**Mean**	**Median**	**Std. Dev.**	**Minimum**	**Maximum**
GEOSEG	372	2.237	2.000	1.520	1.000	10.000
FUNCST	372	0.340	0.333	0.218	0.00	1.000
CAPEX	372	0.146	0.085	0.291	-0.479	0.746
HOASSET	372	0.153	0.000	0.361	0.000	1.000
$SIZE^{Mkt}$ (000s)	372	1,650,800	235,984	6,003,375	15,306	63,520,646
$SIZE^{Sales}$ (000s)	369	1,554,792	286,644	4,211,871	55,300	36,607,300
VOLATILITY	313	0.102	0.088	0.062	0.000	0.655
MBOOK	372	2.547	2.045	1.667	-1.270	5.750
ROA_{t+1}	342	0.086	0.093	0.115	-0.120	0.292
ROE_{t+1}	331	0.182	0.192	0.229	-0.250	0.605
ΔMVE_{t+1}	362	1.190	1.167	0.447	0.125	2.282
$\Delta MVErisk_{t+1}$	362	-0.069	-0.047	0.486	-0.256	2.083
$CScheme^{Ineff}$	372	0.331	0.000	0.471	0.000	1.000

All aggregated firm year observations are from the sample of 372 firm years.

Variable definitions:

$SIZE^{Mkt}$ = Market capitalization (for statistical test SIZE is logged using the natural log);

GEOSEG = the sum of the number of geographic segments disclosed in the notes to the annual report (for statistical test GEOSEG is logged using the natural log);

FUNCST = the number of functional executives on the executive team divided by total senior executives. Functional executives are those where the annual report identifies them as having functional responsibility such as being responsible for functional departments. For example, marketing, finance, operations or research and development;

CAPEX = is measured by dividing the change in Total Assets by opening Total Assets;

HOASSET =	a dummy variable for any firm reporting assets specifically allocated to a central management function (head office) in the annual report segment disclosure;
VOLATILITY =	Standard deviation of stock returns for 18 months, 3 months after and 15 months prior to the earnings announcement date;
$SIZE^{Sales}$ =	the natural log of total firm sales;
MBOOK =	Market to Book ratio;
ROA =	EBIT / Ave Total Assets;
ROE =	EBIT / Ave Total Equity;
ΔMVE =	is the percentage change in value of equity over one financial year plus 1, adjusted for dividends, franking credits and share splits;
ΔMVErisk =	is the change in market value of equity over the financial year plus 1, adjusted for dividends, ranking credits and risk using CAPM; Betas are calculated based regressing monthly firm returns on total monthly market returns, for the 15 months prior and 3 months post the annual report date;
$CScheme^{Ineff}$ =	Value of 1 where the firm has an inefficient compensation scheme as identified by model 3.2; 0 otherwise.

Table 3.2 shows that there is variation between the sample firms. The median firm has a market capitalization of $235 million, market to book ratio of 2.045, and total sales revenue of $286 million. The standard deviations demonstrate that there is variation between firms. Although most firms in the sample are profitable, with the median ROE being 19.2%, and median one year market returns of 16.7%; the median firm had a 4.7% negative abnormal return. There is also variation in accounting measures of performance, with the standard deviation of ROE being 22.9%. Importantly, 33.1% of the sample firms are identified as having a compensation scheme that is not consistent with the firm's characteristics ($CScheme^{Ineff}$). In summary, the sample includes a diverse range of firms providing variation in the sample, allowing for tests of the Hypothesis. The correlations between the variables are reported in Table 3.3.

Table 3.3 reports a number of associations between the independent variables. Of particular note is that the proxies for firm size, $SIZE^{Mkt}$ and $SIZE^{Sales}$, are positively associated with firm performance. Chapter Two reported that CScheme is also positively related to $SIZE^{Mkt}$. As firm size is positively associated with both firm performance and CScheme, any test of firm performance will need to be multivariate to control for the firm size effect. As is expected, proxies for known risk factors, such as

$SIZE^{Mkt}$, $SIZE^{Sales}$, VOLATILITY, and MBOOK are predictably associated with each other. Importantly, $CScheme^{Ineff}$ is not related to the risk factors proxies, providing some evidence that $CScheme^{Ineff}$ is not simply capturing a know risk factor.

Table 3.3 Correlation table for the pooled sample of 372 firms for the period 2003 to 2005

(next page)

		$SIZE^{Mkt}$	GEOSEG	FUNCST	CAPEX	HOASSET	VOLATILITY	$SIZE^{Sales}$	MBOOK	ROA_{t+1}	ROE_{t+1}	ΔMVE_{t+1}	$\Delta MVErisk_{t+1}$	$CScheme^{Ineff}$
$SIZE^{Mkt}$	Correlation	1	**.204****	**-.104***	-.038	.023	**-.404****	**.754****	.082	**.303****	**.333****	.092	**.112***	-.047
	(p-value)		*(0.000)*	*(0.045)*	*(0.460)*	*(0.657)*	*(0.000)*	*(0.000)*	*(0.115)*	*(0.000)*	*(0.000)*	*(0.081)*	*(0.033)*	*(0.366)*
GEOSEG	Correlation	**.178****	1	-.098	**-.118***	.072	-.036	**.153****	-.046	-.038	-.013	-.092	**-.109***	.093
	(p-value)	*(0.001)*		*(0.059)*	*(0.022)*	*(0.164)*	*(0.522)*	*(0.003)*	*(0.372)*	*(0.484)*	*(0.815)*	*(0.080)*	*(0.038)*	*(0.074)*
FUNCST	Correlation	**-.103***	-.086	1	.047	.006	**.114***	-.091	.034	-.047	-.028	-.055	-.053	-.003
	(p-value)	*(0.046)*	*(0.099)*		*(0.362)*	*(0.915)*	*(0.044)*	*(0.082)*	*(0.515)*	*(0.391)*	*(0.612)*	*(0.293)*	*(0.314)*	*(0.958)*
CAPEX	Correlation	-.017	**-.108***	.029	1	.000	-.033	-.051	**.168****	.025	.040	-.009	-.015	.035
	(p-value)	*(0.750)*	*(0.037)*	*(0.581)*		*(0.995)*	*(0.561)*	*(0.327)*	*(0.001)*	*(0.640)*	*(0.473)*	*(0.857)*	*(0.782)*	*(0.506)*
HOASSET	Correlation	.021	.081	.029	-.008	1	-.004	.045	-.065	-.006	-.026	-.076	-.045	-.029
	(p-value)	*(0.692)*	*(0.117)*	*(0.572)*	*(0.885)*		*(0.944)*	*(0.388)*	*(0.212)*	*(0.905)*	*(0.638)*	*(0.149)*	*(0.396)*	*(0.573)*
VOLATILITY	Correlation	**-.461****	-.049	.091	-.017	.030	1	**-.481****	-.008	**-.433****	**-.422****	**-.283****	**-.336****	-.005
	(p-value)	*(0.000)*	*(0.384)*	*(0.108)*	*(0.761)*	*(0.591)*		*(0.000)*	*(0.891)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.930)*
$SIZE^{Sales}$	Correlation	**.810****	**.160****	**-.134***	-.048	.038	**-.506****	1	**-.165****	**.440****	**.490****	**.165****	**.217****	-.058
	(p-value)	*(0.000)*	*(0.002)*	*(0.010)*	*(0.359)*	*(0.465)*	*(0.000)*		*(0.001)*	*(0.000)*	*(0.000)*	*(0.002)*	*(0.000)*	*(0.268)*
MBOOK	Correlation	.055	-.054	.047	**.185****	-.084	.018	**-.154****	1	**.151****	**.192****	-.073	-.055	-.041
	(p-value)	*(0.294)*	*(0.300)*	*(0.362)*	*(0.000)*	*(0.106)*	*(0.752)*	*(0.003)*		*(0.005)*	*(0.000)*	*(0.167)*	*(0.295)*	*(0.435)*
ROA_{t+1}	Correlation	**.322****	-.033	-.051	.067	-.006	**-.433****	**.325****	**.259****	1	**.951****	**.357****	**.371****	**-.113***
	(p-value)	*(0.000)*	*(0.545)*	*(0.349)*	*(0.218)*	*(0.907)*	*(0.000)*	*(0.000)*	*(0.000)*		*(0.000)*	*(0.000)*	*(0.000)*	*(0.037)*
ROE_{t+1}	Correlation	**.343****	-.003	-.032	.077	-.027	**-.428****	**.389****	**.292****	**.943****	1	**.344****	**.368****	**-.108***
	(p-value)	*(0.000)*	*(0.964)*	*(0.560)*	*(0.164)*	*(0.624)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*		*(0.000)*	*(0.000)*	*(0.049)*
ΔMVE_{t+1}	Correlation	**.150****	-.102	-.062	.013	**-.107***	**-.253****	**.181****	-.027	**.374****	**.348****	1	**.910****	-.011
	(p-value)	*(0.004)*	*(0.053)*	*(0.236)*	*(0.810)*	*(0.042)*	*(0.000)*	*(0.001)*	*(0.604)*	*(0.000)*	*(0.000)*		*(0.000)*	*(0.833)*
$\Delta MVErisk_{t+1}$	Correlation	**.154****	**-.117***	-.074	-.019	-.063	**-.342****	**.205****	-.022	**.375****	**.361****	**.894****	1	-.027
	(p-value)	*(0.003)*	*(0.026)*	*(0.160)*	*(0.721)*	*(0.235)*	*(0.000)*	*(0.000)*	*(0.681)*	*(0.000)*	*(0.000)*	*(0.000)*		*(0.613)*
$CScheme^{Ineff}$	Correlation	-.019	.081	.029	.024	-.029	-.004	-.047	-.069	**-.116***	**-.112***	-.020	-.041	1
	(p-value)	*(0.715)*	*(0.119)*	*(0.573)*	*(0.647)*	*(0.573)*	*(0.948)*	*(0.372)*	*(0.187)*	*(0.032)*	*(0.042)*	*(0.702)*	*(0.442)*	

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively
The top right of the table reports Pearson correlation coefficients and bottom left Spearman correlation coefficients.
Reported p-values in correlation table are for two sided significance.

All aggregated firm year observations are from the sample of 372 firm years.

