UNIVERSITY OF THE WITWATERSRAND
SCHOOL OF ACCOUNTANCY

RESEARCH REPORT

Presented in partial fulfillment of the requirements for the degree of
Master of Commerce in Accounting (50% Research)

THE EFFECT OF INSTITUTIONAL SHAREHOLDERS ON THE LEVEL AND MIX OF SOUTH AFRICAN CHIEF EXECUTIVE OFFICERS' COMPENSATION

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Date of submission:

November 2008

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Declaration

I declare that this research report is my own original work and that all sources have been accurately reported and acknowledged. It is submitted for the degree of Masters of Commerce to the University of Witwatersrand, Johannesburg. This research is a continuation and expansion of the research report that was submitted for my B.Com (Hons) degree in Financial Accounting at the University of Cape Town.

Yaser Survé

Date

Acknowledgements

I would like to express my gratitude to my supervisor, Mr. Gary Swartz, for his continuing guidance, support and insight, and to my wife, Mrs. Humaira Survé, for her love, care and patience during the writing of this report.

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Abstract

Agency theory would predict that, given the presence of large or powerful shareholders in a company, agency costs would be reduced. Excessive executive compensation can be regarded as being an externality problem that stems from the agency problem. Agency theory would also then predict that executives in companies with large shareholders would receive less compensation and a larger proportion of long-term incentive-based compensation than companies with smaller shareholders.

The validity of these two hypotheses has been tested using a unique cross-sectional, time series dataset and two statistical techniques. The first set of tests involve the construction of multiple regression models in order to provide evidence as to whether Chief Executive Officer (CEO) compensation is affected by institutional shareholders. The second method, using statistical tests of differences between means, involves separating the sample into two sub-samples, namely management- and owner-controlled firms, to ascertain whether these two groups remunerate their CEOs differently to each other, thus testing the hypotheses in an alternative manner to the regression models.

This report examines whether the presence of institutional shareholders affects the level and mix of CEO compensation for 50 companies listed on the JSE Securities Exchange over the five-year period 2002-2006. Original findings on the value of share options awarded to CEOs are presented, along with the trends in the level and mix of CEO compensation. Further research findings also include trends in the level of institutional ownership of listed companies over this period.

The results of both the regression models and tests for differences of means provide statistical evidence in support of the assertion that the presence of institutional shareholders do not have an effect on either the level or mix of CEO compensation. Suggested reasons for this result range from shareholder apathy, to not considering executive remuneration to be a significant enough issue for institutional shareholders, and finally to the suggestion that institutional shareholders perceive the level and mix of compensation paid to South African CEOs to be a fair reflection of their value to their company.

Chapter I: Introduction

"Compensation is a function of the balance of influence and power in an organisation."
- Jensen and Meckling (1976 : 306).

1.1. Background

The documented agency problem, first put forward by Jensen and Meckling (1976), holds that top management pursue personal goals that are incongruent with the profit maximisation goal of the firm. Agency costs have been particularly telling in the last ten years, given the plethora of corporate scandals that have occurred internationally.

In the past, managers benefited from "a regime of dispersed and powerless shareholders" (Davis and Thompson, 1994 : 142), which ultimately exacerbated the agency problem. However, as more people have invested their capital with institutions over the years, and funds under management have grown, institutional shareholders have emerged as the biggest potential force to mitigate agency costs – what Davis and Thompson (1994 : 144) describe as a "social movement in corporate control".

It is undeniable then, that institutional investors have a fiduciary duty to safeguard the investments they have made on behalf of their many clients. With the sheer amount of funds under management, it has become imperative for them to intervene and participate more actively in firm activities. Institutional investors are therefore in a position to reduce the overall cost of monitoring activities through their different investments, and hence are in a better position to influence firm policies.

Furthermore, it is difficult to just divest in a firm should they be unhappy – they cannot simply just "take the Wall Street walk" (David and Kochhar, 1996 : 459), i.e. sell their shares. David and Kochhar (1996 : 459) elucidate on this:

> "An attempt to offload large blocks of shares in a single firm adversely affects its stock price. As such, the selling institution will obtain a price that is well below market value and will be faced with an even greater loss in value of their holdings. Furthermore, it is difficult for institutional investors to find appropriate alternative investments considering they already own significant stakes in most firms in the economy. Their increasing presence in the capital markets implies that the opportunity set of new, profitable equity investments is greatly reduced."

Even in larger companies where selling large shareholdings may not affect the market price materially, some institutional investors may be constrained by the requirements from indexing: "Tracking errors constrain how much one can deviate from the index, thus even active managers are required to hold big stock, such as BHP [Billiton], so one has to concentrate more on influencing a company rather than threatening to sell" (Ramsay, Stapledon and Fong, 1998 : 34).

In recent years, increasing incidences of excessive executive remuneration have been documented by the press (e.g. Crotty 2005a, Crotty 2005b, Crotty 2005c). It is within this context then that it is considered whether institutional investors have any reason to be concerned about executive remuneration. According to Dyl (1988 : 21):

> "Excessively high levels of management compensation, relative to normal or expected levels, are an important component of the residual loss resulting from the agency problem."

In an attempt to reduce this "loss", institutional investors have started opposing excessive executive pay in force: In Britain, shareholder activists, led by institutional shareholders, voted against GlaxoSmithKline's $35.7m golden handshake to CEO J-P Garnier (*The Economist*, 2003). In 2002, executive pay was fiercely debated at Boeing, CitiGroup and General Electric, and over the period 1999-2000, the California Public Employees Retirement System pension fund (CalPERS) "not only voted against 43% of executive [share] plans...but also withheld votes from members of compensation committees who had authorised outrageous compensation for top executives" (Khan, Dharwadkar and Brandes, 2005 : 1078). It is also no surprise then, that in Germany and Japan (where institutional intervention is encouraged), CEOs earn substantially less than their U.S. counterparts, despite having equalled or outperformed many of them during the last few decades (Abowd and Kaplan, 1999).

1.2. The South African context

The King Report on Corporate Governance for South Africa (2002 : 44) ("King II") states that:

"Institutional shareowners in South Africa have been notable in their apathy towards participating actively in shareowner meetings and it is recommended that the bodies representing these institutions look to the steps taken by bodies such as the National Association of Pension Funds and the Association of Pension Funds and the Association of British Insurers in the United Kingdom in setting benchmark standards expected of companies in relation to conformance with good corporate governance."

Furthermore, the report states that, “the absence of shareowner activism in South Africa seriously undermines good levels of managerial compliance. Institutional investors and pension funds for the most part remain passive despite some very obvious instances of poor or undesirable corporate governance practices by South African companies. A moderate level of activism has recently emerged however” (King Report on Corporate Governance for South Africa, 2002 : 143).

The “moderate level of activism” mentioned above has emerged through a number of recent successes, most involving institutional investors placing pressure on management to change course. These include former co-operative OTK (now Afgri) being forced to adopt a new restructuring strategy, the Comparex (now called Business Connexion) and Kersaf boards being reconstituted and the delisting plans of Energy Africa and Mutual & Federal being rejected (Marrs, 2004).

The Public Investment Corporation (PIC) has also become a more active shareholder in its investee companies. In recent years the PIC has challenged executive remuneration at a number of companies, including Dorbyl (who paid CEO Bill Cooper a R2.4 million bonus in 2004, despite a 25% drop in earnings) and Aveng (who paid CEO Carl Grim a R166 000 bonus amid a 66% income drop) (Rose, 2004a).

Despite the existence of these incidences of shareholder activism, there has been no formal South African study on the effects of institutional activism. This research report therefore intends to provide formal research on the topic of institutional shareholder activism, with regards to the specific issue of CEO compensation.

1.3. Research problems and objectives

1.3.1. Main problem and objective

The primary aim of this research report is to establish whether institutional shareholders minimise agency costs by influencing CEO remuneration levels and structure (form), thereby fulfilling their requisite fiduciary duty in the manner predicted by agency theory. Data on 50 companies listed on the JSE Securities Exchange over the five-year period 2002-2006 will be used, resulting in a total sample size of 250 firm-year observations. Two main statistical methods will be used to test these hypotheses – multiple regression, and tests for differences of means.

1.3.2. Sub-problems and objectives

There are two sub-problems. The first is to quantify the value of share options awarded to South African CEOs (as per the sample) as part of their remuneration packages over the period, and to provide meaningful interpretation of these results. This has not been done before in South Africa to date. Research has been done on the number of share options awarded to executives (Crotty, 2005c), but this provides little meaning unless their value has been estimated. The most likely reason for there being no prior research is due to the technical complexity of valuing share options, and the time required to gather the data.

The second sub-problem is to determine the level of institutional shareholdings in companies and which institutions are dominant, including the role of the Public Investment Corporation. Much of the information on institutional shareholders is fragmented. This report intends to consolidate much of the information on institutional shareholders in South Africa, both qualitative and quantitative, and highlight their significance. For example, certain asset managers publish their voting records (e.g. Frater Asset Management) and have clear policies on specific corporate governance issues (e.g. Regarding Capital Management). This study intends to consolidate this information.

1.4. Relevance of the study and expected outcomes

Issues such as executive remuneration have received much publicity recently, ever since the increased disclosure requirements of the King II report. This has stimulated much debate, especially from the media, who have reported on it extensively. Corporate governance has also received much attention due to the corporate collapses of the recent past and the subsequent regulatory backlash. The fiduciary duty of those who are responsible for others' money has also been highlighted by a recent case against a pension fund trustee (Cameron, 2006).

The main outcome of this study will provide evidence as to the effectiveness of institutional shareholders in minimising agency externalities. Secondary outcomes include providing information on CEO compensation and whether there have been any trends in the level and/or mix of compensation (e.g. has the structure of CEO compensation changed since the introduction of *IFRS 2: Share-based Payments*?). This will lead to the creation of a unique cross-sectional database of information that can be used for future research endeavours. This study also represents a refinement of previous (U.S.) studies because two methodologies are used, instead of one, and a superior option valuation model is used (the Hull and White (2004) model – refer to Section 3.4 for a more detailed discussion as to why this model is superior).

1.5. Organisation of the study

Chapter II consists of a literature review which discusses the roots of this topic in agency theory, before moving on to a review of the empirical evidence on institutional shareholder activism, in particular from a South African perspective. Finally, a review of the controversies surrounding executive remuneration follows. Chapter III develops and presents the hypotheses to be tested, and discusses, in detail, the methodology used in testing these hypotheses. This is followed by a discussion of the various employee share option valuation models and the one used in this study, before concluding with the assumptions and limitations of the methodology employed. Chapter IV presents findings on the level of institutional shareholders over the period (in the sample), as well as trends in the level and mix of CEO compensation. An interpretation of the statistical test results follows. Chapter V concludes the study with a summary of the findings, discusses limitations, and identifies avenues for future research.

Chapter II: Literature Review

2.1. Introduction

Agency theory is the foundation on which this research is based. This chapter first discusses the roots of agency theory, through the seminal work of Berle and Means (1932) and later, Jensen and Meckling (1976). Next, methods of reducing agency costs are investigated, before the section on institutional shareholders. South African institutions, and in particular the increasingly important role that the PIC has come to take on, are also discussed. Much of the information regarding South African institutional shareholders was fragmented and has been consolidated in this section, particularly the information on the Public Investment Corporation and the other asset management companies. Finally, executive compensation is discussed, which includes a detailed discussion on share options and the controversies that have surrounded executive compensation in the recent history.

2.2. Agency Theory

> "The directors of such companies, however, being the managers rather of other people's money than of their own, it cannot be well expected, that they should watch over it with the same anxious vigilance with which the partners in a private copartnery frequently watch over their own. Like the stewards of a rich man, they are apt to consider attention to small matters as not for their master's honour, and very easily give themselves a dispensation from having it. Negligence and profusion, therefore, must always prevail, more or less, in the management of the affairs of such a company."
>
> - Adam Smith, *The Wealth of Nations* (1776 : 700).

Despite Adam Smith having alluded to the problems that existed in a firm due to the principal-agent relationship, it wasn't until Berle and Means (1932), that agency theory became fully appreciated and recognised by academics and practitioners as a problem that had significant implications for the way that business would be conducted. They were the first to recognise the increasing separation of ownership and control, on which they wrote (Berle and Means, 1932: vii):

> "The translation of perhaps two-thirds of the industrial wealth of the country from individual ownership to ownership by large, publicly-financed corporations vitally changes the lives of workers, and the methods of property tenure. The divorce of ownership and control consequent on that process almost necessarily involves a new form of economic organization of society."

Berle and Means (1932) recognised too, that stock ownership by ordinary Americans was increasing dramatically due to both the liquidity and wealth effects of owning shares. For example, they estimated that in 1929, approximately 1 million Americans owned shares, and at the close of 1967 (in their revised edition), conservatively estimated that figure at between twenty-two and twenty-three million people. As the number of shareholders in each corporation increased, each individual vote became less important and "the capacity of each to express opinions is extremely limited" (Berle and Means, 1932 : xvii). Even though each had a right to bring an action against the management of the company, this was very difficult to implement, becoming increasingly so the bigger the corporation became. Given that corporations would inevitably become larger and require more capital to fund their expansions, so too would the gap between the ownership and control of a firm become more pronounced.

They also argued that, even if management owned some portion of stock, they could still undertake actions which, even though would decrease the value of the firm (and their own shareholdings), would still benefit themselves more, because they would only experience a loss equal to their share of the economic loss experienced by the firm. They used the numerous examples of railroad bankruptcies between 1900 and 1915, "as a result of financial mismanagement, apparently designed largely for the benefit of the controlling group, while heavy losses were sustained by the security holders" (Berle and Means, 1967 : 115).

Yet, it would take more than 50 years after the original Berle and Means (1932) publication for agency theory to be revitalised through the seminal paper by Jensen and Meckling (1976). Their approach differed to the extant literature in that it investigated the incentives faced by each of the parties and the elements entering into the determination of the equilibrium of the relationship between agents and principals.

Jensen and Meckling (1976) formally defined agency costs as "a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent" (Jensen and Meckling, 1976 : 308). Under such a theory, agents would tend to maximise their own utility, which may be at odds with acting in the best interests of the principal. This behaviour was

pervasive in all organisations where there are agents and principals, regardless of whether the firm operated in a monopolistic or competitive product or factor market.

Furthermore they deconstructed agency costs into (1) monitoring costs by the principal (to limit deviant behaviour by the agent), (2) bonding costs that the agent may voluntarily incur to prevent him/herself from taking such actions or to ensure adequate compensation to the principal if such actions are taken, and finally, (3) a residual loss, being the "dollar equivalent of the reduction in welfare experienced by the principal due to this divergence" (Jensen and Meckling, 1976 : 308).

They emphasised that every firm could be deconstructed into a nexus of contractual relationships amongst individuals, and that by analysing such relationships, one should be able to ascertain what the consequences are for the behaviour of the firm, and how they may be affected by exogenous changes to the firm.

Thus, owner-managers will simultaneously maximise their own and their firm's utility, by benefiting from both pecuniary and non-pecuniary rewards. When equity is sold to outsiders, the owner will benefit less (due to their decreased shareholding), resulting in agency costs. These costs could be limited by monitoring costs (such as auditing, formal control systems and incentive compensation systems). It was also demonstrated that the owner would bear the entire wealth effects of these expected costs provided that the equity market anticipated these effects, i.e. the price paid for the firm's equity by prospective shareholders would reflect this divergence of interests. Hence, as the owner-manager's shareholding fell, so would the incentive to appropriate further perquisites increase, resulting in greater monitoring costs and reduced market value of the firm's equity. An important corollary to this was that as managers' fractional ownership decreased, the less their incentive was to search out new, value-creating ventures due to the effort involved. Such actions would result in a further deviation from the potential value of a firm.

Jensen and Meckling (1976), however, asserted that agency costs were not inefficient, as they are a necessary concomitant of the agency relationship, i.e. they would only be inefficient "in comparison to a world in which we would obtain compliance of the agent to the principal's wish at zero cost" (Jensen and Meckling, 1976 : 328). Furthermore, agency costs would only be incurred if the benefits to the owner-manager exceeded these costs.

They also argued that the existence and size of agency costs depended on the nature of the monitoring and bonding costs, the tastes of managers for non-pecuniary benefits, the costs of evaluating the manager's performance and aligning their interests with the owners, and the supply (and competition) for potential managers.

And finally, while not explicitly mentioning the potential ability of institutional shareholders to reduce agency costs, they noted that security analysis played an important role in monitoring firms, and by extension, deviant managerial behaviour. This conveniently leads us to the next section, which deals with mechanisms for reducing agency costs.

2.2.1. Mechanisms for reducing agency costs

The literature includes a number of mechanisms which mitigate agency costs, some of which are internal to the firm, and others, external. Organisational (internal) mechanisms will be dealt with first, and then external (market) mechanisms.

2.2.1.1. Organisational mechanisms

Expert/outsider boards

Given that ordinary shareholders have a right to appoint board members, it is expected that the board would consist of individuals capable enough of monitoring management's actions. In many cases, outsiders (so called independent non-executive directors) are appointed in order to bring a balanced view and to keep managerial hegemony in check (David, Kochhar and Levitas, 1998).

Share-based remuneration and insider shareholders

By aligning the interests of managers with shareholders, one can reduce agency costs. Share-based remuneration is a means of achieving this, through the awarding of shares, share options, phantom shares and a wide variety of other share-based remuneration. In particular, because middle management's activities are less easier to monitor than the tasks of lower-level employees (who are measured usually against a fixed output per employee), "shirking by middle management may be reduced if they are allowed to share in profits….sharing in profit gives some incentive to curtail *voluntarily* the degree of shirking" (Demsetz, 1983 : 385).

The use of debt

First introduced by Jensen and Meckling (1976) as a means for reducing agency costs, the use of debt over equity reduces the amount of free cash flow available to managers to spend at their discretion. Jensen and Smith (1985) conducted a survey of numerous studies which showed that leverage-enhancing transactions resulted in significantly positively abnormal returns in share prices, with 2-day gains ranging from 2.2% to 21.9%.

2.2.1.2. External mechanisms

The stock market

First introduced by Jensen and Meckling (1976), external monitoring by the stock market is unique only to companies that are listed on stock exchanges. Share prices represent the "implications of internal decisions for current and future net cash flows" (Fama and Jensen, 1983 : 313). Thus agency costs will be reflected in share prices, exerting pressure on management to maximising the value of the firm to its shareholders.

Furthermore, Demsetz (1983 : 387) asserts that:

> "of course, management does worry about the prices of the firm's stocks and bonds because these give the terms on which capital will be supplied to the corporation…even shirking managers desire cheaper financing of amenities."

The market for corporate control (takeovers)

The second external mechanism is also only limited to publicly-listed firms, being the external monitoring by the takeover market. Where the firm's value is not being maximised (being reflected by a weak share price), hostile managers from other firms can bypass existing managers to gain control of the firm through open market purchases of the target's shares (Dyl, 1988). This further exerts pressure on the incumbent management to act in the interests of shareholders, and not themselves.

Finally, the presence of large institutional shareholders has also shown to be a mechanism for reducing agency costs, but to this, an entire section is devoted.

2.3. Institutional Investors

> *"Social and institutional factors [have] lead to a changing zeitgeist with respect to corporate governance issues."*
>
> - Zajac and Westphal, 1995 : 288.

For the purposes of this report, the definition of institutional investors as provided by Koh (2003) will be used. Institutional investors are defined as "large investors, other than natural persons, who exercise discretion over the investments of others...and include the following organisations: insurance companies (life and non-life), superannuation and pension funds, investment trusts (including unit trusts), financial institutions (including banks and finance companies, building

societies, and credit cooperatives), investment companies, and other nominee companies associated with the above categories of institutions" (Koh, 2003 : 112).

While the literature on institutional investors in the United States (U.S.) is small but slowly expanding, the literature on them in South Africa is limited. Few studies have examined the effects that institutional shareholders have had on the companies that they invest in, with just anecdotal evidence being reported on by the media. However, the amount of influence that they potentially have at their disposal is undeniable.

In the U.S., institutional ownership of corporations has increased from approximately 16% in 1965 to just over 50% in 2003 (Hartzell and Starks, 2003). Hamilton (2001) noted that only four companies in the 1000 largest American corporations had 90% or more of their shares owned by institutional investors in 1987, but by 1997 this had grown to 40 companies. In the U.K. and Australia in 1995, institutions held approximately 60% and 50% of listed domestic equities respectively (Ramsay et al., 1998).

2.3.1. South African institutions

In South Africa there is very little research as to how much exactly institutional investors own. Currently the biggest institutional investor is the Public Investment Corporation (PIC), with over R786.8 billion worth of assets under management and approximately 47% of those funds invested on the JSE, as at 31 March 2008 (Public Investment Corporation, 2008). The PIC controls about 9.1% of the market capitalisation of the JSE (Public Investment Corporation, 2008).

The PIC is wholly owned by the South African government, and though founded in 1911, it was only established as a corporate entity in terms of the Public Investment Corporation Act of 2004, on 1 April 2004 (www.pic.gov.za). The PIC invests funds on behalf of public sector entities, of which its biggest client is the Government Employees Pension Fund (GEPF), which accounts for approximately 91.7% of assets, and is the seventh largest pension fund in the world (Public Investment Corporation, 2008). However, owing to its size (and the fact that any meaningful portfolio adjustments could have major implications for the capital markets) has led to the PIC outsourcing some 86% of its equity portfolio to external asset managers, which include RMB Asset Management, Stanlib, Futuregrowth, Sanlam Investment Managers and Old Mutual Asset Management (now called Old Mutual Investment Group South Africa) (Rose & Gunnion, 2005). In March 2005, the PIC relocated R22 billion of equity investments from these managers to their internal fund, largely due to the fact that its own fund had outperformed its outsourced funds, and that the PIC had started to bolster its own investment teams (Gunnion, 2005).

The following table shows South Africa's 15 largest asset managers, by assets under management (excluding the PIC), as of 31 December 2007:

Table 1: South Africa's 15 largest asset managers at 31 December 2007

Rank	Company	Total Assets under management as at 31 December 2007 (R'000)
1	Old Mutual Investment Group SA	445 691,8
2	Stanlib Asset Management	339 828,0
3	Sanlam Investment Management	288 213,0
4	Allan Gray	233 962,5
5	Investec	222 552,9
6	RMB Asset Management	190 510,0
7	Investment Solutions	138 600,7
8	Coronation Fund Managers	133 408,1
9	Sanlam Multi Managers	101 419,4
10	Absa Asset Management	77 552,0
11	Prudential Portfolio Managers	71 629,5
12	Metropolitan Asset Managers	60 423,1
13	Advantage Asset Management	57 771,2
14	Cadiz African Harvest	49 810,0
15	Prescient Investment Management	40 742,3

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2.3.2. Institutional shareholder activism

Possibly the biggest area of research has concerned the role of institutional investors in maximising shareholder wealth and curtailing poor management decisions. Activism "includes a broad set of actions including public announcements, shareholder proposals and proxy contests, through which institutional investors attempt to gain power" (David and Kochhar, 1996 : 463).

The main aim of these actions is to bring public pressure on complacent managers, thus improving firm performance and enhancing shareholder value. The efficacy of these actions is ultimately dependent on, amongst other things, their legitimacy, managers' attitude to such actions, and any legislative barriers. For example, in Germany and Japan, where a strong culture of activism exists, numerous interventions by institutional investors have led to major

turnarounds (Akai Electric in Japan) and management shake-outs (Daimler-Benz in Germany) because the prevailing regime encourages, and is conducive to, such action (David and Kochhar, 1996).

In contrast to this, in the United States, where regulatory barriers exist, institutional action is sometimes considered as an unwarranted intrusion into companies' affairs (Smith, 1996). California's public pension fund, California Public Employees Retirement System (CalPERS), is infamous for its targeted interventions. Smith (1996) examined firms that were targeted by CalPERS over the period 1987-1993 and found that 72% adopted proposed changes or made changes resulting in a settlement with CalPERS. He further found that shareholder wealth increased for firms that adopted or settled, while decreased for those that resisted the action. For CalPERS, "the value increase of its holdings from activism is almost $19 million over the 1987-1993 period…while its estimated costs of activism over the same period were approximately $3.5 million" (Smith, 1996 : 251).

Nesbitt (1994) also investigated companies targeted by CalPERS, and in particular, their long-term share price performance. Prior to the initiative led by CalPERS, the targeted companies had under-performed the S&P 500 index by 66% over the previous 5 years, but outperformed the index by 41% over the subsequent 5 years. "To the extent such long-term excess gains are attributable to an ongoing institutional catalyst for change and a fundamental response by directors and management, the results of this study provide support for the effectiveness of long-term relationship investing" (Nesbitt, 1994 : 80).

Carleton, Nelson and Weisbach (1998) examined the activities of the Teachers Insurance Annuity Association-College Retirement Equities Fund (TIAA-CREF), the single largest U.S. pension fund which holds approximately 1% of the total U.S. equity market. They found that out of the 45 firms that TIAA-CREF contacted between 1992 and 1996 about governance issues, agreements were reached with 42 firms (93%) and 39 (87%) subsequently took action to comply with these agreements. They also found statistically significant positive abnormal returns surrounding the targeting date for blank cheque preferred issues.

Gillan and Starks (2000) examined the voting outcomes and short-term market reactions of shareholder proposals (known in South Africa as shareholder's resolutions), depending on the proposal type and the identity of the proposal's sponsor. The sample consisted of 2042 shareholder proposals submitted at 452 companies over the period 1987-1994. Of the proposals, 463 were submitted by institutional investors, 213 proposals by co-ordinated groups of individual investors, and the remaining 1366 proposals were from individual investors.

Proposals sponsored by the latter garnered fewer votes and were associated with a slightly positive affect on share prices. However, proposals sponsored by institutional investors and co-

ordinated groups of investors received significantly more votes and had a small, negative impact on share prices. Gillan and Starks (2000 : 301) explained this by stating that "the negative reaction may result from a belief that the appearance of the proposal in the proxy statement is a signal of management's unwillingness to negotiate with such investors". In a related study, Gordon and Pound (1993) found the same results.

Many of the studies however, only focused on "visible" activism. Behind-the-scenes (or "invisible") activism also occurs but is more difficult to research, and is likely to be more effective than visible activism (Coffee, 1991). A study by Opler and Sokobin (1997), investigated firms that were on the 'focus list' of the Council of Institutional Investors (CII), an umbrella organisation for large institutional investors in the U.S. Compared to other such organisations (e.g. CalPERS), the CII used quiet diplomacy when engaging with investee companies, and not public shareholder proposals. The study covered 117 firms over the period 1991-1994. Prior to appearing on the list, the targeted firms exhibited poor share price performance. After being put on the list, the targeted firms outperformed control firms (matched by industry, book-to-market ratios, and prior returns) in both share price performance and accounting performance.

Another study, by Strickland, Wiles and Zenner (1996), examined 216 proposals at 85 firms during 1990-1993, by the United Shareholders Association (USA), an organisation for small shareholders. The USA monitored publicly-traded firms and targeted those that had poor financial performance, executive compensation plans that were not sensitive to firm performance and policies that limited shareholder input on corporate governance. The organisation first attempted to negotiate agreements with targeted firms, using its 65 000 members' ability to sponsor proxy proposals as leverage. The results indicated that the USA successfully negotiated changes involving 53 proposals before those were submitted for inclusion in proxy statements. The targeted firms' shareholders experienced an abnormal return of 0.9% at the announcement of the negotiated agreement, suggesting that the USA was successful in its actions.

2.3.3. South African institutional shareholder activism

The King Report on Corporate Governance for South Africa (2002 : 44) notes that:

> "Institutional shareowners in South Africa have been notable in their apathy towards participating actively in shareowner meetings and it is recommended that the bodies representing these institutions look to the steps taken by bodies such as the National Association of Pension Funds and the Association of Pension Funds and the Association of British Insurers in the United Kingdom in setting benchmark standards expected of companies in relation to conformance with good corporate governance."

Furthermore, the report states that, “the absence of shareowner activism in South Africa seriously undermines good levels of managerial compliance. Institutional investors and pension funds for the most part remain passive despite some very obvious instances of poor or undesirable corporate governance practices by South African companies. A moderate level of activism has recently emerged however” (King Report on Corporate Governance for South Africa (2002 : 143).

The “moderate level of activism” mentioned above has emerged through a number of recent successes, most involving institutional investors placing pressure on management to change course. These include former co-operative OTK (now Afgri) being forced to adopt a new restructuring strategy, the Comparex (now called Business Connexion) and Kersaf boards being reconstituted and the delisting plans of Energy Africa and Mutual & Federal being rejected (Marrs, 2004).

In the following section the Comparex case (owing to its precedent-setting nature), the emerging role of the PIC, as well as an examination of the status quo in South Africa, is reviewed. Please note that due to the scarcity of academic research on institutional shareholders in South Africa, the information that follows has been mainly obtained from newspapers, websites and other financial-related press articles.

2.3.3.1. Comparex case study

In June 2002, a group of institutional shareholders of Comparex decided to change the board of the Information Technology (IT) consulting company, arising from frustration with management, mainly for not productively using the windfall it had received from selling its networking business to Dimension Data at the height of the IT boom (Cohen, 2003).

Their argument was that the company should either use the money productively or give it back to shareholders. Part of this windfall had already been spent in Europe for little return, and the company was losing money. The situation was complicated by the fact that the market value of IT assets was collapsing at the time and that any investment might be markedly cheaper by waiting a bit longer. But institutional shareholders became weary after two years of inaction. This was followed by a letter sent on behalf of Allan Gray, Investec Asset Management and Sanlam Investment Management stating that they supported a change in the board, if necessary by calling an extraordinary general meeting (Cohen, 2003).

The Comparex directors replied, complaining to the Securities Regulation Panel (SRP) that the acts of the asset managers constituted “action in concert” and arguing they were to be obliged to make an offer to minorities because collectively they owned more than 35% of the company’s shares. If this argument was upheld, the asset managers’ action would be regarded as an “affected transaction” in terms of Section 440 of the Companies Act and the panel’s rules (See Section 2.3.5.2.) (Cohen, 2003).

The SRP ruled that the fund managers had not contravened the section. The finding was largely based on the definition of “control” and a distinction between types of mandates that are granted to asset managers by pension funds and the like. The SRP also pointed out that an agreement on how the parties will vote at a general meeting was not in itself sufficient to give rise to an affected transaction, as it was not allied with a decision to acquire shares (Cohen, 2003). The significance of this ruling was considered a major victory for shareholder activism as it effectively allowed institutional shareholders to pool their voting power in cases where managers act contrary to shareholder value maximisation. In any event, many of the directors resigned instead of waiting for the SRP's ruling and the board was reconstituted with the company being renamed Business Connexion (Cohen, 2003).

2.3.3.2. The PIC – champion for shareholder activism?

Following its corporatisation in April 2005, the PIC has become a more active shareholder in its investee companies (Rose, 2004a). In recent years the PIC has challenged executive remuneration at a number of companies, including Dorbyl (who paid CEO Bill Cooper a R2.4 million bonus in 2004, despite a 25% drop in earnings) and Aveng (who paid CEO Carl Grim a R166 000 bonus amid a 66% income drop) (Rose, 2004a).

In May 2005, the PIC also questioned life assurer Sanlam as to why it wanted shareholders to approve a 60% pay increase for its chairman, Roy Andersen, at its June 1 annual general meeting (Rose, 2005a). Later in November of that year, the PIC voted against Shoprite CEO Whitey Basson's R58 million package, but failed to lobby others to reject it (Rose, 2005b).

The PIC also investigated listed industrial Barloworld, in 2007. In January 2007, the PIC, which owned 17.2% worth of Barloworld’s shares, challenged the conglomerate for not having a single black director on its Board. It was also unhappy that the Chairman of the Board, Warren Clewlow, was also the father-in-law of the recently appointed CEO, Clive Thomson (Rumney, 2007). This subsequently led to four directors resigning from the Board, including Clewlow

himself, and the appointment of a black Chairman, advocate Dumisa Ntsebeza, and a black executive director, Isaac Shongwe (Mantshantsha, 2007).

However, shortly afterwards, Barloworld announced the appointment of former SASOL deputy CEO, Trevor Munday, as deputy chairman of the group, a newly created position that had not existed at the company for more than a decade. The PIC described this as being "racist and patronising, because it would appear that the company believes the first black person to become chairman in its 105-year history needs a white deputy to look over his shoulder" (Rose, 2007a). Munday subsequently also resigned.

The PIC also recently indicated its intention to review the independence of some of Barloworld's independent non-executive directors, especially that of Mike Levett, a non-executive director who had been with the company for 22 years (Crotty, 2007a). It regarded such a tenure to severely affect the independence of a director who was supposed to be independent of that company.

The amount of influence that the PIC has cannot be questioned, simply due to the amount of funds that it has under management. However, a more pertinent issue is how strong its links with government still are. This is important because, while the PIC will remain a state entity and some of its board members will be government appointees, its primary responsibility is to the state employees whose pension funds it manages. This was highlighted in the actions that the PIC took against Sasol over the appointment of a black director, Imogen Mkhize (Rose, 2004b), as well as with Barloworld (Rumney, 2007). In 2008, the PIC vetoed directors' pay at a number of companies, including AngloGold Ashanti, where is said that the fees were "extremely high" (Rose, 2008 : 140).

The following table shows the top 10 holdings of the PIC as at 31 March 2008. The table is relevant, as it shows the significant voting power that the PIC has in many of the companies in which it invests, and thus, the ability to enable change at these companies.

Table 2: Top 10 holdings of the Public Investment Corporation at 31 March 2008

	Company name	**Percent**
1	SA Corporate Real Estate Fund	31.29%
2	Growthpoint Properties Ltd	29.14%
3	Alexander Forbes Pref Share Inv Ltd	22.85%
4	Lewis Group Ltd	19.93%
5	Aveng Ltd	18.89%
6	Imperial Holdings Ltd	17.93%
7	Telkom SA Ltd	17.77%
8	Sasol Ltd	17.10%
9	Barloworld Ltd	15.16%
10	Murray & Roberts Holdings Ltd	14.83%

Source: Public Investment Corporation (2008 : 84).

2.3.3.3. Other significant institutional shareholders

2.3.3.3.1. Frater Asset Management

Frater Asset Management ("Fraters") is possibly the most vocal of all institutional shareholders on principles of corporate governance. They were not only the first asset manager to offer an "activist" investment (the Fraters Earth Equity Fund – launched in October 2001), but were also the first to publish a complete voting record and voting proxy policy (Frater Asset Management, 2007a).

From an international perspective, they were also the first South African asset manager to become a signatory to the United Nations Principles for Responsible Investing, as well as the first to become a signatory to the Principles of the Extractive Industries Transparency Initiative (EITI) – an initiative that supports the full publication and verification of company payments and government revenues from oil, gas and mining, in resource-rich countries (Frater Asset Management, 2007b).

Certain asset managers such as Investec Asset Management and Cadiz African Harvest don't publish their voting records, as they believe that it would lead to unhelpful public debates on each vote – they preferred to work privately with companies, than publicly against them (Bonorchis, 2007a).

Fraters, however, have been public with their intentions. To this end, they have set up an independent advisory board, selected from local company directors, professionals, and international asset managers that adopt a similar approach and leaders of a number of non-governmental organisations (Frater Asset Management, 2007c). This board reviews engagement and voting policies, helps set priorities for engagement and suggests methods of engagement (Frater Asset Management, 2007c).