Variable definitions:

$SIZE^{Mkt}$ =	Market capitalization (for statistical test SIZE is logged using the natural log);
GEOSEG =	the sum of the number of geographic segments disclosed in the notes to the annual report (for statistical test GEOSEG is logged using the natural log);
FUNCST =	the number of functional executives on the executive team divided by total senior executives. Functional executives are those where the annual report identifies them as having functional responsibility such as being responsible for functional departments. For example, marketing, finance, operations or research and development;
CAPEX =	is measured by dividing the change in Total Assets by opening Total Assets;
HOASSET =	a dummy variable for any firm reporting assets specifically allocated to a central management function (head office) in the annual report segment disclosure;
VOLATILITY =	Standard deviation of stock returns for 18 months, 3 months after and 15 months prior to the earnings announcement date;
$SIZE^{Sales}$ =	the natural log of total firm sales;
MBOOK =	Market to Book ratio;
ROA =	EBIT / Ave Total Assets;
ROE =	EBIT / Ave Total Equity;
ΔMVE =	is the percentage change in value of equity over one financial year plus 1, adjusted for dividends, franking credits and share splits;
ΔMVErisk =	is the change in market value of equity over the financial year plus 1, adjusted for dividends, ranking credits and risk using CAPM; Betas are calculated based regressing monthly firm returns on total monthly market returns, for the 15 months prior and 3 months post the annual report date;
$CScheme^{Ineff}$ =	Value of 1 where the firm has an inefficient compensation scheme as identified by model 3.2; 0 otherwise.

3.4 Results and discussion

3.4.1 Main results for Hypothesis 1

Table 3.4 and Table 3.5 report the results of the test of Hypothesis 1, that there is no association, on average, between the choice of different compensation schemes and firm performance where firms choose compensation schemes according to the firms' characteristics. Table 3.4 Panel A and Panel B report the results where accounting measures of performance are the dependent variables (ROA_{t+1} and ROE_{t+1}).

Table 3.4 Panel A reports the result of OLS regression models, with p-values in parentheses, where ROA_{t+1} is the dependent variable and CScheme is the independent variable. The first model reports p-values based on OLS regression standard errors. The

second model is identical to the first, except the p-values are based on Petersen (2009) clustered standard errors, clustered for both firm and time effects. The sample is increased to 417 firm years due to data availability. The model has explanatory power, with significant F statistics and an Adjusted R Square of 27.1%. As predicted, the test statistic CScheme is not significant in either model, with p-values of 80.2% and 82.4% respectively. As expected, $SIZE^{Sales}$ is positively related, and VOLATILITY negatively related to ROA_{t+1}. The industry dummies for the Materials, Consumer Discretionary and Information Technology sectors are all positive and significant.

Table 3.4 Estimated regression models of the association between accounting measures of performance and the choice between group versus individual compensation schemes for the senior executives

Panel A: Firm Performance measured using Return on Assets

Dependent Variable: ROA_{t+1}

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		-0.232	*(0.001)*	***	-0.232	*(0.000)*	***
CScheme		0.002	*(0.802)*		0.002	*(0.824)*	
$SIZE^{Sales}$		0.016	*(0.000)*	***	0.016	*(0.000)*	***
VOLATILITY		-0.470	*(0.000)*	***	-0.470	*(0.000)*	***
Energy		0.023	*(0.513)*		0.023	*(0.598)*	
Materials		0.066	*(0.025)*	**	0.066	*(0.022)*	**
Industrials		0.045	*(0.130)*		0.045	*(0.116)*	
Consumer Discretionary		0.077	*(0.009)*	***	0.077	*(0.004)*	***
Consumer Staples		0.016	*(0.615)*		0.016	*(0.582)*	
Health Care		0.017	*(0.588)*		0.017	*(0.593)*	
Information Technology		0.095	*(0.003)*	***	0.095	*(0.008)*	***
Telecommunications Services							
Utilities		0.013	*(0.788)*		0.013	*(0.658)*	
Year 2003							
Year 2004		0.000	*(0.969)*		0.000		
Year 2005		0.010	*(0.431)*		0.010		
N.		417			417		
F		12.880	*(0.000)*	***	12.880	*(0.000)*	***
Adjusted R Square		0.271			0.271		
No. firm Clusters					255		
No. year clusters					3		

Panel B: Firm Performance measured using Return on Equity

Dependent Variable: ROE_{t+1}

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		-0.434	*(0.002)*	***	-0.434	*(0.000)*	***
CScheme		0.010	*(0.605)*		0.010	*(0.516)*	
$SIZE^{Sales}$		0.037	*(0.000)*	***	0.037	*(0.000)*	***
VOLATILITY		-0.816	*(0.000)*	***	-0.816	*(0.003)*	***
Energy		-0.079	*(0.368)*		-0.079	*(0.388)*	
Materials		0.011	*(0.888)*		0.011	*(0.928)*	
Industrials		-0.020	*(0.804)*		-0.020	*(0.873)*	
Consumer Discretionary		0.041	*(0.606)*		0.041	*(0.702)*	
Consumer Staples		-0.055	*(0.505)*		-0.055	*(0.621)*	
Health Care		-0.082	*(0.315)*		-0.082	*(0.478)*	
Information Technology		0.050	*(0.545)*		0.050	*(0.675)*	
Telecommunications Services		-0.057	*(0.555)*		-0.057	*(0.646)*	
Utilities							
Year 2003		-0.025	*(0.297)*		-0.025		
Year 2004		-0.024	*(0.295)*		-0.024		
Year 2005							
N.		405			405		
F		13.770	*(0.000)*	***	13.770	*(0.000)*	***
Adjusted R Square		0.291			0.291		
No. firm Clusters					249		
No. year clusters					3		

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively

note: p-values are reported two tailed. The coefficients for the Pooled OLS with Clustered Standard errors are the same as for the Pooled OLS Model. Standard errors are clustered by firm and by year, using the Petersen (2009) method.

note: All aggregated firm year observations are from the total sample of 372 firm years. Reported results exclude firms where one or more variables were missing.

Variable definitions:

ROA = EBIT / Ave Total Assets;

ROE = EBIT / Ave Total Equity;

CScheme = is calculating by first identifying the incentive compensation type (cash bonus and/or equity-based compensation) given to each of the senior executives. The percentage of executives having the same type of compensation is then calculated for each firm. CScheme is a categorical variable and is calculated by splitting the sample into thirds. The middle third is excluded. The third with the executive compensation with the closest compensation structures given a value of 1 (group compensation scheme), firms with the greatest level of variation between senior executives compensation are given a value of 0 (individual compensation scheme);

VOLATILITY = Standard deviation of stock returns for 18 months, 3 months after and 15 months prior to the earnings announcement date;

$SIZE^{Sales}$ = the natural log of total firm sales;

INDUSTRY = a dummy variable for each industry;

YEAR = a dummy variable for each year.

Table 3.4 Panel B reports the result of OLS regression models, with p-values in parentheses, where ROE_{t+1} is the dependent variable and CScheme is the independent

variable. The first model reports p-values based on OLS regression standard errors. The second model is identical to the first, except the p-values are based on Petersen (2009) clustered standard errors, clustered for both firm and time effects. The sample is increased to 405 firm years due to data availability. The model has explanatory power, with significant F statistics and an Adjusted R Square of 29.1%. As predicted, the test statistic CScheme is not significant in either model, with p-values of 60.5% and 51.6% respectively. As expected, $SIZE^{Sales}$ is positively related, and VOLATILITY negatively related to ROE_{t+1}. Although the industry dummies for the Materials, Consumer Discretionary and Information Technology sectors are all positive, the association with ROE_{t+1} is not significantly, unlike the association with ROA_{t+1}.

The results of regressions comparing the differences in market performance are reported in Table 3.5 Panel A and Panel B.

Table 3.5 Panel A reports the result of OLS regression models, with p-values in parentheses, where ΔMVE_{t+1} is the dependent variable, and CScheme is the independent variable. The first model reports p-values based on OLS regression standard errors. The second model is identical to the first, except the p-values are based on Petersen (2009) clustered standard errors, clustered for both firm and time effects. The sample is increased to 426 firm years due to data availability. The model has explanatory power, with significant F statistics and an Adjusted R Square of 13.7%. As expected, the test statistic CScheme is not significant in either model, with p-values of 37.6% and 20.6% respectively. As expected, VOLATILITY is negatively associated with ΔMVE_{t+1}. Surprisingly, both $SIZE^{Sales}$ and MBOOK are not significantly associated with ΔMVE_{t+1}. The industry dummies for the Energy, Materials and Utilities sectors are all positive and significantly associated with ΔMVE_{t+1} in both models. However,

Industrials, Consumer Discretionary and Information Technology are positive, but only significant where the p-values are based on Petersen's (2009) clustered standard errors.

Table 3.5 Estimated regression models of the association between market based measures of performance and the choice between group versus individual compensation schemes for the senior executives

Panel A: Firm Performance measured using Market returns

Dependent Variable: ΔMVE_{t+1}

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		0.898	*(0.003)*	***	0.898	*(0.099)*	*
CScheme		0.038	*(0.376)*		0.038	*(0.206)*	
$SIZE^{Sales}$		0.011	*(0.397)*		0.011	*(0.709)*	
VOLATILITY		-1.511	*(0.000)*	***	-1.511	*(0.000)*	***
MBOOK		-0.013	*(0.346)*		-0.013	*(0.435)*	
Energy		0.362	*(0.020)*	**	0.362	*(0.002)*	***
Materials		0.362	*(0.005)*	***	0.362	*(0.000)*	***
Industrials		0.191	*(0.140)*		0.191	*(0.005)*	***
Consumer Discretionary		0.130	*(0.310)*		0.130	*(0.239)*	
Consumer Staples		0.070	*(0.613)*		0.070	*(0.012)*	**
Health Care		0.124	*(0.359)*		0.124	.	
Information Technology		0.181	*(0.192)*		0.181	*(0.001)*	***
Telecommunications Services							
Utilities		0.345	*(0.099)*	*	0.345	.	
Year 2003		0.176	*(0.001)*	***	0.176	*(0.000)*	***
Year 2004		0.017	*(0.733)*		0.017	*(0.007)*	***
Year 2005							
N.		426			426		
F		5.800	*(0.000)*	***	6.350	*(0.000)*	***
Adjusted R Square		0.137					
No. firm Clusters					261		
No. year clusters					3		

Panel B: Firm Performance measured using Market returns, adjusted for risk

Dependent Variable: $\Delta MVErisk_{t+1}$

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		0.609	*(0.068)*	*	0.609	*(0.358)*	
CScheme		0.030	*(0.520)*		0.030	*(0.479)*	
$SIZE^{Sales}$		0.015	*(0.268)*		0.015	*(0.669)*	
VOLATILITY		-1.842	*(0.000)*	***	-1.842	*(0.000)*	***
MBOOK		-0.005	*(0.747)*		-0.005	*(0.746)*	
Energy		0.352	*(0.038)*		0.352	*(0.028)*	**
Materials		0.245	*(0.081)*	*	0.245	*(0.000)*	***
Industrials		0.162	*(0.254)*		0.162	*(0.046)*	**
Consumer Discretionary		0.109	*(0.437)*		0.109	*(0.370)*	
Consumer Staples		0.087	*(0.566)*		0.087	*(0.215)*	
Health Care		0.050	*(0.734)*		0.050	*(0.612)*	
Information Technology		0.134	*(0.378)*		0.134	*(0.205)*	
Telecommunications Services							
Utilities		0.313	*(0.170)*		0.313	*(0.001)*	***
Year 2003		0.186	*(0.001)*	***	0.186	*(0.000)*	***
Year 2004		0.030	*(0.586)*		0.030	*(0.001)*	***
Year 2005							
N.		426			426		
F		5.460	*(0.000)*	***	6.210	*(0.000)*	***
Adjusted R Square		0.128					
No. firm Clusters					261		
No. year clusters					3		

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively

note: p-values are reported two tailed. The coefficients for the Pooled OLS with Clustered Standard errors are the same as for the Pooled OLS Model. Standard errors are clustered by firm and by year, using the Petersen (2009) method.

note: All aggregated firm year observations are from the total sample of 372 firm years. Reported results exclude firms where one or more variables were missing.