One of the responsibilities of the board is to review Fraters' voting policies. According to the voting policy, "as far as possible, Fraters will contact the company, preferably in writing, prior to voting, to discuss our concerns, explain why Fraters is voting in a particular manner, explain the voting policies of the firm, and to request the company to implement a strategy to meet our recommendations, where appropriate" (Frater Asset Management, 2007d : 3).

The policy document sets out very clear guidelines as to how Fraters will vote in certain scenarios, and their views on certain governance issues. These include extensive provisions on the re-election of directors, the size and composition of the Board, remuneration of directors, capital allocation decisions (share issues, repurchases, etc.) and others. Because an important topic of this study deals with executive remuneration, this will be discussed next.

Fraters would consider a symbolic vote against the re-election of one or all of the Chairman, deputy chairman and the chairman and members of the remuneration committee should the company consistently fail to adopt best practice standards with regards to remuneration. (Section B, item 3.1.3.). Fraters is opposed to share options being awarded to non-executives as they believe that it may impair their independence, but if they are awarded, there are very strict conditions under which they should be awarded, e.g. share options should not be issued at a discount, and they should be aligned with board performance indicators, not performance indicators that are applied under general employee share option schemes (Section B, item 3.2.4.). This was evident when they voted against share options being awarded to Mervyn King, a non-executive at furniture retailer JD Group (Rose, 2008).

Fraters also stipulates significant disclosures by companies with regards to share option schemes (Section B, item 3.3.6.). And finally, where Fraters believes there to be excessive

remuneration, “where it is inadequately motivated and there is a clear misalignment of interests between management and shareholders, Fraters should consider voting against one or all members of the remuneration committee nominated for re-election, and/or the Chairman or deputy chairman” (Section B, item 3.4.).

However, in terms of assets under management, they are a relatively small institution and would have less of an impact as a bigger institution, such as Allan Gray.

2.3.3.3.2. Allan Gray

Allan Gray is the largest privately-owned investment management firm in South Africa, with assets under management of R234 billion as of 31 December 2007 (Financial Mail, 2008). They have been involved in some of the more high-profile shareholder conflicts in South Africa. In 2000, they were instrumental in forcing through management changes at listed agricultural co-operative OTK (Marrs, 2004). They were also involved in the previously mentioned Comparex case.

Allan Gray also often takes large positions in its investee companies. For example, the approximately 25% stake that it held in both mining companies JCI and Randgold & Exploration (R&E) enabled it to be the chief proponent behind the ousting of Brett Kebble (from both companies) in August 2005, for which the Chief Investment Officer, Stephen Mildenhall, was alleged shot at by supporters of Kebble (Sergeant, 2007). More recently, they were also involved in the ousting of 2 directors from the Board of R&E (Sergeant, 2007).

2.3.3.3.3. Other companies

One of the few companies (other than Fraters) to publish its policy on certain corporate governance issues is Regarding Capital Management (“RE:CM”). There are clear policies with regards to the composition of the Board of Directors, directors’ remuneration policies, and the repurchasing and issuing of shares. Of particular relevance to this study, was their policy on executive share option schemes:

“In principle, we are against share option schemes as a form of remuneration, unless they contain very challenging performance conditions. Options issuance should be linked to explicit financial performance criteria, preferably relative to an index of comparable companies. Such a

share option scheme must only be available to top management" (Regarding Capital Management, 2007).

RE:CM is also the only other asset manager to publish its voting records (Bonorchis, 2007b). In 2008, RE:CM voted against Standard Bank chairman Derek Cooper's remuneration, as they believed "the amount proposed for his remuneration [was] excessive" (Rose, 2008 : 140). Unfortunately, RE:CM has significantly less funds under management than some of the more established asset managers.

A number of other companies also have standard policies on certain company actions (see also sub-section 2.3.3.4. below). These often involve critical decisions such as giving directors approval for issuing shares for cash. Institutions such as Fraters, Coronation Asset Management (Coronation), Allan Gray, RMB Asset Management (RMB) and RE:CM all have written policies against such resolutions (Jones, 2007).

2.3.3.4. The current state of institutional shareholder activism in South Africa

Trevor Manuel, the Minister of Finance, has urged pension fund trustees and members to "pool their collective muscle" to influence companies in which pension funds are invested (Rose, 2005c). The biggest pension fund in South Africa – the Government Employee Pension Fund (GEPF) – also falls under him as Minister of Finance, and it (the GEPF) recently signed the Principles of Responsible Investment (Bonorchis, 2007a). This will require the fund to disclose how it votes. "If that were to happen, it may follow that the Public Investment Corporation and the fund managers that it uses may follow suit. This would be the tipping point for shareholder activism in SA" (Bonorchis, 2007a : 1).

Trade unions such as the Congress of South African Trade Unions (COSATU) said that it would also play a more active role in influencing corporate decisions using the leverage of workers' pension money (Rose, 2005c). These events have served to create an environment in which trustees are becoming more aware of their fiduciary duties.

In a recent event involving MTN Group Ltd ("MTN"), the influence of institutional shareholders was again highlighted (Anderson, 2007). At MTN's Annual General Meeting, 46% of shareholders voted against the resolution giving directors the general authority to issue up to 10% of the company's share capital. The resolution was therefore rejected, because it required the approval of 75% of shareholders.

Institutional shareholders, Allan Gray and RMB Asset Management, both voted against the resolution, citing standard policy not to allow directors the freedom to issue large amounts of shares without first consulting them with regards to the reasons for the share issue (Anderson, 2007). RMB cited a further reason that "the company would be virtually ungeared by end-December-2008 and, consequently, it didn't seem wise to issue shares for cash" (Anderson, 2007 : 26).

The Financial Services Board (FSB) recently published a circular entitled "Good Governance of Retirement Funds" (www.fsb.co.za/pension/circulars.html). However, the circular only mentions how pension funds should be run, and is silent on shareholder activism and disclosure of shareholder votes. This has been criticised by some, including Fraters, who described it as being of little substance (Bonorchis, 2007a).

Finally, in August 2007, the PIC released its much-awaited corporate governance guidelines. Whilst similar to King II in many ways, it has a number of distinguishing features, most of all being that while King II was not required to be complied with by companies (although JSE-listed firms are required to report deviations from King II), the PIC's set of governance principles will be enforced by a large, powerful shareholder. The PIC will also start publishing its voting records from March 2008 (Crotty, 2007b).

Its distinguishing features include opposing dual equity capitalization structures that give preferential voting rights to different classes of shares (e.g. Naspers, Remgro), pyramid structures (e.g. Standard Bank-Liberty Holdings-Liberty Life), companies that do not have independent, non-executive chairmen (e.g. JD Group, Steinhoff), and companies that do not have Boards that "reflect the demographics of the country in terms of gender and race" (Rose, 2007b : 62). Finally, the most significant differentiator is its clear statement on executive remuneration. The PIC requires companies to provide detailed disclosure on how and why executives are remunerated the way that they are. It also prefers that non-executive directors are paid only in cash, as it believes that share-based remuneration may undesirably compromise the independence of such directors.

The major criticism of this code, however, is that it essentially uses the same definition of "independence" that King II uses, which is notably deficient with regards to non-executive directors who have served long periods on company boards (Rose, 2007b).

2.3.4. Empirical evidence on institutional shareholders

The four main areas in which the effect of institutional investors has been studied relate to corporate takeovers, innovation/research and development, corporate diversification and dividend policy. However, in some of these areas the conclusions have been equivocal. The literature examining the relationship with executive compensation is reviewed in a later section, owing to its stand-alone significance.

2.3.4.1. Corporate anti-takeover amendments

Brickley, Lease and Smith (1988) examined whether institutional investors voted differently to other investors when it came to anti-take over charters, using data from 201 firms that proposed 308 anti-takeover amendments during 1984 in the U.S.. Their hypothesis was that managers of poorly performing firms have incentives to protect their positions with anti-takeover defences, which may reduce shareholder value. They found that institutional investors not only voted more actively on these amendments (compared to other investors) but also voted against value-destroying anti-takeover defences. They also found that different types of institutional investors voted differently. In order to avoid repetition, this is discussed in Section 2.3.5.1., because it is more relevant to that section.

Agrawal and Mandelker (1992) also examined anti-takeover proposals, using data from 356 firms in the U.S. over the period 1979-1985. They documented a statistically significant negative relationship between the ownership of institutional shareholders and the abnormal returns on the shares of firms around the announcement of anti-takeover amendments, indicating that their findings were consistent with the theory that firms with large institutional ownership are more likely to maximise shareholder wealth.

2.3.4.2. Innovation/research and development

Jarrell and Lehn (1985), as cited in Graves (1988), examined the relationship between institutional ownership and research and development (R&D) spending in 324 companies during the period 1980-1983. Using multiple regression analysis, they found a statistically significant positive relationship between the level of institutional ownership and the R&D-to-sales ratio, suggesting that institutional investors encourage such value-creating expenditure.

Graves (1988) extended the study of Jarrell and Lehn (1985), but focused on a single industry – computer manufacturing – over the period 1976-1985. He used two measures of R&D intensity: constant-dollar R&D expenditures per employee and R&D as a proportion of sales. Graves

(1988), however, found a negative relationship between R&D intensity (spend) and institutional ownership, arguing that such spending tends to be large and left to managers' discretion, and hence subject to abuse. Given that the study was focused on the computer industry, Graves (1988) acknowledged that such behaviour might also be only endemic to that industry. He also attributed this to possible reason that some institutional investors may have a short-term focus, and thus would discourage R&D spending, as they negatively affect short-term earnings.

In a later study, Baysinger, Kosnik and Turk (1991) examined the R&D programmes of 176 Fortune 500 companies over the period 1980-1983, and across different industries. They found a positive relationship between corporate R&D programmes and the level of institutional share ownership, arguing that, “the prospect of high financial returns attracts institutional investors to companies that engage in long-term R&D strategies, and the investment risk does not deter these investors because they can diversify it away” (Baysinger et al., 1991: 212).

2.3.4.3. Corporate diversification

Palmer, Friedland, Jennings and Powers (1987) examined the relationship between institutional ownership and corporate diversification, using data on 147 firms over the period 1963-1964. The found a negative relationship between the two, arguing that institutional investors discourage such ‘empire building’ by managers.

In contrast to this, Hansen and Hill (1991) conducted a study of 129 firms over the period 1977-1987 and found a positive association, noting that some institutions would rather use the activities of their investee companies through which to diversify their own risk.

2.3.4.3. Dividend policy

Short, Zhang and Keasey (2002) as well as Eckbo and Verma (cited in Short et al., 2002) found a positive association between institutional shareholdings and a firm's dividend payouts in the United Kingdom and Canada, respectively. Short et al. (2002) examined 211 firms listed on the London Stock Exchange over the period 1988-1992, and used 4 different types of dividend models to test their hypothesis.

Short et al. (2002) argued that the payment of dividends reduces agency costs, as such payment forces a firm to go to external capital markets in order to secure additional finance, and thus the firm has to undergo monitoring by the capital market. Short et al. (2002), further cited the favourable tax treatment of dividends (over capital gains), as a reason that institutional shareholders may prefer companies with higher dividend payouts.

2.3.5. Barriers to effective governance

While it may seem that institutional investors wield immense power, in some ways this power is constrained. The main threats to their ability to monitor firms effectively arise from additional business relationships they may have with investee companies, regulatory restrictions, high costs of monitoring and lack of organisational capability and other reasons that may affect institutional shareholders who are only short-term holders of the company's shares (i.e. active traders). These are discussed in detail below.

2.3.5.1. Business relationships

With some financial institutions such as banks and insurance companies, there is a possible conflict of interest as these institutions may also invest in the companies with which they have commercial dealings. Thus, institutions' ability to intervene is limited to the extent to which they depend on those companies for business.

Brickley et al. (1988) developed a taxonomy of different types of institutional investors, with three classifications of institutional investors: "pressure-resistant" (those without any significant business relationship); "pressure-sensitive" (those for whom a conflict of interest is highly probable) and; "pressure-indeterminate" (those for which there is a business relationship, but uncertainty as to the influence of such relationship). Brickley et al. (1988) found that mutual funds, endowments and foundations, and public pension funds are more likely to oppose anti-takeover charter amendments than banks, insurance companies and trusts, the latter group more likely are which to have business relationships with their investee companies.

Kochhar and David (1996) also found that only institutional investors without potential business relationships positively influence firms' investment in innovation, while other institutions have no effect, further confirming that business relationships provide a barrier to corporate governance.

2.3.5.2. Barriers from the regulatory environment

In a survey conducted by Ramsay et al. (1998) amongst Australian institutional investors, most indicated that insider trading provisions acted as a disincentive to effective monitoring by restricting the level of monitoring, due to the fear of acquiring inside information and thus being prohibited from trading the shares until such information was made public.

Black (1990) cited a complex web of legal rules that made it difficult, expensive and legally risky to own large percentage stakes or to undertake joint efforts, by institutional shareholders in the U.S. These include various barriers such as state corporate law, proxy rules, disclosure requirements, insider trading reporting and liability, poison pills, ownership limits, fiduciary liability, and antitrust concerns (Black, 1990). Black and Coffee (1994) examined shareholder passivity in the U.K., and came to similar conclusions as Black (1990).

Following the Comparex case, the only potential regulatory barrier to institutional shareholders acting in concert was effectively removed by the SRP's decision. The ruling meant that institutional shareholders are allowed to act in concert, provided that there is no simultaneous arrangement in place to acquire shares with intention to take control. This would not constitute a breach of S440 of the Companies' Act.

2.3.5.3. Barriers due to monitoring costs and organisational capability

When shareholders are dispersed and ownership is less concentrated, monitoring costs are high due to the need for co-ordination and increased information asymmetry (Tosi and Gomez-Mejia, 1989). As the number of owners increases, the benefits that an individual investor receives for greater monitoring decrease with the marginal costs required, creating a ‘free rider’ problem. Hence, monitoring ultimately depends on the cost-benefit trade-off.

Furthermore, some institutions (especially the smaller, boutique-types), may not have the sufficient resources, both time and staffing, to engage in interventions (Black and Coffee, 1994). Intervention may consume scarce managerial time, and then there is the added disincentive that larger rivals (who are also invested in the target company) may also gain from the action.

2.3.5.4. Barriers as a result of being an active trader

Some institutions may only hold a company’s shares for the short-term and may be apathetic towards shareholder activism for a number of reasons. Firstly, these institutions may be cut off from the flow of information that management provides to securities analysts and institutions, if they challenge management on certain issues (Soobyah, 2002). The value of this information may not be as beneficial to long term holders such as pension funds or asset managers with long investment horizons.

Secondly, due to the long-term benefits of shareholder intervention, these short-term shareholders may have no incentive to act. For example, a disruption may even lead to an interim period of share price weaknesses, which is undesirable for these investors.

Black (1990) makes mention of a number of 'cultural factors' that may further inhibit shareholder action. The focus by many fund managers on outperforming their competitors may mean that they are not accustomed to taking legal risks.

2.3.6. A survey of South African institutional shareholders

Soobyah (2002) conducted a survey of a sample of institutional shareholders in South Africa. The sample consisted of 2 respondents from each of Abvest (ABSA's previous asset management division), Fraters, and FTNIB Asset Management (now Nedgroup Investments), who at the time managed R40 billion worth of funds collectively. While the sample size may have been small, its findings were interesting and relevant to this study. The survey was intended to ascertain what some of the factors were that inhibited shareholder activism in South Africa (amongst other things).

A unique factor related to the convoluted control structures that were established in the past, such as low-voting "N" shares (e.g Naspers, Brimstone) and pyramid structures (e.g. the Liberty Holdings-Liberty Group pyramid structure), which made shareholder intervention difficult. However, since the JSE has now outlawed the creation of these (despite allowing existing structures to continue), this is less likely to be a factor in the future (Soobyah, 2002).

Another factor was the close relationship between corporate managers and institutions, owing to the small community of institutional investors. This often led to a conflict of interest, as "there were only six or seven major institutions, which had close associations with brokers, investment banks and asset managers" (Soobyah, 2002 : 48).

Trustees of pension funds were also cited as being uninformed on certain issues, as well as their significant workloads and short tenures precluding them from taking a more active stance. Other factors included the lack of time and resources, as well as expertise in dealing with corporate governance issues, on the part of asset managers. The respondents also cited the 'free rider' problem, as well as the negative publicity that may arise from interventions, which may result in depressed prices due to panicked selling. Finally, scrip lending by pension funds was common because it contributed additional revenue separate from fund performance. When funds lend their scrip, they lose the ability to vote, which may be material in instances when

value is destroyed (Soobyah, 2002).

The institutions were also asked that, if a company exhibited poor corporate governance, whether they (the institutions) would sell the shares or engage with management. The general response was that they would first engage with management, making management aware of their position and recommending possible courses of action. The next course of action would depend on the relative size of the holding – if it was small then the company would be sold, but if it was a large, then further engagement with management would be undertaken. One of the respondents mentioned the likelihood of meeting with other institutional investors should the matter be serious enough (Soobyah, 2002).

2.4. CEO compensation

> *"Fed by an exaggerated and unsubstantiated belief in their own importance, heightened by unspoken threats of imminent departure to even better paying jobs in Dubai, Sydney or Atlanta...these executives have heaped a whole load of money, share options and glory on themselves."*
>
> – Crotty, 2005b.

Executive remuneration has come under increasing scrutiny following the detailed disclosure now required by companies in their annual reports. While researchers in South Africa have seemingly ignored this previously unavailable information, the financial press has not. Due to the limited research in South Africa, most of the research that is cited is based on studies conducted in the United States. As one of the objectives of this report is to provide original South African findings, the findings of this research report are presented in Chapter IV.

2.4.1. Components of CEO compensation

CEO remuneration has many components, the sum total of which is not always the most important. To lend some structure to this discussion, total compensation, consisting of salary, bonus and share options, is referred to as the *level* of pay; each component is called a *type* of pay; and the combination of types is called the *mix* of pay (David et al., 1998). While the amount of pay is an important factor, consideration of type and mix explicitly recognises the complexity of CEO remuneration.

2.4.2. Trends in the level and mix of compensation

Hall and Liebman (1998) found that the mean salary and bonus of U.S. CEOs grew by 97% over the period 1980-1994 (median by 85%), from $655 000 to $1.3 million (median from $566 541 to $1.05 million). The rise in the value of share options was even more dramatic, with the mean value of option grants having risen by 683% from $155 000 to $1.2 million (median from $0 to $325 000). Furthermore, Hall and Liebman (1998) found that the percentage of CEOs being awarded share options had grown from 30% in 1980 to 70% in 1994, while the number of executives holding share options increased from 57% to 87%, making them a very important component of equity incentives. The New York Times reports that share options were "the source of more than half of most top executives' compensation in 2001," (Maloney, 2002 : 1).

In South Africa, there is minimal research dealing with the value (not amount) of share options awarded to company executives. A survey conducted by staff recruitment firm Renwick Reward found that the average compensation package of SA CEOs comprised approximately 40% of share options (van der Kooy, 2000). Betts, Billett, Rainier and Survé (2005) found that executive share options as a percentage of total shares outstanding rose from about 2% to 2.5% over the period 2000-2004 in South Africa, indicating their increased popularity. They didn't, however, examine trends in option grants. One of the aims of this study is to quantify the actual value of share options awarded to company CEOs in South Africa, something that no other previous South African study has yet done (to the best of the author's knowledge).

The tilt towards incentive compensation is mainly in response to the agency problem – the often conflicting goals of managers and owners (shareholders), exacerbated by the separation of management and ownership. By aligning the incentives of executives with the interests of shareholders through the use of shares and share options, the agency problem is somewhat ameliorated.

One method of assessing how well the compensation structure ties CEO pay to firm performance is to calculate the dollar (rand) change in CEO pay relative to each thousand dollar (rand) change in total shareholder wealth. This particular relationship was specified by Jensen and Murphy (1990) and is referred to as "pay-performance sensitivity". Hall and Liebman (1998) found that this has more than doubled from $2.5 to $5.3 per $1000 change in firm value (from 1980-1994).

2.4.3. Share options

2.4.3.1. The mechanics of share options

A typical call option used in an executive compensation scheme allows the grantee to purchase a specified number of shares at a fixed exercise price. Typically, share options granted have maturity dates of five to ten years after the grant date (Abowd and Kaplan, 1999). The option contracts are written to allow the executive the right (but not the obligation) to exercise the option any time before it matures (i.e. they are “American” call options). Usually there are some formal restrictions on early exercise during the first few years of the option's life (“vesting restrictions”).

This method of remuneration effectively transfers equity value from existing shareholders to the party receiving the remuneration and dilutes the value held by the existing shareholders. The cost to shareholders of issuing share options is the decrease in value per share that results. Prior to the introduction of International Financial Reporting Standard 2: *Share-based payments* (effective for financial year-ends ending on or after 1 January 2005), this dilution was not reflected as a cost in the financial statements of companies, allowing entities to avoid reflecting a portion of remuneration paid in their reported financial performance.

2.4.3.2. Accounting implications

Prior to 1 January 2005, South African companies were only required to disclose the nature, terms, and dilution effects of these share based payments in their financial statements, with a charge rarely appearing in the profit and loss account. In the United States and United Kingdom, accounting practice has been to expense share options at their intrinsic value on grant date. Dreyer and Williams (2003) note though that the recognition of an expense based on the intrinsic value of an option can easily be avoided[1] and so companies have been able to reduce the effect of this legislature.

To address the effects of the cost of share-based payments, the International Accounting Standards Board (IASB) issued an exposure draft in November 2002 that drew upon comments submitted from interested parties in response to an earlier discussion document. In February 2004, the Board approved International Financial Reporting Standard (IFRS) 2: *Share-Based Payments* for issue.

The objective of the standard is to specify the financial reporting required by an entity when it undertakes share-based payment transactions. No matter what form of share-based transaction

[1] The intrinsic value of a share option is defined as the difference between the exercise price of an option and the ruling or spot price of the underlying share. By increasing the exercise price of an option to match the ruling price of the share on grant date, an issuer can reduce the intrinsic value of an option to nil.

is entered into, IFRS 2 requires the entity to recognise the related expense. IFRS 2 is effective for annual periods beginning on or after 1 January 2005.

The reasoning behind the expensing of share options is the fact that an entity has sacrificed its equity in lieu of services rendered by the employee (Hassan and Wolpert, 2005). Had the entity provided a cash salary, it would have recognised an expense in its Income Statement. Hence, even though the nature of the compensation has changed, the nature of the item as an expense has not changed. As Warren Buffett, billionaire investor and philanthropist, put it: "If options aren't a form of compensation, what are they? If compensation
isn't an expense, what is it? And if expenses shouldn't go into the calculation of earnings, where in the world should they go?" (Mann, 2001).

The effect of this policy change is that issuing share options reduces a company's profit for the year. Consider the example of listed financial services group Investec Limited who voluntarily disclosed the potential cost of share-based payments in the announcement of their September 2002 interim results. According to the announcement, expensing the cost of share-based payments would have reduced Investec's headline earnings for the six months ended 30 September 2002 by 4.2% (Dreyer et. al, 2003).

Furthermore, Matisonn (1999) investigated the effect that expensing share options had on a sample of South African company profits and presented the following results for the year ended 1996:

Table 3: The effect of expensing share options for a sample of South African companies for the year ended 1996.

Company	**Decrease in Earnings (%)**
Polifin	0.48%
Leisurenet	0.37%
Bidvest Group	6.43%
SAB	0.896%

In 2003, Pricewaterhouse-Coopers (PwC) conducted a study of the impact of IFRS 2's preceding exposure draft (ED2) on 22 listed companies in the United Kingdom (Financial Director, 2004). Although IFRS 2 is not exactly the same as ED2, the results are still informative. PwC found that the effects varied widely, depending on the share schemes in place. On average, implementing ED2 could reduce earnings from continuing operations by 3.5% and by more than 10% for the most affected companies (Financial Director, 2004).

As far as South African companies are concerned, Sanlam seems to be leading the way when it comes to accounting for executive share options. In the 2005 financial year, Sanlam deducted R800 million from its embedded value[2] because this is what it estimated was the fair value of its share incentive scheme (Business Report, 2005).

The valuation of employee share options is a complicated process, and critical to this study, as this study requires that the share options awarded to CEOs be valued. Owing to its standalone significance, a discussion on the valuation of employee share options as well as the impact of IFRS 2 on such valuation will be dealt with in Chapter III.

2.4.3.3. Tax implications

From a company's perspective, share options are not deductible as an expense. The South African Revenue Services ("SARS") is of the viewpoint that it is in fact the shareholders of the company who incur the expense, and not the company, as they suffer from the dilution of their own shareholding (Betts et al., 2005). This in contrast to the deduction that companies are allowed for shares that are awarded to employees in terms of a broad-based employee share ownership plan (S8B of the Income Tax Act).

For directors themselves, there are 2 different treatments depending on when the share options were granted. According to S8A of the Income Tax Act, share options that are granted before 26 October 2004 are only taxed when they are exercised (or ceded) by the director in question. This also applies to deferred shares awarded before 26 October 2004. Capital Gains Tax (CGT) only arises if the shares (that were acquired with the option) are sold.

For share options that were granted after 26 October 2004, the share options are taxed when they vest in the hands of the director (S8C of the Income Tax Act). Furthermore, any subsequent gains on the disposal of the shares acquired in terms of the option scheme, over and above the market value at vesting date, will attract CGT on disposal of those shares.

2.4.3.4. Adverse effects of awarding share options

Given the increased incidence of awarding share options to executives over the past few years, it seems logical that companies would repurchase shares, so as to counter some of the dilution that would result upon the exercising of those share options or to fund future share option grants. However, executives who are heavily compensated with share options may also have a

[2] Embedded value is not an accounting term. Sanlam disclosed the full effect of a change in policy, however they did not show an expense in their financial statements.

vested interest in favouring share repurchases over dividends. The primary reason is that share repurchases and decreased dividends both enhance the value of share options held on the company's shares. Thus, managers who hold these share options have an incentive to favour repurchases over dividends.

Jolls (1998), Fenn and Liang (2001) and Kahle (2002) all found evidence for both reasons of repurchases, but with emphasis on the latter. Within a South African context, Betts et al. (2005) conducted a study using data from 88 companies listed on the JSE Securities Exchange, for the financial years 2000-2004. They only found evidence for the first hypothesis, i.e. that companies repurchase shares in order to undo the dilution created by awarding employee share options. They attribute this result to a number of reasons, including a limited sample size, potential errors in data collection and the unavailability of data relating to the number of unexercisable executive share options.

2.4.3.5. Recent developments: phantom cash options

Following the accounting and tax reforms that have taken place with regards to share options, a growing list of companies in South Africa (including for example, Tiger Brands) have scrapped their share option schemes in favour of phantom cash option schemes (Crotty, 2006). How the schemes work is that companies will make a cash payment equivalent to the profit that would have been made by the executive on the share options, as opposed to issuing shares. The advantage is that these payments are tax deductible (conventional share options are not), and they avoid diluting existing shares in issue.

2.4.4. Legislation

Before the introduction of new accounting standards, both the King Report on Corporate Governance (1994) ("King I") and the King Report on Corporate Governance for South Africa (2002) ("King II") recommended full disclosure of top executives' remuneration, meaning that a single line item displaying a directors salary would now be broken down into its constituent parts: cash based remuneration, share options and any other forms of compensation.

In addition to King II, Section 297 of the Companies Act requires disclosure of all directors' emoluments. Yet the Companies' Act in no way empowers shareholders to regulate remuneration matters. Some guidance can only be found in Appendix V to King II. Entitled "Model Terms of Reference for Board Committees", paragraph 3.5 provides as follows:

“3.5 Shareholder acceptance

- Every effort should be made to promote acceptance of the necessity for, and benefits of, a realistic realignment of director remuneration;
- Requirements to disclose remuneration in annual reports is seen as a constructive opportunity to communicate with shareholders on all aspects of remuneration;
- The information disclosed could usefully include, in relation to each director, such matters as a breakdown of the remuneration into its individual components, the remuneration package as a total cost to company, the number of meetings attended and, if practicable, the number of hours worked;
- The adoption by companies of formal remuneration policies, encompassing such matters as the philosophy behind remuneration assessments, the criteria for remuneration setting, the remuneration components, and the composition and role of the Committee, and the disclosure of such policies to shareholders, can also indicate to the public a responsible approach by companies to remuneration issues.

In fact, the resolutions that are placed before shareholders at Annual General Meetings (AGMs) are only “to approve the remuneration of directors in their capacity as directors, not in their capacity as executives. Executive contracts, and thus executive remuneration, are established by the remuneration committee of a company, or what is termed usually in a company’s articles of association as a “disinterested body of directors”” (Frater Asset Management 2007d : 9).

Thus, shareholders cannot directly prevent executive remuneration abuse in South Africa. There are, of course, indirect means of reigning companies in for executive remuneration abuses, such as voting against re-election of the remuneration committee, or certain non-executive directors. Also, if the relevant company has a primary listing in the United Kingdom, e.g. Anglo American plc, then the remuneration report has to be presented to shareholders, in which case they will have input into executive remuneration (Frater Asset Management, 2007d).

However, shareholders are able to vote on the introduction and amendment of share option schemes. They are also able to vote on the allocation of shares to option schemes (Frater Asset Management, 2007d). Since remuneration committees have been mentioned above, they are discussed next.

2.4.5. Remuneration committees

Remuneration committees have been recommended by King II, “consisting entirely or mainly of independent non-executive directors, to make recommendations to the board within agreed terms if reference on the company's framework of executive remuneration and to determine specific remuneration packages for each of the executive directors” (King Report on Corporate Goverance for South Africa, 2002 : 2.5.2). It also recommends that the committee be chaired by a non-executive director. The aim of this is ultimately to ensure that executives are remunerated in a manner that would be considered fair and reasonable by an objective outsider, given that executive's performance.

The efficacy of remuneration committees however, is in question. Conyon and Peck (1998) found that companies in the United Kingdom that adopted remuneration committees or with high proportions of outsiders on those committees generally had *higher* levels of top management pay. Mongalo (2003) noted that this could be due to a number of reasons, the first of which is “back-scratching”: “the classic situation in which this occurs is if executive directors of company X are non-executives with company Y and the executives of company Y are non-executives of company X. It would be obvious to each of these individuals that it would be in their own self-interest to be generous with respect to their approach to executive pay” (Mongalo, 2003 : 763).

Secondly, cross-directorships (like in the example above) also mean “that when such individuals are deciding on issues of executive pay in companies in which they sit as members of remuneration committees, they would be aware that they are setting, albeit indirectly, the going rate for executive pay in a more general sense” (Mongalo, 2003 : 672), thus raising the benchmark for their own pay. In South Africa, this is of greater concern given the small pool of directors that are available and the numerous cross-directorships held by some (Crotty, 2005c).

Finally, it is problematic that members of remuneration committees themselves are remunerated by the company, the level of which is usually decided by the main board of directors. Daily, Johnston, Ellstrand and Dalton (1998) investigated this and found that the salaries of remuneration committee members and the composition of these committees are positively related to CEO compensation. Given all this, it would appear then that remuneration committees are from the panacea that they were made out to be.

2.4.6. Controversies surrounding executive remuneration

While any discussion on executive remuneration seems to invite controversy, there are a few major issues that have attracted much attention in the recent past, and are dealt with below.

2.4.6.1. Share option schemes

The first problem relates to share option schemes, ironically. Share options allow management to benefit when a company is doing well but do not penalise them when performance is unsatisfactory. In fact, in some cases when a company's share price has declined significantly, executive share options have been re-priced (e.g. Metro Cash and Carry, PSG) or even cancelled (e.g. Shoprite) (Henderson, 2001). Secondly, most executives tend to just sell their shares immediately upon exercising the share options granted to them (instead of holding onto the shares), thereby yielding an immediate profit (Mongalo, 2003). This practice completely contradicts the very reasoning behind awarding share options in the first place, i.e. as a long-term incentive tool.

2.4.6.2. Macroeconomic influences

In the past three years the South African economy has been experiencing a significant boom. In Massmart's 2005 annual report, non-executive chairman Chris Seabrooke noted that “continued low inflation and low interest rates, together with growth in real GDP of over 4%, higher disposable incomes, improved social stability, increasingly affluent black consumers and a more stable exchange rate have stimulated an unprecedented expansion in consumer spending” (Crotty, 2005b). Such an environment is mainly the fruit of the government's sound fiscal and monetary policies, yet remuneration committees have failed to see that “in a hurricane even turkeys can fly” (Crotty, 2005b). Given the rise in company share prices and that these are often used in determining executive remuneration, executive packages have increased dramatically, in many cases only because the companies have been trading in a highly favourable environment.

2.4.6.3. Excessive remuneration

By far the most controversial issue is the amount by which executives are remunerated. The criticism is that the gulf between executive pay and the pay of rank and file workers is increasing dramatically from year to year. The following table gives a comparative view of the pay

packages in executives in ten countries and their respective wage gaps (in order of total package):

Table 4: Total compensation for executives in different countries compared with the wage gap in that country

Country	**Total value (US$)**	**Wage gap***
United States	1 403 000	54
Canada	752 000	20
Britain	720 000	24
Australia	646 000	23
The Netherlands	621 000	17
Brazil	597 000	49
Japan	545 000	11
Germany	422 000	13
South Africa	406 000	22
New Zealand	258 000	14
* multiple of lowest paid worker		

Source: Finance Week, 24 November 2000, p. 28

Of the 25 countries, CEOs in 18 of the countries earned more than their South African counterparts, yet South Africa had the fifth highest wage gap. However, this could perhaps be due to the large skills and education differentials in South Africa, as well as different work ethic and productivity levels than other countries (Henderson, 2001).

Option schemes have also been used to mask excessive remuneration. *Business Report* (21 August 2005) indicates that Naspers CEO, Koos Bekker, whose remuneration consists solely of share options, was reportedly set to make a profit of over R300m on his share options if the current share price (at the time) held.

2.5. Previous research and their findings

The subject of executive remuneration, whilst receiving much attention from the financial press, has been seemingly neglected by academic researchers, while research on institutional investors/shareholder activism is anecdotal at best. As a result, much of the previous work in this arena has been conducted overseas, notably in the United States. The following section provides a brief summary of some of the related studies in this area, and is not intended to be a literature review.

While not specifically addressing the effect of *institutional* investors on executive compensation, Dyl (1988) examined whether in closely-held companies, *major shareholders* engage in monitoring activities that reduce agency costs through lower managerial compensation. Using a sample of the 271 major industrial corporations in the United States during 1982, he found a statistically significant negative relationship (at the 5% level) between the level of corporate control and management compensation. He estimated that, on average, "monitoring activities by major shareholders may have reduced the residual loss portion of agency costs due to excessive top management compensation by approximately 32%." (Dyl, 1988 : 24)

Gomez-Mejia, Tosi and Hinkin (1987) were the first to examine whether ownership structure affects the level and mix of executive remuneration. In their sample of 71 manufacturing firms in the U.S. over the period 1979-1982, they found that owner-controlled firms remunerated executives differently to management-controlled firms. They found that in owner-controlled firms, executives were rewarded more for the firm's performance, and had a higher proportion of their remuneration in long-term incentives. However, in management-controlled firms, executives were rewarded more for the scale of operations than for performance. Their conclusion is that outside dominant shareholders view firms primarily as investments and have the power and incentive to align the compensation of hired CEOs with performance of their firms.