Variable definitions:

ΔMVE = is the percentage change in value of equity over one financial year plus 1, adjusted for dividends, franking credits and share splits;

$\Delta MVErisk$ = is the change in market value of equity over the financial year plus 1, adjusted for dividends, ranking credits and risk using CAPM; Betas are calculated based regressing monthly firm returns on total monthly total market returns, for the 15 months prior and 3 months post the annual report date;

CScheme = is calculating by first identifying the incentive compensation type (cash bonus and/or equity-based compensation) given to each of the senior executives. The percentage of executives having the same type of compensation is then calculated for each firm. CScheme is a categorical variable and is calculated by splitting the sample into thirds. The middle third is excluded. The third with the executive compensation with the closest compensation structures given a value of 1 (group compensation scheme), firms with the greatest level of variation between senior executives compensation are given a value of 0 (individual compensation scheme);

VOLATILITY = Standard deviation of stock returns for 18 months, 3 months after and 15 months prior to the earnings announcement date;

$SIZE^{Sales}$ = the natural log of total firm sales;

MBOOK = Market to Book ratio;

INDUSTRY = a dummy variable for each industry;
YEAR = a dummy variable for each year.

Table 3.5 Panel B reports the result of OLS regression models, with p-values in parentheses, where $\Delta MVErisk_{t+1}$ is the dependent variable, and CScheme is the independent variable. The first model reports p-values based on OLS regression standard errors. The second model is identical to the first, except the p-values are based on Petersen (2009) clustered standard errors, clustered for both firm and time effects. The sample is increased to 426 firm years due to data availability. The model has explanatory power, with significant F statistics and an Adjusted R Square of 13.77%. As expected, the test statistic CScheme is not significant, in either model, with p-values of 60.7% and 51.6% respectively. As expected, $SIZE^{Sales}$ is positively associated, and VOLATILITY is negatively associated with $\Delta MVErisk_{t+1}$. Surprisingly, MBOOK is not significantly associated with $\Delta MVErisk_{t+1}$. Unlike the model with ΔMVE_{t+1} as the dependent variable, none of the industry dummies are significant in either model where $\Delta MVErisk_{t+1}$ is the dependent variable.

In summary, the results are consistent with the Hypothesis that there is no association, on average, between the choice of different compensation schemes for senior executives and firm performance, where firms choose compensation schemes according to the firms' characteristics. The results are consistent with the proposition that, on average, firms are contracting efficiently with the senior executives. However, an alternative explanation for the result is because the choice of compensation contracts does not matter. This issue is addressed by Hypothesis 2, below.

3.4.2 Main results for Hypothesis 2

Hypothesis 2 predicts that firms that choose a compensation scheme for senior executives that is not consistent with the firm's characteristics, have lower subsequent firm performance. The results from the pooled logit regression used to identify firms with inefficient compensation contracts are reported in Table 3.6 (Equation 3.3).

Table 3.6 Estimated Binary Pooled Logit regression model of the choice between group versus individual compensation schemes for the senior executives

		Dependent Variable: CScheme		
		Pooled Logit Model		
Variable	Predicted Sign	Coefficient	(*p-value*)	
Intercept		-10.702	*(0.000)*	***
GEOSEG	-	-0.563	*(0.028)*	##
FUNCST	+	1.114	*(0.021)*	##
CAPEX	+	0.270	*(0.259)*	
HOASSET	+	0.229	*(0.244)*	
$SIZE^{Mkt}$		0.562	*(0.000)*	***
Energy		0.417	*(0.544)*	
Materials		-0.135	*(0.761)*	
Industrials		0.233	*(0.625)*	
Consumer Discretionary		-0.122	*(0.787)*	
Consumer Staples				
Health Care		-1.008	*(0.044)*	**
Information Technology		-0.049	*(0.929)*	
Telecommunications Services		-0.088	*(0.909)*	
Utilities		-1.492	*(0.260)*	
Year 2003		-0.039	*(0.907)*	
Year 2005		0.051	*(0.841)*	
N		372		
Chi-square		70.8	*(0.000)*	***
-2 Log likelihood		444.9		
Cox & Snell R Square		17.30%		
Nagelkerke R Square		23.10%		
Percentage Correct:				
Individual compensation		68.40%		
Group compensation		65.40%		
Total		66.90%		

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively

#, ##, ### Indicates one-tailed significance at the 10, 5, and 1 percent levels, respectively
note: Reported p-values are based on the Wald statistic and reported as one sided where the coefficient is in the predicted direction, two sided otherwise.
note: All aggregated firm year observations are from the sample of 372 firm years. Reported results exclude firms where one or more variables were missing.

Variable definitions:

CScheme =	is calculating by first identifying the incentive compensation type (cash bonus and/or equity-based compensation) given to each of the senior executives. The percentage of executives having the same type of compensation is then calculated for each firm. CScheme is a categorical variable and is calculated by splitting the sample into thirds. The middle third is excluded. The third with the executive compensation with the closest compensation structures given a value of 1 (group compensation scheme), firms with the greatest level of variation between senior executives compensation are given a value of 0 (individual compensation scheme).
GEOSEG =	the natural log of the sum of the number of geographic segments disclosed in the notes to the annual report;
FUNCST =	the number of functional executives on the executive team divided by total senior executives. Functional executives are those where the annual report identifies them as having functional responsibility such as being responsible for functional departments. For example, marketing, finance, operations or research and development;
CAPEX =	is measured by dividing the change in total assets by opening total assets;
HOASSET =	a dummy variable for any firm reporting assets specifically allocated to a central management function (head office) in the annual report segment disclosure;
$SIZE^{Mkt}$ =	the natural log of market capitalization;
INDUSTRY =	a dummy variable for each industry:
YEAR =	a dummy variable for each year.

Table 3.6 reports the results from a pooled binary logit model, with p-values in parentheses, where CScheme is the dependent variable. The firm characteristics that determine the compensation scheme choice, group versus individual, are the independent variables. The model has explanatory power, with a significant Chi-Square statistics and a Nagelkerke R square of 23.1%. As expected, GEOSEG and FUNCST are in the predicted direction and significant at the 5% level, and $SIZE^{Mkt}$ is significant at the <0.001 level. The model identifies 66.9% of the sample as having the correct compensation scheme, as predicted by the model. Correspondingly, 33.1% of the sample has a compensation scheme that is not consistent with the firms characteristics. To create the dummy variable $CScheme^{Ineff}$, the 33.1% of firms with the 'wrong' compensation scheme are assigned a value of 1 (inefficient), and the remaining 66.9% of firms are assigned 0 (efficient).

The main results testing Hypothesis 2 are reported in Table 3.7 and Table 3.8. Table 3.7 Panel A reports the result of the Hypothesis test, where ROA_{t+1} is the dependent variable.

Table 3.7 Estimated regression models of the association between accounting measures of performance and inefficient compensation contracts for the senior executives

Panel A: Firm Performance measured using Return on Assets

Dependent Variable: ROA_{t+1}

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		-0.139	*(0.118)*		-0.139	*(0.056)*	*
$CScheme^{Ineff}$	-	-0.020	*(0.041)*	##	-0.020	*(0.002)*	###
$SIZE^{Sales}$		0.014	*(0.000)*	***	0.014	*(0.000)*	***
VOLATILITY		-0.508	*(0.000)*	***	-0.508	*(0.000)*	***
Energy		0.013	*(0.838)*		0.013	*(0.738)*	
Materials		0.041	*(0.471)*		0.041	*(0.000)*	***
Industrials		0.019	*(0.741)*		0.019	*(0.097)*	*
Consumer Discretionary		0.055	*(0.330)*		0.055	*(0.000)*	***
Consumer Staples		0.003	*(0.959)*		0.003	*(0.844)*	
Health Care		-0.022	*(0.698)*		-0.022	*(0.101)*	*
Information Technology		0.089	*(0.126)*		0.089	*(0.004)*	***
Telecommunications Services		-0.018	*(0.776)*		-0.018	*(0.564)*	
Utilities							
Year 2003		-0.009	*(0.568)*		-0.009		
Year 2004		-0.013	*(0.311)*		-0.013		
Year 2005							
N.		302			302		
F		10.910	*(0.000)*	***	10.910	*(0.000)*	***
Adjusted R Square		0.299			0.299		
No. firm Clusters					207		
No. year clusters					3		

Panel B: Firm Performance measured using Return on Equity

Dependent Variable: ROE_{t+1}

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		-0.273	*(0.124)*		-0.273	*(0.082)*	*
$CScheme^{Ineff}$	-	-0.043	*(0.036)*	##	-0.043	*(0.049)*	##
$SIZE^{Sales}$		0.034	*(0.000)*	***	0.034	*(0.000)*	***
VOLATILITY		-0.781	*(0.000)*	***	-0.781	*(0.000)*	***
Energy		-0.149	*(0.221)*		-0.149	*(0.211)*	
Materials		-0.077	*(0.492)*		-0.077	*(0.690)*	
Industrials		-0.110	*(0.327)*		-0.110	*(0.586)*	
Consumer Discretionary		-0.040	*(0.723)*		-0.040	*(0.816)*	
Consumer Staples		-0.128	*(0.268)*		-0.128	*(0.487)*	
Health Care		-0.200	*(0.083)*	*	-0.200	*(0.293)*	
Information Technology		0.009	*(0.938)*		0.009	*(0.963)*	
Telecommunications Services		-0.128	*(0.311)*		-0.128	*(0.484)*	
Utilities							
Year 2003		-0.016	*(0.610)*		-0.016		
Year 2004		-0.031	*(0.225)*		-0.031		
Year 2005							
N.		292			292		
F		11.190	*(0.000)*	***	11.190		
Adjusted R Square		0.313			0.313		
No. firm Clusters					200		
No. year clusters					3		

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively

#, ##, ### Indicates one-tailed significance at the 10, 5, and 1 percent levels, respectively

note: p-values are reported one tailed for variables where there is a directional hypothesis and the coefficient is in the predicted direction, and two tailed for the remaining variables. The coefficients for the Pooled OLS with Clustered Standard errors are the same as for the Pooled OLS Model. Standard errors are clustered by firm and by year.

note: All aggregated firm year observations are from the sample of 372 firm years. Reported results exclude firms where one or more variables were missing.