In one of the more celebrated studies in this genre, Hambrick and Finkelstein (1995) examined how ownership configuration affects the determination of CEO pay raises. Based on a sample of 188 firms (in the United States) over the period 1978-1982, they found that CEO pay rises were based on distinctly different factors, depending on the ownership profile of the firm. In firms where no single major owner existed (management-controlled firms), the overarching pay philosophy was to maximise CEO pay, subject to "demonstration of face legitimacy" (Hambrick and Finkelstein, 1995 : 188); whereas in firms where a major (non-managerial) owner existed (externally-controlled firms), CEO pay was minimised, subject to the ability to attract/retain a satisfactory CEO.

David, Kochhar and Levitas (1998), took a different approach by investigating whether different *types* of institutional investors have different effects on the level and mix of CEO compensation. They classified institutional investors into 2 categories: pressure-resistant (those without any significant business relationship) and pressure-sensitive (those for whom a conflict of interest is highly probable). Using data on 125 U.S. firms over the period 1990-1994, they found that the presence of pressure-resistant institutional shareholders reduced the level of CEOs' pay and increased the proportion of long-term incentives (i.e. share options). Pressure-sensitive institutions, however, had no effect on the mix of CEO pay but appeared to be associated with higher CEO compensation, highlighting the highly political nature of executive remuneration as well as confirming their original hypothesis.

Hartzell and Starks (2003) have to date conducted the most rigorous tests on the relationship between institutional ownership and executive compensation, using a sample of 1914 firms taken from the S&P 500, S&P Midcap and S&P Smallcap indices. They found that institutional ownership is positively related to the long-term incentive-based component of executive compensation and negatively related to the level of compensation. Their results indicate that a one standard deviation increase in the percentage of institutional shareholdings by the top five institutional investors is associated with “an estimated 20% increase in option-grant sensitivity to stock price changes” and “a drop in salary equal to 12% of the sample mean, and a drop in total compensation equal to 19% of the sample mean” (Hartzell and Starks, 2003 : 2352).

They also found that clientele effects exist among institutions for firms with certain compensation structures, “suggesting that institutions also influence compensation structures through their preferences” (Hartzell and Starks, 2003 : 2351). Importantly, they found that subsequent changes in institutional shareholdings lead to changes in compensation in the manner hypothesised.

2.6. Summary

This chapter has presented the relevant literature regarding agency theory and how institutional shareholders are a potential means to mitigating agency costs. South African institutions were also discussed, and how important the PIC has become in terms of shareholder activism. Finally, executive remuneration was discussed, and some of the controversies that have surrounded this issue. The next chapter presents the research hypotheses and methodology used to test these hypotheses.

Chapter III: Research Hypotheses, Methodology and Data

3.1. Introduction

Various methodologies were used in prior studies to test the hypothesis that institutional shareholders mitigate agency costs through their activities. However, the most common methods used some form of multiple regression. This study augments those models and adds further testing through the use of tests for differences of means.

The following section first describes and then crystallises the central hypotheses of this report, based on the literature review in Chapter III. Next the delimitations of the sample used in this study will be discussed, followed by the sources from which data will be collected. Then, the statistical methodologies employed in this study will be discussed – regression models, and tests for differences of means – which is different to the previous studies on this issue, which generally used only one methodology. Finally, a discussion on valuing employee share options ensues, and how the model adopted in this study is arrived at.

3.2. The research hypotheses

3.2.1. Hypothesis 1

The first hypothesis is that the greater the concentration of institutional shareholders in a firm, the greater their ability to rein in salaries, options and total compensation. This leads us to the first hypothesis (related to the *level* of compensation):

Hypothesis 1a:
Institutional ownership concentration is negatively related to salary, share options and total compensation levels.

In accordance with Hambrick and Finkelstein (1995), owner-controlled firms also remunerate executives differently to management-controlled firms. In these firms, owners and their representatives (e.g. institutional investors) will be more influential in pay determination, whereas in management-controlled firms, the CEO should be the dominant influence. In owner-controlled firms, the owners will seek to minimise agency costs through reduced compensation, hence:

Hypothesis 1b:
Owner-controlled firms award lower levels of salary, share options and total compensation to its CEO, compared to management-controlled firms.

3.2.2. Hypothesis 2

To mitigate agency costs, the interests of managers and owners need to be aligned. Share options have become the primary medium through which this has been carried out, by making the reward contingent on the company's share price, and hence, future firm performance. Of all the institutions surveyed by Ramsay et al. (1998), all but one favoured some sort of share option/incentive scheme. Thus, it appears that institutional owners tend to favour remuneration systems that award more share options as a percentage of total compensation than salary. Hence, the next hypothesis (related to the *mix* of compensation) is as follows:

Hypothesis 2a:
Institutional share ownership is positively related to the proportion of total compensation that comprises share options.

By making compensation contingent on future firm performance, long-term incentives add uncertainty to a CEO's compensation. While owner-controlled firms are more likely to award a greater proportion of options than management-controlled firms, executives in management-controlled firms would prefer just the opposite structure in order to minimise personal risks. Beatty and Zajac (1994 : 316) assert the following:

> "Managers are more likely to attach significantly more value to a given level of cash than to the same expected level in stock or options because they can use that cash to buy a diversified portfolio of common stocks, bonds or whatever. But, as you force managers to reduce their cash compensation while making a larger investment in their own firm, you're asking them to bear more risk – risk that cannot be diversified away by holding other stocks and bonds." Hence:

Hypothesis 2b:
Owner-controlled firms award a greater proportion of share options (of total compensation) compared to management-controlled firms.

3.3. Research design and methodology

3.3.1. Population, samples and delimitations

The study uses data from the top fifty companies listed on the JSE Securities Exchange, ranked by market capitalisation. This choice of selection is based on a number of factors. Firstly, larger companies are assumed to have better disclosure than smaller companies, because they have more resources to devote to their annual reports, and typically attract more investors than smaller companies. This is evidenced by the fact that, in the Ernst & Young Corporate Reporting Survey, 46 (out of 50) of the companies in the three highest categories (Top 10, Excellent, Good) were in the top fifty companies ranked by market capitalisation in 2006 (2005 had 47 out of 51, 2004 had 43 out of 52, 2003 had 49 out of 62, and 2002 had 47 out of 56) (Ernst & Young, 2002-2006). This is important for data collection purposes because data will have to be manually collected from company annual reports.

Secondly, the top fifty companies by market capitalisation constituted approximately 84.92% of the total market capitalisation of the JSE Securities Exchange (as calculated using data from McGregor BFA on 23 October 2007). As a result, institutional shareholders will have most of their funds invested in these companies and have larger proportions of their portfolios allocated to these companies. This provides a greater incentive to correct deviant managerial behaviour (in these companies) compared to a company that constitutes a small portion of their portfolio.

Data will be gathered on these companies over the five-year period 2002-2006, due to the fact that certain disclosures were only made possible (after 2001) as a result of the King II Report on Corporate Governance. This should result in a sample of approximately 250 observations (fifty companies over five years). It was decided to use this approach as opposed to just taking data from 250 companies over one year, as the former allows one to incorporate both cross-sectional and longitudinal (time-series) effects which will evidence the trends (in compensation, institutional holdings, etc.) over the chosen period. This sample size is still significant (despite the number of independent variables used in the model), as it exceeds the statistically significant requirement of 186 observations (Green, 1991).

Companies with poor or insufficient disclosure will be omitted from the sample. Dual-listed companies will also be omitted owing to insufficient disclosure (due to different disclosure regulations) and possibly different labour market conditions (which could affect the level and/or mix of executive remuneration).

3.3.2. Data collection

The necessary data will be obtained from the following sources:

- McGregor BFA
- Company annual reports

The two main variables of interest – CEO compensation and institutional shareholdings - are not available on the electronic databases available. Following King II, however, all JSE-listed companies were required to disclose detailed remuneration schedules of their top executives in their annual reports. Companies are also required to disclose shareholders who own more than 5% of their share capital, as per Section 140A (8) of the Companies' Act. For these reasons, data on these two variables are manually captured from each company's annual report.

All other variables (control or otherwise) are obtained from the McGregor BFA database. For data collected from McGregor BFA, the published financials data, and not the standardised financial data will be used. This is for two reasons: firstly, and most importantly, companies that base their awards on financial data will most likely base it on their own data (e.g. if based on Return on Equity, then it will be based on the Return on Equity as calculated by them, not by McGregor), and secondly, it is not known what changes McGregor makes to the published data to make it standardised, and whether these provide more useful information.

3.3.3. Techniques of analysis

3.3.3.1. Regression models

The first part of the study will involve the construction of five regression models, the first three of which represent the *level* of compensation as their dependent variables (salary, share options and total compensation) and the next two of which represent the *mix* of compensation (salary as a percentage of total compensation and share options as a percentage of total compensation, as the dependent variables). For the 3 models that do not involve share options (Models 1, 3 and 4), ordinary least squares (OLS) regressions will be estimated. For the two other models, tobit regressions will be estimated, because not all companies award share options in every year[3].

Each of the models will employ the same independent variables, consisting of measures of institutional concentration, insider influence and a number of control variables (firm size, performance, industry, etc.), which have empirically been shown to be statistically significant (see the detailed discussion that follows). The independent variables are those which hold the

[3] Refer to Appendix A for a more detailed explanation as to why a tobit model was chosen.

most interest. The control variables are used to account for other factors that may affect CEO compensation policy. The aim of these models is to provide evidence as to whether there are any statistically significant relationships observed, with emphasis on the institutional concentration variables.

3.3.3.1.1. Dependent variables

Level

Model 1: salary (OLS)
The dependent variable is the base salary plus bonus of the CEO earned during the relevant year. This will be obtained from each company's annual report.

Model 2: share options (tobit)
The dependent variable represents the aggregate value of share options granted to the CEO during the relevant year. Share options will be used as a proxy for total incentive-based compensation. Since companies are only required to value (and expense) share options granted to employees from fiscal years beginning after 1 January 2005 (International Accounting Standards Board, 2007), share option grants will be valued using the Hull and White (2004) model (see Section 3.4. as to why this model was chosen and the assumptions made to value the share options).

Model 3: total compensation (OLS)
The dependent variable in this model represents the value of all the components of CEO compensation for a given year, including the estimated value of share options granted as calculated for Model 2.

Mix

Model 4: salary as a percentage of total compensation (OLS)
The dependent variable here is the base salary of the CEO as a percentage of total compensation received for the year.

Model 5: share options as a percentage of total compensation (tobit)
The dependent variable in this model is the ratio of share options to total compensation of the relevant CEO for the given year.

3.3.3.1.2. Independent variables

Institutional influence

A number of measures of institutional influence will be employed. The first measure is the total number of institutional investors that possess 5% or more of shares, which is considered to be a significant holding in terms of the literature (Bethel and Liebeskind, 1993; Khan et al., 2005). This measure is also convenient as companies have to disclose all shareholders who own 5% or more of total shares outstanding, per Section 140A (8) of the Companies' Act. The second measure is the percentage of shares owned by the largest institutional owner (Hartzell and Starks, 2003). The third measure is the total percentage owned by all the institutional shareholders with more than 5% of shares, as consistent with Dyl (1988). The fourth and final measure is the total percentage of shares held by all institutions, which all of the abovementioned studies used. The data for the all of the institutional variables are obtained from companies' annual reports.

However, a data limitation arose with respect to the fourth measure. It was found that 52 out of the 250 firm-year observations did not disclose this measure (total percentage of shares held by all institutions). This was not considered to be a significant proportion of the sample (approximately 20.80%). The limitation was overcome by assuming that the total percentage owned by all the institutional shareholders with more than 5% of shares (the third measure) is the same as the total percentage of shares held by all institutions.

Insider influence

As a corollary to the hypotheses, some measures of insider influence are also included, to examine whether these have any effects on the dependent variables. The percentage of shares owned (directly and indirectly) by the CEO will be included, as it relates to “risk-taking, firm strategy, CEO compensation and agency issues” (Finkelstein and Hambrick, 1989 : 214). The total percentage of shares owned by the board of directors will also be included. Data for both measures are obtained from the annual reports, and are required as per paragraph 8.63 (d) of the listings requirements of the JSE.

3.3.3.1.3. Control variables

Size

A number of studies have documented a systematic (positive) relation between managerial compensation and firm size (Baker, Jensen and Murphy, 1988; Gomez-Mejia, 1994; and Lambert, Larcker and Weigelt, 1991). According to Dyl (1988), “executives of larger firms have more levels of management reporting to them, and a 'tall' organisational structure may create upward pressure on top-management salaries simply to maintain salary differentials between

each level of executives further down in the hierarchy" (Dyl, 1988 : 23). Size also "has the added advantage for the manager of being a generally defensible way to justify pay" (Hambrick and Finkelstein, 1995 : 178) and connotes responsibility and complexity (Agrawal, 1981). To control for size, the natural logarithm of total assets (McGregor data item number 50) will be used, consistent with other studies (David et al., 1998; Hartzell and Starks, 2003). The natural logarithm is used as a scaling factor because of the large variance in total assets held by the firms in the sample.

Firm performance

Firm performance has also been shown to drive both the level (Smith and Watts, 1992) and mix (Zajac and Westphal, 1994) of compensation. This makes sense given that it is widespread practice for management compensation to be tied to firm performance (Hall and Liebman, 1998). Both an accounting measure (return on equity) and a market measure (ordinary share annual return) will be used, as there is some debate as to the preferred measure (Weiner and Mahoney, 1981). The share return above is simply the capital appreciation over the year in question (ordinary share prices are obtained from McGregor), as it is unlikely that executives would be evaluated on the income (dividend) portion of the gain – something which they have direct control over.

Investment opportunities

Smith and Watts (1992) and Harvey and Shrieves (2001) also documented a strong relation between a firm's growth opportunities and incentive compensation. They hypothesised that "because it is more difficult to observe managers' actions in firms with more growth options, those firms will be more likely to employ incentive plans" (Smith and Watts, 1992 : 269). This is corroborated by both Hartzell and Starks (2003) and Khan et al. (2005), who found a strong positive relation between investment opportunities and incentive compensation measures. As a proxy for growth opportunities, Tobin's *q* (market value divided by total assets) will be used, consistent with the above-mentioned studies. Market value at year-end is obtained by the product of year-end share price (obtained from McGregor) and number of shares outstanding at year-end (item number 201 in McGregor). Total assets is McGregor data item number 50.

Industry-specific behaviour

Dummy/indicator variables will also be used in order to control for any pay similarities within industries. Industries are based on the sector in which the company is listed on the JSE Main Board. A company will receive a number of one if in the specific sector or zero if otherwise. Data will be sorted into five sectors: Basic Materials (which includes Resources shares), Financials, Consumer Goods, Consumer Services and Industrials (there were no Information Technology sector shares in the sample).

CEO and Board characteristics

David et al. (1998) found a number of CEO and Board characteristics which have statistically significant effects on the level and/or mix of compensation. They found that older CEOs tended to command a higher pay, by virtue of their experience. CEOs' ages can be found in most annual reports. Also, CEOs "with greater tenure may accumulate power over their boards...and this may help them obtain higher levels of compensation" (Finkelstein and Hambrick, 1989 : 127). Unfortunately, this study was not able to control for this owing to data constraints.

Finally, David et al. (1998) also found that boards of directors with a greater proportion of outside (independent) directors award greater remuneration. This is consistent with the argument put forward by Mongalo (2003), that since many of these independent non-executive directors are executive directors on other companies' boards, they award higher remuneration so that 'the favour is returned', so to speak. Whether all of this is conjecture though is another matter, so this variable will be included without making any predictions as to its sign. Information on board characteristics is also found in the annual reports.

The regression models will be as follows:

$$
\begin{aligned}
(1)\ y_i = {} & \beta_0 + \beta_1 * \text{NUMBER OF INSTITUTIONS THAT HOLD} > 5\%_i + \\
& \beta_2 * \%\ \text{OWNED BY LARGEST INSTITUTION}_i + \\
& \beta_3 * \text{TOTAL OF INSTITUTIONS THAT OWN} > 5\%_i + \\
& \beta_4 * \text{TOTAL \% HELD BY INSTITUTIONS}_i + \beta_5 * \text{CEO OWNERSHIP}_i + \\
& \beta_6 * \text{BOARD OWNERSHIP}_i + \beta_7 * \text{LN(TOTAL ASSETS)}_i + \beta_8 * \text{ROE}_i + \\
& \beta_9 * \text{SHARE RETURN}_i + \beta_{10} * \text{TOBIN'S } q_i + + \beta_{11} * \text{CEO AGE}_i + \\
& \beta_{12} * \text{PROPORTION OF INDEPENDENTS ON BOARD}_i + \\
& \beta_{13\text{-}17} * \text{SECTOR}_i + \varepsilon_i
\end{aligned}
$$

Table 5: Summary of regression variables, their measures/proxies and sources of information for the regression models

	Variable	Measure/Proxy	Source
β_1	Number of institutional investors that own >5% of shares	Institutional concentration	Annual Reports
β_2	% owned by largest institution	Institutional concentration	Annual Reports
β_3	Total of institutions that own >5%	Institutional concentration	Annual Reports
β_4	Total % held by all institutions	Institutional concentration	Annual Reports
β_5	CEO ownership	Insider influence	Annual Reports
β_6	Board ownership	Insider influence	Annual Reports
β_7	Natural log of total assets	Size of firm	McGregor BFA (item 50)
β_8	Return on Equity	Firm performance	McGregor BFA
β_9	Share price return	Firm performance	McGregor BFA
β_{10}	Tobin's *q*	Investment opportunities	McGregor BFA (items 50, and 201)
β_{11}	CEO age	CEO experience	Annual reports
β_{12}	Proportion of independent directors on board	Board characteristics	Annual reports
β_{13} β_{14} β_{15} β_{16} β_{17}	Sector indicator variables: Basic Materials Consumer goods Consumer services Financials Industrials	Industry specific behaviour	Financial Press (Business Report)

3.3.3.2. Tests for differences of means

The second set of tests conducted, are an adaptation of those carried out by Hambrick and Finkelstein (1995). They involve separating the sample into two sub-samples: so-called “owner-controlled” firms (i.e. where institutions hold a significant part of the company) and “management-controlled” firms (i.e. where institutions do not hold a significant stake in the company). These classifications are based on the criteria used by Hambrick and Finkelstein (1995) in their study. The ultimate aim is to demonstrate whether there are any significant differences between the two sub-samples with regards to the level and mix of compensation, i.e.

whether owner-controlled firms do, in fact, remunerate CEOs differently to management-controlled firms, in the manners hypothesised.

There are two choices of tests, each of which depends on whether the data is normal (t-tests for differences) or non-normal (Wilcoxon Rank Sum tests). The choice of which test will be used will be decided upon once the variables have been tested for normality (see Section 4.4.2.) The null and alternative hypothesis for each variable is detailed below.

3.3.3.2.1. Owner-controlled firms versus management-controlled firms

A firm is designated as being owner-controlled if at least 5% of its shares are controlled by one or more institutional shareholders. The consensus in the literature is that 5% is an appropriate cut-off for attributing a strong owner (Tosi and Gomez-Mejia, 1989; Hambrick and Finkelstein, 1995). Firms that are management-controlled have at least 5% of their shares owned by an insider (manager, CEO, etc.) or if no single individual or organisation owned at least 5% of its shares. Firms that have both managers and institutional shareholders owning at least 5% of shares are designated owner-controlled if the "Total of institutions that own more than 5%" institutional concentration measure (calculated previously) exceeded the "board ownership" concentration measure (also calculated previously) and vice versa for management-controlled firms.

3.3.3.2.2. Key variables

The principal variables of interest are those used in the five models developed in the regression tests, viz. cash component, share options, total compensation, cash component as a percentage of total compensation and, share options as a percentage of total remuneration.

Salary and other cash benefits (level)

It is expected that owner-controlled firms award lower salaries to their CEOs compared with management-controlled firms. This is consistent with the general agency theory that monitoring by institutional shareholders should reduce agency costs, one of which would be to serve as a check on executive compensation. These are supported by statistically significant results by Khan et al. (2005), amongst others.

Formally, the null and alternative hypothesis for this variable is as follows:

H_0: $\mu_1 = \mu_2$
H_1: $\mu_1 < \mu_2$

Where μ_1 is the mean cash component for owner-controlled firms and μ_2 is the mean cash component for management-controlled firms.

Share options (level)

It is expected that owner-controlled firms award fewer share options to CEOs than management-controlled firms. The reasoning behind this is the same as with the "salary and other cash benefits" variable. Formally, the null and alternative hypothesis for this variable is as follows:

H_0: $\mu_1 = \mu_2$
H_1: $\mu_1 < \mu_2$

Where μ_1 is the mean share options component for owner-controlled firms and μ_2 is the mean share options component for management-controlled firms.

Total compensation (level)

It is expected that total compensation is lower for owner-controlled firms than for management-controlled firms. This is consistent with the other two "level" variables previously and with the theory that institutional shareholders should reduce managerial discretion in compensation decisions (Khan et al., 2005). Formally, the null and alternative hypothesis for this variable is as follows:

H_0: $\mu_1 = \mu_2$
H_1: $\mu_1 < \mu_2$

Where μ_1 is the mean total compensation for owner-controlled firms and μ_2 is the mean total compensation for management-controlled firms.

Cash benefits as a percentage of total compensation (mix)

It is expected that salary constitutes a smaller proportion of total compensation for owner-controlled firms. This is because a salary is relatively risk-free and not as conducive to reducing

agency costs as share options are (see below). Formally, the null and alternative hypothesis for this variable is as follows:

H_0: $\mu_1 = \mu_2$
H_1: $\mu_1 < \mu_2$

Where μ_1 is the mean cash percentage for owner-controlled firms and μ_2 is the mean cash percentage for management-controlled firms.

Share options as a percentage of total remuneration (mix)

Finally, it is expected that share options form a greater part of total compensation for owner-controlled firms. This is also consistent with agency theory, as institutional shareholders should be more inclined to set compensation that aligns managers' interests with that of their own – compensation that is contingent on the well-being of the firm itself. In fact, Hartzell and Starks (2003) found in their study that "an increase of one standard deviation in the institutional shareholdings by the top five institutional investors is associated with a greater than 20% increase in the sensitivity of changes in total compensation to changes in shareholder wealth" (Hartzell and Starks, 2003 : 2352). Formally, the null and alternative hypothesis for this variable is as follows:

H_0: $\mu_1 = \mu_2$
H_1: $\mu_1 > \mu_2$

Where μ_1 is the mean options percentage for owner-controlled firms and μ_2 is the mean options percentage for management-controlled firms.

3.4. Employee share option valuation

A critical part of this study involves valuing the share options awarded to the CEOs of the companies in the selected sample. This is vital in determining not only the CEOs' total compensation, but also their mix of compensation. As a result, the following section is entirely devoted to the discussion of the valuation of employee share options, and the model that this study will use to value share options granted to CEOs.

3.4.1. The requirements of *IFRS 2: Share-based payments*

IFRS 2 establishes a valuation pecking order for determining the fair values of share options to be expensed, requiring the use of market prices for similar share options where available (International Accounting Standards Board, 2007). Market prices provide the best indication of the fair value of share options, however the fact that share options with terms and conditions similar to the employee share options granted are rarely traded in active markets, presents a problem. In the absence of market prices, a generally accepted valuation methodology is used, provided that it "incorporates all factors and assumptions that knowledgeable, willing market participants would consider in setting the price" (Hassan and Wolpert, 2005 : 1).

IFRS 2 makes reference to two pricing models, namely the Binomial Option pricing model, which is used to value American share options[4], and the Black-Scholes-Merton model ("Black-Scholes") which is predominantly used to value European share options[5] (International Accounting Standards Board, 2007). Share options in South Africa are predominantly American calls, although American puts, as well as European calls and puts are also traded. Identifying an appropriate valuation model is crucial, since valuations can differ significantly from conventional equity options.

3.4.2. Differences between conventional options and employee share options

Employee share options differ in many ways to ordinary "vanilla" options, and these have significant implications for how they are valued. These differences are discussed below.

Maturity

Employee share options typically have much longer maturities than ordinary options. This is because traded options are created by investment banks and are thus of shorter maturities, due to the estimation risk involved in creating options with longer maturities. Employee share options also have longer maturities, so as to align the interests of managers and shareholders over longer periods of time. This means that the volatility of the underlying share, dividend yields and interest rates may change significantly from when the option was granted. As a result this should increase the value of employee share options compared to ordinary options.

[4] An American option can be exercised at any time during the option's life.
[5] European share options can only be exercised at the end of the option's life. American options are normally more valuable than European options because of the greater flexibility; however IFRS 2 indicates that the difference in value is seldom significant.

Vesting

Employee share options are often subject to vesting requirements, i.e. they are not exercisable after a certain period of time from the grant date (the vesting period). This will decrease the value of employee share options as compared to ordinary options.

Forfeiture

Employees that leave before all their share options have vested will often lose the right to any unvested share options, and may be forced to exercise their vested share options prematurely (Correia, 2006). This will decrease the value of employee share options as compared to ordinary share options, as not all share options may eventually vest.

Non-tradability and non-transferability

Employees are typically not allowed to sell or transfer their share options to other parties. As a result, this may cause the employee to exercise early, and thus reduce the value of employee share options as compared to ordinary share options.

Performance conditions

Some companies may impose performance hurdles before the share options are exercisable. This has the same effect as vesting conditions (Correia, 2006). Thus, it will reduce the value of employee share options as compared to ordinary share options.

Lack of diversification

With tradable options, investors are assumed to hold a diversified portfolio of assets, but employee share options may constitute a significant proportion of an employee's personal wealth. In order to achieve diversification, an employee may exercise the option earlier than is optimal (Correia, 2006). This will reduce the value of employee share options as compared to ordinary share options.

The result of the above differences (excluding the long-term nature of employee share options) will typically reduce the value of employee share options as compared to standard share options and in most cases, result in early exercise by the employee. They also complicate the valuations.

3.4.3. Black-Scholes and adjusted Black-Scholes

The ordinary Black-Scholes model is ill-suited in dealing with employee share options, due to a number of critical reasons. Firstly, Black-Scholes can only model European share options, and assumes no early exercise on the part of the option-holder. Furthermore, the non-transferability, lack of diversification and potential forfeiture of employee share options all may lead to early exercise, which the Black-Scholes model cannot incorporate in its valuation of share options (Rubenstein, 1995).

To compensate for the effects of forfeiture, the Financial Accounting Standards Board (FASB) in the U.S. has suggested that the resulting option value be adjusted downwards by multiplying the value that would otherwise be obtained by one minus the probability of forfeiture through the vesting date (FASB 1995, as cited in Amman and Seiz, 2004). To generally handle all factors that result in early exercise, if the Black-Scholes formula is used, the time-to-maturity of the option should be replaced by the *expected* time-to-maturity of the option (FASB 1995, as cited in Amman and Seiz, 2004).

Rubenstein (1995) empirically tested both adjustments, but found that the adjusted model suggested by the FASB systematically understated the value of the option. Furthermore, the model does not incorporate the feature that share options cannot be exercised during the vesting period.

3.4.4. Binomial models

The standard binomial model is also ill-suited to deal with employee share options, but because adjustments can be incorporated easily into such model and explicitly modelled, this has received much of the focus in the extant literature when trying to value employee share options. Three seminal papers on the topic are discussed in the following sub-sections.

3.4.4.1. Rubenstein (1995)

Rubenstein (1995) adapted the standard binomial model to take into account the effects of longer maturity, vesting, forfeiture, non-transferability, dilution of the company's earnings and the tax effects to the option holder. The final model required 16 input variables (10 more than the usual 6 variables required). The additional 10 input variables were: expected share return, number of years to vesting, expected employee forfeiture rate, minimum and maximum

forfeiture rate multipliers, employee's non-option wealth per owned option, employee's risk aversion, employee's tax rate, percentage dilution, and number of steps in the binomial tree.

However, critically, Rubenstein (1995) did not empirically test the validity of his model, mainly due to the difficulty in obtaining many of its additional variables. While this study was the first to highlight the main differences between ordinary share options and employee share options (and the issues involved), from a practical point of view, it was of little value.

3.4.4.2. Carpenter (1998)

Carpenter (1998) tested the validity of two option-pricing models: a simple, extended binomial with a complicated one, to determine whether either was better in terms of valuing employee share options. The performance of the 2 models was examined by their ability to predict actual exercise patterns for a sample of 40 firms with data during the period 1979-1994.

The first model was a simple extension of a binomial American option model that "introduces an exogenous 'stopping state', in which the executive automatically exercises or forfeits the option. This state arrives with some fixed probability, given as the 'stopping rate', each period" (Carpenter, 1998 : 128-129). The aim was to capture as simply as possible the fact that executives may exercise share options earlier than if they held ordinary share options. The stopping event was meant to serve as a proxy for anything that caused the executive to exercise the option early, such as the desire for liquidity, voluntary or involuntary employment termination, a need for diversification, or forced exercise or forfeiture.

The second model explicitly accounted for the non-transferability of employee share options, by also including a stopping state, as well as "other unobservable factors, such as the executive's risk aversion, his outside wealth, and his potential gain from voluntary separation" (Carpenter, 1998 : 129).

Her results indicated that both models performed just as well, with the simpler model even outperforming the more complicated model in certain cases. The first model also predicted the actual exercise patterns of her dataset better than the second model, suggesting that "exercise patterns can be approximately replicated by merely imposing a suitable stopping rate, without the need to make assumptions about executive risk aversion, diversification, and the value of new employment" (Carpenter, 1998 : 129).

She also tested the validity of the adjusted Black-Scholes suggested by the FASB (1995) and also found, like Rubenstein (1995), that that model systematically understated option values.

3.4.4.3. Hull and White (2004)

Hull and White (2004) adjusted the model suggested by the FASB (1993) in two ways (Hull and White, 2004 : 116):

- "it explicitly considers the possibility that the employee will leave the company after the vesting period. It requires the company to use employee turnover rates to estimate an employee exit rate that applies to both the prevesting period and the postvesting period.
- it explicitly incorporates the employee's early exercise policy by assuming that early exercise happens when the stock price is a certain multiple of the exercise price."

The first change (incorporation of employee exit rate) can be directly estimated from the company's historical data on employee turnover, for the particular category of employees who receive the share options. The second variable (early exercise multiple) poses more difficulties, but should also be based on past decisions by employees who voluntarily exercised their share options voluntarily. Hull and White (2004) suggested an alternative for the latter, where such information is not available.

They recommended using empirical evidence on such behaviour, such as that found by Huddart and Lang (1996), and Carpenter (1998). Huddart and Lang (1996) studied 8 companies who granted share options to 58 316 employees (including executives and ordinary employees) during the 1980s and early 1990s. They found that the average ratio of the share price to the exercise price, at the time of exercise, was 2.2. Carpenter's (1998) sample of 40 companies between 1979-1994 gave a multiple of 2.8.

A possible reason for the difference between Carpenter's (1998) multiple and Huddart and Lang's (1996) multiple, is that executives are more affluent and can thus wait longer to exercise their share options, as they have less of a need for personal liquidity (Hull and White, 2004). Hull and White (2004) therefore recommended using Carpenter's (1998) multiple when trying to value executive share options.

3.4.5. The valuation model used in this study

From a practical point of view, Carpenter's (1998) simple model poses difficulties, in that in order to select an appropriate stopping rate, data on the annual cancellation rates of share options (for a specific grant) granted by firms needs to be obtained. Such data is not publicly available, as firms only publish (in their financial statements) total cancellations every year – not from a specific grant. In any event, the cancellation rates of share options (for specific grants) awarded to the CEOs of companies is required – this information is not available either.

Thus, this study uses the Hull and White (2004) model to value share options granted to CEOs[6]. Non-parametric models were considered, but none of the literature surveyed on the topic of valuing employee share options mentioned the use or application of non-parametric models. For this reason they were excluded.

A number of assumptions have had to be made with regards to the other variables in the Hull and White (2004) model, such as the grant date, expected share volatility, expected dividend yield, risk-free rate, early exercise multiple, and expected employee exit rate. The inputs to the model are discussed next.

3.4.6. Valuation model inputs and assumptions made

Grant date and grant date share price

None of the companies in the sample disclosed the exact grant dates of the share options granted. This date is important, so as to determine the spot share price on the grant date which is used in the valuation of the share options. However, all of the companies disclosed the exercise price of the shares, and given that all of the companies awarded share options with exercise prices either equal to the spot price on the day (or, in some cases, the weighted average of the share price in the few days before the grant date), the exact grant date is not important in determining the spot price of the individual share, because the grant date share price will be the same (or very close to) the exercise price of the option. Also, as per the JSE listing requirements, companies are not allowed to award share options that have an exercise price less than the grant date share price (i.e. companies are not allowed to award share options that are so called “in-the-money”). Based on the above, the grant date share price will be assumed to be the exercise price of the options granted.

However, the grant date is still needed to determine the risk-free rate. Thus, given that it can be assumed that the exercise price of the options are the same as the grant date price (see above), the grant date was found by searching the closing share prices during that particular year until the share price matched the exercise price of the shares. This date would then be taken as the grant date price. Where the exercise price occurs more than once in the same year, then the date closest to the year-end will be taken. This is because it is reasonable to assume that the options would only be awarded once the performance of the firm over the past year can be assessed – usually towards the end of the year. Finally, where exercise prices could not be matched exactly to the closing share prices in that particularly year, then the

[6] An electronic version of this model is available at http://www.rotman.utoronto.ca/~hull

closest share price (as close to the year end as possible) was taken - this date would then be substituted as the grant date.

Expected share volatility

Given the inherent difficulties associated with estimating the *expected* standard deviation of the share over the option's life, an alternative measure will be used. The average standard deviation of the share's return over the 5 years prior to the grant date will be calculated, and this will be normalised by the mean share return over that 5 year period. This is, in effect, the coefficient of variation, and will be used because the standard deviations of shares with large share prices will tend to be greater than those shares that have smaller share prices – the coefficient of variation removes this bias. This is consistent with Westphal and Zajac (1994) and Carpenter (1998). Share prices will be obtained from McGregor BFA.

Expected dividend yield

The 5-year average dividend yield prior to the grant date, will be used as a proxy for the expected dividend rate, which too, is consistent with Westphal and Zajac (1994) and Carpenter (1998). This will slightly underestimate the value of options in early years and slightly overestimate the value of options in later years (because dividends reduce the value of options), and so should even out over the period under examination (Westphal and Zajac, 1994). Dividend yields will be calculated using data from McGregor BFA.

Time to maturity/expiration

This data will be obtained from company annual reports.

Vesting period

This will be obtained directly from the company's annual report.