Variable definitions:

ROA = EBIT / Ave Total Assets;

ROE = EBIT / Ave Total Equity;

$CScheme^{Ineff}$ = Value of 1 where the firm has an inefficient compensation scheme as identified by model 3.2, 0 otherwise;

VOLATILITY = Standard deviation of stock returns for 18 months, 3 months after and 15 months prior to the earnings announcement date;

$SIZE^{Sales}$ = the natural log of total firm sales;

INDUSTRY = a dummy variable for each industry;

YEAR = a dummy variable for each year.

Table 3.7 Panel A reports the result of OLS regression models, with p-values in parentheses, where ROA_{t+1} is the dependent variable, and $CScheme^{Ineff}$ is the independent variable. The first model reports p-values based on OLS regression

standard errors. The second model is identical to the first, except the p-values are based on Petersen (2009) clustered standard errors, clustered for both firm and time effects. The model has explanatory power, with significant F statistics and an Adjusted R Square of 29.9%. As predicted, the test statistic $CScheme^{Ineff}$ is negative and significant in both models, with p-values of 4.1% and 0.2% respectively. The coefficient is -0.020, meaning that firms with compensation schemes that are not consistent with the firms' characteristics have, on average, 2% lower ROA the following year. As expected, $SIZE^{Sales}$ is positively related, and VOLATILITY negatively related to ROA_{t+1}. None of the Industry dummies are significant in the standard OLS model. The industry dummies for the Materials, Industrials, Consumer Discretionary and Information Technology sectors are all positive and significant when the p-values are estimated using Petersen's (2009) clustered standard errors.

Table 3.7 Panel B reports the result of OLS regression models, with p-values in parentheses, where ROE_{t+1} is the dependent variable, and $CScheme^{Ineff}$ is the independent variable. The first model reports p-values based on OLS regression standard errors. The second model is identical to the first, except the p-values are based on Petersen (2009) clustered standard errors, clustered for both firm and time effects. The model has explanatory power, with significant F statistics and an Adjusted R Square of 31.3%. As predicted, the test statistic $CScheme^{Ineff}$ is negative and significant in both models, with p-values of 3.6% and 4.9% respectively. The coefficient is -0.043, meaning that firms with compensation schemes that are not consistent with the firms' characteristics, have on average 4.3% lower ROE the following year. As expected, $SIZE^{Sales}$ is positively related, and VOLATILITY negatively related to ROA_{t+1}. With the exception of Health Care in the standard OLS model, non of the Industry dummies are significant in either model.

Table 3.8 Panel A reports the result of the Hypothesis test, where ΔMVE_{t+1} is the dependent variable.

Table 3.8 Estimated regression models of the association between market based measures of performance and inefficient compensation contracts for the senior executives

Panel A: Firm Performance measured using Market returns

Dependent Variable: ΔMVE_{t+1}

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		0.896	*(0.013)*	**	0.896	*(0.195)*	
$CScheme^{Ineff}$	-	0.031	*(0.556)*		0.031	*(0.208)*	
$SIZE^{Sales}$		0.015	*(0.297)*		0.015	*(0.595)*	
VOLATILITY		-1.734	*(0.000)*	***	-1.734	*(0.000)*	***
MBOOK		-0.017	*(0.291)*		-0.017	*(0.522)*	
Energy		0.326	*(0.064)*	*	0.326	*(0.000)*	***
Materials		0.293	*(0.039)*	**	0.293	*(0.087)*	*
Industrials		0.149	*(0.298)*		0.149	*(0.382)*	
Consumer Discretionary		0.085	*(0.546)*		0.085	*(0.568)*	
Consumer Staples		0.059	*(0.701)*		0.059	*(0.452)*	
Health Care		0.094	*(0.533)*		0.094	*(0.186)*	
Information Technology		0.200	*(0.200)*		0.200	*(0.033)*	**
Telecommunications Services							
Utilities		0.207	*(0.462)*		0.207	*(0.058)*	*
Year 2003		0.160	*(0.021)*	**	0.160	*(0.000)*	***
Year 2004		0.003	*(0.957)*		0.003	*(0.564)*	
Year 2005							
N.		310			310		
F		3.840	*(0.000)*	***	4.120	*(0.000)*	***
Adjusted R Square		0.114					
No. firm Clusters					213		
No. year clusters					3		

Panel B: Firm Performance measured using Market returns, adjusted for risk

Dependent Variable: $\Delta MVErisk_{t+1}$

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		0.505	*(0.199)*		0.505	*(0.498)*	
$CScheme^{Ineff}$	-	0.008	*(0.890)*		0.008	*(0.808)*	
$SIZE^{Sales}$		0.024	*(0.141)*		0.024	*(0.486)*	
VOLATILITY		-2.033	*(0.000)*	***	-2.033	*(0.000)*	***
MBOOK		-0.007	*(0.690)*		-0.007	*(0.770)*	
Energy		0.359	*(0.061)*	*	0.359	*(0.000)*	***
Materials		0.178	*(0.249)*		0.178	*(0.232)*	
Industrials		0.142	*(0.364)*		0.142	*(0.399)*	
Consumer Discretionary		0.086	*(0.575)*		0.086	*(0.579)*	
Consumer Staples		0.100	*(0.548)*		0.100	*(0.223)*	
Health Care		0.046	*(0.782)*		0.046	*(0.681)*	
Information Technology		0.184	*(0.280)*		0.184	*(0.188)*	
Telecommunications Services							
Utilities		0.257	*(0.403)*		0.257	*(0.046)*	**
Year 2003		0.162	*(0.033)*	**	0.162	*(0.000)*	***
Year 2004		0.025	*(0.685)*		0.025	*(0.089)*	*
Year 2005							
N.		310			310		
F		4.040	*(0.000)*	***	7.880	*(0.000)*	***
Adjusted R Square		0.121					
No. firm Clusters					213		
No. year clusters					3		

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively

note: p-values are reported one tailed for variables where there is a directional hypothesis and the coefficient is in the predicted direction and two tailed for the remaining variables. The coefficients for the Pooled OLS with Clustered Standard errors are the same as for the Pooled OLS Model. Standard errors are clustered by firm and by year, using the Petersen (2009) method.

note: All aggregated firm year observations are from the sample of 372 firm years. Reported results exclude firms where one or more variables were missing.

Variable definitions:

ΔMVE = is the percentage change in value of equity over one financial year plus 1, adjusted for dividends, franking credits and share splits;

$\Delta MVErisk$ = is the change in market value of equity over the financial year plus 1, adjusted for dividends, ranking credits and risk using CAPM; Betas are calculated based regressing monthly firm returns on total monthly total market returns, for the 15 months prior and 3 months post the annual report date;

$CScheme^{Ineff}$ = Value of 1 where the firm has an inefficient compensation scheme as identified by model 3.2, 0 otherwise;

VOLATILITY = Standard deviation of stock returns for 18 months, 3 months after and 15 months prior to the earnings announcement date;

$SIZE^{Sales}$ = the natural log of total firm sales;

MBOOK = Market to Book ratio;

INDUSTRY = a dummy variable for each industry;

YEAR = a dummy variable for each year.

Table 3.8 Panel A reports the result of OLS regression models, with p-values in parentheses, where ΔMVE_{t+1} is the dependent variable, and $CScheme^{Ineff}$ is the independent variable. The first model reports p-values based on OLS regression standard errors. The second model is identical to the first, except the p-values are based on Petersen (2009) clustered standard errors, clustered for both firm and time effects. The sample is reduced to 310 firm years due to data availability. The model has explanatory power, with significant F statistics and an Adjusted R Square of 11.4%. Contrary to expectations, the test statistic $CScheme^{Ineff}$ is not significant in either model, with p-values of 55.6% and 20.8% respectively. As expected, VOLATILITY is negatively associated with ΔMVE_{t+1}. Surprisingly, both $SIZE^{Sales}$ and MBOOK are not significantly associated with ΔMVE_{t+1}. The industry dummies for the Energy and Materials sectors are positive and significantly associated with ΔMVE_{t+1} in both models. However, Information Technology is positive, but only significant when the p-values are based on Petersen's (2009) clustered standard errors.

Table 3.8 Panel B reports the result of OLS regression models, with p-values in parentheses, where $\Delta MVErisk_{t+1}$ is the dependent variable, and $CScheme^{Ineff}$ is the independent variable. The first model reports p-values based on OLS regression standard errors. The second model is identical to the first, except the p-values are based on Petersen (2009) clustered standard errors, clustered for both firm and time effects. The model has explanatory power, with significant F statistics and an Adjusted R Square of 12.1%. Contrary to expectations, and consistent with Panel A, the test statistic $CScheme^{Ineff}$ is not significant in either model, with p-values of 89.0% and 80.8% respectively. As expected, VOLATILITY is negatively associated with $\Delta MVErisk_{t+1}$. Surprisingly, MBOOK is not significantly associated with $\Delta MVErisk_{t+1}$ in either model, and $SIZE^{Sales}$ is significantly positively associated only with the Petersen (2009)

clustered standard errors. The industry dummies for the Energy sector are positive and significantly associated with $\Delta MVErisk_{t+1}$ in both models. Utilities are positive, but only significant when the p-values are based on Petersen's (2009) clustered standard errors.

In summary, the test statistic $CScheme^{Ineff}$ is negative and significant in all the accounting performance models; therefore Hypothesis 2 cannot be rejected. Contrary to expectations, $CScheme^{Ineff}$ is not significant any of the market based performance models. Despite this, the consequences for firms with inefficient compensation schemes is economically significant, with firms, on average, having 4.3% and 2% lower ROE and ROA the following year, respectively. The difference between ROA and ROE suggests that the effect is increasing with leverage. On balance, the evidence suggests that firms that choose compensation schemes for senior executives, which are not consistent with the firms characteristics, have lower subsequent accounting performance. However, they do not have lower subsequent market performance.

3.4.3 Robustness testing

In order to evaluate the robustness of the results, a number of sensitivity tests are conducted.

3.4.3.3 Alternative compensation benchmark models

An alternative specification of the LHS variable is used to re-estimate the benchmark compensation contract (results not reported). Instead of removing the middle thirty three percent of firms when estimating the compensation scheme (CScheme), the sample is split in half, increasing the sample size. Using the alternative left hand side variable, Equation 3.3 is estimated. Firms with compensation contracts deviating from

the firm characteristics are identified. In the firm performance model (ROA_{t+1}), the results are consistent with those reported.

The Hypothesis is also retested using a composite proxy, based on combining CScheme and the two alternative proxies developed in Appendix A (CScheme2 and CScheme3). The results are consistent with the reported results (see Appendix A, Table 4).

It is possible that the results are driven by either the group or individual compensation scheme firms, where getting one of them incorrect has a greater impact on firm performance. To assess whether the results are unequally influenced by either group or individual compensation scheme firms, $CScheme^{Ineff}$ is split into two different dummy variables, where either individual or group compensation is the benchmark compensation scheme the firm has deviated from. Accounting performance was compared separately for those firms identified as having the wrong type of individual or group compensation. The results (reported in Appendix B Table 1) provide evidence that firms with compensation schemes that are not consistent with the firms' characteristics suffer lower performance, regardless of which compensation scheme is inefficient.

3.4.3.4 Alternative explanation for market performance

Historically, the lack of conclusive empirical evidence on the relation between market measures of firm performance and executive pay level or structure may be due to market forces (Murphy 1999). This is because investors may anticipate the performance effect of manager incentives, and price the stock accordingly (Murphy 1999). Once stock prices have adjusted for this information, comparison of subsequent stock returns becomes meaningless. Therefore, the interpretation of any tests of firm

performance using market measures of performance is confounded. Two alternative tests of market performance, using the end of year share price and a proxy for Tobin's Q, are estimated to assess whether shareholders adjust share prices for anticipated suboptimal performance by executives.

First, the association between year-end share price and CScheme^{Ineff} is estimated to assess whether information about the efficiency of the compensation contract is anticipated by investors.[72] The model, Equation 3.6, is specified below:

$$Share\,\mathrm{Pr}ice_{jt} = \alpha_0 + \alpha_1 CScheme^{Ineff}{}_{jt} + \alpha_2 BVE^{pershare}{}_{jt} + \alpha_3 EPS_{jt} + \alpha_n YEAR_{jt} + \varepsilon_I \qquad 3.6$$

Where:

SharePrice = Share Price at year end

CScheme^{Ineff} = Value of 1 where the firm has an inefficient compensation scheme as identified by Equation 3.3, and a value of 0 if the compensation scheme is consistent with the model;

BVE^{pershare} = Book Value of Equity divided by the diluted weighted number of shares outstanding during the year;

EPS = Reported Net Profit after tax to shareholders, divided by the diluted weighted number of shares outstanding during the year;

YEAR = Dummy variable for each year compensation is awarded.

The results for Equation 3.6 are reported in Table 3.9 (Equation 3.6 is also repeated with industry dummies, with the results reported in Appendix B Table 2).

[72] This model is based on a simplification of the Ohlson framework (Ohlson, 1995).

Table 3.9 Estimated regression models of the association between year-end share price and inefficient compensation contracts for the senior executives

Dependent Variable: Share price at year end

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		0.925	*(0.000)*	***	0.925	*(0.000)*	***
$CScheme^{Ineff}$	-	-0.313	*(0.059)*	#	-0.313	*(0.022)*	##
$BVE^{pershare}$		0.952	*(0.000)*	***	0.952	*(0.000)*	***
EPS		0.062	*(0.000)*	***	0.062	*(0.000)*	***
Year 2003		-0.260	*(0.333)*		-0.260	.	
Year 2004							
Year 2005		0.170	*(0.415)*		0.170	.	
N.		349			349		
F		188.380	*(0.000)*	***	188.380	*(0.000)*	***
Adjusted R Square		0.73			0.73		
No. firm Clusters					235		
No. year clusters					3		

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively

note: p-values are reported one tailed for variables where there is a directional hypothesis and the coefficient is in the predicted direction and two tailed for the remaining variables. The coefficients for the Pooled OLS with Clustered Standard errors are the same as for the Pooled OLS Model. Standard errors are clustered by firm and by year, using the Petersen (2009) method.

note: All aggregated firm year observations are from the sample of 372 firm years. Reported results exclude firms where one or more variables were missing.

Variable definitions:

Share Price = The share price at year end;

$CScheme^{Ineff}$ = Value of 1 where the firm has an inefficient compensation scheme as identified by Equation 3.3, 0 otherwise;

$BVE^{pershare}$ = Book Value of Equity divided by the diluted weighted number of shares outstanding during the year;

EPS = Reported Net Profit after tax to shareholders, divided by the diluted weighted number of shares outstanding during the year.

YEAR = a dummy variable for each year.

Table 3.9 reports the result from a Pooled OLS regression, where the end of year share price is the dependent variable, and $CScheme^{Ineff}$ is the independent variable. The model has explanatory power, with a significant F test and an Adjusted R Square of 72.9%. $CScheme^{Ineff}$ is in the predicted direction and significant, albeit at the 10% level for the Pooled OLS where the p-value is based on ordinary standard errors. Firms with a compensation scheme that is not consistent with the firms' characteristics, have on

average a 33c lower share price at year end. The negative association between $CScheme^{Ineff}$ and the year end share price is consistent with investors anticipating subsequent lower firm performance, and adjusting share prices accordingly. Therefore, direct test of market performance using changes in market value are weakened substantially.

Second, Tobin's Q is estimated following Adams and Santos (2006). Tobin's Q is defined as the ratio of a firm's total market value to book value. The market value of the firm is estimated as the book value of liabilities plus the market value of equity. The equation includes a number of controls for other factors that explain Tobin's Q, and is specified below (Equation 3.7):

$$\begin{aligned} Tobin'sQ_t = {} & \alpha_0 + \alpha_1 CScheme^{Ineff}{}_{jt} \\ & + \alpha_2 VOLATILITY_{jt} + \alpha_3 SIZE^{Sales}{}_{jt} + \alpha_4 MBOOK_{jt-1} + \alpha_5 Leav_{jt} + \alpha_6 ROA_{jt-1} \\ & + \alpha_n YEAR_{jt} + \alpha_n INDUSTRY_{jt} + \varepsilon_I \end{aligned} \quad 3.7$$

Where:

Tobin's Q = (Book value of Total Assets – Book Value of Equity + Market Value of Equity) / Book Value of Total Assets

$CScheme^{Ineff}$ = Value of 1 where the firm has an inefficient compensation scheme as identified by Equation 3.3, and a value of 0 if the compensation scheme is consistent with the model.

VOLATILITY = Standard deviation of monthly stock returns for 18 months, 3 months after and 15 months prior to the earnings announcement data. Stock return is the percentage change in value of equity adjusted for dividends, franking credits and share splits.

$SIZE^{Sales}$= Log of total firm sales.

MBOOK = Market to Book ratio.

LEAV = Book Value of Liabilities divided by Book Value of Assets

ROA = EBIT divided by average Total Assets

YEAR = Dummy variable for each year compensation is awarded.

INDUSTRY = Dummy variable for each industry group.

The results for Equation 3.7 are reported in Table 3.10.

Table 3.10 Estimated regression model of the association between Tobin's Q and inefficient compensation contracts for the senior executives

Dependent Variable: Tobin's Q

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		3.602	*(0.000)*	***	3.602	*(0.001)*	***
$CScheme^{Ineff}$	-	-0.068	*(0.182)*		-0.068	*(0.000)*	###
MBOOK		0.143	*(0.000)*	***	0.143	*(0.001)*	***
Leav		0.356	*(0.021)*	**	0.356	*(0.019)*	**
$SIZE^{Sales}$		-0.140	*(0.000)*	***	-0.140	*(0.000)*	***
VOLATILITY		-2.968	*(0.000)*	***	-2.968	*(0.000)*	***
ROA_{t-1}		1.541	*(0.000)*	***	1.541	*(0.018)*	**
Energy		0.638	*(0.104)*		0.638	*(0.017)*	**
Materials		0.495	*(0.170)*		0.495	*(0.153)*	
Industrials		0.428	*(0.237)*		0.428	*(0.199)*	
Consumer Discretionary		0.490	*(0.173)*		0.490	*(0.022)*	**
Consumer Staples		0.505	*(0.173)*		0.505	*(0.114)*	
Health Care		0.977	*(0.009)*	***	0.977	*(0.000)*	***
Information Technology		0.582	*(0.120)*		0.582	*(0.156)*	
Telecommunications Services		0.812	*(0.042)*	**	0.812	*(0.008)*	***
Utilities							
Year 2003		-0.174	*(0.081)*	*	-0.174		
Year 2004		0.075	*(0.347)*		0.075		
Year 2005							
N.		301			301		
F		20.360	*(0.000)*	***	20.360	*(0.000)*	***
Adjusted R Square		0.51			0.51		
No. firm Clusters					207		
No. year clusters					3		

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively
#, ##, ### Indicates one-tailed significance at the 10, 5, and 1 percent levels, respectively
note: p-values are reported one tailed for variables where there is a directional hypothesis and the coefficient is in the predicted direction and two tailed for the remaining variables. The coefficients for the Pooled OLS with Clustered Standard errors are the same as for the Pooled OLS Model. Standard errors are clustered by firm

and by year, using the Petersen (2009) method.

note: All aggregated firm year observations are from the sample of 372 firm years. Reported results exclude firms where one or more variables were missing.

Variable definitions:

Tobin's Q =	(Book value of Total Assets – Book Value of Equity + Market Value of Equity)/ Book Value of Total Assets
$CScheme^{Ineff}$ =	Value of 1 where the firm has an inefficient compensation scheme as identified by Equation 3.3, 0 otherwise;
MBOOK =	Market to Book ratio;
LEAV =	Book Value of Liabilities divided by Book Value of Assets
$SIZE^{Sales}$ =	the natural log of total firm sales;
VOLATILITY =	Standard deviation of stock returns for 18 months, 3 months after and 15 months prior to the earnings announcement date;
ROA =	EBIT divided by average Total Assets
INDUSTRY =	a dummy variable for each industry;
YEAR =	a dummy variable for each year.

Table 3.10 reports the result from an Pooled OLS regression, where Tobin's Q is the dependent variable, and $CScheme^{Ineff}$ is the independent variable. The model has explanatory power, with a significant F test and an Adjusted R Square of 50.8%. $CScheme^{Ineff}$ is in the predicted direction, but is not significant in the Pooled OLS where the p-value is based on ordinary standard errors. However it is significant, at the <0.001 level in the model where p-values are based on Petersen's (2009) clustered standard errors.

On balance, the results of the two alternative tests of market performance, using the end of year share price and a proxy for Tobin's Q, are supportive of the proposition that shareholders adjust share prices for anticipated suboptimal performance of executives.

3.4.3.5 Alternative firm performance models

Robustness testing was conducted by clustering the standard errors using firm clustering only, and also by year clustering only. As discussed in section 3.3.2, if there is independence across residuals, standard errors may be biased, confounding tests of

significance. The results (not tabulated) are consistent with the Petersen (2009) clustered standard errors, as tabulated.

Several alternative specifications of market performance are used to re-estimate Equation 3.5 (not tabulated). The first two involved adjusting the market return for either the risk free rate, or the average market wide return over the financial year. Returns were also estimated using different starting dates for measuring the stock return. The change in the value of equity was measured from the three months after the annual report release date for twelve months. Consistent with the reported results, none of the test statistics are significant using the alternative specifications.

3.5 Conclusion and limitations

The first objective of this chapter was to determine whether there are firm performance consequences for firms that choose group or individual compensation schemes, for the senior executives just below the CEO level. Consistent with the theory development, in direct tests of firm performance there is no difference in firm performance between firms that choose individual or group compensation schemes for senior executives. However, it is unclear whether the lack of a result is because the choice of compensation contracts does not matter, or whether firms are on average contracting efficiently. A two stage design was employed to address this issue.