Risk-free rate

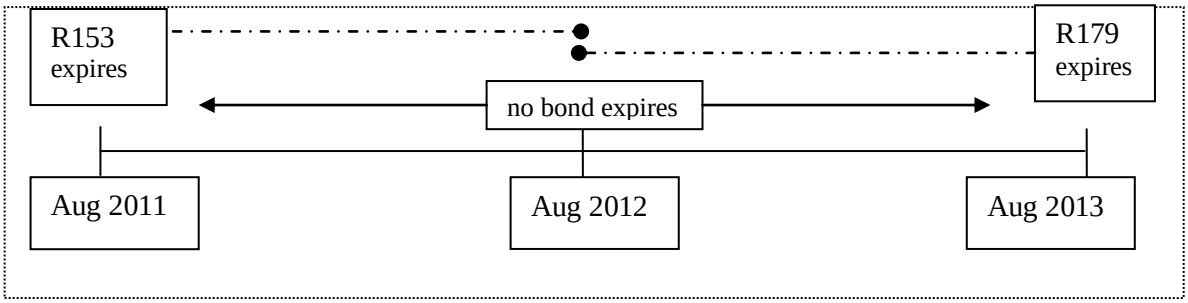
As a proxy for the risk-free rate, the interest rate prevailing on the grant date for the government bond that most closely matches the maturity of the option will be used. Details of government bonds (such as issue dates, redemption dates and durations/maturities), will be obtained from the National Treasury's website[7]. Government bond rates will be obtained from McGregor BFA.

It was found, however, that bond data from McGregor BFA only went back to 1 August 2003 for most bonds (the only bond for which there was data before 1 August 2003 was the R153 – maturing in August 2011). This is a problem with McGregor BFA itself, because, as per the National Treasury's schedule of bonds (see above), there were many more bonds in issue before this. This only presented a problem for share options that were issued before this date. For share options that were issued before this date (1 August 2003), the yield on the R153 was

[7] Available at: http://www.treasury.gov.za/divisions/alm/2006/default.aspx

used (because data was available on this bond before 1 August 2003). The difference in the maturity of the option and the R153 bond (which was never more than 5 years), can be accepted as not being material, given that the South African yield curve is relatively flat over a 5 year period, and generally only changes shape over a longer period.

A further problem was presented by the fact that the R153 matured in August 2011 and there were no bonds in issue (during 2002 and 2003) that matured in 2012 – a later bond which matured in 2012 (the R205) was only issued in July 2005, and McGregor BFA has no data on this bond. The bond that matured next was the R179 (in August 2013), but data on this was only available from 1 August 2003. Thus, there was no bond that matured between the period 1 August 2011 and 1 August 2013. As a result, a midpoint of 1 August 2012 was determined, and for share options that matured before 1 August 2012, the R153 was used. For share options that matured between 1 August 2012 and 1 August 2013, the R179 was used, as shown below:



But because data on the R179 was only available from 1 August 2003, the yield on the R179 on 1 August 2003 (9.68%) was used for these share options (i.e. ones that matured between 1 August 2012 and 1 August 2013), even if the option was granted before this date (1 August 2003). In any event, the difference between this date (1 August 2003) and any given option's grant date (for share options that matured between 1 August 2012 and 1 August 2013) was never more than 6 months, which is not likely to materially affect the calculation or its use in this study, because it is unlikely for interest rates to change dramatically over a 6 month period.

This can best be illustrated by an example: assume an option (maturing on 1 May 2012) was granted on 1 June 2003. For this option, the yield on the R153 at 1 June 2003 would be used (because the option matures before 1 August 2012, and because there is data for the R159 at 1 June 2003). For an option (maturing on 1 October 2012) that was granted on 1 June 2003, the yield on the R179 on 1 August 2003 would be used (because the option matures after 1 August 2012, and because there is no data on the R179 before 1 August 2003).

Early exercise multiple

Following the Hull and White (2004) recommendation (from the Carpenter (1998) study), this is taken as being the first time the share price is 2.8 times the exercise price.

Employee exit rate (pre-vesting and post-vesting)

The CEO exit rate is not given in company annual reports and will be impracticable to calculate, as a detailed record of all CEOs and their tenures (for each company) will be required. Consequently, the CEO exit rate is estimated to be 0%, as it is reasonable to assume that CEOs will not leave within the five-year period (2002-2006).

3.5. Assumptions underlying the study

This study is based on agency theory, and hence the assumptions underlying agency theory underpin this study as well. Specifically, the primary assumption is that managers *do* pursue goals that are at odds with shareholder wealth maximisation, and that one of the primary means of doing this is through awarding themselves higher salaries.

The second assumption is that data collected from the various sources, namely McGregor BFA and company annual reports, is accurate.

3.6. Limitations

3.6.1. Sample size

The sample size used in this study is smaller than those used in U.S. studies. Most of the data must be captured manually (i.e. 250 annual reports must be examined) and then additional valuations of the share options is required, hence the relatively small sample size compared to the U.S. studies. In the U.S. studies all the data (excluding the actual valuing of share options) were readily available on electronic databases, hence the large sample sizes used in those studies.

The JSE Securities Exchange also has substantially less companies than its U.S. counterparts, with a few companies making up the majority of the overall market capitalisation. The sample of companies used here covers a large proportion of the total market capitalisation of the JSE. The appropriateness of choosing the top fifty companies was discussed in detail in Section 3.3.1.

3.6.2. Differences in institutional investors

As discussed previously, some institutional investors may have commercial relations with the companies that they invest in and hence are "indifferent" to irregular corporate governance acts in their investee companies. It may be that since the measures of institutional investors have not been separated into pressure-sensitive and pressure-resistant, this may affect the results of this study (see the discussion of David, et al. (1998) in Section 2.5.). In any event, such a separation would be very difficult to achieve, and most likely not be practicable.

3.7. Summary

The first section of this chapter developed and formally stated the central hypotheses underlying this study, namely that (1) the greater the presence of the institutional shareholders in a company, the less the overall remuneration awarded to CEOs, and the more the percentage of remuneration that is in the form of share options, and (2) firms that are controlled by their owners will award less overall compensation and more compensation in the form of share options (and *vice versa*). The next section described the delimitations of the sample chosen, and the sources from which the data has been obtained.

Then, the first statistical technique was described, and the five regression models explained, with justification for the various independent and dependent variables. Thereafter, the tests for differences of means were explained, and how firms are designated "management-controlled" or "owner-controlled". The various employee share option valuation models were also discussed, a model was chosen (the Hull and White (2004) model), and the various assumptions used in valuing the options were described. Finally, the assumptions and limitations of the methodology employed were discussed. The next chapter will present the findings of this study, and interpret the results obtained from the regression models and tests for differences of means.

Chapter IV: Results and Discussion

4.1. Introduction

As noted in the previous chapters, there has been little or no research on institutional shareholders in South Africa. In particular, it is not known exactly how much institutions own of the companies listed on the JSE Securities Exchange. A similar conclusion can be reached about the value of share options awarded to South African CEOs. While there has been some media publicity about the number of options, no study has yet explicitly valued these options. The following sections will first describe the sample used, thereby presenting original findings on both the level of institutional shareholdings in these companies over the period 2002-2006, and findings on the level and mix of CEO compensation over this same period. Thereafter, the results of the regression models and tests for differences of means are presented, with a detailed interpretation and discussion of the results. All regression models were estimated using EViews 5.1 for Windows, whereas the tests for means (and other related statistical tests) were performed using the Data Analysis Plus 2.12 add-in for MS Excel 2003 (available with the Keller and Warrack (2000) text).

4.2. Sample description

The purpose of this section is to describe and analyse some of the more interesting findings, where applicable. The relevant data was obtained for these 50 companies over the five previous financial years, being 2002-2006, resulting in a sample of 250 firm-years[8]. Certain companies (sixteen in total) were excluded from the sample, due to a number of reasons[9]. Most of those excluded were dual listed companies (ten companies), due to the fact that their financial statements were presented in a foreign currency and often did not contain the required data. Other companies were generally excluded for not having the required data.

In presenting the findings from the data, more reliance is placed on the median figures, as the mean figures are often distorted by significant outliers (e.g. Phutuma Nhleko's approximately R36 million package in 2006). The following tables summarise the key data from the sample, sorted by year:

[8] Refer to Appendix B for a list of the companies included in the sample.
[9] For a list of the companies excluded from the sample, and the reasons for their exclusion, refer to Appendix C.

Table 6: Mean compensation data sorted by year (median figures in parentheses)

	2002	2003	2004	2005	2006
Cash component	R 3 631 963 (R 3 139 000)	R 4 372 069 (R 3 432 500)	R 5 214 418 (R 4 568 000)	R 5 890 684 (R 5 130 000)	R 6 944 741 (R 6 499 500)
Options component	R 1 989 688 (R 890 725)	R 2 394 746 (R 1 134 339)	R 1 951 599 (R 1 078 932)	R 2 257 134 (R 1 211 500)	R 2 680 389 (R 0)
Total compensation	R 5 621 651 (R 4 222 000)	R 6 766 815 (R 5 171 892)	R 7 166 017 (R 5 857 240)	R 8 147 818 (R 7 167 555)	R 9 625 129 (R 7 639 783)
Cash %	75.46% (81.90%)	72.79% (71.22%)	78.76% (83.22%)	79.16% (82.93%)	84.12% (100%)
Options %	24.54% (18.10%)	27.21% (28.78%)	21.24% (16.78%)	20.84% (17.07%)	15.88% (0%)

Table 7: Mean institutional data sorted by year (median figures in parentheses)

	2002	2003	2004	2005	2006
Number of institutions that own more than 5% of total shares	2.57 (2.00)	2.68 (2.00)	2.80 (3.00)	2.64 (2.00)	2.44 (2.50)
% owned by the largest institution	15.41% (13.56%)	15.68% (13.90%)	15.05% (13.21%)	14.65% (13.43%)	13.73% (12.50%)
Total of institutions that own more than 5% of total shares	31.85% (30.04%)	32.61% (27.34%)	31.48% (25.45%)	29.75% (24.87%)	25.94% (24.87%)
Total % owned by all institutions	51.44% (55.98%)	54.44% (59.36%)	51.88% (53.61%)	52.36% (52.04%)	49.11% (48.09%)

Table 8: Mean control variables sorted by year

(median figures in parentheses)

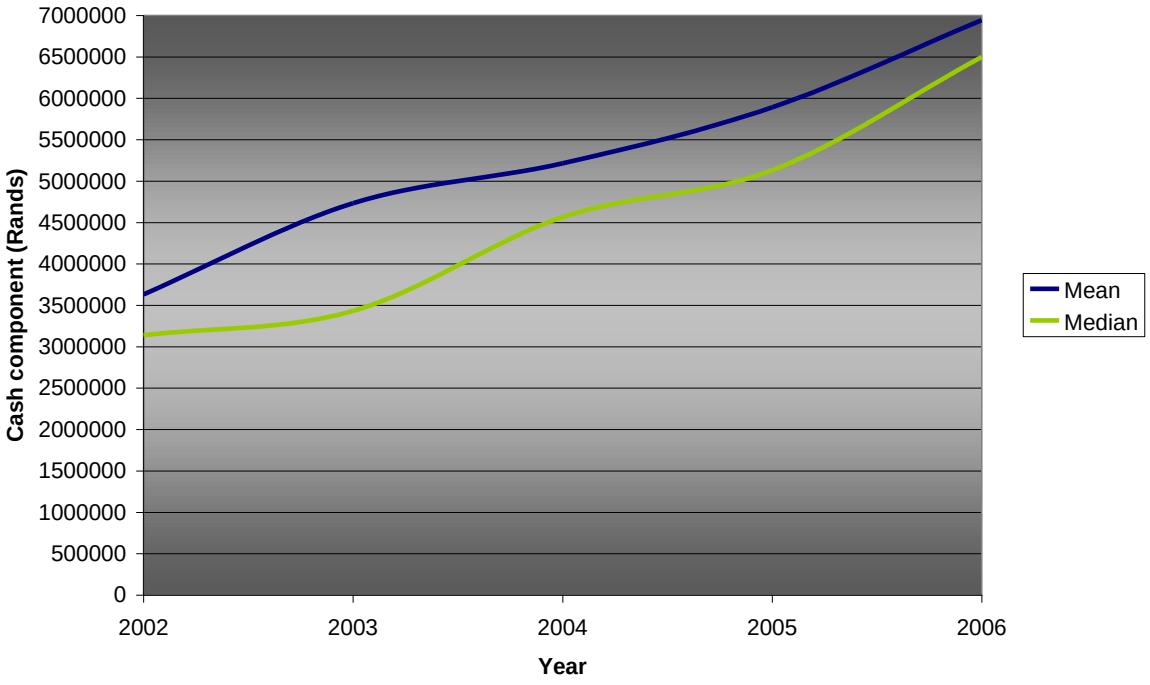
	2002	**2003**	**2004**	**2005**	**2006**
Total assets	Rm 42 264 (Rm 8 883)	Rm 46 677 (Rm 9 645)	Rm 53 351 (Rm 11 498)	Rm 68 138 (Rm 10 569)	Rm 79 690 (Rm 14 003)
Return on equity (ROE)	26.20% (19.00%)	18.60% (20.25%)	21.42% (20.28%)	28.81% (25.60%)	31.76% (26.13%)
Share return	16.03% (8.44%)	16.33% (0.11%)	44.28% (37.79%)	44.10% (40.05%)	37.99% (33.58%)
Tobin's Q	0.89 (0.60)	0.81 (0.71)	0.98 (0.94)	1.26 (1.14)	1.49 (1.29)
CEO age	51.94 (53.00)	51.86 (53.00)	52.38 (53.50)	52.80 (54.00)	52.84 (53.50)
Proportion of independent non-executive directors on Board	46.36% (45.00%)	47.55% (46.87%)	50.76% (50.00%)	49.75% (51.32%)	49.36% (50.00%)
CEO ownership	0.98% (0.06%)	1.01% (0.08%)	0.94% (0.07%)	1.67% (0.10%)	1.64% (0.12%)
Board ownership	6.08% (0.40%)	6.64% (0.61%)	7.36% (0.49%)	7.53% (0.60%)	8.07% (0.85%)

4.2.1. Analysis by years

4.2.1.1. Compensation

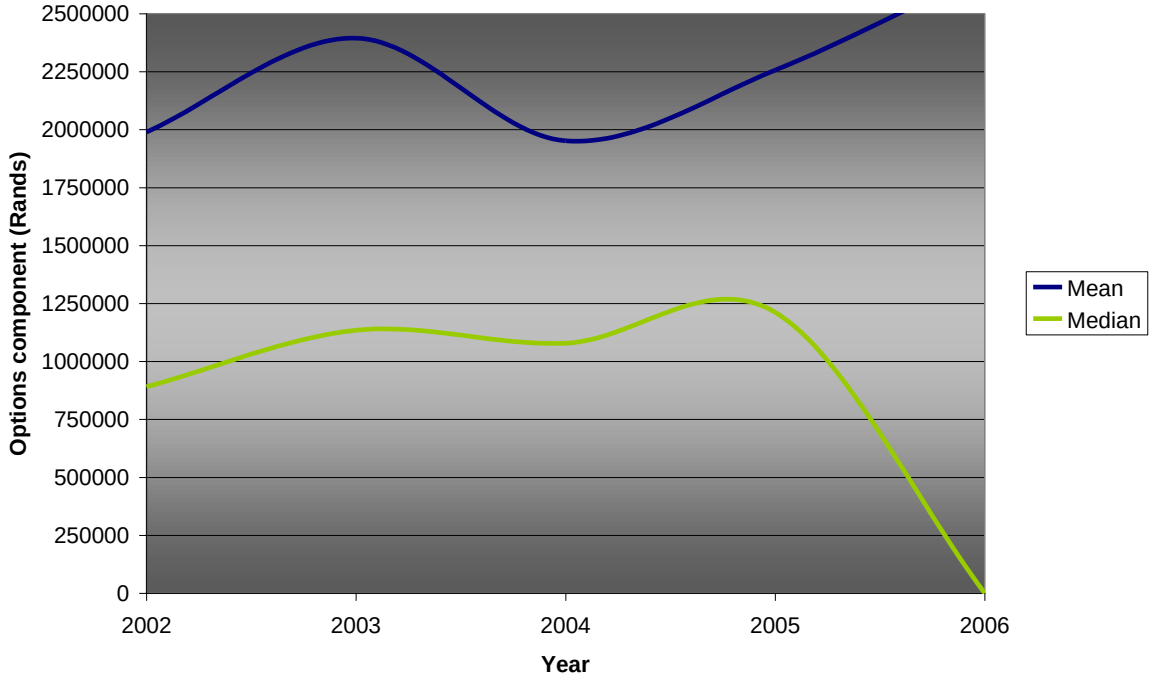
The cash component of compensation has risen from a mean of R3 631 963 (median of R3 139 000) in 2002 to a mean of R6 944 741 (median of R6 499 500), a compound annual growth rate of 17.59% (median of 19.96%) - increases which are significantly above inflation. This is shown in the figure below:

Figure 1: Cash component of compensation over the sample period (2002-2006)



The options component of compensation has risen from a mean of R1 989 688 (median of R890 725) in 2002 to a mean of R2 680 389 (median of R0) in 2006, a compound annual increase of 7.73% (median is a decrease of 100.00%). This is shown in the figure below:

Figure 2: Options component of compensation over the sample period (2002-2006)



The mean figures are often distorted by large amounts of share options awarded to executives. To partially remove this effect from the mean figures, option awards of R10 million or greater were removed from the sample – R10 million worth of share options seems an acceptable limit for reasonability. This resulted in the following adjusted amounts:

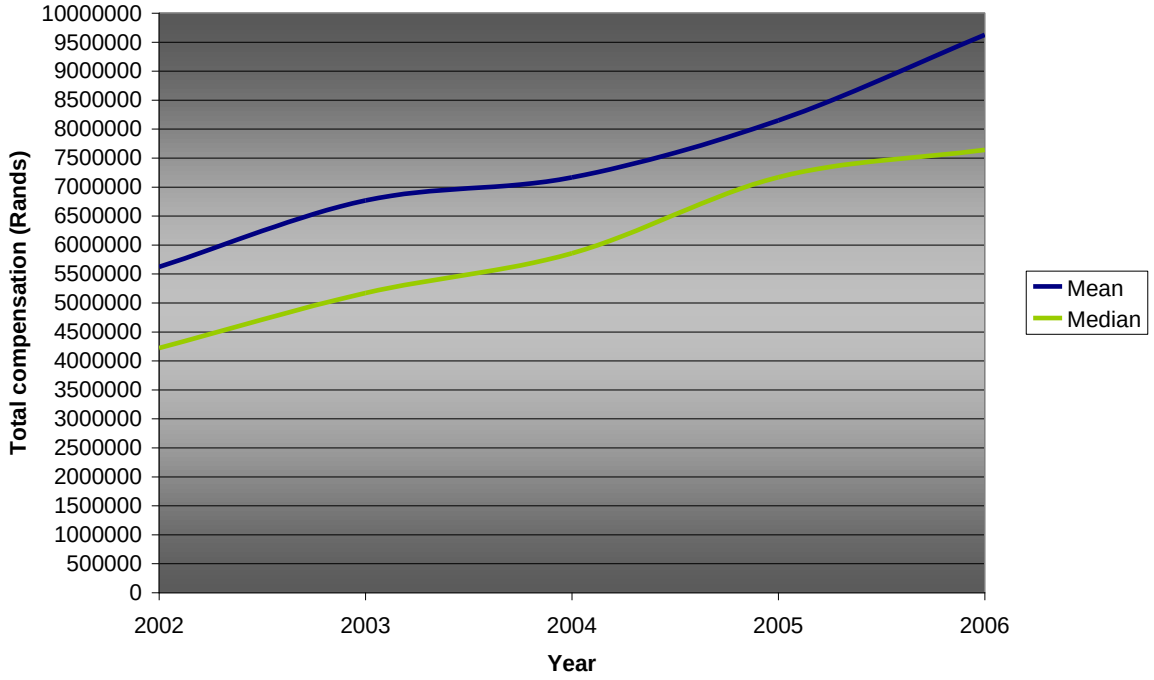
Table 9: Mean options component sorted by year (with abnormal awards removed)

	2002	**2003**	**2004**	**2005**	**2006**
Options component	R 1 486 861	R 1 889 142	R 1 735 567	R 2 058 463	R 1 242 339

These numbers show that the value of share options awarded increased until 2005, whereafter they decreased by approximately 40% in 2006. Both un-adjusted (median) and adjusted (mean) figures show a decrease in the 2006 year. This is perhaps as a result of the increasing negative publicity surrounding share options (refer to Section 2.4.6.), and also due to the adoption of cash option awards – e.g. phantom share options (see Section 2.4.3.5). Perhaps another reason is the adoption

of International Accounting Standards by firms in 2005/2006, and in particular, *IFRS 2: Share-based payments*, which requires the expensing of share options. The negative effect on the income statement of expensing these options may have discouraged remuneration committees from awarding them, as well as the effect of a bull market, which made shares less attractive than cash.

Figure 3: Total compensation over the sample period (2002-2006)



As shown in Figure 3 (above), mean total compensation has grown from R5 621 651 (median of R4 222 000) in 2002, to mean of R9 625 129 (median of R7 639 783) in 2006, an annual compounded rate of 14.96% (median by 15.98%). Thus, it appears that CEO compensation has nearly doubled over the period 2002-2006.

With regards to the various components of CEO compensation (see Figure 4 and 5 on the next page), the cash component of executive remuneration increased over the sample from a mean of 75.46% to 84.12% (median from 81.90% to 100.00%), indicating a greater propensity to award cash over options. This may be attributed to the factors mentioned above (with regards to the decrease in options), namely the fact that options have had to be expensed, their unfavourable tax status, and negative publicity. This is in complete contrast to the results found by Hall and Liebman (1998) in the U.S.

Figure 4: Cash percentage of total compensation over the sample period (2002-2006)

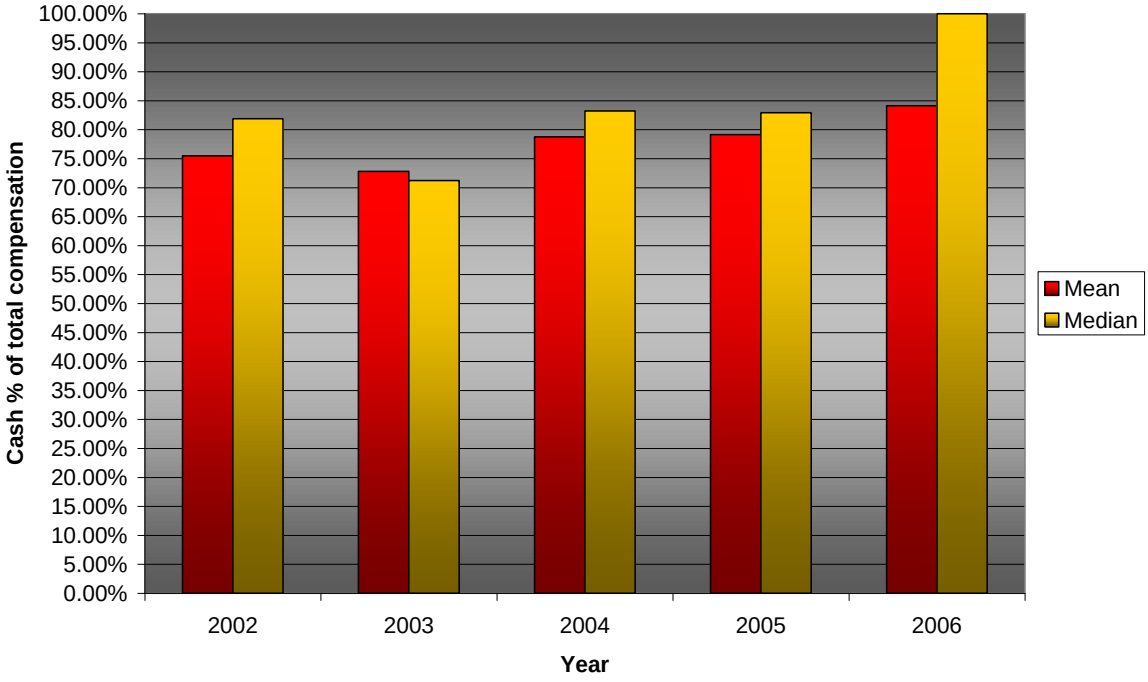
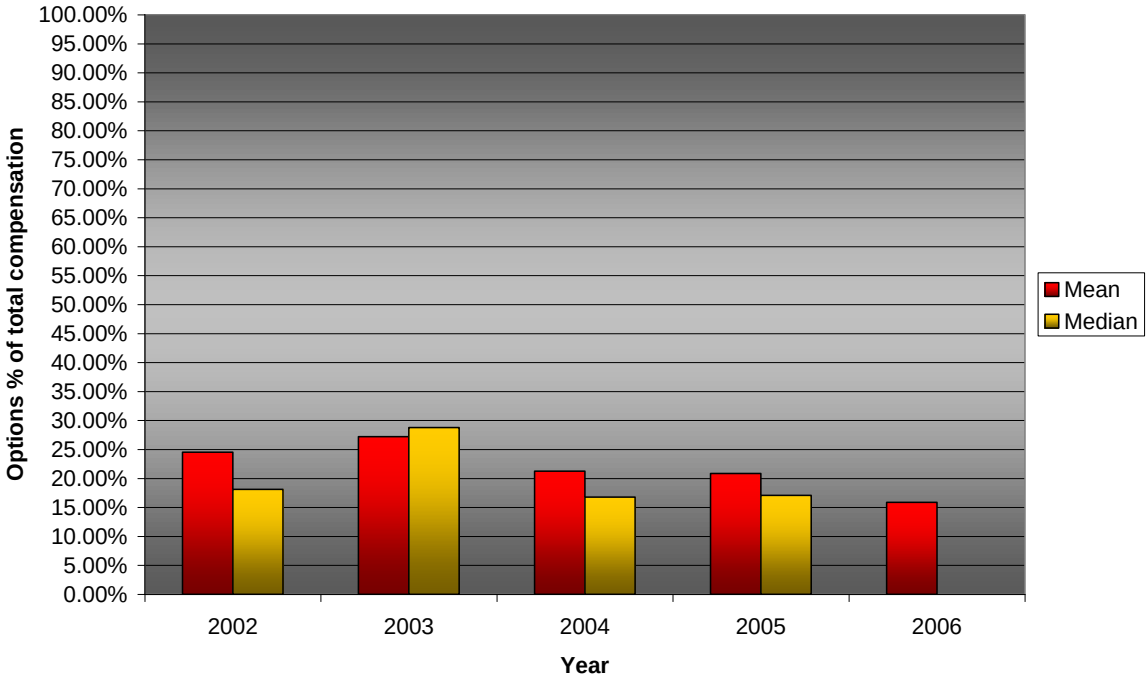


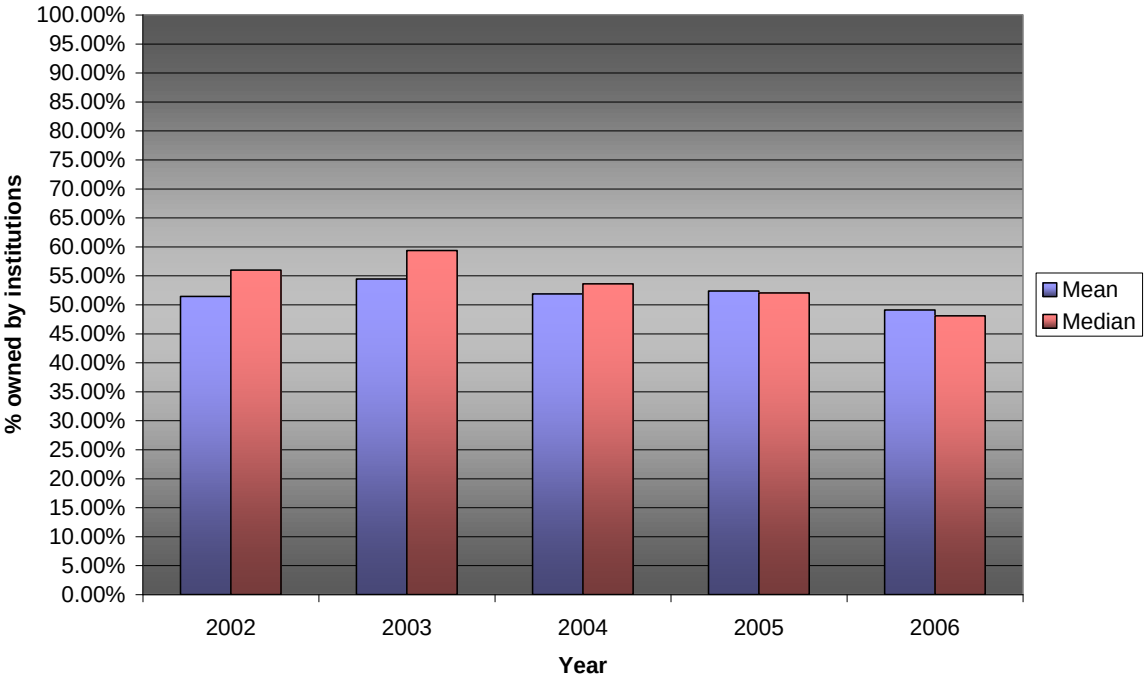
Figure 5: Options percentage of total compensation over the sample period (2002-2006)



4.2.1.2. Institutional holdings (see Table 7)

The number of companies that have institutional shareholders holding more than 5% of shares seems to be constant at about 2 to 3. It also appears that institutions on average, don't take more than about a 15% holding in a company, though this differs when different sectors are taken into account (discussed in a further section). From the statistics on the total percentage of shares (of a company) owned by institutions, it can be seen that the total percentage of shares owned by institutions went from 51.44% (median of 55.98%) in 2002 to 49.11% (median of 48.09%) in 2006. However, even though this level has decreased, there appears to be no discernible trend, as the percentage owned seems to be around the 50% level from year to year. Thus, it can tentatively be concluded that approximately 50% of listed companies in South Africa are held by institutions, which is consistent with the level of institutional shareholdings in the U.S. (Hartzell and Starks, 2003) and in the U.K. and Australia (Ramsay et al., 1998).

Figure 6: Percentage of companies owned by institutions over the sample period (2002-2006)



4.2.1.3. Board membership, Board ownership and CEO ownership (see Table 8)

Of further interest is that the percentage of independent non-executives on companies' Boards has increased over the period, from a mean of 46.36% to 49.36% (median from 45.00% to 50.00%), indicating companies' increased focus on corporate governance. With regards to CEO ownership, this has increased from 0.98% to 1.64% (median from 0.06% to 0.12%). The median figures should be relied upon here because the mean figures have been distorted by some significant outliers such as Patrice Motsepe's approximately 40% holding in African Rainbow Minerals and Steven Saad's approximately 14% holding in Aspen Pharmacare. Thus, given that the median percentage has doubled over the period, a plausible explanation for this increase could be that, following the equity market crash in 2001/2002, CEOs increased their own personal holdings in their companies in the subsequent period, because they knew that the market price of their shares was lower than their company's intrinsic value.

Finally, Board ownership has increased over the period from a mean of 6.08% (median of 0.40%) in 2002 to a mean of 8.07% (median of 0.85%) in 2006. This could also be attributed to the same reason for the increase in the CEO holdings.

4.2.2. Analysis by sector

The final sample can be analysed into sectors as follows:

Table 10: Distribution of sample by sector

	Basic Materials	Consumer Goods	Consumer Services	Financials	Industrials	Total
Number of companies	12	7	11	12	8	50
Number of firm-years	60	35	55	60	40	250

There appears to be a good representation of all the sectors in the sample.

4.2.2.1. Compensation

The following tables analyses the variables from the data by sector. A commentary follows.

Table 11: Mean compensation data analysed by sector over the period 2002-2006

(median figures in parentheses)

	Basic Materials	Consumer Goods	Consumer Services	Financials	Industrials
Cash component	R 4 144 118 (R 3 626 027)	R 4 077 257 (R 2 850 000)	R 6 041 792 (R 5 950 000)	R 6 726 564 (R 5 603 500)	R 4 339 610 (R 3 718 500)
Options component	R 2 515 534 (R 1 258 270)	R 1 509 587 (R 0)	R 2 672 012 (R 1 152 010)	R 2 464 311 (R 970 335)	R 1 136 326 (R 862 475)
Total compensation	R 6 659 652 (R 5 384 907)	R 5 586 844 (R 3 471 000)	R 8 713 805 (R 7 357 668)	R 9 190 876 (R 9 159 500)	R 5 475 936 (R 4 919 867)
Cash %	72.92% (74.23%)	84.76% (100.00%)	76.18% (83.94%)	80.07% (86.28%)	81.43% (84.07%)
Options %	27.08% (25.77%)	15.24% (0.00%)	23.82% (16.06%)	19.93% (13.72%)	18.57% (15.93%)

Table 12: Mean institutional data analysed by sector over the period 2002-2006

(median figures in parentheses)

	Basic Materials	Consumer Goods	Consumer Services	Financials	Industrials
Number of institutions that own more than 5%	1.83 (1.00)	2.34 (2.00)	3.07 (3.00)	2.28 (2.00)	3.98 (4.00)
% owned by the largest institution	8.19% (8.50%)	24.21% (16.31%)	16.97% (14.66%)	12.75% (12.33%)	17.58% (17.60%)
Total of institutions that own more than 5%	17.00% (10.00%)	38.77% (33.34%)	36.17% (31.60%)	24.16% (22.04%)	44.59% (45.60%)
Total % owned by all institutions	36.61% (34.70%)	50.08% (43.36%)	60.45% (66.00%)	52.28% (51.79%)	64.27% (70.23%)

Table 13: Mean control variables analysed by sector over the period 2002-2006

(median figures in parentheses)

	Basic Materials	**Consumer Goods**	**Consumer Services**	**Financials**	**Industrials**
Total assets	Rm 23 257 (Rm 17 562)	Rm 7 703 (Rm 5 639)	Rm 7 454 (Rm 5 883)	Rm 194 497 (Rm 92 909)	Rm 12 756 (Rm 9 661)
Return on equity (ROE)	25.24% (21.38%)	24.93% (20.17%)	32.13% (25.56%)	19.92% (20.56%)	24.44% (19.59%)
Share return	36.72% (20.30%)	34.18% (34.97%)	38.96% (37.25%)	17.58% (16.00%)	31.38% (21.13%)
Tobin's Q	1.54 (1.31)	1.44 (1.10)	1.25 (1.15)	0.42 (0.14)	0.86 (0.77)
CEO age	52.92 (52.50)	51.97 (53.00)	52.95 (55.00)	48.65 (49.00)	57.00 (57.00)
Proportion of independent non-executive directors on Board	42.93% (40.00%)	46.76% (53.85%)	48.73% (43.06%)	56.06% (56.70%)	45.76% (45.80%)
CEO ownership	1.44% (0.00%)	2.68% (0.16%)	0.72% (0.14%)	0.46% (0.11%)	1.46% (0.13%)
Board ownership	6.27% (0.06%)	8.11% (1.52%)	11.00% (4.90%)	7.20% (0.43%)	4.70% (0.66%)

It would appear that companies in the Financials sector reward their CEOs the most generously, with a mean total compensation of R9 190 876 (median of R9 159 500) over the sample period. Second is the Consumer Services sector (which includes retailers like JD Group), followed by Basic Materials (which includes Resources companies). It is interesting to note that the profits of companies in all three of these sectors, is significantly affected by macroeconomic factors such as commodity prices (Resources) and interest rates (Consumer Services and Financials).

Consumer Services companies seem to award more share options than any other companies, followed by Resources companies. This is consistent with research by Betts et al. (2005), who found that Consumer Services companies (in South Africa) had the biggest employee share option programmes. The share prices (and hence share options) of these companies are also significantly influenced by macroeconomic factors. Figure 7 and 8 (below) graphically presents these findings:

Figure 7: Mean compensation data analysed by sector over the sample period (2002-2006)

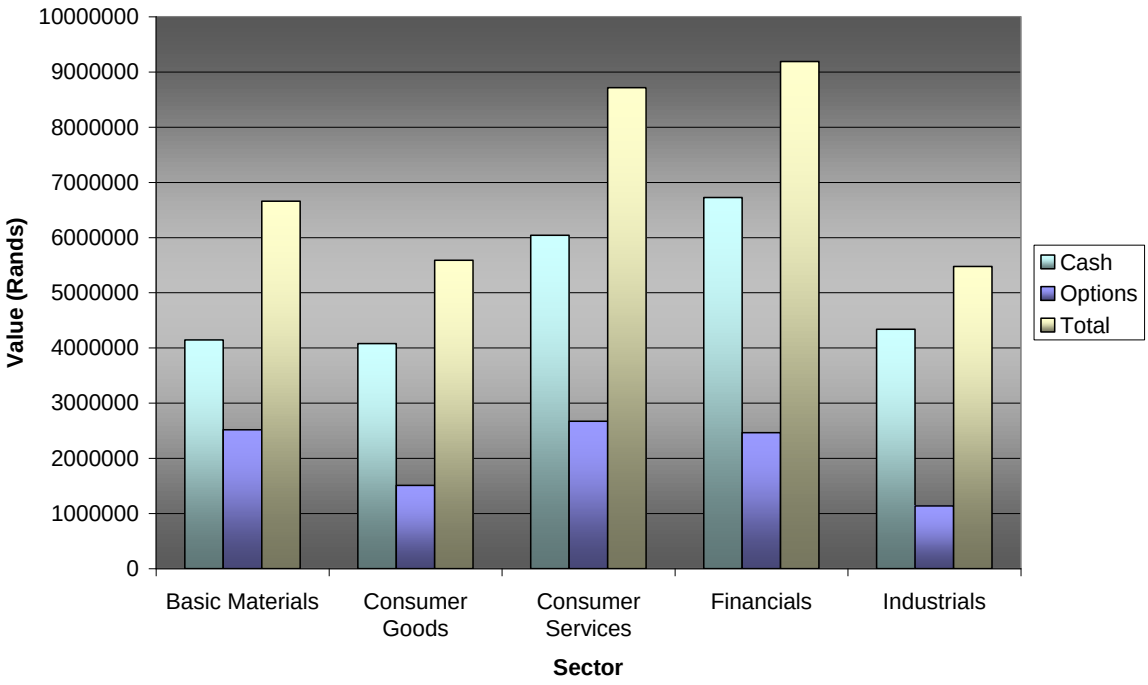
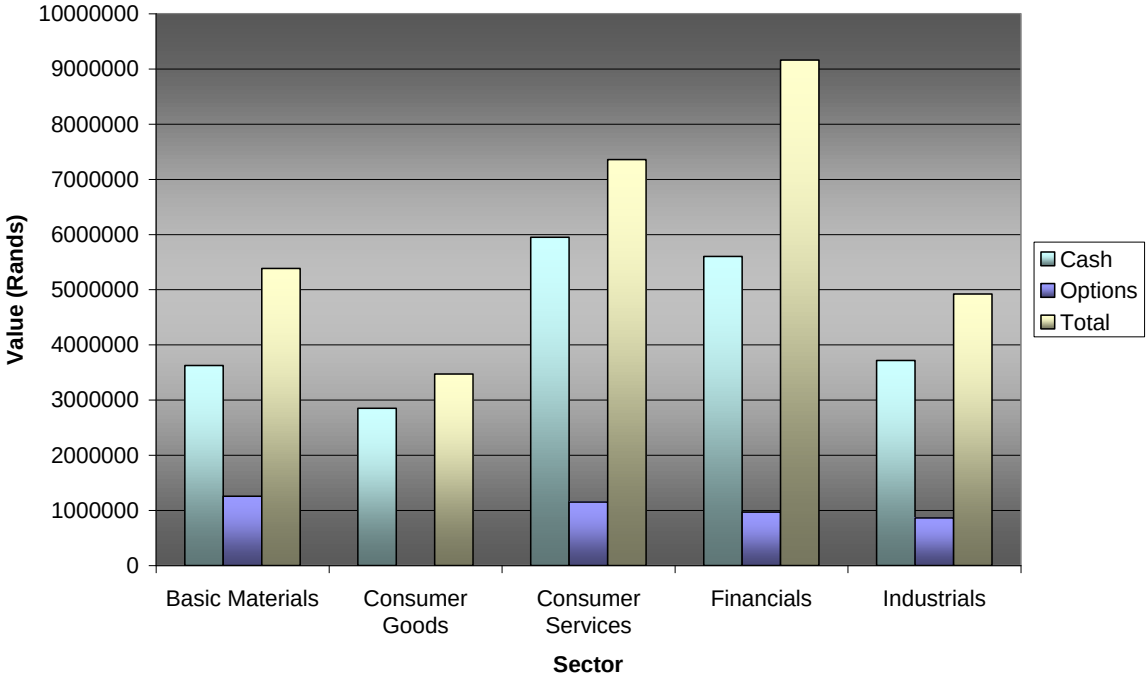


Figure 8: Median compensation data analysed by sector over the sample period (2002-2006)



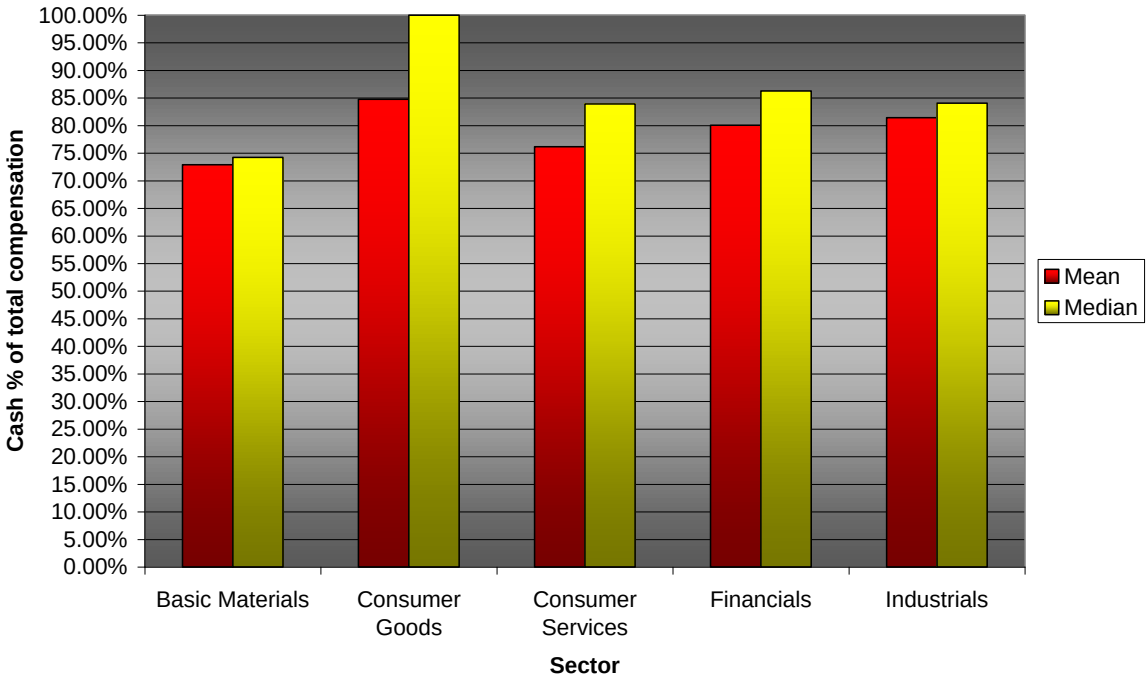
In terms of the mix of compensation (see Figure 9 below), Consumer Goods companies award the greatest portion of CEO compensation in the form of cash (and hence the least in the form of share options) at a mean of 84.76% (median of 100.00%) in the form of cash. Basic Materials companies award the greatest proportion of CEO compensation in the form of share options (and hence the least in the form of cash), at a mean of 27.08% (median of 25.77%) in the form of share options.

The last result (regarding Basic Materials companies) is particularly concerning, given that the CEOs of these companies hold the least number of shares in their companies compared to CEOs of other companies. If Patrice Motsepe's 43% stake in African Rainbow Minerals is removed from the sample the mean drops to 0.02% (from 1.44%), while the median stays the same at 0%, the lowest (mean and median figures) of all the sectors. This unwillingness to hold shares in their own companies is perhaps a disguised admission that the fortunes of their companies are largely out of their own hands. This raises the validity of using equity-based compensation in the first place, especially given that companies in this sector awards the greatest proportion of compensation in the form of share options (see above).

The mix of compensation across all sectors is surprisingly within roughly the same region, i.e. approximately 80% cash and 20% share options. The sector that differs markedly is the Consumer Goods sector. Of the 7 companies in this sector, 3 of them were still being run by their founders

(Aspen Pharmacare, Netcare, Steinhoff), which perhaps explains the low incidence of share options, as these CEOs already owned significant stakes in their companies, and thus their interests can be said to be already significantly aligned with other shareholders.

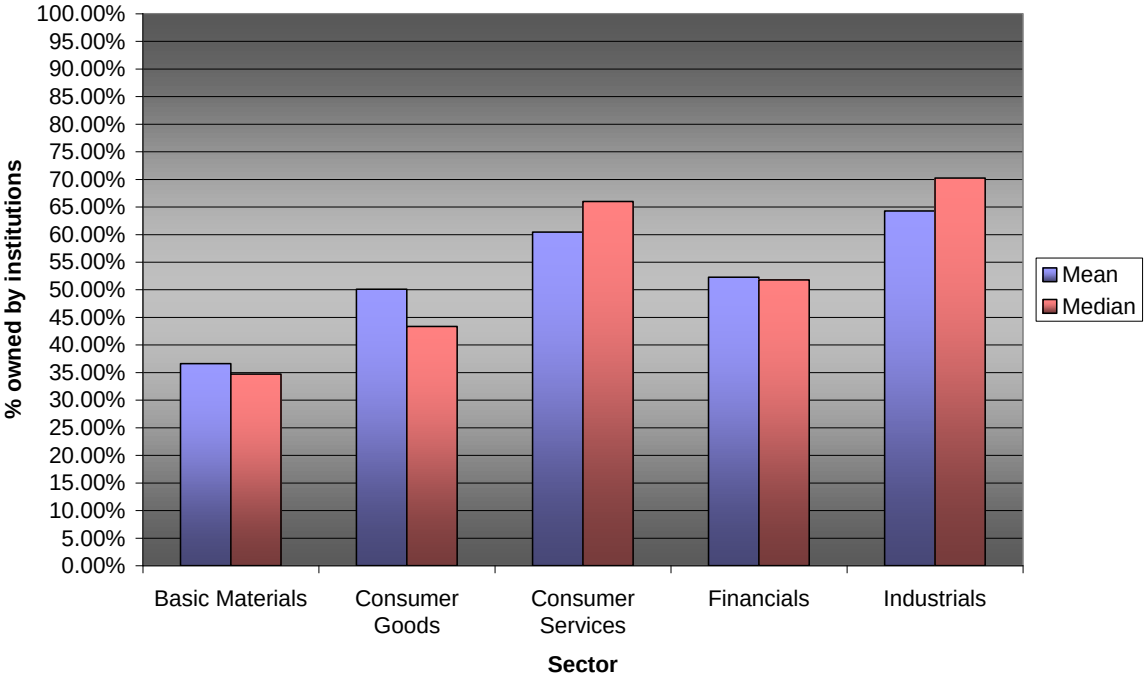
Figure 9: Cash percentage of total compensation analysed by sector over the sample period (2002-2006)



4.2.2.2. Institutional holdings (see Table 12 and Figure 10)

All the statistics on institutional holdings are consistent in that Consumer Services (mean ownership of 60.45%, median of 66.00%) and Industrial companies (mean ownership of 64.27%, median of 70.23%) appear to be the most popular with institutions, and Basic Materials companies the least popular (mean ownership of 36.61%, median of 34.70%). A possible explanation why Resources are so scarcely held once again relates to their dependence on commodity prices, and the difficulty of having to predict these prices. This difficulty and inherent uncertainty, may well discourage institutions from investing in these companies, or at least from taking long-term positions in them.

Figure 10: Percentage of shares owned by institutions analysed by sector over the sample period (2002-2006)



4.2.2.3. Board membership, Board ownership and CEO ownership (see Table 11)

The percentage of independent non-executives on the various Boards is approximately the same across the sectors, except for Financials (with a mean of 56.06% and median of 56.70% of the Board being independent non-executive directors). The small CEO and Board ownership of Basic Materials companies was discussed earlier, but of interest here is the relatively larger ownership (both CEO and Board) in Consumer Services companies, especially since there aren't major outliers. This is perhaps explained by the large number of share options that these companies award (Consumer Services companies award the most share options as mentioned previously).

4.3. Regression results

The results from the regression models are shown in the table below (where ** = coefficient is significant at the 99% level, * = coefficient is significant at the 95% level):

Table 14: Summary of regression coefficients (p-values in parentheses) for original models

	(1)	(2)	(3)	(4)	(5)
	Cash Component (OLS)	**Options Component (tobit)**	**Total Compensation (OLS)**	**Cash % (OLS)**	**Options % (tobit)**
Number of institutions that own>5%	280 569 (0.1655)	89 134 (0.8643)	631 135 (0.1314)	0.0097 (0.6504)	-0.0303 (0.3548)
% owned by largest institution	-2 021 835 (0.5308)	696 924 (0.9331)	3 649 293 (0.5841)	0.1661 (0.6286)	-0.5457 (0.2956)
Total of institutions that own >5%	392 304 (0.8694)	-1 853 361 (0.7623)	-4 166 978 (0.3985)	-0.0409 (0.8722)	0.2616 (0.4962)
Total % owned by all institutions	**-2 052 617 (0.0069)****	246 472 (0.8972)	-2 176 993 (0.1636)	-0.0952 (0.2367)	0.1305 (0.2772)
Natural log of Total assets	**1 747 341 (0.0000)****	**1 649 182 (0.0000)****	**3 016 775 (0.0000)****	**-0.0343 (0.0176)***	**0.0480 (0.0269)***
Return on equity	890 279 (0.0570)	-2 095 735 (0.2168)	677 894 (0.4818)	0.0737 (0.1387)	-0.2382 (0.0680)
Share return	-45 657 (0.8560)	287 667 (0.6469)	105 064 (0.8399)	-0.0101 (0.7071)	0.0195 (0.6230)
Tobin's Q	**1 057 536 (0.0000)****	234 331 (0.6655)	**1 392 695 (0.0009)****	0.0162 (0.4470)	-0.0207 (0.5583)
CEO ownership	-182 849 (0.9565)	2 339 284 (0.7747)	3 048 750 (0.6599)	-0.2625 (0.4623)	0.1990 (0.7000)
Board ownership	752 124 (0.4839)	-1 375 518 (0.6089)	-1 078 386 (0.6272)	0.1075 (0.3478)	-0.0642 (0.7064)
CEO age	5 317 (0.8357)	-29 493 (0.6615)	-27 299 (0.6064)	0.0034 (0.2088)	-0.0028 (0.5169)
Proportion of independents on Board	617 508 (0.4878)	3 020 214 (0.1850)	2 379 076 (0.1965)	-0.0957 (0.3130)	0.1733 (0.2252)
Basic Materials	**-38 983 628 (0.0000)****	**-36 955 523 (0.0000)****	**-66 047 873 (0.0000)****	**1.3616 (0.0002)****	-0.7508 (0.1631)
Consumer goods	**-36 834 466 (0.0000)****	**-37 477 123 (0.0000)****	**-63 768 183 (0.0000)****	**1.4454 (0.0000)****	-0.8816 (0.0942)
Consumer services	**-34 840 563 (0.0000)****	**-35 012 302 (0.0000)****	**-60 402 575 (0.0000)****	**1.3653 (0.0001)****	-0.7465 (0.1499)
Financials	**-37 882 076 (0.0000)****	**-40 467 667 (0.0000)****	**-67 100 853 (0.0000)****	**1.5397 (0.0000)****	-0.9969 (0.0751)
Industrials	**-37 160 083 (0.0000)****	**-37 248 424 (0.0000)****	**-64 667 261 (0.0000)****	**1.4322 (0.0001)****	-0.8229 (0.1214)

4.3.1. Level of compensation[10]

4.3.1.1. Cash component (OLS regression)

Only one of the institutional variables (total percentage owned by all institutions) is significant for the cash component model, and in the hypothesised direction, i.e. that there is a decreased level of compensation because of a higher level of shares owned by institutions. However, none of the other institutional variables are significant, which suggests (on an overall level) that the presence of institutional shareholders does not appear to affect the cash component of CEO compensation.

The (natural log of) Total Assets variable is highly significant (at the 99% confidence level) indicating that CEOs of bigger companies are likely to be awarded a greater cash salary than their counterparts in smaller companies. This is consistent with the predictions and with the previous studies mentioned earlier.

The Tobin's *q* variable (a proxy for investment opportunities) is significant at the 99% level for this model, which is opposite to the predicted direction (refer to Section 3.3.3.1.3.). The results suggest that firms with greater investment opportunities pay larger amounts of cash than firms with fewer investment opportunities. A possible explanation for this is that the "size" effect (natural log of total assets variable) has somehow distorted this, due to the fact that total assets forms part of the calculation of Tobin's *q*. Therefore, this variable is in the same direction as the "size" variable. Another explanation is that this may also indicate overvaluation of the company's shares, and that cash is a better alternative as the company realises its growth opportunities.

Although not significant at the 99% or 95% level, the return on equity (ROE) variable is significant at the 90% level for this model, and in the direction hypothesised. This suggests that ROE is a determinant in the level of cash compensation paid to CEOs. This makes intuitive sense given that the options component of CEO's pay should theoretically reward them for increases in the share price.

Finally, the only remaining variables that are significant are the sector variables. Even more interesting is that all the sector variables are significant (at the 99% confidence level), indicating that remuneration practices (with regards to the cash element) clearly differ amongst sectors.

[10] See Appendix D for the detailed output of each model.

The R-squared and adjusted R-squared statistics for this model were 0.5639 and 0.5340 respectively, indicating that approximately 53.40% of the cash component is explained by this model.

4.3.1.2. Options component (tobit regression)

None of the institutional variables are significant in this model. But more importantly, the presence of institutional shareholders would also not appear to affect the value of share options awarded to CEOs.

Again, the size variable (natural log of total assets) is highly significant (at the 99% level), which is consistent with the theory. The sector variables are also highly significant, again suggesting that companies in different industry sectors remunerate their CEOs differently. Unfortunately, EViews does not report an R-squared or adjusted R-squared for tobit regressions, so this information is unavailable.

4.3.1.3. Total Compensation (OLS regression)

As with the "cash component" model, the size proxy (natural log of Total Assets) and investment opportunities proxy (Tobin's *q*) independent variables are significant, at the 99% confidence level. The sector variables are also all significant (at the 99% confidence level), confirming a clear difference between industry compensation practices. The R-squared and adjusted R-squared statistics for this model were 0.4277 and 0.3883 respectively, indicating that approximately 38.83% of total compensation is explained by the independent variables.

4.3.1.4. Overall comments

A consistent pattern across all models is that none of the institutional proxies have any significance, except for the "total percentage owned by all institutions variable in the "cash component" model. From this it can be preliminary concluded that the presence of institutional shareholders appear to have no effect on the level of compensation that CEOs receive. The validity of the last statement will be evaluated once the remaining tests are conducted.

Also, there is a clear sector effect across all three "level" models which provides evidence of sector-specific remuneration policies.

Finally, share return, CEO age, CEO ownership, Board ownership or the proportion of independent non-executive directors on a Board do not appear to influence the level of CEO pay. The R-squared and adjusted R-squared statistics for the various models (where applicable) were satisfactory, ranging from 38.82% to 53.40%, thus providing some support for the conclusions reached from these models.

4.3.2. Mix of compensation[11]

4.3.2.1. Cash percentage (OLS regression)

None of the institutional variables are significant in this model, suggesting that institutional shareholders do not have an effect on the cash percentage of CEOs' remuneration.

The "size effect" is not prevalent in this model as it is with the other models, but instead, this model shows an inverse relationship between the size of the company and the percentage of cash salary (statistically significant at the 95% level). A possible explanation for this is that with larger companies, the agency problem is worsened (because managers take stewardship of larger assets), and thus are paid with a greater percentage of share options in order to align their interests with those of shareholders, thus reducing the agency problem.

Again, the sector variables are all highly significant at the 99% confidence level. The R-squared and adjusted R-squared statistics for this model were 0.1014 and 0.0397 respectively, indicating that the overall model is not a good predictor of the cash percentage of CEOs compensation.

4.3.2.2. Options percentage (tobit regression)

None of the institutional variables are significant, implying that institutional shareholders would not appear to influence the proportion of share options awarded. The Tobin's *q* variable is also statistically significant at the 95% level as in the "cash percentage" model, and probably for the same reasons as mentioned above. Finally, there appears to be no sector-specific behaviour, given that none of the sector variables are significant at either the 99% or 95% level.

[11] See Appendix D for the detailed output of each model.

Although not significant at the 99% or 95% level, the return on equity (ROE) variable is significant at the 90% level for this model (p-value of 0.0680). This is an interesting result as the results suggest that the proportion of a CEO's remuneration in the form of share options is negatively related to a company's ROE. This also suggests that companies with lower ROEs award more share options as a percentage of total compensation. It also indicates that, when ROEs decrease, the proportion of options awarded increase.

Given that share options did not affect the income statement in previous years, this would imply a degree of subterfuge on behalf of companies, because any decrease in cash compensation resulting from poor performance appears to have been offset by increased remuneration from share options. This became evident during the data capturing process, when it was observed that certain companies, particularly Resources companies, awarded large amounts of share options when their ROE was very poor, even negative. For example, in 2004 when Harmony's ROE was a dismal -2.52%, CEO Bernard Swanepoel's salary only increased by R108 000 (the amount which is actually visible from the financial statements). However, his share options award was approximately R5.4million in that year (versus no share options in the prior year), an amount which was not quantified in the financial statements.

Finally, because this is a tobit model, EViews does not report its R-squared or adjusted R-squared statistic.

4.3.2.3. Overall comments

Consistent with the results of the regressions on the level of compensation, it appears that institutional shareholders have no effect on the mix of compensation. Once again it can only be preliminary concluded that the presence of institutional shareholders does not seem to have any effect on the mix of CEO compensation.

The negative relationship between the firm's performance (as measured by the ROE) poses some interesting questions, such as whether this result will be observed in the post-IFRS period.

4.3.3. Alternative specification – lagged compensation variables

An alternative specification of the regression models is to make the assumption that compensation is based on the previous year's situation, e.g. compensation paid to a CEO in 2003 was based on the company's 2002 financial performance, or based on the actions of the institutional shareholders

in 2002 (the previous year), etc. Both David et al. (1998) and Khan et al. (2005) employed such a model to a degree of success.

The alternative specification can be represented mathematically as follows:

(2) $\text{Compensation variable}_{\text{Year n}} = \sum \text{Independent variables}_{\text{Year n-1}} + \varepsilon$

Application of a lagged effect reduces the sample size from 250 firm-year observations to 200 firm-year observations, due to the fact that the compensation data for 2002 (salary, share options, etc.) would have to be removed, as the independent variables for 2001 were not part of the original sample. The sample size is still sufficient, as it is larger than the statistical requirement of 186 observations (Green, 1991). All five regression models were re-estimated using the lagged compensation variables, and the results are presented in the table below (where ** = coefficient is significant at the 99% level, * = coefficient is significant at the 95% level) [12]:

[12] For the detailed output for each model, refer to Appendix E.

Table 15: Summary of regression coefficients (p-values in parentheses) for lagged models

	(1)	(2)	(3)	(4)	(5)
	Cash Component (OLS)	**Options Component (tobit)**	**Total Compensation (OLS)**	**Cash % (OLS)**	**Options % (tobit)**
Number of institutions that own>5%	266 571 (0.2705)	481 675 (0.4586)	747 285 (0.1617)	-0.0101 (0.6951)	0.0063 (0.8679)
% owned by largest institution	-3 588 560 (0.3373)	4 168 609 (0.6780)	977 402 (0.9055)	-0.1722 (0.6641)	0.1241 (0.8315)
Total of institutions that own >5%	899 840 (0.7487)	-3 314 203 (0.6599)	-2 615 232 (0.6729)	0.1323 (0.6573)	-0.0910 (0.8352)
Total % owned by all institutions	**-1 853 219 (0.0270)***	-727 300 (0.7445)	-2 426 223 (0.1873)	-0.0382 (0.6659)	0.0426 (0.7433)
Natural log of Total assets	**1 783 286 (0.0000)****	**1 414 150 (0.0007)****	**2 922 878 (0.0000)****	-0.0183 (0.2685)	0.0269 (0.2679)
Return on equity	-71 817 (0.8884)	-503 290 (0.7018)	-243 944 (0.8289)	0.0230 (0.6716)	-0.0384 (0.6181)
Share return	293 929 (0.2560)	-315 698 (0.6387)	258 388 (0.6502)	0.0186 (0.4969)	-0.0343 (0.3823)
Tobin's Q	**1 257 660 (0.0000)****	283 977 (0.6799)	**1 745 923 (0.0024)****	0.0094 (0.7300)	-0.0237 (0.5555)
CEO ownership	-1 553 813 (0.7196)	-8 500 398 (0.4509)	-3 880 308 (0.6843)	0.2569 (0.5762)	-0.5996 (0.3638)
Board ownership	615 714 (0.6110)	203 552 (0.9483)	258 826 (0.9227)	0.0135 (0.9164)	0.0152 (0.9337)
CEO age	23 854 (0.4096)	15 023 (0.8497)	42 917 (0.5009)	0.0019 (0.5273)	-0.0025 (0.5890)
Proportion of independents on Board	736 570 (0.4582)	175 763 (0.9472)	1 077 755 (0.6224)	-0.0100 (0.9245)	0.0020 (0.9896)
Basic Materials	**-40 450 800 (0.0000)****	**-33 240 918 (0.0011)****	**-67 011 828 (0.0000)****	**1.0838 (0.0078)****	-0.2703 (0.6474)
Consumer goods	**-37 978 607 (0.0000)****	**-34 050 346 (0.0006)****	**-64 134 809 (0.0000)****	**1.1712 (0.0033)****	-0.4346 (0.4522)
Consumer services	**-35 858 713 (0.0000)****	**-31 066 925 (0.0014)****	**-60 551 948 (0.0000)****	**1.0711 (0.0064)****	-0.2580 (0.6493)
Financials	**-39 057 553 (0.0000)****	**-35 595 698 (0.0008)****	**-66 797 309 (0.0000)****	**1.1851 (0.0051)****	-0.4338 (0.4802)
Industrials	**-38 484 003 (0.0000)****	**-34 154 310 (0.0006)****	**-65 734 643 (0.0000)****	**1.1544 (0.0041)****	-0.3611 (0.5342)

As can be seen from the above figures, the results are very much similar to those in the original regression models. The "total percentage owned by institutions" variable is again significant in the "cash component" model, though this time only at the 95% confidence level. The "size" effect is only visible in the three "level" models, and Tobin's *q* is significant in the same models as before (the "cash component" and "total compensation" models).

The R-squared and adjusted R-squared for the cash component model was 0.5807 and 0.5441 respectively, indicating a slightly stronger fit than the original model. For the "total compensation" model, the R-squared and adjusted R-squared was 0.4055 and 0.3535 respectively – a slightly weaker fit than the original model. In general, the same conclusions can be reached – i.e. that institutional shareholders do not appear to have any effect on either the level or mix of CEO compensation.

4.4. Tests of differences of means

4.4.1. Sample description

There were 17 management-controlled firms (49 firm-year observations, or 19.60% of the sample) and 45 owner-controlled firms (201 firm-year observations, or 80.40% of the sample[13]. The table below summarises the key data for each sub-sample:

[13] Note that the number of firms do not add up to 50 because some firms were management-controlled in some years and owner-controlled in other years.

Table 16: Mean data for management-controlled and owner-controlled firms over the sample period 2002-2006 (median figures in parentheses)

	Management-controlled firms	**Owner-controlled firms**
Cash component	R 5 010 375 (R 4 358 000)	R 5 250 346 (R 4 640 000)
Options component	R 1 390 587 (R 603 300)	R 2 367 668 (R 954 000)
Total compensation	R 6 400 962 (R 5 269 000)	R 7 618 014 (R 5 950 000)
Cash %	81.99% (87.23%)	77.49% (81.43%)
Options %	18.01% (12.77%)	22.51% (18.57%)

Whether the differences or similarities observed above are of any significance will be determined by the outcome of the remaining statistical tests.

4.4.2. Choice of test

4.4.2.1. Tests for normality

In deciding on the requisite test (t-test for normal data or Wilcoxon Rank Sum test for non-normal data), the data first needs to be tested for normality (Keller and Warrack, 2000). There are three available tests: the chi-squared test for normality, the Kolmogorov-Smirnov test and the Lilliefors test. The chi-squared test requires that each observation be at least equal to 5, which would not be possible because of the cash percentage and options percentage variables. The Kolmogorov-Smirnov test assumes that the mean and standard deviation of the population is known, which is not the case with these variables. Finally, the Lilliefors test has no requirement for each observation and does not require the mean or standard deviation of the population to be known (Keller and Warrack, 2000). Therefore, the Lilliefors test will be carried out.

The hypotheses for the Lilliefors test are as follows:

H_0: The data are normally distributed
H_1: The data are not normally distributed

and the critical value (for a sample size of more than 30, and where "n" is the sample size), is as follows (Keller and Warrack, 2000):

at the 95% confidence level: $0.886 / \sqrt{n}$

at the 99% confidence level: $1.031 / \sqrt{n}$

Thus, for the owner-controlled firm variables, the 95% critical value is 0.0625 and 99% critical value is 0.0727. For management-controlled firms, the 95% critical value is 0.1237 and 99% critical value is 0.1473. The calculated "D" values (as calculated by MS Excel) need to be greater than the critical values for the null hypothesis to be rejected.

There were 10 sets of data to test (salary, options, total compensation, cash percentage and options percentage for each of the management- and owner-controlled firm-years). A summary of the results are displayed below[14].

Table 17: Summary of results of Lilliefors tests

	D statistic	**Critical value (95%)**	**Critical value (99%)**
Management-controlled firms			
Cash component	0.1557	0.1237	0.1473
Options component	0.1867	0.1237	0.1473
Total compensation	0.1477	0.1237	0.1473
Cash %	0.2003	0.1237	0.1473
Options %	0.2078	0.1237	0.1473
Owner-controlled firms			
Cash component	0.0945	0.0625	0.0727
Options component	0.2288	0.0625	0.0727
Total compensation	0.1279	0.0625	0.0727
Cash %	0.1956	0.0625	0.0727
Options %	0.2061	0.0625	0.0727

[14] Refer to Appendix F (management-controlled firms) and Appendix G (owner-controlled firms) for the full results.

Since all the calculated D statistics are greater than the critical values (even at the 99% confidence level), the null hypothesis can be rejected for all variables, and it can be concluded that all 10 variables are not normally distributed. Thus, Wilcoxon Rank Sum tests will be performed on all the data. The hypotheses (per variable) for the Wilcoxon Rank Sum tests are detailed in Section 3.3.3.2.2.

4.4.3. Level of compensation

The following table displays the results of the Wilcoxon Rank Sum tests for each of the "cash component", "options component" and "total compensation" variables[15]:

Table 18: Summary of results of Wilcoxon Rank Sum tests (level of compensation)

	Z statistic	**P-value**
Variable		
Cash component	0.4594	0.6770
Options component	1.0675	0.8571
Total compensation	0.8978	0.8154

Given that the p-values are insignificant (at both the 95% and 99% levels) for all three variables, the null hypothesis cannot be rejected, and thus it can be concluded that owner-controlled firms do not remunerate their CEOs less than management-controlled firms, with regards to the level of pay. These results corroborate the results of the regression models.

4.4.4. Mix of compensation

The following two table displays the results of the Wilcoxon Rank Sum tests for each of the "cash percentage" and "options percentage" variables[16]:

[15] Refer to Appendix H for the full results.
[16] Refer to Appendix H for the full results.

Table 19: Summary of results of Wilcoxon Rank Sum tests (mix of compensation)

	Z statistic	**P-value**
Variable		
Cash %	-1.2922	0.0981
Options %	1.2922	0.0981

The p-values for both tests are insignificant (at both the 95% and 99% levels). However, they are significant at the 90% level, which is too weak to make any strong conclusions. The results, therefore, are much the same as the previous Wilcoxon Rank Sum tests, which indicate that, with regards to the mix of CEO compensation, owner-controlled firms do not remunerate their CEOs differently to management-controlled firms.

4.5. Summary and overall conclusion of statistical tests

The results of the original regression models indicated that the influence of institutional shareholders is not a determinant of either the level or mix of CEO compensation. The alternative regression models, using lagged compensation variables, provided a similar result. These results are not consistent with previous empirical studies in other markets.

However, it must be noted from the relatively low R-squared and adjusted R-squared statistics that there are other variables (not included in the various models) that probably affect the various measures of compensation, which need to be included in the model in the future. Despite this, the purpose of this study was not to provide comprehensive models that predict remuneration, but to test whether the institutional variables were related (or not) to the various measures of compensation, in the manners hypothesised. This has been achieved.

Thereafter, the sample was separated into firms that were designated as being owner-controlled or management-controlled. To test whether firms in these two sub-samples remunerated their CEOs differently to each other, Wilcoxon Rank Sum tests were performed (because the data was found to be non-normal). The Wilcoxon Rank Sum tests confirmed that companies that are owner-controlled do not remunerate their CEOs differently to management-controlled companies, or more specifically in the manners hypothesised by agency theory.

Both sets of statistical tests allowed us to tentatively conclude that the presence of large external shareholders do not affect CEO compensation, despite what agency theory may predict.

Why this is the case would be a difficult question to answer. Magda Wierzycka, (previous CEO of African Harvest Fund Managers, which manages investments for over 205 funds), is of the opinion that pension-fund trustees in SA are largely apathetic (Rose, 2005c). Even the head of the largest asset manager in South Africa, Thabo Dloti (CEO of Old Mutual Investment Group SA), had this to say in a newspaper report:

> "As a house we don't believe in shareholder activism", quoted in Barron (2006).

Yet specific cases such as that of Comparex would indicate that institutional shareholders *do* get involved in their investments when it really matters. Perhaps then, executive compensation is not perceived to be an area of sufficient significance to warrant their attention.

A final reason could be that institutional shareholders actually perceive the level and mix of CEO remuneration in South Africa to be justified, and to correctly reflect the value that CEOs contribute to their companies. Thus, intervention on their part is not necessary.

The next chapter concludes the research report, discusses the limitations of the study, and provides suggestions for future research.