The second objective of this chapter was to investigate whether firms that choose compensation schemes for senior executives that are not consistent with the firm's characteristics, have lower subsequent firm performance. The model developed in Chapter Two was used to estimate a benchmark compensation contract in order to identify the firms with compensation schemes that are not consistent with the firms' characteristics. The evidence provides support that accounting performance suffers for

firms that offer compensation schemes to senior executives that are not consistent with the firm's characteristics. However, future market performance is not significantly different. Robustness testing provides evidence that investors anticipate lower firm performance, and adjust the share price accordingly, before year end. As the impact of inefficient contracting is already in the share price, interpretation of the market performance result is problematic. Despite this, the consequences for firm performance are economically significant, with firms identified as having inefficient compensation contracts having 4.3% lower ROE the following year.

A limitation of this study is that the strength of statistical tests may be weakened by the existence of other contracting mechanisms that substitute for compensation schemes. For example, if a firm that would benefit from having a group compensation scheme adopts an individual compensation scheme, alternative mechanisms may be adopted as substitutes, such as: increased meetings, greater monitoring by the board of directors, or other mechanism designed to increase co-operation and co-ordination. If the benefits of the substitute mechanisms outweigh the costs of having an individual compensation scheme, the firm performance will not suffer as a result of having an inefficient compensation scheme for that firm. Further exploratory research is warranted to investigate this possibility.

Chapter 4: Conclusions and Implications

4.1 Conclusion

This thesis has provided evidence on the economic determinants and performance consequences of alternative compensation schemes for senior executives. The first objective was to investigate the firm characteristics associated with the choice between individual versus group compensation schemes for senior executives directly below the CEO level. The second objective was to determine whether there are firm performance consequences for these compensation choices.

The theory development in Chapter Two predicts that firms adopt individual, as opposed to group, compensation schemes for senior executives where their inputs and outputs are separable and observable, such as firms with low levels of integration. To test the Hypothesis, a new proxy was developed to identify firms that have chosen predominately group or individual compensation schemes for their senior executives. The empirical evidence supports the theory development.

Chapter Three investigates the firm performance consequences for firms that choose individual versus group compensation schemes for senior executives. Consistent with the theory development, on average, there is no association between firm performance and the choice of group versus individual compensation. Further, Chapter Three investigates whether firms that choose a compensation scheme for senior executives that is not consistent with their firms' characteristics, have lower subsequent firm performance. Using firm characteristics, the empirical model developed in Chapter Two was used to estimate a benchmark compensation contract for senior executives for each firm (group versus individual), allowing for the identification of firms with compensation schemes that are not consistent with the firm's characteristics. It was found that firms with compensation schemes that are not consistent with the firm

characteristics have lower subsequent performance. The lower performance is economically significant, with firms identified as having inefficient compensation contracts having 4.3% lower ROE the following year.

Overall, this thesis has provided new insights into the senior executive compensation scheme choices made by firms. The first motivation for the thesis was the lack of empirical evidence on different compensation schemes for senior executives below the CEO, despite a plethora of evidence on equity-based compensation in the literature (e.g. Cheng & Farber 2008; Bebchuk & Grinstein 2005; Datta, Iskander-Datta & Raman 2004; Hillegeist & Penalva 2004; Core & Larcker 2002). This thesis contributes to this literature by exploiting an increase in the disclosure of senior executive compensation in Annual Reports, and reports on the economic determinants of group versus individual compensation schemes.

The second motivation was the paucity of evidence on the performance consequences of different compensation schemes. The lack of evidence has fuelled public policy debate, where various interest groups including public policy makers have proposed setting 'benchmark' compensation contracts.[73] This thesis contributes to this debate, and the more general literature on the pay to performance relation with compensation, by providing evidence that firms with compensation contracts that are not consistent with the firms' characteristics suffer lower subsequent performance. This

[73] For example: the Counterparty Risk Management Policy Group III report (CRMPG-III 2008), Containing Systematic Risk: The Road to Reform, identified executive compensation as one of the top five contributors to the 2008 financial crisis. CRMPG-III consists of representatives from the major British and US investments banks who produced the report in respond to the 2008 financial crisis and provide advice as to what steps could be taken by the private sector to reduce the frequency and severity of future shocks. In response to the CRMPG-III report, the UK based Financial Services Authority began the process of investigating 'best practice' guidelines and audits for executive compensation packages, with application to capital markets (Financial Stability Forum 2008; Durkin 2009). Similar actions with respect to executives compensation have been taken by the Australian Prudential Regulation Authority (Durkin 2009).

finding is consistent with prior research, and casts strong doubt on the 'one size fits all' approach to corporate governance regulation favoured by some policy makers.

The results of this thesis, taken together, also provide some evidence on whether firms' contract efficiently with senior executives below the CEO level. The results from Chapter Two supports the proposition that firm characteristics determine the appropriateness of the type of compensation scheme to award senior executives, and that on average those schemes are chosen. Chapter Three found no direct association between firm performance and the choice between group versus individual compensation schemes. This evidence is consistent with firms contracting efficiently, on average, with senior executives. Chapter Three used the model developed in Chapter Two to identify firms that had chosen a compensation scheme that was not consistent with the firm's characteristics. Those firms had lower subsequent performance, an unlikely result under a strong efficient contracting hypothesis, that all firms are contracting optimally. However, the results are consistent with a weakly efficient contracting hypothesis, that although firms on average are contracting efficiently, there are many firms that are not.

In summary, this thesis contributes to the literature in the following ways. First, this study contributes to the ongoing debate surrounding the determination of appropriate corporate governance mechanisms in the presence of agency conflicts by identifying factors that explain the choice between different compensation schemes. Second, this thesis provides empirical evidence on the performance consequences of group versus individual compensation schemes for senior executives. Third, by providing evidence on several identifying factors that explain the choice between different compensation schemes and which are grounded in economic theory, the evaluation and design of senior executive compensation contracts is enhanced for those

firms that have compensation contracts which are not consistent with the firms' characteristics. This thesis also allows for critical evaluation of the practitioner-based literature, which is relevant considering the conflicting guidance offered.

4.2 Limitations and implications for future research

This thesis has a number of limitations. First, the statistical tests are based on a specific subset of firms, being large Australian firms listed on the ASX for the period 2003 to 2005. It is possible that the phenomena is limited to this specific subset of firms for the given time period. Future research could replicate the study over differ time period and using different samples of firms to probe this limitation. Also, the generalizability of the results would be increased with testing in other contexts. Second, the proxy developed in Chapter Two for identifying firms with predominately group or individual compensation schemes has not previously been tested in the literature. The proxy is also limited in its ability to clearly identify the underlying ex ante compensation scheme, as it is based on ex post observation of rewards. The strength of the results would increase with triangulation using different methods, including interviews and surveys. Third, the strength of the statistical test may be weakened by the existence of omitted correlated variables, such as substitute or complimentary contacting mechanisms. Further research identifying such compliments and substitutes, and other omitted correlated variables, would allow the development of a more comprehensive model of compensation choice.

4.3 Topics for future research

This section explores a number of potential extensions of this thesis by addressing some of the questions raised.

4.3.1 Mutual monitoring as a governance mechanism

The role of mutual monitoring within the senior executive team, and how it interacts with group versus individual compensation schemes is a potential extension of this thesis, requiring further theory development. It is possible that the mutual monitoring may interact with, or act as a substitute for, other explicit corporate governance mechanisms. For example, it is possible that use of group compensation schemes relative to individual compensation schemes is increasing as difficulty in direct monitoring by external shareholders increases. This is because the difficulty in direct monitoring of executives is proposed to be related to the information asymmetry between the board and executives, reducing the ability of the board to effectively contract with executives (Bushman & Smith 2001), and increasing in the potential for an adverse selection of performance measures risk.

Where the board of directors has difficulty in observing effort, to reduce shirking, it can either increase the monitoring mechanisms, like purchasing more auditing, or alternatively increase bonding mechanisms such as awarding equity, both of which are costly solutions. On the other hand, by introducing a group compensation scheme, directors provide an incentive for executives to monitor the effort levels of other executives because the attainment of common performance targets is related to the sum of effort by all executives. Group compensation schemes may be used as a substitute for direct monitoring by the board through increasing the mutual monitoring by the executive team, who are in a better position than the board to monitor effort and output because of the information asymmetry problem. This benefit could be contrasted with the costs to the firms from costly effort expended by executives engaging in mutual monitoring. The proposition could be tested by using a proxy for the difficulty in monitoring executives, such as the complexity of the firm, decreasing quality of

performance measurement measures such as accounting numbers, or increasing growth options (Bushman & Smith 2001; Core & Guay 2001; Ittner, Lambert & Larcker 2003).

4.3.2 Accounting verses other performance measures in group compensation schemes

A study investigating the relative efficiency of accounting and other performance measures in group versus individual compensation schemes for senior executives would be consistent with the CEO compensation literature and a natural extension of this thesis. For example, it could be argued that the practice in the US of awarding option compensation uniformly to senior executives is equivalent to offering group compensation, as the executives are given rewards based on a common performance measure, stock price. This could have unintended consequences for the firm, such as providing stronger than expected incentives for senior executives to collude in extracting rents from shareholders, consistent with the rent extraction view of executives (Bebchuk & Fried 2004). One way to test this would be to investigate whether firms with group compensation for senior executives have greater than average earnings management surrounding option exercise.

4.3.3 Different contexts in the relation between firm characteristics and individual versus group compensation schemes

The model developed in the study could be replicated at various levels of the organisation. For example, replication at the divisional manager level would allow greater comparability with earlier literature, such as Bushman et al (1995) and Keating (1997). Replication of this study at lower levels of the organization, such as between different work groups or lower levels of management, would increase the generalizability of the results. Such replications would also provide the opportunity to

extend the theory development to other contexts. For example, a study manipulating the information environment, both within and between firms, would provide interesting insights into the tension between applying the informativeness principle, the motivation to free ride, and the other incentives induced by group compensation, such as the incentive for mutual monitoring, co-operation and information sharing.

Appendices

Appendix A: Alternative proxies for Group versus Individual Compensation Schemes

This appendix reports details on the construction of the two alternative proxies for CScheme. Several of the tests reported in the body of the thesis are replicated. As the tests are not the main results, they are not discussed beyond the reference made to them in the body of the thesis.

CScheme2: Variation between Senior Executives' Incentive Compensation relative to Base Salary (percentages)

The first alternative proxy for CScheme involves comparing the relative variation between the percentage of incentive compensation given to different executives, within the executive team. The percentage of total incentive compensation relative to base pay is calculated for each executive using the following formula: (cash bonus + equity-based compensation) / Base Salary. Firms with large variation between members of the senior executive team indicate dispersed performance evaluation structures; firms with smaller percentage levels of incentive compensation between members are evidence of closer performance evaluation structures. Closer performance evaluation structures are consistent with groups of executives being remunerated on common performance measures (group compensation scheme). Divergent performance evaluation structures are consistent with executives being rewarded under an individual, rather than group compensation schemes.