Chapter V: Summary and Conclusion

5.1. Summary

Agency theory would predict that, given the presence of large or powerful shareholders in a company, agency costs would be reduced. Since excessive executive compensation is regarded as being a problem that stems from the agency problem (Dyl, 1988), agency theory would also predict that executives in companies with large shareholders would receive less compensation and a larger proportion of long-term incentive-based compensation.

From a South African perspective, there has been no research that has dealt with institutional shareholders, let alone their effect on firm value. The aim of this study was to test the hypotheses mentioned above, as well as present original findings on the level of institutional share ownership, and CEO remuneration, in South Africa over the sample period. A review of the literature was performed in Chapter II, which included the agency theory underpinnings of these hypotheses as well as mechanisms to reduce agency costs, a discussion of South African institutions (including the role of the PIC and other major activist institutional shareholders), empirical evidence on the effect of institutional shareholders on firm value, and the barriers faced by institutional shareholders. The trends and controversies surrounding CEO compensation were also discussed, and then finally, previous studies that examined and tested the same hypotheses posed by this study, were discussed.

The research methodology was discussed in Chapter III. The central hypotheses were introduced and then the sample, limitations and delimitations were described. The hypotheses were tested using data from 50 companies over the period 2002-2006, resulting in 250 firm-year observations. There were two principal techniques of analysis used – regression models and tests for differences of means. The regression models were separated into those that represented the level of compensation (3 models) and those that represented the mix of compensation (2 models). The independent variables for each model were then presented, including justification for their use, with the key variables being the institutional ones.

The tests for differences of means required that the entire sample be separated into two sub-samples – a sample that contained owner-controlled firms and a sample that contained management-controlled firms. Owner-controlled firms were those firms that were deemed to have a sufficiently large institutional shareholder presence to reduce agency costs. The aim was to

determine whether owner-controlled firms remunerated their CEOs differently to management-controlled firms. This was an alternative way of testing what the regression models aimed to do.

Finally, a discussion on how the share options awarded to CEOs would be valued, ensued. The literature on the various valuation models was discussed, before reaching a conclusion on which model would be adopted for this study (the Hull and White (2004) model). Then, the assumptions and inputs to the model were discussed. The results and findings from the tests were presented in Chapter IV.

5.2. Results and findings

First, the sample used was described, and the trends in CEO compensation were presented. It was shown how the use of share options decreased over the sample period, most likely relate to the introduction of *IFRS 2: Share-based payments*, their adverse tax effects, and the negative publicity associated with them. Furthermore, companies in the financial services sector seemed to remunerate their CEOs the best, whereas resources companies awarded the greatest proportion of remuneration in the form of share options, despite the fact that CEOs in these firms held the lowest percentage of shares in their companies, compared to companies in other sectors. It was also shown how institutions own approximately 50% of the shares of the firms in the sample, and this has remained relatively stable over the sample period.

Next, the results of the regression models were presented. On an overall level, the institutional variables were shown not to be significant in any of the models. The only consistent findings were that bigger companies (in terms of total assets) were found to reward their CEOs more than companies with fewer assets, and that remuneration practices differed amongst sectors. There was also weak evidence for suggesting that when companies' ROEs declined, CEOs received more share options in those years, suggesting a degree of dishonesty on the part of those firms. An alternative set of models, using lagged compensation variables were used, and the results from these models mirrored those of the original models. The poor fit for both sets of models suggest that they should not be used for predictive purposes.

Then the tests for differences of means were performed. First, the sample was separated into management- and owner-controlled firms. Then, the sub-samples were tested for normality and found to be non-normal, hence Wilcoxon Rank Sum tests would be used to test the means of the two sub-samples. The Wilcoxon Rank Sum tests found that, for all the variables, owner-controlled firms did not remunerate their CEOs differently to management-controlled firms.

5.3. Conclusion

The overall results do not support the hypotheses posed by agency theory. The results of the tests conducted have allowed us to tentatively conclude that the presence of institutional shareholders do not have an effect on either the level or mix of CEO compensation in these companies. Suggested reasons for this range from apathy, to not considering executive remuneration to be a significant enough issue for institutional shareholders, and finally to the suggestion that institutional shareholders perceive the level and mix of compensation paid to South African CEOs to be a fair reflection of their value to their companies.

5.4. Limitations

The sample size used in this study was smaller than those used in U.S. studies. Most of the data was captured manually, hence the relatively small sample size compared to the U.S. studies. In the U.S. studies all the data (excluding the actual valuing of share options) were readily available on electronic databases, hence the large sample sizes used in those studies. However, given the composition of the JSE Securities Exchange (where a few companies account for a large proportion of the total market capitalisation), a large proportion of the market capitalisation was covered by the sample used in this study.

Also, some institutional investors may have commercial relations with the companies that they invest in and hence are "indifferent" to irregular corporate governance acts in their investee companies. It may be that since the measures of institutional investors have not been separated into pressure-sensitive and pressure-resistant, this may have affected the results of this study (see the discussion of David et al. (1998) in Section 2.5.). In any event, such a separation would have been very difficult to achieve, and most likely not have been practicable.

5.5. Directions for future research

While the primary means of testing the hypotheses posed in this study were statistical tests, it would be interesting to conduct a study similar to Ramsay et al. (1998), who surveyed institutional shareholders on their views with regards to specific corporate governance issues, one of which was executive compensation policies. A survey would provide a qualitative comparison to the quantitative nature of this study. Soobyah's (2002) survey only garnered responses from two South African asset managers, and thus a more extensive survey could be conducted in the future.

Further studies examining the effect of institutional shareholders on issues identified in the literature as being significant (see Section 2.3.4.), such as corporate diversification, dividend policy and corporate takeovers, may further shed light on the actions of institutional shareholders, and their affect on firm value.

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APPENDIX A

A note on tobit regression models

The typical linear regression model (estimated using the ordinary least squares method) requires no assumptions regarding measurement of the independent variables (x_i), but does require that the dependent variable (y_i) be continuous. Among other assumptions, the key assumption is that the dependent variable has been measured for all cases in the sample (Frone, 1997).

When the dependent variable is only partially observed, it is said to be a 'limited outcome' dependent variable. "Limited outcomes are variables characterized by the fact that their observed values do not cover their entire range" (Frone, 1997: 2). A type of limited outcome variable is a censored outcome. Censored outcomes are those where the observations are clustered at a lower threshold (left-censored), an upper threshold (right censored) or both. Censored dependent variables can be analysed using tobit regression.

In the sample of firms used in this study, not all of the 50 companies granted options to their CEO during the period under investigation. In fact, out of the total 250 firm-years used, 93 did not have option grants. Given that share option grants and options granted as a percentage of total compensation are the dependent variables in two of the models (Models 2 and 5 respectively), option grants therefore qualify as a 'censored dependent variable'. For this reason tobit regression models have been used.

APPENDIX B

List of companies included in the sample

No.	**Company**	**No.**	**Company**	**No.**	**Company**
1.	ABSA	18.	Grindrod	35.	Netcare
2.	AECI	19.	Harmony	36.	Pick n Pay
3.	African Bank	20.	Highveld Steel	37.	Remgro
4.	African Oxygen	21.	Impala Platinum	38.	Reunert
5.	African Rainbow Minerals	22.	Imperial	39.	RMB Holdings
6.	Alexander Forbes	23.	JD Group	40.	Sanlam
7.	AngloGold Ashanti	24.	Johnnic Communications (Avusa)	41.	Santam
8.	Anglo Platinum	25.	Kumba (Exxaro)	42.	Sasol
9.	Aspen Pharmacare	26.	Liberty Life	43.	Shoprite
10.	Aveng	27.	Massmart	44.	Standard Bank
11.	Barloworld	28.	Medi-Clinic	45.	Steinhoff International
12.	Bidvest Group	29.	Metropolitan Holdings	46.	Sun International
13.	Distell	30.	Mittal Steel	47.	Tiger Brands
14.	Ellerines	31.	MTN	48.	Tongaat-Hulett
15.	FirstRand	32.	Murray & Roberts	49.	Truworths
16.	Foschini	33.	Nampak	50.	Woolworths
17.	Goldfields	34.	Nedbank		

APPENDIX C

List of companies excluded from the sample

	Company	Reason for exclusion
1.	Anglo American PLC	Foreign incorporation; foreign currency; insufficient disclosure
2.	BHP Billiton PLC	Foreign incorporation; foreign currency; insufficient disclosure
3.	SABMiller PLC	Foreign incorporation; foreign currency; insufficient disclosure
4.	Richemont Securities AG	Foreign incorporation; foreign currency; insufficient disclosure
5.	Old Mutual PLC	Foreign incorporation; foreign currency; insufficient disclosure
6.	Telkom Ltd	Not listed for full period of 2002-2006. Only listed in 2004
7.	Naspers Ltd	Insufficient disclosure
8.	Liberty International PLC	Foreign incorporation; foreign currency; insufficient disclosure
9.	Lonmin PLC	Foreign incorporation; foreign currency; insufficient disclosure
10.	Investec PLC	Foreign incorporation; foreign currency; insufficient disclosure
11.	Sappi Ltd	Foreign currency; insufficient disclosure
12.	Pretoria Portland Cement	Insufficient disclosure
13.	Assmang Ltd	Managed by African Rainbow, hence insufficient disclosure
14.	Discovery Ltd	Insufficient disclosure
15.	Growthpoint Properties	Managed by Investec, hence insufficient disclosure
16.	Didata PLC	Foreign incorporation; foreign currency; insufficient disclosure

APPENDIX D

Regression model output - Cash Component model

Dependent Variable: CASH COMPONENT
Method: Least Squares
Included observations: 250 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NUMBER_5_	280569	201684.5	1.391127	0.1655
LARGEST	-2021835	3220649	-0.627772	0.5308
TOTAL_5_	392304	2383329	0.164603	0.8694
ALL	-2053617	753701.1	-2.72471	0.00690
LOGASSETS	1747341	134786.1	12.96381	0.00000
ROE	890279	465512.6	1.91247	0.05700
SHARE	-45658	251396.3	-0.181617	0.85600
TOBINSQ	1057537	199835.3	5.292045	0.00000
BASIC	-38983628	3352650	-11.6277	0.00000
CGOODS	-36834466	3277493	-11.23861	0.00000
CSERVICES	-34840563	3236398	-10.76523	0.00000
FINS	-37882076	3481423	-10.8812	0.00000
INDUST	-37160083	3319298	-11.19516	0.00000
CAGE	5317	25602.32	0.207675	0.83570
INDEP	617508	888619.3	0.694907	0.48780
CSHIP	-182849	3347643	-0.05462	0.95650
BSHIP	752124	1072765	0.701107	0.48390

R-squared	0.563899	Mean dependent var	5203312
Adjusted R-squared	0.533952	S.D. dependent var	2994316
S.E. of regression	2044151	Akaike info criterion	31.96444
Sum squared resid	9.74E+14	Schwarz criterion	32.2039
Log likelihood	-3978.555	Durbin-Watson stat	1.221112

APPENDIX D

Regression model output - Options Component model

Dependent Variable: OPTIONS COMPONENT
Method: ML - Censored Normal (TOBIT) (Quadratic hill climbing)
Included observations: 250 after adjustments
Left censoring (value) at zero
Convergence achieved after 12 iterations
Covariance matrix computed using second derivatives

	Coefficient	Std. Error	z-Statistic	Prob.
NUMBER_5_	89134	521396.7	0.170953	0.8643
LARGEST	696924	8299076	0.083976	0.9331
TOTAL_5_	-1853361	6128487	-0.302417	0.7623
ALL	246472	1908132	0.129169	0.8972
LOGASSETS	1649182	347918.1	4.740146	0.0000
ROE	-2095735	1697006	-1.23496	0.2168
SHARE	287667	628052.8	0.458031	0.6469
TOBINSQ	234331	541934.4	0.432397	0.6655
BASIC	-36955523	8626974	-4.283718	0.0000
CGOODS	-37477123	8442005	-4.439363	0.0000
CSERVICES	-35012302	8299631	-4.218537	0.0000
FINS	-40467667	8994380	-4.499217	0.0000
INDUST	-37248424	8503309	-4.380462	0.0000
CAGE	-29493	67356.73	-0.437855	0.6615
INDEP	3020214	2278733	1.325392	0.1850
CSHIP	2339284	8173767	0.286194	0.7747
BSHIP	-1375518	2688334	-0.511662	0.6089

Error Distribution				
SCALE:C(18)	4829403	288608.7	16.7334	0
Mean dependent var	2176160	S.D. dependent var		3804146
S.E. of regression	3639941	Akaike info criterion		21.7829
Sum squared resid	3.07E+15	Schwarz criterion		22.03645
Log likelihood	-2704.863	Hannan-Quinn criter.		21.88494
Avg. log likelihood	-10.81945			
Left censored obs	93	Right censored obs		0
Uncensored obs	157	Total obs		250

APPENDIX D

Regression model output - Total Compensation model

Dependent Variable: TOTAL COMPENSATION
Method: Least Squares
Included observations: 250 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NUMBER_5_	631135	416870.9	1.513982	0.1314
LARGEST	3649293	6656907	0.548196	0.5841
TOTAL_5_	-4166978	4926213	-0.845879	0.3985
ALL	-2176993	1557860	-1.397426	0.1636
LOGASSETS	3016775	278595.5	10.82851	0.0000
ROE	677894	962189.5	0.704532	0.4818
SHARE	105064	519622.6	0.202194	0.8399
TOBINSQ	1392695	413048.8	3.371746	0.0009
BASIC	-66047873	6929747	-9.531065	0.0000
CGOODS	-63768183	6774400	-9.413111	0.0000
CSERVICES	-60402575	6689461	-9.029514	0.0000
FINS	-67100853	7195914	-9.324855	0.0000
INDUST	-64667261	6860811	-9.4256	0.0000
CAGE	-27299	52918.62	-0.515858	0.6064
INDEP	2379076	1836728	1.29528	0.1965
CSHIP	3048750	6919398	0.440609	0.6599
BSHIP	-1078386	2217348	-0.48634	0.6272

R-squared	0.427729	Mean dependent var	7379472
Adjusted R-squared	0.388431	S.D. dependent var	5402807
S.E. of regression	4225150	Akaike info criterion	33.41659
Sum squared resid	4.16E+15	Schwarz criterion	33.65604
Log likelihood	-4160.073	Durbin-Watson stat	1.878745

APPENDIX D

Regression model output - Cash % model

Dependent Variable: CASH %
Method: Least Squares
Included observations: 250 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NUMBER_5_	0.0097	0.021477	0.453794	0.6504
LARGEST	0.1661	0.342961	0.484401	0.6286
TOTAL_5_	-0.0409	0.253796	-0.161031	0.8722
ALL	-0.0952	0.08026	-1.186351	0.2367
LOGASSETS	-0.0343	0.014353	-2.390074	0.0176
ROE	0.0737	0.049572	1.485823	0.1387
SHARE	-0.0101	0.026771	-0.376273	0.7071
TOBINSQ	0.0162	0.02128	0.761689	0.4470
BASIC	1.3616	0.357018	3.813687	0.0002
CGOODS	1.4454	0.349014	4.141254	0.0000
CSERVICES	1.3653	0.344638	3.96162	0.0001
FINS	1.5397	0.37073	4.153052	0.0000
INDUST	1.4322	0.353466	4.051847	0.0001
CAGE	0.0034	0.002726	1.260479	0.2088
INDEP	-0.0957	0.094627	-1.011065	0.3130
CSHIP	-0.2625	0.356484	-0.73626	0.4623
BSHIP	0.1075	0.114237	0.940755	0.3478

R-squared	0.101379	Mean dependent var	0.783722
Adjusted R-squared	0.039672	S.D. dependent var	0.222129
S.E. of regression	0.217678	Akaike info criterion	-0.146022
Sum squared resid	11.0404	Schwarz criterion	0.093437
Log likelihood	35.2528	Durbin-Watson stat	1.828603

APPENDIX D

Regression model output - Options % model

Dependent Variable: OPTIONS %
Method: ML - Censored Normal (TOBIT) (Quadratic hill climbing)
Included observations: 250 after adjustments
Left censoring (value) at zero
Convergence achieved after 5 iterations
Covariance matrix computed using second derivatives

	Coefficient	Std. Error	z-Statistic	Prob.
NUMBER_5_	-0.0303	0.032721	-0.92537	0.3548
LARGEST	-0.5457	0.521744	-1.04594	0.2956
TOTAL_5_	0.2616	0.384486	0.68051	0.4962
ALL	0.1305	0.120096	1.08670	0.2772
LOGASSETS	0.0480	0.021696	2.21343	0.0269
ROE	-0.2382	0.130513	-1.82518	0.0680
SHARE	0.0195	0.039699	0.4916	0.6230
TOBINSQ	-0.0207	0.035364	-0.58535	0.5583
BASIC	-0.7508	0.538253	-1.39483	0.1631
CGOODS	-0.8816	0.526802	-1.67358	0.0942
CSERVICES	-0.7465	0.518452	-1.43991	0.1499
FINS	-0.9969	0.560176	-1.77960	0.0751
INDUST	-0.8229	0.531287	-1.54895	0.1214
CAGE	-0.0028	0.004254	-0.64808	0.5169
INDEP	0.1733	0.142916	1.212703	0.2252
CSHIP	0.1990	0.516264	0.385377	0.7000
BSHIP	-0.0642	0.170354	-0.37671	0.7064

	Error Distribution			
SCALE:C(18)	0.306292	0.018926	16.18392	0
Mean dependent var	0.216278	S.D. dependent var		0.222129
S.E. of regression	0.219039	Akaike info criterion		1.043624
Sum squared resid	11.13093	Schwarz criterion		1.297169
Log likelihood	-112.453	Hannan-Quinn criter.		1.145668
Avg. log likelihood	-0.449812			
Left censored obs	93	Right censored obs		0
Uncensored obs	157	Total obs		250

APPENDIX E

Lagged regression model output - Cash Component model

Dependent Variable: CASH COMPONENT
Method: Least Squares
Included observations: 200 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NUMBER_5_	266571	241185.4	1.105255	0.2705
LARGEST	-3588560	3730174	-0.962036	0.3373
TOTAL_5_	899840	2804651	0.320838	0.7487
ALL	-1853219	831332.7	-2.229215	0.0270
LOGASSETS	1783286	155654.4	11.4567	0.0000
ROE	-71817	511188.5	-0.140491	0.8884
SHARE	293929	257972.6	1.139381	0.2560
TOBINSQ	1257660	256672.1	4.899869	0.0000
BASIC	-40450800	3793456	-10.66331	0.0000
CGOODS	-37978607	3709454	-10.23833	0.0000
CSERVICES	-35858713	3654454	-9.812331	0.0000
FINS	-39057553	3941319	-9.909768	0.0000
INDUST	-38484003	3739841	-10.29028	0.0000
CAGE	23854	28863.06	0.826455	0.4096
INDEP	736570	990861.8	0.743363	0.4582
CSHIP	-1553813	4321889	-0.359522	0.7196
BSHIP	615714	1208580	0.509453	0.6110

R-squared	0.580774	Mean dependent var	5600633
Adjusted R-squared	0.544121	S.D. dependent var	3004994
S.E. of regression	2028937	Akaike info criterion	31.96509
Sum squared resid	7.53E+14	Schwarz criterion	32.24545
Log likelihood	-3179.509	Durbin-Watson stat	1.387429

APPENDIX E

Lagged regression model output - Options Component model

Dependent Variable: OPTIONS COMPONENT
Method: ML - Censored Normal (TOBIT) (Quadratic hill climbing)
Included observations: 200 after adjustments
Left censoring (value) at zero
Convergence achieved after 12 iterations
Covariance matrix computed using second derivatives

	Coefficient	Std. Error	z-Statistic	Prob.
NUMBER_5_	481675	649846.6	0.741213	0.4586
LARGEST	4168609	10041789	0.415126	0.6780
TOTAL_5_	-3314203	7531150	-0.44006	0.6599
ALL	-727300	2231544	-0.32591	0.7445
LOGASSETS	1414150	417630	3.386131	0.0007
ROE	-503290	1314482	-0.38288	0.7018
SHARE	-315698	672379.2	-0.46952	0.6387
TOBINSQ	283977	688168.1	0.412657	0.6799
BASIC	-33240918	10160308	-3.27164	0.0011
CGOODS	-34050346	9949321	-3.42237	0.0006
CSERVICES	-31066925	9751478	-3.18586	0.0014
FINS	-35595698	10582915	-3.36350	0.0008
INDUST	-34154310	9982499	-3.42141	0.0006
CAGE	15023	79284.06	0.189489	0.8497
INDEP	175763	2656489	0.066163	0.9472
CSHIP	-8500398	11274242	-0.75396	0.4509
BSHIP	203552	3136769	0.064892	0.9483

	Error Distribution			
SCALE:C(18)	5070593	336412.9	15.07253	0
Mean dependent var	2232726	S.D. dependent var		3946772
S.E. of regression	3878414	Akaike info criterion		22.11861
Sum squared resid	2.74E+15	Schwarz criterion		22.41546
Log likelihood	-2193.861	Hannan-Quinn criter.		22.23874
Avg. log likelihood	-10.96931			
Left censored obs	73	Right censored obs		0
Uncensored obs	127	Total obs		200

APPENDIX E

Lagged regression model output - Total Compensation model

Dependent Variable: TOTAL COMPENSATION
Method: Least Squares
Included observations: 200 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NUMBER_5_	747285	531793.2	1.405216	0.1617
LARGEST	977402	8224717	0.118837	0.9055
TOTAL_5_	-2615232	6184017	-0.422902	0.6729
ALL	-2426223	1833018	-1.323622	0.1873
LOGASSETS	2922878	343204.8	8.516426	0.0000
ROE	-243944	1127127	-0.21643	0.8289
SHARE	258388	568807.6	0.454262	0.6502
TOBINSQ	1745923	565940.1	3.084997	0.0024
BASIC	-67011828	8364248	-8.011698	0.0000
CGOODS	-64134809	8179030	-7.841371	0.0000
CSERVICES	-60551948	8057760	-7.514737	0.0000
FINS	-66797309	8690273	-7.686446	0.0000
INDUST	-65734643	8246032	-7.97167	0.0000
CAGE	42917	63640.59	0.67437	0.5009
INDEP	1077755	2184766	0.493305	0.6224
CSHIP	-3880308	9529398	-0.407193	0.6843
BSHIP	258826	2664816	0.097127	0.9227

R-squared	0.405466	Mean dependent var	7833359
Adjusted R-squared	0.353484	S.D. dependent var	5563792
S.E. of regression	4473634	Akaike info criterion	33.54647
Sum squared resid	3.66E+15	Schwarz criterion	33.82683
Log likelihood	-3337.647	Durbin-Watson stat	1.680186

APPENDIX E

Lagged regression model output - Cash % model

Dependent Variable: CASH %
Method: Least Squares
Included observations: 200 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NUMBER_5_	-0.0101	0.025605	-0.392559	0.6951
LARGEST	-0.1722	0.396008	-0.434914	0.6641
TOTAL_5_	0.1323	0.297751	0.444372	0.6573
ALL	-0.0382	0.088257	-0.432522	0.6659
LOGASSETS	-0.0183	0.016525	-1.109809	0.2685
ROE	0.0230	0.05427	0.424631	0.6716
SHARE	0.0186	0.027387	0.680778	0.4969
TOBINSQ	0.0094	0.027249	0.345718	0.7300
BASIC	1.0838	0.402726	2.691075	0.0078
CGOODS	1.1712	0.393808	2.97391	0.0033
CSERVICES	1.0711	0.387969	2.760819	0.0064
FINS	1.1851	0.418424	2.832321	0.0051
INDUST	1.1544	0.397034	2.907465	0.0041
CAGE	0.0019	0.003064	0.633298	0.5273
INDEP	-0.0100	0.105193	-0.094847	0.9245
CSHIP	0.2569	0.458827	0.560008	0.5762
BSHIP	0.0135	0.128307	0.105091	0.9164

R-squared	0.054519	Mean dependent var	0.789773
Adjusted R-squared	-0.028146	S.D. dependent var	0.21243
S.E. of regression	0.215399	Akaike info criterion	-0.151481
Sum squared resid	8.490599	Schwarz criterion	0.128876
Log likelihood	32.14807	Durbin-Watson stat	1.797934

APPENDIX E

Lagged regression model output - Options % model

Dependent Variable: OPTIONS %
Method: ML - Censored Normal (TOBIT) (Quadratic hill climbing)
Included observations: 200 after adjustments
Left censoring (value) at zero
Convergence achieved after 5 iterations
Covariance matrix computed using second derivatives

	Coefficient	Std. Error	z-Statistic	Prob.
NUMBER_5_	0.0063	0.037774	0.166355	0.8679
LARGEST	0.1241	0.583178	0.212796	0.8315
TOTAL_5_	-0.0910	0.437546	-0.20807	0.8352
ALL	0.0426	0.130126	0.327527	0.7433
LOGASSETS	0.0269	0.024257	1.107949	0.2679
ROE	-0.0384	0.076955	-0.49853	0.6181
SHARE	-0.0343	0.03927	-0.87358	0.3823
TOBINSQ	-0.0237	0.040176	-0.58953	0.5555
BASIC	-0.2703	0.590799	-0.45743	0.6474
CGOODS	-0.4346	0.578153	-0.75171	0.4522
CSERVICES	-0.2580	0.567403	-0.45471	0.6493
FINS	-0.4338	0.614505	-0.70600	0.4802
INDUST	-0.3611	0.580889	-0.62162	0.5342
CAGE	-0.0025	0.004601	-0.54027	0.5890
INDEP	0.0020	0.154741	0.013041	0.9896
CSHIP	-0.5996	0.660215	-0.90818	0.3638
BSHIP	0.0152	0.183295	0.083162	0.9337

Error Distribution				
SCALE:C(18)	0.298775	0.02053	14.55301	0
Mean dependent var	0.210227	S.D. dependent var		0.21243
S.E. of regression	0.216412	Akaike info criterion		1.059712
Sum squared resid	8.523846	Schwarz criterion		1.35656
Log likelihood	-87.97117	Hannan-Quinn criter.		1.179842
Avg. log likelihood	-0.439856			
Left censored obs	73	Right censored obs		0
Uncensored obs	127	Total obs		200

APPENDIX F

Lilliefors test results - Cash Component variable (Management-controlled firms)

Data	Ordered	S(x)	Z	F(x)	|S(x)-F(x)|
3473000	1546223	0.020408	-1.2341	0.108583	0.088175
3461000	1559367	0.040816	-1.22942	0.109458	0.068642
4443000	1666000	0.061224	-1.19143	0.116743	0.055518
3279000	1689904	0.081633	-1.18291	0.118422	0.036789
5512000	2033000	0.102041	-1.06068	0.144417	0.042376
7027000	2102500	0.122449	-1.03593	0.150118	0.027669
7643000	2164000	0.142857	-1.01402	0.155287	0.01243
7842000	2173000	0.163265	-1.01081	0.156054	0.007212
8734000	2200000	0.183673	-1.00119	0.158367	0.025306
2559009	2405000	0.204082	-0.92816	0.176662	0.027419
4962903	2449000	0.22449	-0.91249	0.180757	0.043733
4650075	2559009	0.244898	-0.8733	0.191251	0.053647
6091220	2597000	0.265306	-0.85976	0.19496	0.070346
2164000	2640832	0.285714	-0.84415	0.199294	0.08642
3471000	3069000	0.306122	-0.69161	0.244591	0.061532
5269000	3147000	0.326531	-0.66382	0.253401	0.073129
5975000	3279000	0.346939	-0.6168	0.268683	0.078255
3147000	3282000	0.367347	-0.61573	0.269036	0.098311
2102500	3461000	0.387755	-0.55196	0.290487	0.097268
1666000	3471000	0.408163	-0.5484	0.291709	0.116455
3069000	3473000	0.428571	-0.54769	0.291953	0.136618
2173000	3578358	0.44898	-0.51015	0.304972	0.144008
2597000	3648000	0.469388	-0.48534	0.313716	0.155672
2033000	4015000	0.489796	-0.3546	0.361444	0.128352
3282000	4358000	0.510204	-0.23241	0.408111	0.102093
3648000	4443000	0.530612	-0.20213	0.419909	0.110703
2449000	4650075	0.55102	-0.12836	0.448933	0.102087
11516597	4906000	0.571429	-0.03718	0.485169	0.086259
7865000	4962903	0.591837	-0.01691	0.493253	0.098583
4906000	5191000	0.612245	0.064347	0.525653	0.086592
8087000	5269000	0.632653	0.092135	0.536704	0.095949
9041000	5512000	0.653061	0.178703	0.570915	0.082147
4358000	5975000	0.673469	0.343646	0.634444	0.039026
1546223	6091220	0.693878	0.385049	0.649899	0.043978
3578358	7027000	0.714286	0.718419	0.763751	0.049465
1559367	7045700	0.734694	0.725081	0.765799	0.031105
2640832	7171000	0.755102	0.769719	0.779267	0.024165
1689904	7643000	0.77551	0.937868	0.825844	0.050334
7045700	7842000	0.795918	1.008761	0.843455	0.047537
8923800	7865000	0.816327	1.016955	0.845413	0.029086
8219700	8087000	0.836735	1.096042	0.86347	0.026735
9680100	8219700	0.857143	1.143316	0.873546	0.016404

Lilliefors Test Statistic
D = 0.1557

9135100	8734000	0.877551	1.326535	0.907669	0.030118
2405000	8923800	0.897959	1.394151	0.918364	0.020405
4015000	9041000	0.918367	1.435903	0.924485	0.006118
5191000	9135100	0.938776	1.469426	0.929141	0.009634
12011000	9680100	0.959184	1.663581	0.951902	0.007282
7171000	11516597	0.979592	2.31783	0.989771	0.010179
2200000	12011000	1	2.493961	0.993684	0.006316

Data	Ordered	S(x)	Z	F(x)	|S(x)-F(x)|
0	0	0.408163	-0.68154	0.247764	0.160399
584018	0	0.408163	-0.68154	0.247764	0.160399
5857500	0	0.408163	-0.68154	0.247764	0.160399
1934963	0	0.408163	-0.68154	0.247764	0.160399
1876640	0	0.408163	-0.68154	0.247764	0.160399
1310720	0	0.408163	-0.68154	0.247764	0.160399
1205820	0	0.408163	-0.68154	0.247764	0.160399
2776242	0	0.408163	-0.68154	0.247764	0.160399
2579893	0	0.408163	-0.68154	0.247764	0.160399
4800000	0	0.408163	-0.68154	0.247764	0.160399
0	0	0.408163	-0.68154	0.247764	0.160399
0	0	0.408163	-0.68154	0.247764	0.160399
3109910	0	0.408163	-0.68154	0.247764	0.160399
0	0	0.408163	-0.68154	0.247764	0.160399
0	0	0.408163	-0.68154	0.247764	0.160399
0	0	0.408163	-0.68154	0.247764	0.160399
0	0	0.408163	-0.68154	0.247764	0.160399
0	0	0.408163	-0.68154	0.247764	0.160399
4304575	0	0.408163	-0.68154	0.247764	0.160399
49200	0	0.408163	-0.68154	0.247764	0.160399
1258200	49200	0.428571	-0.65743	0.255453	0.173119
0	231630	0.44898	-0.56802	0.285012	0.163968
0	426320	0.469388	-0.4726	0.31825	0.151138
603300	584018	0.489796	-0.39531	0.346308	0.143488
0	603300	0.510204	-0.38586	0.349801	0.160403
0	797140	0.530612	-0.29085	0.385581	0.145031
10629765	1016250	0.55102	-0.18347	0.427216	0.123804
0	1110415	0.571429	-0.13732	0.445391	0.126038
1738072	1138254	0.591837	-0.12367	0.450788	0.141049
2444350	1205820	0.612245	-0.09056	0.463923	0.148322
2902000	1258200	0.632653	-0.06488	0.474133	0.15852
1323000	1310720	0.653061	-0.03914	0.484388	0.168673
1016250	1323000	0.673469	-0.03312	0.486787	0.186682
2289871	1738072	0.693878	0.170306	0.567615	0.126262
0	1852206	0.714286	0.226245	0.589494	0.124791
0	1876640	0.734694	0.23822	0.594145	0.140549
797140	1934963	0.755102	0.266805	0.60519	0.149912
1138254	2289871	0.77551	0.440749	0.670303	0.105207
0	2444350	0.795918	0.516461	0.697234	0.098685
0	2451215	0.816327	0.519826	0.698407	0.117919
1110415	2579893	0.836735	0.582892	0.720017	0.116718
1852206	2776242	0.857143	0.679125	0.751471	0.105672
5537279	2902000	0.877551	0.740761	0.770581	0.10697
2451215	3109910	0.897959	0.84266	0.800291	0.097669
426320	4304575	0.918367	1.428178	0.92338	0.005012
0	4800000	0.938776	1.670991	0.952638	0.013863

Lilliefors Test Statistic
D = 0.1867

0	5537279	0.959184	2.03234	0.97894	0.019757
0	5857500	0.979592	2.189284	0.985712	0.00612
231630	10629765	1	4.528224	0.999997	2.97E-06

APPENDIX F

Lilliefors test results - Total Compensation variable (Management-controlled firms)

Data	Ordered	S(x)	Z	F(x)	|S(x)-F(x)|
3473000	1559367	0.020408	-1.40398	0.080163	0.059755
4045018	1715200	0.040816	-1.35879	0.087107	0.046291
10300500	2164000	0.061224	-1.22864	0.109603	0.048378
5213963	2173000	0.081633	-1.22603	0.110093	0.02846
7388640	2431630	0.102041	-1.15104	0.124859	0.022818
8337720	2597000	0.122449	-1.10308	0.134996	0.012547
8848820	2636300	0.142857	-1.09169	0.137486	0.005371
10618242	2828158	0.163265	-1.03605	0.150089	0.013176
11313893	3147000	0.183673	-0.94359	0.172689	0.010984
7359009	3282000	0.204082	-0.90444	0.18288	0.021201
4962903	3437972	0.22449	-0.85921	0.195111	0.029379
4650075	3471000	0.244898	-0.84964	0.197764	0.047134
9201130	3473000	0.265306	-0.84906	0.197925	0.067381
2164000	3578358	0.285714	-0.8185	0.206534	0.07918
3471000	3648000	0.306122	-0.79831	0.212345	0.093777
5269000	3836094	0.326531	-0.74377	0.228509	0.098022
5975000	4045018	0.346939	-0.68318	0.247246	0.099693
3147000	4327200	0.367347	-0.60135	0.273802	0.093545
6407075	4441320	0.387755	-0.56826	0.284929	0.102826
1715200	4650075	0.408163	-0.50773	0.305823	0.102341
4327200	4856215	0.428571	-0.44795	0.327095	0.101476
2173000	4962903	0.44898	-0.41701	0.338335	0.110645
2597000	5191000	0.469388	-0.35087	0.362844	0.106544
2636300	5213963	0.489796	-0.34421	0.365345	0.124451
3282000	5269000	0.510204	-0.32825	0.371362	0.138842
3648000	5374250	0.530612	-0.29773	0.382955	0.147657
13078765	5975000	0.55102	-0.12352	0.450847	0.100173
11516597	6407075	0.571429	0.001773	0.500707	0.070721
9603072	7045700	0.591837	0.186963	0.574155	0.017682
7350350	7171000	0.612245	0.223297	0.588348	0.023897
10989000	7350350	0.632653	0.275306	0.608459	0.024194
10364000	7359009	0.653061	0.277817	0.609423	0.043638
5374250	7388640	0.673469	0.286409	0.612718	0.060752
3836094	8337720	0.693878	0.561625	0.712814	0.018937
3578358	8848820	0.714286	0.709835	0.761097	0.046811
1559367	8923800	0.734694	0.731578	0.767787	0.033093
3437972	9201130	0.755102	0.811999	0.791604	0.036502
2828158	9330115	0.77551	0.849402	0.802171	0.026661
7045700	9603072	0.795918	0.928555	0.82344	0.027522
8923800	10300500	0.816327	1.130797	0.87093	0.054603
9330115	10364000	0.836735	1.149211	0.874765	0.038031
11532306	10618242	0.857143	1.222936	0.889323	0.03218

Lilliefors Test Statistic
D = 0.1477

14672379	10989000	0.877551	1.330449	0.908315	0.030764
4856215	11313893	0.897959	1.424663	0.922873	0.024913
4441320	11516597	0.918367	1.483443	0.931022	0.012654
5191000	11532306	0.938776	1.487999	0.931624	0.007151
12011000	12011000	0.959184	1.626811	0.948111	0.011072
7171000	13078765	0.979592	1.936444	0.973593	0.005998
2431630	14672379	1	2.398564	0.99177	0.00823

APPENDIX F

Lilliefors test results - Cash % variable (Management-controlled firms)

Data	Ordered	S(x)	Z	F(x)	|S(x)-F(x)|
1	0.18725	0.020408	-2.95296	0.001574	0.018834
0.85562	0.328153	0.040816	-2.29533	0.010857	0.029959
0.431338	0.347738	0.061224	-2.20392	0.013765	0.047459
0.628888	0.403072	0.081633	-1.94565	0.025848	0.055785
0.74601	0.431338	0.102041	-1.81373	0.03486	0.067181
0.842796	0.495242	0.122449	-1.51547	0.064827	0.057622
0.863731	0.597528	0.142857	-1.03807	0.149619	0.006762
0.73854	0.622605	0.163265	-0.92103	0.178518	0.015253
0.771971	0.628888	0.183673	-0.8917	0.186277	0.002603
0.347738	0.662008	0.204082	-0.73712	0.230524	0.026443
1	0.667451	0.22449	-0.71172	0.23832	0.013831
1	0.709235	0.244898	-0.5167	0.302683	0.057785
0.662008	0.735918	0.265306	-0.39216	0.34747	0.082163
1	0.73854	0.285714	-0.37992	0.352002	0.066288
1	0.74601	0.306122	-0.34506	0.365026	0.058903
1	0.768137	0.326531	-0.24179	0.404473	0.077942
1	0.771157	0.346939	-0.22769	0.409943	0.063005
1	0.771971	0.367347	-0.22389	0.411422	0.044075
0.328153	0.810904	0.387755	-0.04218	0.483179	0.095423
0.971315	0.819009	0.408163	-0.00435	0.498265	0.090102
0.709235	0.83939	0.428571	0.090775	0.536164	0.107593
1	0.842796	0.44898	0.106675	0.542476	0.093497
1	0.85562	0.469388	0.166529	0.566129	0.096742
0.771157	0.863731	0.489796	0.204383	0.580973	0.091177
1	0.872347	0.510204	0.244595	0.596615	0.086411
1	0.880986	0.530612	0.284917	0.612146	0.081534
0.18725	0.904011	0.55102	0.39238	0.652611	0.101591
1	0.904743	0.571429	0.395798	0.653873	0.082445
0.819009	0.971315	0.591837	0.706512	0.760065	0.168229
0.667451	1	1	0.840393	0.799656	0.200344
0.735918	1	1	0.840393	0.799656	0.200344
0.872347	1	1	0.840393	0.799656	0.200344
0.810904	1	1	0.840393	0.799656	0.200344
0.403072	1	1	0.840393	0.799656	0.200344
1	1	1	0.840393	0.799656	0.200344
1	1	1	0.840393	0.799656	0.200344
0.768137	1	1	0.840393	0.799656	0.200344
0.597528	1	1	0.840393	0.799656	0.200344
1	1	1	0.840393	0.799656	0.200344
1	1	1	0.840393	0.799656	0.200344
0.880986	1	1	0.840393	0.799656	0.200344
0.83939	1	1	0.840393	0.799656	0.200344

Lilliefors Test Statistic
D = 0.2003

0.622605	1	1	0.840393	0.799656	0.200344
0.495242	1	1	0.840393	0.799656	0.200344
0.904011	1	1	0.840393	0.799656	0.200344
1	1	1	0.840393	0.799656	0.200344
1	1	1	0.840393	0.799656	0.200344
1	1	1	0.840393	0.799656	0.200344
0.904743	1	1	0.840393	0.799656	0.200344

APPENDIX F

Lilliefors test results - Options % variable (Management-controlled firms)

Data	Ordered	S(x)	Z	F(x)	|S(x)-F(x)|
0	0	0.408163	-0.84039	0.200344	0.207819
0.14438	0	0.408163	-0.84039	0.200344	0.207819
0.568662	0	0.408163	-0.84039	0.200344	0.207819
0.371112	0	0.408163	-0.84039	0.200344	0.207819
0.25399	0	0.408163	-0.84039	0.200344	0.207819
0.157204	0	0.408163	-0.84039	0.200344	0.207819
0.136269	0	0.408163	-0.84039	0.200344	0.207819
0.26146	0	0.408163	-0.84039	0.200344	0.207819
0.228029	0	0.408163	-0.84039	0.200344	0.207819
0.652262	0	0.408163	-0.84039	0.200344	0.207819
0	0	0.408163	-0.84039	0.200344	0.207819
0	0	0.408163	-0.84039	0.200344	0.207819
0.337992	0	0.408163	-0.84039	0.200344	0.207819
0	0	0.408163	-0.84039	0.200344	0.207819
0	0	0.408163	-0.84039	0.200344	0.207819
0	0	0.408163	-0.84039	0.200344	0.207819
0	0	0.408163	-0.84039	0.200344	0.207819
0	0	0.408163	-0.84039	0.200344	0.207819
0.671847	0	0.408163	-0.84039	0.200344	0.207819
0.028685	0	0.408163	-0.84039	0.200344	0.207819
0.290765	0.028685	0.428571	-0.70651	0.239935	0.188637
0	0.095257	0.44898	-0.3958	0.346127	0.102853
0	0.095989	0.469388	-0.39238	0.347389	0.121999
0.228843	0.119014	0.489796	-0.28492	0.387854	0.101942
0	0.127653	0.510204	-0.24459	0.403385	0.106819
0	0.136269	0.530612	-0.20438	0.419027	0.111585
0.81275	0.14438	0.55102	-0.16653	0.433871	0.11715
0	0.157204	0.571429	-0.10667	0.457524	0.113905
0.180991	0.16061	0.591837	-0.09078	0.463836	0.128001
0.332549	0.180991	0.612245	0.00435	0.501735	0.11051
0.264082	0.189096	0.632653	0.042178	0.516821	0.115832
0.127653	0.228029	0.653061	0.223888	0.588578	0.064483
0.189096	0.228843	0.673469	0.227691	0.590057	0.083413
0.596928	0.231863	0.693878	0.241786	0.595527	0.098351
0	0.25399	0.714286	0.345057	0.634974	0.079311
0	0.26146	0.734694	0.379921	0.647998	0.086696
0.231863	0.264082	0.755102	0.392161	0.65253	0.102572
0.402472	0.290765	0.77551	0.5167	0.697317	0.078193
0	0.332549	0.795918	0.711716	0.76168	0.034239
0	0.337992	0.816327	0.737122	0.769476	0.046851
0.119014	0.371112	0.836735	0.891701	0.813723	0.023011
0.16061	0.377395	0.857143	0.921026	0.821482	0.035661

Lilliefors Test Statistic
D = 0.2078

0.377395	0.402472	0.877551	1.038068	0.850381	0.02717
0.504758	0.504758	0.897959	1.515471	0.935173	0.037214
0.095989	0.568662	0.918367	1.813728	0.96514	0.046773
0	0.596928	0.938776	1.945655	0.974152	0.035376
0	0.652262	0.959184	2.203915	0.986235	0.027051
0	0.671847	0.979592	2.295327	0.989143	0.009551
0.095257	0.81275	1	2.952964	0.998426	0.001574

APPENDIX G

Lilliefors test results - Cash Component variable (Owner-controlled firms)

Data	Ordered	S(x)	Z	F(x)	|S(x)-F(x)|
3356882	717000	0.004975	-1.48974	0.068147	0.063172
8478729	1169000	0.00995	-1.3412	0.089928	0.079977
10492382	1233000	0.014925	-1.32017	0.093389	0.078464
8576667	1264000	0.0199	-1.30998	0.095101	0.0752
16608081	1276000	0.024876	-1.30604	0.09577	0.070894
2204000	1360000	0.029851	-1.27844	0.100548	0.070697
2403000	1458000	0.034826	-1.24623	0.10634	0.071514
3431000	1476000	0.039801	-1.24032	0.107429	0.067628
3502000	1478000	0.044776	-1.23966	0.107551	0.062775
5122000	1498000	0.049751	-1.23309	0.108772	0.059021
3200000	1505000	0.054726	-1.23079	0.109202	0.054475
3300000	1513819	0.059701	-1.22789	0.109745	0.050043
4500000	1649000	0.064677	-1.18346	0.118313	0.053636
4528000	1677000	0.069652	-1.17426	0.120145	0.050493
5098000	1703000	0.074627	-1.16572	0.121864	0.047237
1649000	1717655	0.079602	-1.1609	0.122841	0.043239
1703000	1752000	0.084577	-1.14962	0.125151	0.040574
1875000	1788000	0.089552	-1.13779	0.127605	0.038052
3990000	1800000	0.094527	-1.13384	0.12843	0.033903
3343000	1827000	0.099502	-1.12497	0.130301	0.030798
2725000	1875000	0.104478	-1.1092	0.133673	0.029195
12841316	1930000	0.109453	-1.09112	0.137609	0.028157
11832192	1951000	0.114428	-1.08422	0.139133	0.024705
8470000	1987956	0.119403	-1.07208	0.141843	0.02244
9425500	1995711	0.124378	-1.06953	0.142416	0.018037
8464420	2020000	0.129353	-1.06155	0.144221	0.014867
4464926	2066000	0.134328	-1.04643	0.147681	0.013353
2702000	2111000	0.139303	-1.03164	0.15112	0.011816
2309000	2204000	0.144279	-1.00108	0.158394	0.014115
2305000	2295000	0.149254	-0.97118	0.16573	0.016476
1930000	2305000	0.154229	-0.96789	0.166549	0.01232
2695000	2309000	0.159204	-0.96658	0.166878	0.007674
4219000	2403000	0.164179	-0.93569	0.174717	0.010538
3350000	2500000	0.169154	-0.90381	0.183048	0.013893
4459000	2526000	0.174129	-0.89527	0.185322	0.011193
5688000	2533000	0.179104	-0.89297	0.185937	0.006833
5839000	2577700	0.18408	-0.87828	0.189896	0.005817
7027000	2630000	0.189055	-0.86109	0.194594	0.005539
3547000	2679000	0.19403	-0.84499	0.199059	0.005029
3693000	2695000	0.199005	-0.83973	0.20053	0.001525
5023000	2702000	0.20398	-0.83743	0.201175	0.002805
9781000	2725000	0.208955	-0.82987	0.203305	0.00565

Lilliefors Test Statistic
D = 0.0945

11134000	2735157	0.21393	-0.82653	0.20425	0.00968
1233000	2767000	0.218905	-0.81607	0.20723	0.011676
1264000	2795000	0.223881	-0.80687	0.209871	0.01401
1498000	2800000	0.228856	-0.80523	0.210345	0.018511
1677000	2830000	0.233831	-0.79537	0.2132	0.020631
2295000	2850000	0.238806	-0.7888	0.215116	0.02369
1478000	2925300	0.243781	-0.76405	0.222419	0.021362
1752000	2974000	0.248756	-0.74805	0.227216	0.02154
2974000	2997402	0.253731	-0.74036	0.229542	0.024189
5962000	3018431	0.258706	-0.73345	0.231643	0.027063
6436000	3053000	0.263682	-0.72209	0.235121	0.028561
7796000	3139000	0.268657	-0.69382	0.243896	0.024761
8415000	3200000	0.273632	-0.67378	0.250226	0.023406
9165000	3205600	0.278607	-0.67194	0.250811	0.027796
10848000	3215000	0.283582	-0.66885	0.251796	0.031786
4232600	3218296	0.288557	-0.66777	0.252141	0.036416
5265600	3300000	0.293532	-0.64092	0.260788	0.032744
6326200	3333291	0.298507	-0.62998	0.264355	0.034153
6949300	3343000	0.303483	-0.62679	0.265399	0.038083
3333291	3350000	0.308458	-0.62449	0.266154	0.042304
5314779	3356882	0.313433	-0.62223	0.266897	0.046536
5581237	3381331	0.318408	-0.61419	0.269545	0.048863
5577577	3399356	0.323383	-0.60827	0.271505	0.051878
6730031	3400000	0.328358	-0.60806	0.271575	0.056783
2630000	3404000	0.333333	-0.60674	0.272011	0.061322
5910000	3431000	0.338308	-0.59787	0.274964	0.063345
7394000	3461000	0.343284	-0.58801	0.278263	0.065021
4597000	3502000	0.348259	-0.57454	0.282802	0.065456
4640000	3547000	0.353234	-0.55975	0.287825	0.065409
4748000	3573333	0.358209	-0.5511	0.290784	0.067425
1827000	3604053	0.363184	-0.541	0.294254	0.06893
2066000	3638658	0.368159	-0.52963	0.298185	0.069974
3781000	3652000	0.373134	-0.52524	0.299707	0.073428
4636000	3693000	0.378109	-0.51177	0.304406	0.073704
5877000	3702000	0.383085	-0.50881	0.305442	0.077643
5545000	3724000	0.38806	-0.50158	0.30798	0.08008
1788000	3744000	0.393035	-0.49501	0.310296	0.082739
2500000	3781000	0.39801	-0.48285	0.3146	0.08341
3215000	3786000	0.402985	-0.48121	0.315184	0.087801
3652000	3926000	0.40796	-0.4352	0.331708	0.076253
4139000	3933000	0.412935	-0.4329	0.332543	0.080393
2735157	3990000	0.41791	-0.41417	0.339374	0.078536
3218296	4115000	0.422886	-0.37309	0.354539	0.068346
4495388	4128000	0.427861	-0.36882	0.35613	0.071731
6031442	4139000	0.432836	-0.36521	0.357478	0.075358
7148851	4168300	0.437811	-0.35558	0.361078	0.076733
2925300	4181000	0.442786	-0.35141	0.362642	0.080144
1987956	4219000	0.447761	-0.33892	0.367336	0.080426
1513819	4222000	0.452736	-0.33793	0.367707	0.085029
3018431	4232600	0.457711	-0.33445	0.36902	0.088691

3638658	4242000	0.462687	-0.33136	0.370186	0.0925
1717655	4459000	0.467662	-0.26005	0.397413	0.070249
1995711	4464926	0.472637	-0.2581	0.398164	0.074473
3604053	4495388	0.477612	-0.24809	0.402032	0.07558
3381331	4500000	0.482587	-0.24658	0.402618	0.079969
5678000	4528000	0.487562	-0.23738	0.406183	0.081379
5250000	4597000	0.492537	-0.2147	0.415	0.077537
5950000	4636000	0.497512	-0.20188	0.420003	0.077509
5100000	4640000	0.502488	-0.20057	0.420517	0.08197
9112000	4649000	0.507463	-0.19761	0.421674	0.085789
1169000	4728000	0.512438	-0.17165	0.431856	0.080582
1276000	4729000	0.517413	-0.17132	0.431985	0.085428
1476000	4748000	0.522388	-0.16508	0.434441	0.087947
1800000	4767471	0.527363	-0.15868	0.43696	0.090403
3702000	4870100	0.532338	-0.12496	0.450279	0.082059
1505000	4907000	0.537313	-0.11283	0.455083	0.082231
1951000	4986000	0.542289	-0.08687	0.465388	0.076901
3053000	5015283	0.547264	-0.07725	0.469214	0.07805
4907000	5023000	0.552239	-0.07471	0.470223	0.082016
4242000	5084000	0.557214	-0.05466	0.478203	0.079011
6927000	5098000	0.562189	-0.05006	0.480036	0.082153
8098000	5100000	0.567164	-0.04941	0.480298	0.086866
12855000	5122000	0.572139	-0.04218	0.483179	0.08896
13519000	5160000	0.577114	-0.02969	0.488157	0.088957
13393000	5213944	0.58209	-0.01196	0.495228	0.086862
3139000	5250000	0.587065	-0.00011	0.499955	0.08711
3404000	5265600	0.59204	0.005013	0.502	0.09004
3744000	5314779	0.597015	0.021174	0.508446	0.088568
4649000	5376000	0.60199	0.041292	0.516468	0.085522
6578000	5421000	0.606965	0.05608	0.522361	0.084604
3573333	5451000	0.61194	0.065938	0.526287	0.085654
5015283	5465000	0.616915	0.070539	0.528118	0.088798
2997402	5503000	0.621891	0.083026	0.533085	0.088806
4767471	5545000	0.626866	0.096828	0.538569	0.088297
7658922	5577577	0.631841	0.107534	0.542817	0.089024
3724000	5581237	0.636816	0.108737	0.543294	0.093522
2020000	5678000	0.641791	0.140535	0.555881	0.08591
7412000	5688000	0.646766	0.143821	0.557179	0.089587
8447000	5688145	0.651741	0.143868	0.557198	0.094544
9691000	5742000	0.656716	0.161566	0.564176	0.09254
2800000	5788000	0.661692	0.176682	0.570121	0.09157
3461000	5839000	0.666667	0.193442	0.576694	0.089973
2111000	5877000	0.671642	0.205929	0.581577	0.090065
2795000	5910000	0.676617	0.216774	0.585808	0.090809
6850000	5950000	0.681592	0.229918	0.590922	0.09067
2577700	5962000	0.686567	0.233862	0.592454	0.094113
3205600	6031442	0.691542	0.256682	0.601288	0.090255
4168300	6116000	0.696517	0.284469	0.611974	0.084543
4870100	6326200	0.701493	0.353544	0.63816	0.063333
5084000	6369000	0.706468	0.367609	0.643418	0.06305

2679000	6421000	0.711443	0.384697	0.649769	0.061674
2526000	6436000	0.716418	0.389626	0.651594	0.064824
3786000	6539000	0.721393	0.423474	0.664025	0.057368
4729000	6578000	0.726368	0.43629	0.668687	0.057681
5376000	6600000	0.731343	0.44352	0.671305	0.060038
3926000	6668756	0.736318	0.466114	0.679433	0.056885
3400000	6730031	0.741294	0.48625	0.686605	0.054688
4728000	6850000	0.746269	0.525674	0.700443	0.045826
4986000	6927000	0.751244	0.550978	0.709175	0.042068
5742000	6949300	0.756219	0.558306	0.711682	0.044537
1360000	7027000	0.761194	0.583839	0.720336	0.040858
7700000	7127000	0.766169	0.616701	0.731284	0.034885
8608000	7148851	0.771144	0.623882	0.733647	0.037497
9154000	7394000	0.776119	0.704442	0.759421	0.016698
10026000	7412000	0.781095	0.710357	0.761259	0.019836
1458000	7512000	0.78607	0.743219	0.771325	0.014744
5465000	7658922	0.791045	0.7915	0.785674	0.005371
5451000	7700000	0.79602	0.804999	0.78959	0.00643
6369000	7740000	0.800995	0.818143	0.793362	0.007633
3933000	7796000	0.80597	0.836546	0.798576	0.007394
6539000	7811000	0.810945	0.841475	0.799959	0.010986
6600000	7891478	0.81592	0.867922	0.807281	0.008639
4222000	7935000	0.820896	0.882224	0.811172	0.009723
7740000	8059000	0.825871	0.922972	0.821989	0.003881
9948000	8089000	0.830846	0.932831	0.824546	0.006299
10208000	8098000	0.835821	0.935788	0.825309	0.010512
10563000	8415000	0.840796	1.03996	0.850821	0.010025
12605000	8447000	0.845771	1.050476	0.85325	0.007479
14069000	8464420	0.850746	1.0562	0.854562	0.003815
15038000	8470000	0.855721	1.058034	0.85498	0.000741
717000	8478729	0.860697	1.060903	0.855633	0.005064
2850000	8576667	0.865672	1.093087	0.862822	0.00285
5421000	8608000	0.870647	1.103383	0.86507	0.005577
7935000	8724000	0.875622	1.141503	0.87317	0.002452
9469000	9112000	0.880597	1.269006	0.897781	0.017184
3399356	9154000	0.885572	1.282808	0.90022	0.014648
5688145	9165000	0.890547	1.286423	0.900852	0.010305
6668756	9386000	0.895522	1.359048	0.912934	0.017412
7891478	9425500	0.900498	1.372028	0.914973	0.014475
5213944	9430000	0.905473	1.373507	0.915203	0.00973
7127000	9469000	0.910448	1.386323	0.917176	0.006728
7811000	9691000	0.915423	1.459276	0.927755	0.012333
8059000	9781000	0.920398	1.488851	0.931737	0.011339
9430000	9948000	0.925373	1.543731	0.938673	0.0133
9386000	10026000	0.930348	1.569363	0.941718	0.01137
2533000	10208000	0.935323	1.629171	0.948362	0.013038
4115000	10492382	0.940299	1.722624	0.957522	0.017223
5160000	10563000	0.945274	1.74583	0.95958	0.014306
5503000	10848000	0.950249	1.839486	0.967078	0.016829
4128000	11134000	0.955224	1.933471	0.973411	0.018187

6116000	11832192	0.960199	2.162909	0.984726	0.024527
7512000	12605000	0.965174	2.416867	0.992173	0.026998
8089000	12841316	0.970149	2.494524	0.993694	0.023544
8724000	12855000	0.975124	2.499021	0.993773	0.018649
2830000	13393000	0.9801	2.675817	0.996273	0.016173
5788000	13519000	0.985075	2.717223	0.996708	0.011634
4181000	14069000	0.99005	2.897963	0.998122	0.008072
2767000	15038000	0.995025	3.216393	0.999351	0.004326
6421000	16608081	1	3.732349	0.999905	9.49E-05

APPENDIX G

Lilliefors test results - Options Component variable (Owner-controlled firms)

Data	Ordered	S(x)	Z	F(x)	|S(x)-F(x)|
2394000	0	0.363184	-0.57714	0.281923	0.081261
2634750	0	0.363184	-0.57714	0.281923	0.081261
3882800	0	0.363184	-0.57714	0.281923	0.081261
6592000	0	0.363184	-0.57714	0.281923	0.081261
11274337	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
569733	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
971166	0	0.363184	-0.57714	0.281923	0.081261
682425	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
6169600	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
16510	0	0.363184	-0.57714	0.281923	0.081261
1077413	0	0.363184	-0.57714	0.281923	0.081261
1565850	0	0.363184	-0.57714	0.281923	0.081261
2475676	0	0.363184	-0.57714	0.281923	0.081261
2265476	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
948750	0	0.363184	-0.57714	0.281923	0.081261
960438	0	0.363184	-0.57714	0.281923	0.081261
838750	0	0.363184	-0.57714	0.281923	0.081261
5925000	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
869500	0	0.363184	-0.57714	0.281923	0.081261
909833	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
963200	0	0.363184	-0.57714	0.281923	0.081261
2201250	0	0.363184	-0.57714	0.281923	0.081261
2122200	0	0.363184	-0.57714	0.281923	0.081261
2737750	0	0.363184	-0.57714	0.281923	0.081261

Lilliefors Test Statistic
D = 0.2288

0	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
1903122	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
701434	0	0.363184	-0.57714	0.281923	0.081261
1468000	0	0.363184	-0.57714	0.281923	0.081261
1054500	0	0.363184	-0.57714	0.281923	0.081261
524500	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
16982500	0	0.363184	-0.57714	0.281923	0.081261
4980000	0	0.363184	-0.57714	0.281923	0.081261
1335000	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
6360826	0	0.363184	-0.57714	0.281923	0.081261
5058000	0	0.363184	-0.57714	0.281923	0.081261
11992000	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
8086497	0	0.363184	-0.57714	0.281923	0.081261
2082248	0	0.363184	-0.57714	0.281923	0.081261
3564321	0	0.363184	-0.57714	0.281923	0.081261
4832500	0	0.363184	-0.57714	0.281923	0.081261
1155535	0	0.363184	-0.57714	0.281923	0.081261
190400	0	0.363184	-0.57714	0.281923	0.081261
6157500	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
6150329	0	0.363184	-0.57714	0.281923	0.081261
0	0	0.363184	-0.57714	0.281923	0.081261
5384579	0	0.363184	-0.57714	0.281923	0.081261
3987050	0	0.363184	-0.57714	0.281923	0.081261
0	16510	0.368159	-0.57311	0.283284	0.084876
2193746	124502	0.373134	-0.54679	0.292261	0.080873
1057060	174765	0.378109	-0.53454	0.296484	0.081625
2371594	190400	0.383085	-0.53073	0.297804	0.085281
3703165	312891	0.38806	-0.50087	0.308232	0.079828
4940000	319872	0.393035	-0.49917	0.308831	0.084204
1683750	320688	0.39801	-0.49897	0.308901	0.089109
0	524500	0.402985	-0.44929	0.326612	0.076373
0	532650	0.40796	-0.4473	0.327329	0.080631
532650	569733	0.412935	-0.43826	0.330598	0.082337
0	575700	0.41791	-0.43681	0.331126	0.086785
2214000	620840	0.422886	-0.4258	0.335125	0.08776
6973750	653200	0.427861	-0.41792	0.338004	0.089856
1480500	682425	0.432836	-0.41079	0.340612	0.092223
0	701434	0.437811	-0.40616	0.342313	0.095498
0	728000	0.442786	-0.39968	0.344695	0.098091
853600	736000	0.447761	-0.39773	0.345414	0.102348
1523014	838750	0.452736	-0.37269	0.354691	0.098045
2290800	853600	0.457711	-0.36907	0.356039	0.101672

1982651	855450	0.462687	-0.36862	0.356207	0.10648
3136408	869500	0.467662	-0.36519	0.357484	0.110177
934876	890725	0.472637	-0.36002	0.359417	0.11322
1549145	909833	0.477612	-0.35536	0.36116	0.116452
0	924420	0.482587	-0.3518	0.362493	0.120094
3241500	934876	0.487562	-0.34926	0.363449	0.124113
7262500	936668	0.492537	-0.34882	0.363613	0.128924
0	948750	0.497512	-0.34587	0.364719	0.132793
0	954000	0.502488	-0.34459	0.3652	0.137288
0	960438	0.507463	-0.34302	0.36579	0.141673
0	963200	0.512438	-0.34235	0.366043	0.146394
0	971166	0.517413	-0.34041	0.366774	0.150639
0	1054500	0.522388	-0.3201	0.374448	0.14794
0	1056965	0.527363	-0.31949	0.374676	0.152688
0	1057060	0.532338	-0.31947	0.374684	0.157654
0	1077413	0.537313	-0.31451	0.376567	0.160747
0	1080450	0.542289	-0.31377	0.376848	0.165441
0	1100000	0.547264	-0.309	0.378659	0.168605
0	1116667	0.552239	-0.30494	0.380205	0.172034
0	1152010	0.557214	-0.29633	0.38349	0.173724
4713000	1155535	0.562189	-0.29547	0.383818	0.178371
14358476	1177500	0.567164	-0.29011	0.385865	0.181299
0	1190400	0.572139	-0.28697	0.387068	0.185071
0	1237950	0.577114	-0.27538	0.391513	0.185602
22895627	1335000	0.58209	-0.25172	0.400628	0.181461
890725	1371850	0.587065	-0.24274	0.404104	0.182961
728000	1439600	0.59204	-0.22622	0.410513	0.181526
1080450	1468000	0.597015	-0.2193	0.413208	0.183807
855450	1480500	0.60199	-0.21625	0.414395	0.187595
0	1500576	0.606965	-0.21136	0.416303	0.190662
2761333	1523014	0.61194	-0.20589	0.418438	0.193502
0	1549145	0.616915	-0.19952	0.420927	0.195988
954000	1565850	0.621891	-0.19545	0.42252	0.19937
575700	1583479	0.626866	-0.19115	0.424203	0.202663
1237950	1627100	0.631841	-0.18052	0.428372	0.203468
1500576	1683750	0.636816	-0.16671	0.433799	0.203017
653200	1831360	0.641791	-0.13073	0.447995	0.193796
6395279	1903122	0.646766	-0.11324	0.454921	0.191845
2316000	1964400	0.651741	-0.0983	0.460847	0.190894
3598800	1982651	0.656716	-0.09385	0.462614	0.194103
2334000	2004110	0.661692	-0.08862	0.464692	0.197
0	2074193	0.666667	-0.07154	0.471485	0.195181
0	2082248	0.671642	-0.06957	0.472267	0.199375
0	2122200	0.676617	-0.05983	0.476144	0.200473
10068000	2193746	0.681592	-0.04239	0.483092	0.1985
0	2201250	0.686567	-0.04057	0.483821	0.202746
6690846	2214000	0.691542	-0.03746	0.48506	0.206482
6009208	2223840	0.696517	-0.03506	0.486016	0.210501
8783676	2265476	0.701493	-0.02491	0.490063	0.211429
0	2290800	0.706468	-0.01874	0.492525	0.213942

0	2316000	0.711443	-0.01259	0.494976	0.216467
1116667	2334000	0.716418	-0.00821	0.496726	0.219692
0	2371594	0.721393	0.000957	0.500382	0.221011
1964400	2378667	0.726368	0.002681	0.50107	0.225299
0	2394000	0.731343	0.006419	0.502561	0.228783
0	2475676	0.736318	0.026328	0.510502	0.225816
1177500	2634750	0.741294	0.065104	0.525954	0.215339
736000	2737750	0.746269	0.090211	0.53594	0.210329
1100000	2761333	0.751244	0.095959	0.538224	0.21302
2378667	2805751	0.756219	0.106787	0.542521	0.213698
924420	2840112	0.761194	0.115162	0.545842	0.215352
7800960	2986800	0.766169	0.150919	0.55998	0.206189
1371850	3103017	0.771144	0.179248	0.571128	0.200016
0	3136408	0.776119	0.187387	0.574321	0.201798
0	3241500	0.781095	0.213004	0.584338	0.196756
174765	3469040	0.78607	0.268469	0.605831	0.180239
1831360	3511200	0.791045	0.278746	0.60978	0.181265
5387899	3564321	0.79602	0.291694	0.61474	0.18128
5910021	3587250	0.800995	0.297284	0.616875	0.18412
2223840	3598800	0.80597	0.300099	0.617949	0.188021
3469040	3703165	0.810945	0.325539	0.627613	0.183332
32633900	3882800	0.81592	0.369326	0.644058	0.171863
0	3987050	0.820896	0.394738	0.653482	0.167414
14700000	4164024	0.825871	0.437877	0.669262	0.156608
0	4713000	0.830846	0.571695	0.716236	0.11461
0	4832500	0.835821	0.600824	0.726021	0.1098
0	4940000	0.840796	0.627028	0.734679	0.106117
8221250	4980000	0.845771	0.636778	0.737865	0.107906
0	5010027	0.850746	0.644097	0.740244	0.110502
17648125	5058000	0.855721	0.655791	0.744021	0.111701
124502	5384579	0.860697	0.735398	0.768951	0.091745
0	5387899	0.865672	0.736207	0.769198	0.096474
12537139	5497660	0.870647	0.762962	0.777257	0.09339
0	5910021	0.875622	0.863479	0.806063	0.069559
0	5925000	0.880597	0.86713	0.807065	0.073532
320688	6009208	0.885572	0.887656	0.812637	0.072935
312891	6150329	0.890547	0.922056	0.82175	0.068797
4164024	6157500	0.895522	0.923804	0.822206	0.073317
3587250	6169600	0.900498	0.926753	0.822973	0.077525
2840112	6360826	0.905473	0.973366	0.834814	0.070658
5010027	6395279	0.910448	0.981764	0.836892	0.073556
3511200	6592000	0.915423	1.029717	0.848429	0.066994
5497660	6690846	0.920398	1.053811	0.854015	0.066383
3103017	6973750	0.925373	1.122772	0.869233	0.05614
1627100	7262500	0.930348	1.193157	0.883596	0.046752
1056965	7800960	0.935323	1.324411	0.907317	0.028007
319872	8086497	0.940299	1.394013	0.918343	0.021955
2004110	8221250	0.945274	1.42686	0.92319	0.022084
2805751	8783676	0.950249	1.563956	0.941086	0.009163
620840	10068000	0.955224	1.877021	0.969742	0.014519

2986800	11274337	0.960199	2.171076	0.985037	0.024838
1190400	11992000	0.965174	2.346012	0.990512	0.025338
1439600	12537139	0.970149	2.478895	0.99341	0.023261
0	14358476	0.975124	2.922861	0.998266	0.023141
0	14700000	0.9801	3.00611	0.998677	0.018577
1152010	16982500	0.985075	3.562489	0.999816	0.014742
1583479	17648125	0.99005	3.724741	0.999902	0.009852
2074193	22895627	0.995025	5.003864	1	0.004975
936668	32633900	1	7.37765	1	8.06E-14

APPENDIX G

Lilliefors test results - Total Compensation variable (Owner-controlled firms)

Data	Ordered	S(x)	Z	F(x)	|S(x)-F(x)|
5750882	841502	0.004975	-1.17615	0.119767	0.114792
11113479	1169000	0.00995	-1.11931	0.131504	0.121554
14375182	1233000	0.014925	-1.1082	0.133888	0.118962
15168667	1276000	0.0199	-1.10074	0.135505	0.115605
27882418	1476000	0.024876	-1.06602	0.143206	0.118331
2204000	1498000	0.029851	-1.06221	0.144071	0.11422
2972733	1505000	0.034826	-1.06099	0.144347	0.109521
3431000	1632765	0.039801	-1.03882	0.149445	0.109644
4473166	1649000	0.044776	-1.036	0.150101	0.105325
5804425	1677000	0.049751	-1.03114	0.151238	0.101487
3200000	1719510	0.054726	-1.02376	0.152974	0.098248
9469600	1800000	0.059701	-1.00979	0.156298	0.096596
4500000	1951000	0.064677	-0.98358	0.16266	0.097984
4528000	2066000	0.069652	-0.96362	0.167618	0.097966
5098000	2111000	0.074627	-0.95581	0.169583	0.094957
1649000	2204000	0.079602	-0.93967	0.173693	0.094091
1719510	2284420	0.084577	-0.92571	0.177298	0.09272
2952413	2577700	0.089552	-0.87481	0.190838	0.101286
5555850	2673200	0.094527	-0.85824	0.195381	0.100854
5818676	2679000	0.099502	-0.85723	0.195659	0.096157
4990476	2702000	0.104478	-0.85324	0.196764	0.092286
12841316	2735157	0.109453	-0.84748	0.198363	0.088911
11832192	2768750	0.114428	-0.84165	0.199992	0.085564
8470000	2795000	0.119403	-0.8371	0.201269	0.081866
9425500	2806500	0.124378	-0.8351	0.201831	0.077453
8464420	2820400	0.129353	-0.83269	0.202511	0.073157
4464926	2830000	0.134328	-0.83102	0.202981	0.068653
2702000	2841556	0.139303	-0.82902	0.203548	0.064244
3257750	2850000	0.144279	-0.82755	0.203963	0.059684
3265438	2925300	0.149254	-0.81448	0.207685	0.058431
2768750	2930587	0.154229	-0.81356	0.207948	0.053719
8620000	2946000	0.159204	-0.81089	0.208715	0.049511
4219000	2952413	0.164179	-0.80977	0.209035	0.044856
3350000	2972733	0.169154	-0.80625	0.21005	0.040896
5328500	2996434	0.174129	-0.80213	0.211238	0.037108
6597833	3036833	0.179104	-0.79512	0.213271	0.034167
5839000	3053000	0.18408	-0.79232	0.214088	0.030009
7027000	3167122	0.189055	-0.77251	0.219907	0.030852
4510200	3200000	0.19403	-0.7668	0.221599	0.02757
5894250	3215000	0.199005	-0.7642	0.222374	0.023369
7145200	3257750	0.20398	-0.75678	0.224591	0.020611
12518750	3265438	0.208955	-0.75545	0.224991	0.016036