The measure of variation between the senior executives is calculated for each firm using the following formula: Range of Incentive compensation percentage for senior executives / Mean Incentive compensation percentage for senior executives.

Firms are ranked according to the level of variation between executives. The middle third are removed. Firms with the least (greatest) variation between executives are classified as having a group (individual) compensation scheme (0 = individual, 1 = group). CScheme2 provide a measure of the extent to which senior executives' compensation is similar in terms of the level of incentive compensation to base salary.

Appendix A Table 1 Comparison between CScheme and CScheme2

Panel A: Crosstab table for Cscheme and CScheme2

	CScheme2		
CScheme	Individual	Group	Total
Individual	168	18	186
Group	26	151	177
Total	194	169	363
Pearson Chi-Square			208.5
(p-value)			*(0.000)****

Panel B: Directional Measures for CScheme and CScheme2

	Lambda	Goodman and Krushal tau
Value	0.746	0.574
(p-value)	(0.000)***	*(0.000)****

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively
All aggregated firm year observations are from the sample of 590 firm years. Reported results exclude firms where no senior executive receive any incentive compensation or where one or more variables were missing.

Variable definitions:

CScheme = is calculating by first identifying the incentive compensation type (cash bonus and/or equity-based compensation) given to each of the senior executives. The percentage of executives having the same type of compensation is then calculated for each firm. CScheme is a categorical variable and is calculated by splitting the sample into thirds. The middle third is excluded. The third with the executive compensation with the closest compensation structures given a value of 1 (group compensation scheme), firms with the greatest level of variation between senior executives compensation are given a value of 0 (individual compensation scheme).

CScheme2 = is estimated by first calculating the percentage of total incentive compensation relative to base pay for each executive: (cash bonus + equity-based compensation) / Base Salary. A measure of variation between the senior executives is calculated for each firm using the following formula: Range of Incentive compensation percentage for senior executives / Mean Incentive compensation percentage for senior executives. Firms are ranked according to the level of variation between executives. The middle thirty three percent are removed. Firms with the least (greatest) variation between executives are classified as having a group (individual) compensation scheme;

CScheme3: Variations in senior executives total compensation 'levels' for the year

The third variable developed to proxy for firms using predominantly group or individual compensation schemes is based on the relative level of total compensation between senior executives. The construction of CScheme3 is very similar to CScheme2. As with CScheme2, the greater the similarity between executives levels of total compensation, the more (less) likely there is a group (individual) compensation scheme.

The total level of compensation paid is calculated for each senior executive using the following formula: Base Salary + Cash Bonus + Equity-based compensation. This is total compensation excluding termination or retirement benefits. A measure of variation between the senior executives is calculated for each firm using the following formula: Range of Level of Total Compensation for executives / Mean Level of Total Compensation for executives. Firms are ranked according to the level of variation between executives. The middle third are removed. Group versus individual compensation scheme companies are estimated with the third with the least (greatest) variation between executives labelled as group (individual) compensation scheme firms (0 = individual, 1 = group).

Appendix A Table 2 Comparison between CScheme and CScheme3

Panel A: Crosstab table for CScheme and CScheme3

	CScheme2		
CScheme	Individual	Group	Total
Individual	168	18	186
Group	26	151	177
Total	194	169	363
Pearson Chi-Square			208.5
(p-value)			*(0.000)****

Panel B: Directional Measures for CScheme and CScheme3

	Lambda	Goodman and Krushal tau
Value	0.746	0.574
(p-value)	(0.000)***	*(0.000)****

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively
All aggregated firm year observations are from the sample of 590 firm years. Reported results exclude firms where no senior executive receive any incentive compensation or where one or more variables were missing.

Variable definitions:

CScheme = is calculating by first identifying the incentive compensation type (cash bonus and/or equity-based compensation) given to each of the senior executives. The percentage of executives having the same type of compensation is then calculated for each firm. CScheme is a categorical variable and is calculated by splitting the sample into thirds. The middle third is excluded. The third with the executive compensation with the closest compensation structures given a value of 1 (group compensation scheme), firms with the greatest level of variation between senior executives compensation are given a value of 0 (individual compensation scheme).

CScheme3 = is estimated by first calculating the total level of compensation paid for each senior executive: Base Salary + Cash Bonus + Equity-based compensation. This is total compensation excluding termination or retirement benefits. A measure of variation between the senior executives is calculated for each firm using the following formula: Range of Level of Total Compensation for executives / Mean Level of Total Compensation for executives. Firms are ranked according to the level of variation between executives. The middle thirty three percent are removed. Firms with the least (greatest) variation between executives are classified as having a group (individual) compensation scheme;

Appendix A Table 3 Logit Regressions Examining the Impact of Firm Characteristics on the choice between Group Versus Individual Compensation for the Senior Executives

Panel A: Dependent variable is CScheme2

Dependent Variable: CScheme2

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		-9.922	*(0.000)*	***	-9.922	*(0.000)*	***
GEOSEG	-	-0.494	*(0.044)*	##	-0.494	*(0.075)*	##
FUNCST	+	0.887	*(0.049)*	##	0.887	*(0.062)*	##
CAPEX	+	-0.159	*(0.686)*		-0.159	*(0.777)*	
HOASSET	+	-0.451	*(0.146)*		-0.451	*(0.014)*	**
SIZE		0.529	*(0.000)*	***	0.529	*(0.000)*	***
Energy		1.784	*(0.072)*	*	1.784	*(0.021)*	**
Materials		0.223	*(0.788)*		0.223	*(0.718)*	
Industrials		0.002	*(0.998)*		0.002	*(0.998)*	
Consumer Discretionary		0.048	*(0.954)*		0.048	*(0.940)*	
Consumer Staples		1.053	*(0.247)*		1.053	*(0.238)*	
Health Care		-0.218	*(0.799)*		-0.218	*(0.751)*	
Information Technology		0.426	*(0.624)*		0.426	*(0.501)*	
Telecommunications Services		0.990	*(0.498)*		0.990	*(0.223)*	
Utilities							
Year 2003		-0.270	*(0.415)*		-0.270		
Year 2004							
Year 2005		-0.618	*(0.012)*	**	-0.618		
N		404			404		
-2 Log likelihood		481			481		
Cox & Snell R Square		0.177			0.177		
Nagelkerke R Square		0.236			0.236		
No. firm Clusters					251		
No. year clusters					3		
Percentage Correct:							
Individual compensation		71.4%					
Group compensation		69.8%					
Total		70.5%					

Panel B: Dependent variable is CScheme3

Dependent Variable: CScheme3

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		-10.058	*(0.000)*	***	-10.058	*(0.000)*	***
GEOSEG	-	-0.502	*(0.041)*	##	-0.502	*(0.073)*	#
FUNCST	+	0.891	*(0.048)*	##	0.891	*(0.064)*	#
CAPEX	+	-0.142	*(0.719)*		-0.142	*(0.797)*	
HOASSET	+	-0.449	*(0.149)*		-0.449	*(0.013)*	**
SIZE		0.537	*(0.000)*	***	0.537	*(0.000)*	***
Energy		1.782	*(0.073)*	*	1.782	*(0.164)*	
Materials		0.255	*(0.759)*		0.255	*(0.816)*	
Industrials		0.001	*(0.999)*		0.001	*(0.999)*	
Consumer Discretionary		0.002	*(0.998)*		0.002	*(0.998)*	
Consumer Staples		1.051	*(0.249)*		1.051	*(0.330)*	
Health Care		-0.218	*(0.799)*		-0.218	*(0.835)*	
Information Technology		0.429	*(0.622)*		0.429	*(0.711)*	
Telecommunications Services		0.983	*(0.502)*		0.983	*(0.226)*	
Utilities							
Year 2003		-0.265	*(0.424)*		-0.265		
Year 2004							
Year 2005		-0.626	*(0.011)*	**	-0.626		
N							
-2 Log likelihood		480			480		
Cox & Snell R Square		0.179			0.179		
Nagelkerke R Square		0.239			0.239		
No. firm Clusters					251		
No. year clusters					3		
Percentage Correct:							
Individual compensation		69.8%					
Group compensation		69.3%					
Total		69.6%					

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively

#, ##, ### Indicates one-tailed significance at the 10, 5, and 1 percent levels, respectively

Reported p-values are based on the Wald statistic and reported as one sided where the coefficient is in the predicted direction, two sided otherwise.

All aggregated firm year observations are from the sample of 590 firm years. Reported results exclude firms where no senior executive receive any incentive compensation or where one or more variables were missing.

Variable definitions:

CScheme2 = is estimated by first calculating the percentage of total incentive compensation relative to base pay for each executive: (cash bonus + equity-based compensation) / Base Salary. A measure of variation between the senior executives is calculated for each firm using the following formula: Range of Incentive compensation percentage for senior executives / Mean Incentive compensation percentage for senior executives. Firms are ranked according to the level of variation between executives. The middle thirty three percent are removed. Firms with the least (greatest) variation between executives are classified as having a group (individual) compensation scheme.

CScheme3 = is estimated by first calculating the total level of compensation paid for each senior executive: Base Salary + Cash Bonus + Equity-based compensation. This is total compensation excluding termination or retirement benefits. A measure of variation between the senior executives is calculated for each firm using the following formula: Range of Level of Total Compensation for executives / Mean Level of Total Compensation for executives. Firms are ranked according to the level of variation between executives. The middle thirty three percent are removed. Firms with the

	least (greatest) variation between executives are classified as having a group (individual) compensation scheme.
GEOSEG =	the natural log of the sum of the number of geographic segments disclosed in the notes to the annual report;
FUNCST =	the number of functional executives on the executive team divided by total senior executives. Functional executives are those where the annual report identifies them as having functional responsibility such as being responsible for functional departments. For example, marketing, finance, operations or research and development;
CAPEX =	is measured by dividing the change in total assets by opening total assets;
HOASSET =	a dummy variable for any firm reporting assets specifically allocated to a central management function (head office) in the annual report segment disclosure;
SIZE =	the natural log of market capitalization;
INDUSTRY =	a dummy variable for each industry:
YEAR =	a dummy variable for each year.

Appendix A Table 4 Estimated regression models of the association between accounting measures of performance and inefficient compensation contracts for the senior executives

Panel A: Firm performance is ROA_{t+1}

Dependent Variable: ROA_{t+1}

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		-0.158	*(0.074)*	*	-0.158	*(0.026)*	**
$CScheme^{Ineff\ Combined\ Model}$	-	-0.012	*(0.149)*		-0.012	*(0.091)*	#
$SIZE^{Sales}$		0.014	*(0.000)*	***	0.014	*(0.000)*	***
VOLATILITY		-0.501	*(0.000)*	***	-0.501	*(0.000)*	***
Energy		0.021	*(0.729)*		0.021	*(0.627)*	
Materials		0.046	*(0.416)*		0.046	*(0.000)*	***
Industrials		0.026	*(0.645)*		0.026	*(0.018)*	**
Consumer Discretionary		0.061	*(0.281)*		0.061	*(0.000)*	***
Consumer Staples		0.008	*(0.896)*		0.008	*(0.694)*	
Health Care		-0.014	*(0.804)*		-0.014	*(0.384)*	
Information Technology		0.098	*(0.095)*	*	0.098	*(0.003)*	***
Telecommunications Services		-0.011	*(0.858)*		-0.011	*(0.738)*	
Utilities							
Year 2003		-0.008	*(0.593)*		-0.008		
Year 2004		-0.013	*(0.315)*		-0.013		
Year 2005							
N.		303			303		
F		10.690	*(0.000)*	***	10.690	*(0.000)*	***
Adjusted R Square		0.294			0.294		
No. firm Clusters					3		
No. year clusters					207		

Panel B: Firm performance is ROE_{t+1}

Dependent Variable: ROE_{t+1}

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		-0.309	*(0.080)*	*	-0.309	*(0.013)*	**
$CScheme^{Ineff\ Combined\ Model}$	-	-0.031	*(0.095)*	#	-0.031	*(0.031)*	##
$SIZE^{Sales}$		0.035	*(0.000)*	***	0.035	*(0.000)*	***
VOLATILITY		-0.770	*(0.001)*	***	-0.770	*(0.001)*	***
Energy		-0.131	*(0.281)*		-0.131	*(0.180)*	
Materials		-0.066	*(0.558)*		-0.066	*(0.714)*	
Industrials		-0.094	*(0.402)*		-0.094	*(0.604)*	
Consumer Discretionary		-0.027	*(0.812)*		-0.027	*(0.863)*	
Consumer Staples		-0.117	*(0.310)*		-0.117	*(0.480)*	
Health Care		-0.183	*(0.111)*		-0.183	*(0.296)*	
Information Technology		0.026	*(0.823)*		0.026	*(0.888)*	
Telecommunications Services		-0.117	*(0.354)*		-0.117	*(0.500)*	
Utilities							
Year 2003		-0.016	*(0.622)*		-0.016		
Year 2004		-0.030	*(0.230)*		-0.030		
Year 2005							
N.		292			292		
F		11.010	*(0.000)*	***	11.010	*(0.000)*	***
Adjusted R Square		0.309			0.309		
No. firm Clusters					3		
No. year clusters					200		

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively

#, ##, ### Indicates one-tailed significance at the 10, 5, and 1 percent levels, respectively

note: p-values are reported one tailed for variables where there is a directional hypothesis and the coefficient is in the predicted direction, and two tailed for the remaining variables. The coefficients for the Pooled OLS with Clustered Standard errors are the same as for the Pooled OLS Model. Standard errors are clustered by firm and by year, using the Petersen (2009) method.

note: All aggregated firm year observations are from the sample of 372 firm years. Reported results exclude firms where one or more variables were missing.

Variable definitions:

ROA = EBIT / Ave Total Assets;

ROE = EBIT / Ave Total Equity;

$CScheme^{Ineff\ Combined\ Model}$ = Value of 1 where the firm has an inefficient compensation scheme as identified by model 3.2, 0 otherwise; Where the LHS variable in Equation 3.2 is any firm where CScheme, CScheme2 and CScheme3 all classify it with the same compensation scheme;,

VOLATILITY = Standard deviation of stock returns for 18 months, 3 months after and 15 months prior to the earnings announcement date;

$SIZE^{Sales}$ = the natural log of total firm sales;

INDUSTRY = a dummy variable for each industry;

YEAR = a dummy variable for each year.

Appendix B: Robustness tests

This appendix reports the results from some of the robustness tests. As the tests are not the main results, they are not discussed beyond the reference made to them in the body of the thesis.

Appendix B Table 1 Estimated regression models of the association between accounting measures of performance and inefficient compensation contracts for the senior executives

Panel A: Firm peformance is ROA_{t+1}

Dependent Variable: ROA_{t+1}

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		-0.278	*(0.120)*		-0.278	*(0.092)*	*
$CScheme^{Ineff\_Group}$	-	-0.037	*(0.104)*		-0.037	*(0.147)*	
$CScheme^{Ineff\_Individual}$	-	-0.049	*(0.063)*	#	-0.049	*(0.002)*	###
$SIZE^{Sales}$		0.034	*(0.000)*	***	0.034	*(0.000)*	***
VOLATILITY		-0.782	*(0.000)*	***	-0.782	*(0.000)*	***
Energy		-0.148	*(0.224)*		-0.148	*(0.207)*	
Materials		-0.077	*(0.494)*		-0.077	*(0.686)*	
Industrials		-0.110	*(0.328)*		-0.110	*(0.581)*	
Consumer Discretionary		-0.040	*(0.723)*		-0.040	*(0.813)*	
Consumer Staples		-0.128	*(0.267)*		-0.128	*(0.476)*	
Health Care		-0.200	*(0.083)*	*	-0.200	*(0.283)*	
Information Technology		0.009	*(0.937)*		0.009	*(0.962)*	
Telecommunications Services		-0.129	*(0.311)*		-0.129	*(0.475)*	
Utilities							
Year 2003		-0.017	*(0.598)*		-0.017		
Year 2004		-0.031	*(0.221)*		-0.031		
N.		292			292		
F		10.360	*(0.000)*	***	10.360	*(0.000)*	***
Adjusted R Square		0.311			0.311		
No. firm Clusters					3		
No. year clusters					200		

Panel B: Firm peformance is ROE_{t+1}

Dependent Variable: ROE_{t+1}

Variable	Predicted Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		-0.135	*(0.130)*		-0.135	*(0.058)*	*
$CScheme^{Ineff\_Group}$	-	-0.024	*(0.052)*	#	-0.024	*(0.011)*	##
$CScheme^{Ineff\_Individual}$	-	-0.016	*(0.154)*		-0.016	*(0.061)*	#
$SIZE^{Sales}$		0.013	*(0.000)*	***	0.013	*(0.000)*	***
VOLATILITY		-0.507	*(0.000)*	***	-0.507	*(0.000)*	***
Energy		0.012	*(0.844)*		0.012	*(0.726)*	
Materials		0.041	*(0.473)*		0.041	*(0.000)*	***
Industrials		0.019	*(0.742)*		0.019	*(0.110)*	
Consumer Discretionary		0.055	*(0.330)*		0.055	*(0.000)*	***
Consumer Staples		0.003	*(0.955)*		0.003	*(0.816)*	
Health Care		-0.022	*(0.701)*		-0.022	*(0.087)*	*
Information Technology		0.089	*(0.128)*		0.089	*(0.006)*	***
Telecommunications Services		-0.018	*(0.773)*		-0.018	*(0.547)*	
Utilities							
Year 2003		-0.008	*(0.589)*		-0.008		
Year 2004		-0.013	*(0.320)*		-0.013		
N.		303			303		
F		10.110	*(0.000)*	***	10.110	*(0.000)*	***
Adjusted R Square		0.297			0.297		
No. firm Clusters					3		
No. year clusters					207		

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively

#, ##, ### Indicates one-tailed significance at the 10, 5, and 1 percent levels, respectively

note: p-values are reported one tailed for variables where there is a directional hypothesis and the coefficient is in the predicted direction, and two tailed for the remaining variables. The coefficients for the Pooled OLS with Clustered Standard errors are the same as for the Pooled OLS Model. Standard errors are clustered by firm and by year, using the Petersen (2009) method.

note: All aggregated firm year observations are from the sample of 372 firm years. Reported results exclude firms where one or more variables were missing.

Variable definitions:

ROA = EBIT / Ave Total Assets;

ROE = EBIT / Ave Total Equity;

$CScheme^{Ineff\ Individual}$ = Value of 1 where the firm has an inefficient compensation scheme as identified by model 3.2 and where the benchmark compensation scheme is individual, 0 otherwise;

$CScheme^{Ineff\ Group}$ = Value of 1 where the firm has an inefficient compensation scheme as identified by model 3.2 and where the benchmark compensation scheme is group, 0 otherwise;

VOLATILITY = Standard deviation of stock returns for 18 months, 3 months after and 15 months prior to the earnings announcement date;

$SIZE^{Sales}$ = the natural log of total firm sales;

INDUSTRY = a dummy variable for each industry;

YEAR = a dummy variable for each year.

Appendix B Table 2 Estimated regression models of the association between year-end share price and inefficient compensation contracts for the senior executives

Dependent Variable: Share price at year end

Variable	Sign	Pooled OLS			Pooled OLS with Clustered Standard Errors		
		Coefficient	(*p-value*)		Coefficient	(*p-value*)	
Intercept		0.998	*(0.055)*	*	0.998	*(0.024)*	**
$CScheme^{Ineff}$	-	-0.248	*(0.105)*		-0.248	*(0.074)*	#
$BVE^{pershare}$		0.930	*(0.000)*	***	0.930	*(0.000)*	***
EPS		0.066	*(0.000)*	***	0.066	*(0.000)*	***
Energy		-0.688	*(0.292)*		-0.688	*(0.426)*	
Materials		-0.644	*(0.235)*		-0.644	*(0.224)*	
Industrials		-0.022	*(0.968)*		-0.022	*(0.963)*	
Consumer Discretionary		-0.302	*(0.579)*		-0.302	*(0.297)*	
Consumer Staples		0.138	*(0.816)*		0.138	*(0.760)*	
Health Care		0.746	*(0.180)*		0.746	*(0.226)*	
Information Technology		-0.335	*(0.572)*		-0.335	*(0.492)*	
Telecommunications Services							
Utilities		-0.055	*(0.956)*		-0.055	*(0.906)*	
Year 2003		-0.221	*(0.406)*		-0.221	.	
Year 2004							
Year 2005		0.197	*(0.340)*		0.197	.	
N.		349			349		
F		77.360	*(0.000)*	***	77.360	*(0.000)*	***
Adjusted R Square		0.74			0.74		
No. firm Clusters					235		
No. year clusters					3		

*, **, *** Indicates two-tailed significance at the 10, 5, and 1 percent levels, respectively

note: p-values are reported one tailed for variables where there is a directional hypothesis and the coefficient is in the predicted direction and two tailed for the remaining variables. The coefficients for the Pooled OLS with Clustered Standard errors are the same as for the Pooled OLS Model. Standard errors are clustered by firm and by year, using the Petersen (2009) method.

note: All aggregated firm year observations are from the sample of 372 firm years. Reported results exclude firms where one or more variables were missing.

Variable definitions:

Share Price =	The share price at year end;
$CScheme^{Ineff}$ =	Value of 1 where the firm has an inefficient compensation scheme as identified by model 3.2, 0 otherwise;
$BVE^{pershare}$ =	Book Value of Equity divided by the diluted weighted number of shares outstanding during the year;
EPS =	Reported Net Profit after tax to shareholders, divided by the diluted weighted number of shares outstanding during the year.
INDUSTRY =	a dummy variable for each industry;
YEAR =	a dummy variable for each year.

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