Lilliefors Test Statistic
D = 0.1279

11134000	3350000	0.21393	-0.74077	0.229417	0.015487
1233000	3381331	0.218905	-0.73533	0.231069	0.012164
3167122	3431000	0.223881	-0.72671	0.233702	0.009821
1498000	3461000	0.228856	-0.7215	0.2353	0.006444
1677000	3498500	0.233831	-0.71499	0.237306	0.003475
2996434	3589965	0.238806	-0.69912	0.242239	0.003433
2946000	3642667	0.243781	-0.68997	0.245106	0.001325
2806500	3652000	0.248756	-0.68835	0.245615	0.003141
3498500	3702000	0.253731	-0.67967	0.248355	0.005376
5962000	3720044	0.258706	-0.67654	0.249348	0.009358
23418500	3786000	0.263682	-0.66509	0.252995	0.010687
12776000	3926000	0.268657	-0.6408	0.260828	0.007829
9750000	3951402	0.273632	-0.63639	0.262262	0.01137
9165000	4029725	0.278607	-0.62279	0.26671	0.011897
10848000	4132000	0.283582	-0.60504	0.272575	0.011007
10593426	4183750	0.288557	-0.59606	0.275567	0.01299
10323600	4219000	0.293532	-0.58994	0.277615	0.015918
18318200	4222000	0.298507	-0.58942	0.277789	0.020718
6949300	4242000	0.303483	-0.58595	0.278954	0.024528
11419788	4434872	0.308458	-0.55247	0.290312	0.018146
7397027	4464926	0.313433	-0.54726	0.292101	0.021332
9145558	4473166	0.318408	-0.54583	0.292592	0.025816
10410077	4500000	0.323383	-0.54117	0.294195	0.029188
7885566	4510200	0.328358	-0.5394	0.294805	0.033553
2820400	4528000	0.333333	-0.53631	0.295872	0.037462
12067500	4577500	0.338308	-0.52772	0.298847	0.039462
7394000	4640000	0.343284	-0.51687	0.302623	0.040661
10747329	4671650	0.348259	-0.51138	0.304543	0.043716
4640000	4748840	0.353234	-0.49798	0.309248	0.043985
10132579	4824450	0.358209	-0.48486	0.313888	0.044321
5814050	4841193	0.363184	-0.48195	0.31492	0.048264
2066000	4854063	0.368159	-0.47972	0.315714	0.052446
5974746	4907000	0.373134	-0.47053	0.318988	0.054146
5693060	4990476	0.378109	-0.45604	0.32418	0.05393
8248594	5015283	0.383085	-0.45174	0.325729	0.057355
9248165	5084000	0.38806	-0.43981	0.330037	0.058022
6728000	5098000	0.393035	-0.43738	0.330918	0.062117
4183750	5100000	0.39801	-0.43703	0.331044	0.066966
3215000	5134000	0.402985	-0.43113	0.333186	0.069799
3652000	5153198	0.40796	-0.4278	0.334398	0.073562
4671650	5224576	0.412935	-0.41541	0.33892	0.074015
2735157	5309231	0.41791	-0.40072	0.344314	0.073597
5432296	5328500	0.422886	-0.39737	0.345546	0.07734
11469138	5343171	0.427861	-0.39483	0.346485	0.081376
7511942	5376000	0.432836	-0.38913	0.34859	0.084246
7148851	5432296	0.437811	-0.37936	0.352211	0.0856
2925300	5464000	0.442786	-0.37386	0.354256	0.088531
2841556	5504450	0.447761	-0.36684	0.356871	0.09089
3036833	5555850	0.452736	-0.35791	0.360204	0.092533
5309231	5621309	0.457711	-0.34655	0.364463	0.093248

5621309	5693060	0.462687	-0.3341	0.369152	0.093535
4854063	5750882	0.467662	-0.32406	0.372945	0.094717
2930587	5764479	0.472637	-0.3217	0.373838	0.098799
5153198	5804425	0.477612	-0.31477	0.376468	0.101144
3381331	5814050	0.482587	-0.3131	0.377102	0.105485
8919500	5818676	0.487562	-0.3123	0.377407	0.110155
12512500	5839000	0.492537	-0.30877	0.378748	0.113789
5950000	5894250	0.497512	-0.29918	0.382401	0.115112
5100000	5950000	0.502488	-0.28951	0.386097	0.11639
9112000	5962000	0.507463	-0.28742	0.386894	0.120568
1169000	5974746	0.512438	-0.28521	0.387742	0.124696
1276000	6001036	0.517413	-0.28065	0.389491	0.127922
1476000	6086000	0.522388	-0.2659	0.395158	0.12723
1800000	6156840	0.527363	-0.25361	0.3999	0.127463
3702000	6334666	0.532338	-0.22274	0.411868	0.12047
1505000	6578000	0.537313	-0.18051	0.428377	0.108936
1951000	6597833	0.542289	-0.17707	0.429729	0.11256
3053000	6693400	0.547264	-0.16048	0.436252	0.111012
4907000	6728000	0.552239	-0.15447	0.438618	0.11362
4242000	6940010	0.557214	-0.11768	0.453162	0.104052
11640000	6949300	0.562189	-0.11606	0.453801	0.108388
22456476	7027000	0.567164	-0.10258	0.459149	0.108015
12855000	7145200	0.572139	-0.08206	0.467298	0.104841
13519000	7148851	0.577114	-0.08143	0.46755	0.109564
36288627	7164110	0.58209	-0.07878	0.468603	0.113486
4029725	7296360	0.587065	-0.05583	0.47774	0.109325
4132000	7357668	0.59204	-0.04519	0.481979	0.11006
4824450	7394000	0.597015	-0.03888	0.484493	0.112522
5504450	7397027	0.60199	-0.03836	0.484702	0.117288
6578000	7511942	0.606965	-0.01841	0.492656	0.114309
6334666	7885566	0.61194	0.046437	0.518519	0.093421
5015283	7935000	0.616915	0.055017	0.521938	0.094978
3951402	8054056	0.621891	0.075681	0.530163	0.091727
5343171	8120667	0.626866	0.087242	0.53476	0.092105
8896872	8248594	0.631841	0.109445	0.543575	0.088265
5224576	8308751	0.636816	0.119886	0.547713	0.089103
2673200	8464420	0.641791	0.146905	0.558396	0.083395
13807279	8470000	0.646766	0.147873	0.558779	0.087988
10763000	8620000	0.651741	0.173907	0.569031	0.08271
13289800	8702400	0.656716	0.188209	0.574644	0.082073
5134000	8724000	0.661692	0.191958	0.576112	0.085579
3461000	8896872	0.666667	0.221962	0.587828	0.078838
2111000	8919500	0.671642	0.22589	0.589356	0.082285
2795000	9102800	0.676617	0.257704	0.601682	0.074935
16918000	9112000	0.681592	0.2593	0.602298	0.079294
2577700	9145558	0.686567	0.265125	0.604543	0.082024
9896446	9154000	0.691542	0.26659	0.605108	0.086435
10177508	9165000	0.696517	0.268499	0.605842	0.090675
13653776	9248165	0.701493	0.282934	0.611386	0.090106
5084000	9425500	0.706468	0.313712	0.62313	0.083337

2679000	9469000	0.711443	0.321262	0.625994	0.085449
3642667	9469600	0.716418	0.321366	0.626034	0.090384
3786000	9528600	0.721393	0.331607	0.629907	0.091486
6693400	9750000	0.726368	0.370033	0.644321	0.082047
5376000	9896446	0.731343	0.395451	0.653745	0.077598
3926000	9948000	0.736318	0.404399	0.65704	0.079278
4577500	9979850	0.741294	0.409927	0.65907	0.082223
5464000	10008040	0.746269	0.41482	0.660863	0.085406
6086000	10026000	0.751244	0.417937	0.662003	0.08924
8120667	10132579	0.756219	0.436435	0.668739	0.08748
2284420	10177508	0.761194	0.444233	0.671563	0.089631
15500960	10208000	0.766169	0.449525	0.673474	0.092696
9979850	10323600	0.771144	0.469589	0.680676	0.090469
9154000	10410077	0.776119	0.484598	0.686019	0.0901
10026000	10563000	0.781095	0.51114	0.695373	0.085721
1632765	10593426	0.78607	0.516421	0.69722	0.08885
7296360	10747329	0.791045	0.543133	0.706481	0.084564
10838899	10763000	0.79602	0.545852	0.707416	0.088604
12279021	10832780	0.800995	0.557964	0.711565	0.08943
6156840	10838899	0.80597	0.559026	0.711928	0.094042
10008040	10848000	0.810945	0.560605	0.712467	0.098479
39233900	11013100	0.81592	0.589261	0.722157	0.093764
4222000	11113479	0.820896	0.606683	0.727969	0.092926
22440000	11134000	0.825871	0.610244	0.72915	0.096721
9948000	11322200	0.830846	0.642909	0.739858	0.090987
10208000	11419788	0.835821	0.659846	0.745324	0.090497
10563000	11469138	0.840796	0.668412	0.748065	0.092731
20826250	11478728	0.845771	0.670076	0.748595	0.097176
14069000	11640000	0.850746	0.698067	0.757432	0.093314
32686125	11832192	0.855721	0.731424	0.76774	0.087981
841502	12067500	0.860697	0.772265	0.780021	0.080675
2850000	12137027	0.865672	0.784332	0.783577	0.082094
17958139	12279021	0.870647	0.808977	0.790736	0.079911
7935000	12512500	0.875622	0.849501	0.802199	0.073423
9469000	12518750	0.880597	0.850585	0.8025	0.078097
3720044	12533017	0.885572	0.853061	0.803187	0.082385
6001036	12776000	0.890547	0.895234	0.814669	0.075878
10832780	12841316	0.895522	0.906571	0.817683	0.077839
11478728	12855000	0.900498	0.908946	0.818311	0.082187
8054056	13289800	0.905473	0.984411	0.837543	0.067929
12137027	13519000	0.910448	1.024191	0.847128	0.06332
11322200	13556660	0.915423	1.030728	0.848666	0.066757
13556660	13653776	0.920398	1.047584	0.852585	0.067813
12533017	13807279	0.925373	1.074226	0.858639	0.066734
11013100	14069000	0.930348	1.119651	0.868569	0.06178
3589965	14375182	0.935323	1.172793	0.879561	0.055763
4434872	15168667	0.940299	1.310512	0.904989	0.03531
7164110	15500960	0.945274	1.368186	0.914373	0.030901
8308751	16918000	0.950249	1.614131	0.946751	0.003498
4748840	17958139	0.955224	1.794661	0.963646	0.008422

9102800	18318200	0.960199	1.857154	0.968355	0.008156
8702400	20826250	0.965174	2.292458	0.98906	0.023886
9528600	22440000	0.970149	2.572545	0.994952	0.024803
8724000	22456476	0.975124	2.575404	0.994994	0.019869
2830000	23418500	0.9801	2.742376	0.99695	0.016851
6940010	27882418	0.985075	3.517146	0.999782	0.014707
5764479	32686125	0.99005	4.35089	0.999993	0.009943
4841193	36288627	0.995025	4.976151	1	0.004975
7357668	39233900	1	5.48734	1	2.04E-08

APPENDIX G

Lilliefors test results - Cash % variable (Owner-controlled firms)

Data	Ordered	S(x)	Z	F(x)	|S(x)-F(x)|
0.583716	0.168222	0.004975	-2.71277	0.003336	0.001639
0.762923	0.265755	0.00995	-2.27665	0.011404	0.001453
0.729896	0.274825	0.014925	-2.23609	0.012673	0.002252
0.56542	0.291887	0.0199	-2.15979	0.015394	0.004506
0.595647	0.301869	0.024876	-2.11516	0.017208	0.007668
1	0.312645	0.029851	-2.06697	0.019368	0.010482
0.808347	0.314239	0.034826	-2.05985	0.019707	0.015119
1	0.323914	0.039801	-2.01658	0.02187	0.017931
0.782891	0.34492	0.044776	-1.92265	0.027262	0.017514
0.88243	0.345351	0.049751	-1.92073	0.027383	0.022368
1	0.348484	0.054726	-1.90672	0.028278	0.026448
0.348484	0.353859	0.059701	-1.88268	0.029872	0.02983
1	0.356685	0.064677	-1.87005	0.030739	0.033938
1	0.360609	0.069652	-1.8525	0.031977	0.037675
1	0.369069	0.074627	-1.81467	0.034787	0.03984
1	0.391955	0.079602	-1.71233	0.043418	0.036184
0.990398	0.399101	0.084577	-1.68038	0.046442	0.038136
0.635074	0.39955	0.089552	-1.67837	0.046637	0.042915
0.718162	0.404894	0.094527	-1.65448	0.049016	0.045512
0.574529	0.40956	0.099502	-1.63361	0.05117	0.048332
0.54604	0.41958	0.104478	-1.5888	0.056052	0.048425
1	0.427734	0.109453	-1.55234	0.06029	0.049163
1	0.460073	0.114428	-1.40774	0.079604	0.034824
1	0.468588	0.119403	-1.36967	0.085396	0.034007
1	0.489745	0.124378	-1.27506	0.101144	0.023234
1	0.496743	0.129353	-1.24376	0.106793	0.02256
1	0.498486	0.134328	-1.23597	0.108234	0.026094
1	0.501697	0.139303	-1.22161	0.110927	0.028377
0.708771	0.502911	0.144279	-1.21619	0.111957	0.032322
0.705878	0.510055	0.149254	-1.18424	0.118159	0.031095
0.697065	0.51869	0.154229	-1.14563	0.125974	0.028255
0.312645	0.535786	0.159204	-1.06918	0.142494	0.01671
1	0.536818	0.164179	-1.06457	0.143536	0.020643
1	0.545384	0.169154	-1.02627	0.152383	0.016771
0.836821	0.54604	0.174129	-1.02333	0.153076	0.021054
0.862101	0.564092	0.179104	-0.94261	0.17294	0.006165
1	0.56542	0.18408	-0.93667	0.174463	0.009616
1	0.568525	0.189055	-0.92279	0.178059	0.010996
0.78644	0.571553	0.19403	-0.90925	0.18161	0.01242
0.626543	0.574529	0.199005	-0.89594	0.185143	0.013862
0.702989	0.583716	0.20398	-0.85486	0.196314	0.007666
0.781308	0.587211	0.208955	-0.83923	0.20067	0.008285

Lilliefors Test Statistic
D = 0.1956

1	0.592438	0.21393	-0.81586	0.20729	0.006641
1	0.594468	0.218905	-0.80678	0.209896	0.00901
0.399101	0.595103	0.223881	-0.80394	0.210715	0.013165
1	0.595337	0.228856	-0.8029	0.211017	0.017838
1	0.595647	0.233831	-0.80151	0.211418	0.022413
0.76591	0.59755	0.238806	-0.793	0.213889	0.024917
0.501697	0.599578	0.243781	-0.78393	0.21654	0.027241
0.624265	0.605246	0.248756	-0.75859	0.224049	0.024707
0.850079	0.610207	0.253731	-0.73641	0.230742	0.022989
1	0.610268	0.258706	-0.73613	0.230825	0.027882
0.274825	0.615609	0.263682	-0.71225	0.238155	0.025526
0.610207	0.624265	0.268657	-0.67354	0.250301	0.018356
0.863077	0.626543	0.273632	-0.66336	0.253551	0.020081
1	0.63283	0.278607	-0.63524	0.262635	0.015972
1	0.635074	0.283582	-0.62521	0.265916	0.017666
0.39955	0.636583	0.288557	-0.61846	0.268135	0.020422
0.510055	0.638802	0.293532	-0.60854	0.271414	0.022118
0.345351	0.647297	0.298507	-0.57055	0.284152	0.014356
1	0.647369	0.303483	-0.57023	0.28426	0.019223
0.291887	0.653375	0.308458	-0.54338	0.293435	0.015023
0.718502	0.662314	0.313433	-0.50341	0.30734	0.006093
0.610268	0.671881	0.318408	-0.46062	0.322534	0.004126
0.535786	0.680994	0.323383	-0.41988	0.337288	0.013905
0.853462	0.687487	0.328358	-0.39084	0.347958	0.019599
0.932492	0.689884	0.333333	-0.38012	0.351926	0.018593
0.489745	0.693448	0.338308	-0.36419	0.357859	0.019551
1	0.697065	0.343284	-0.34801	0.363916	0.020633
0.427734	0.699382	0.348259	-0.33765	0.367812	0.019554
1	0.699601	0.353234	-0.33667	0.368182	0.014948
0.468588	0.702989	0.358209	-0.32152	0.373908	0.015699
0.314239	0.705578	0.363184	-0.30995	0.378301	0.015117
1	0.705878	0.368159	-0.30861	0.378811	0.010652
0.63283	0.706517	0.373134	-0.30575	0.379898	0.006764
0.814325	0.707085	0.378109	-0.30321	0.380866	0.002756
0.712485	0.708771	0.383085	-0.29567	0.383742	0.000658
0.599578	0.712485	0.38806	-0.27906	0.390099	0.002039
0.265755	0.712785	0.393035	-0.27772	0.390614	0.002421
0.59755	0.718162	0.39801	-0.25368	0.399873	0.001863
1	0.718502	0.402985	-0.25216	0.400461	0.002525
1	0.720257	0.40796	-0.24431	0.403496	0.004464
0.885982	0.725304	0.412935	-0.22174	0.412258	0.000677
1	0.729206	0.41791	-0.20429	0.419063	0.001152
0.592438	0.729896	0.422886	-0.20121	0.420268	0.002618
0.391955	0.742764	0.427861	-0.14367	0.442881	0.015021
0.802914	0.749004	0.432836	-0.11577	0.453919	0.021083
1	0.752413	0.437811	-0.10052	0.459965	0.022154
1	0.755649	0.442786	-0.08605	0.465713	0.022927
0.699601	0.758567	0.447761	-0.073	0.470902	0.023141
0.498486	0.762923	0.452736	-0.05352	0.478657	0.025921
0.568525	0.76591	0.457711	-0.04017	0.483981	0.026269

0.647297	0.776047	0.462687	0.005161	0.502059	0.039372
0.353859	0.778961	0.467662	0.018193	0.507258	0.039596
0.680994	0.781308	0.472637	0.028686	0.511443	0.038806
0.699382	0.782891	0.477612	0.035763	0.514264	0.036652
1	0.784818	0.482587	0.044383	0.5177	0.035113
0.636583	0.78644	0.487562	0.051633	0.520589	0.033027
0.41958	0.802914	0.492537	0.125298	0.549856	0.057319
1	0.808347	0.497512	0.149593	0.559457	0.061945
1	0.814325	0.502488	0.176323	0.56998	0.067492
1	0.819257	0.507463	0.198379	0.578626	0.071163
1	0.823814	0.512438	0.218755	0.58658	0.074142
1	0.834005	0.517413	0.264323	0.604234	0.086821
1	0.836821	0.522388	0.276916	0.609078	0.08669
1	0.844589	0.527363	0.311653	0.622348	0.094985
1	0.848918	0.532338	0.331009	0.629681	0.097343
1	0.850079	0.537313	0.336199	0.63164	0.094326
1	0.852048	0.542289	0.345005	0.634955	0.092666
1	0.852258	0.547264	0.345943	0.635307	0.088044
1	0.853462	0.552239	0.351328	0.637329	0.08509
1	0.860856	0.557214	0.384389	0.649655	0.092441
0.595103	0.862101	0.562189	0.389959	0.651717	0.089527
0.360609	0.862538	0.567164	0.391912	0.652438	0.085274
1	0.863077	0.572139	0.394322	0.653328	0.081189
1	0.86321	0.577114	0.394917	0.653548	0.076434
0.369069	0.8653	0.58209	0.404263	0.65699	0.074901
0.778961	0.869265	0.587065	0.421992	0.663484	0.07642
0.823814	0.872695	0.59204	0.43733	0.669064	0.077024
0.776047	0.88243	0.597015	0.480861	0.684692	0.087678
0.844589	0.885982	0.60199	0.496745	0.690316	0.088326
1	0.892255	0.606965	0.524794	0.700137	0.093171
0.564092	0.892964	0.61194	0.527963	0.701237	0.089297
1	0.913795	0.616915	0.621109	0.732736	0.115821
0.758567	0.927873	0.621891	0.684064	0.753033	0.131142
0.892255	0.932492	0.626866	0.704715	0.759506	0.132641
0.860856	0.947861	0.631841	0.773438	0.780368	0.148527
0.712785	0.990398	0.636816	0.963649	0.832389	0.195573
0.755649	1	1	1.006583	0.842932	0.157068
0.536818	1	1	1.006583	0.842932	0.157068
0.784818	1	1	1.006583	0.842932	0.157068
0.729206	1	1	1.006583	0.842932	0.157068
0.545384	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
0.404894	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
0.323914	1	1	1.006583	0.842932	0.157068
0.40956	1	1	1.006583	0.842932	0.157068
0.356685	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068

1	1	1	1.006583	0.842932	0.157068
0.693448	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
0.706517	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
0.742764	1	1	1.006583	0.842932	0.157068
0.8653	1	1	1.006583	0.842932	0.157068
0.819257	1	1	1.006583	0.842932	0.157068
0.707085	1	1	1.006583	0.842932	0.157068
0.595337	1	1	1.006583	0.842932	0.157068
0.496743	1	1	1.006583	0.842932	0.157068
0.862538	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
0.892964	1	1	1.006583	0.842932	0.157068
0.749004	1	1	1.006583	0.842932	0.157068
0.502911	1	1	1.006583	0.842932	0.157068
0.51869	1	1	1.006583	0.842932	0.157068
0.638802	1	1	1.006583	0.842932	0.157068
0.653375	1	1	1.006583	0.842932	0.157068
0.168222	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
0.34492	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
0.605246	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
0.460073	1	1	1.006583	0.842932	0.157068
0.852048	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
0.301869	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
0.913795	1	1	1.006583	0.842932	0.157068
0.947861	1	1	1.006583	0.842932	0.157068
0.615609	1	1	1.006583	0.842932	0.157068
0.687487	1	1	1.006583	0.842932	0.157068
0.647369	1	1	1.006583	0.842932	0.157068
0.587211	1	1	1.006583	0.842932	0.157068
0.689884	1	1	1.006583	0.842932	0.157068
0.594468	1	1	1.006583	0.842932	0.157068
0.752413	1	1	1.006583	0.842932	0.157068
0.852258	1	1	1.006583	0.842932	0.157068
0.705578	1	1	1.006583	0.842932	0.157068
0.927873	1	1	1.006583	0.842932	0.157068
0.720257	1	1	1.006583	0.842932	0.157068
0.662314	1	1	1.006583	0.842932	0.157068
0.869265	1	1	1.006583	0.842932	0.157068

0.671881	1	1	1.006583	0.842932	0.157068
0.86321	1	1	1.006583	0.842932	0.157068
0.848918	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
1	1	1	1.006583	0.842932	0.157068
0.834005	1	1	1.006583	0.842932	0.157068
0.725304	1	1	1.006583	0.842932	0.157068
0.571553	1	1	1.006583	0.842932	0.157068
0.872695	1	1	1.006583	0.842932	0.157068

APPENDIX G

Lilliefors test results - Options % variable (Owner-controlled firms)

Data	Ordered	S(x)	Z	F(x)	|S(x)-F(x)|
0.416284	0	0.363184	-1.00658	0.157068	0.206116
0.237077	0	0.363184	-1.00658	0.157068	0.206116
0.270104	0	0.363184	-1.00658	0.157068	0.206116
0.43458	0	0.363184	-1.00658	0.157068	0.206116
0.404353	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0.191653	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0.217109	0	0.363184	-1.00658	0.157068	0.206116
0.11757	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0.651516	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0.009602	0	0.363184	-1.00658	0.157068	0.206116
0.364926	0	0.363184	-1.00658	0.157068	0.206116
0.281838	0	0.363184	-1.00658	0.157068	0.206116
0.425471	0	0.363184	-1.00658	0.157068	0.206116
0.45396	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0.291229	0	0.363184	-1.00658	0.157068	0.206116
0.294122	0	0.363184	-1.00658	0.157068	0.206116
0.302935	0	0.363184	-1.00658	0.157068	0.206116
0.687355	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0.163179	0	0.363184	-1.00658	0.157068	0.206116
0.137899	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0.21356	0	0.363184	-1.00658	0.157068	0.206116
0.373457	0	0.363184	-1.00658	0.157068	0.206116
0.297011	0	0.363184	-1.00658	0.157068	0.206116

Lilliefors Test Statistic
D = 0.2061

0.218692	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0.600899	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0.23409	0	0.363184	-1.00658	0.157068	0.206116
0.498303	0	0.363184	-1.00658	0.157068	0.206116
0.375735	0	0.363184	-1.00658	0.157068	0.206116
0.149921	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0.725175	0	0.363184	-1.00658	0.157068	0.206116
0.389793	0	0.363184	-1.00658	0.157068	0.206116
0.136923	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0.60045	0	0.363184	-1.00658	0.157068	0.206116
0.489945	0	0.363184	-1.00658	0.157068	0.206116
0.654649	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0.708113	0	0.363184	-1.00658	0.157068	0.206116
0.281498	0	0.363184	-1.00658	0.157068	0.206116
0.389732	0	0.363184	-1.00658	0.157068	0.206116
0.464214	0	0.363184	-1.00658	0.157068	0.206116
0.146538	0	0.363184	-1.00658	0.157068	0.206116
0.067508	0	0.363184	-1.00658	0.157068	0.206116
0.510255	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0.572266	0	0.363184	-1.00658	0.157068	0.206116
0	0	0.363184	-1.00658	0.157068	0.206116
0.531412	0	0.363184	-1.00658	0.157068	0.206116
0.685761	0	0.363184	-1.00658	0.157068	0.206116
0	0.009602	0.368159	-0.96365	0.167611	0.200548
0.36717	0.052139	0.373134	-0.77344	0.219632	0.153503
0.185675	0.067508	0.378109	-0.70472	0.240494	0.137616
0.287515	0.072127	0.383085	-0.68406	0.246967	0.136117
0.400422	0.086205	0.38806	-0.62111	0.267264	0.120796
0.734245	0.107036	0.393035	-0.52796	0.298763	0.094272
0.40245	0.107745	0.39801	-0.52479	0.299863	0.098147
0	0.114018	0.402985	-0.49675	0.309684	0.093301
0	0.11757	0.40796	-0.48086	0.315308	0.092653
0.114018	0.127305	0.412935	-0.43733	0.330936	0.081999
0	0.130735	0.41791	-0.42199	0.336516	0.081395
0.407562	0.1347	0.422886	-0.40426	0.34301	0.079876
0.608045	0.13679	0.427861	-0.39492	0.346452	0.081409
0.197086	0.136923	0.432836	-0.39432	0.346672	0.086164
0	0.137462	0.437811	-0.39191	0.347562	0.090249
0	0.137899	0.442786	-0.38996	0.348283	0.094503
0.300399	0.139144	0.447761	-0.38439	0.350345	0.097416
0.501514	0.146538	0.452736	-0.35133	0.362671	0.090065

0.431475	0.147742	0.457711	-0.34594	0.364693	0.093019
0.352703	0.147952	0.462687	-0.345	0.365045	0.097641
0.646141	0.149921	0.467662	-0.3362	0.36836	0.099301
0.319006	0.151082	0.472637	-0.33101	0.370319	0.102318
0.300618	0.155411	0.477612	-0.31165	0.377652	0.09996
0	0.163179	0.482587	-0.27692	0.390922	0.091665
0.363417	0.165995	0.487562	-0.26432	0.395766	0.091796
0.58042	0.176186	0.492537	-0.21876	0.41342	0.079117
0	0.180743	0.497512	-0.19838	0.421374	0.076138
0	0.185675	0.502488	-0.17632	0.43002	0.072468
0	0.191653	0.507463	-0.14959	0.440543	0.06692
0	0.197086	0.512438	-0.1253	0.450144	0.062294
0	0.21356	0.517413	-0.05163	0.479411	0.038002
0	0.215182	0.522388	-0.04438	0.4823	0.040088
0	0.217109	0.527363	-0.03576	0.485736	0.041628
0	0.218692	0.532338	-0.02869	0.488557	0.043781
0	0.221039	0.537313	-0.01819	0.492742	0.044571
0	0.223953	0.542289	-0.00516	0.497941	0.044348
0	0.23409	0.547264	0.040165	0.516019	0.031244
0	0.237077	0.552239	0.053524	0.521343	0.030896
0	0.241433	0.557214	0.073003	0.529098	0.028116
0.404897	0.244351	0.562189	0.086051	0.534287	0.027902
0.639391	0.247587	0.567164	0.100522	0.540035	0.027129
0	0.250996	0.572139	0.115765	0.546081	0.026059
0	0.257236	0.577114	0.143668	0.557119	0.019996
0.630931	0.270104	0.58209	0.201208	0.579732	0.002357
0.221039	0.270794	0.587065	0.204292	0.580937	0.006127
0.176186	0.274696	0.59204	0.22174	0.587742	0.004298
0.223953	0.279743	0.597015	0.244308	0.596504	0.000511
0.155411	0.281498	0.60199	0.252155	0.599539	0.002451
0	0.281838	0.606965	0.253676	0.600127	0.006838
0.435908	0.287215	0.61194	0.277719	0.609386	0.002554
0	0.287515	0.616915	0.279061	0.609901	0.007015
0.241433	0.291229	0.621891	0.295667	0.616258	0.005633
0.107745	0.292915	0.626866	0.303208	0.619134	0.007731
0.139144	0.293483	0.631841	0.305748	0.620102	0.011739
0.287215	0.294122	0.636816	0.308606	0.621189	0.015627
0.244351	0.294422	0.641791	0.309946	0.621699	0.020092
0.463182	0.297011	0.646766	0.321521	0.626092	0.020674
0.215182	0.300399	0.651741	0.336672	0.631818	0.019924
0.270794	0.300618	0.656716	0.337653	0.632188	0.024529
0.454616	0.302935	0.661692	0.34801	0.636084	0.025608
0	0.306552	0.666667	0.364186	0.642141	0.024526
0	0.310116	0.671642	0.380125	0.648074	0.023568
0	0.312513	0.676617	0.390841	0.652042	0.024574
0.595106	0.319006	0.681592	0.419877	0.662712	0.01888
0	0.328119	0.686567	0.460624	0.677466	0.009101
0.676086	0.337686	0.691542	0.503405	0.69266	0.001118
0.59044	0.346625	0.696517	0.543377	0.706565	0.010047
0.643315	0.352631	0.701493	0.570233	0.71574	0.014248

0	0.352703	0.706468	0.570552	0.715848	0.009381
0	0.361198	0.711443	0.608541	0.728586	0.017143
0.306552	0.363417	0.716418	0.618463	0.731865	0.015447
0	0.364926	0.721393	0.625211	0.734084	0.012691
0.293483	0.36717	0.726368	0.635243	0.737365	0.010997
0	0.373457	0.731343	0.663357	0.746449	0.015106
0	0.375735	0.736318	0.673542	0.749699	0.01338
0.257236	0.384391	0.741294	0.712249	0.761845	0.020551
0.1347	0.389732	0.746269	0.736134	0.769175	0.022907
0.180743	0.389793	0.751244	0.736406	0.769258	0.018014
0.292915	0.394754	0.756219	0.758589	0.775951	0.019732
0.404663	0.400422	0.761194	0.783931	0.78346	0.022266
0.503257	0.40245	0.766169	0.793001	0.786111	0.019942
0.137462	0.404353	0.771144	0.80151	0.788582	0.017437
0	0.404663	0.776119	0.802896	0.788983	0.012863
0	0.404897	0.781095	0.803942	0.789285	0.00819
0.107036	0.405532	0.78607	0.806782	0.790104	0.004034
0.250996	0.407562	0.791045	0.815862	0.79271	0.001666
0.497089	0.412789	0.79602	0.839231	0.79933	0.00331
0.48131	0.416284	0.800995	0.854861	0.803686	0.002691
0.361198	0.425471	0.80597	0.895939	0.814857	0.008887
0.346625	0.428447	0.810945	0.909247	0.81839	0.007445
0.831778	0.431475	0.81592	0.922788	0.821941	0.006021
0	0.43458	0.820896	0.936673	0.825537	0.004641
0.65508	0.435908	0.825871	0.942612	0.82706	0.00119
0	0.45396	0.830846	1.023331	0.846924	0.016079
0	0.454616	0.835821	1.026266	0.847617	0.011796
0	0.463182	0.840796	1.064567	0.856464	0.015668
0.394754	0.464214	0.845771	1.069182	0.857506	0.011735
0	0.48131	0.850746	1.145631	0.874026	0.02328
0.539927	0.489945	0.855721	1.184243	0.881841	0.02612
0.147952	0.497089	0.860697	1.216187	0.888043	0.027347
0	0.498303	0.865672	1.221613	0.889073	0.023401
0.698131	0.501514	0.870647	1.235972	0.891766	0.021119
0	0.503257	0.875622	1.243765	0.893207	0.017585
0	0.510255	0.880597	1.275058	0.898856	0.018259
0.086205	0.531412	0.885572	1.369666	0.914604	0.029032
0.052139	0.539927	0.890547	1.40774	0.920396	0.029849
0.384391	0.572266	0.895522	1.552344	0.93971	0.044188
0.312513	0.58042	0.900498	1.588805	0.943948	0.04345
0.352631	0.59044	0.905473	1.633612	0.94883	0.043357
0.412789	0.595106	0.910448	1.654475	0.950984	0.040537
0.310116	0.60045	0.915423	1.678373	0.953363	0.03794
0.405532	0.600899	0.920398	1.680382	0.953558	0.03316
0.247587	0.608045	0.925373	1.712333	0.956582	0.031209
0.147742	0.630931	0.930348	1.814671	0.965213	0.034864
0.294422	0.639391	0.935323	1.852501	0.968023	0.0327
0.072127	0.643315	0.940299	1.870045	0.969261	0.028963
0.279743	0.646141	0.945274	1.882682	0.970128	0.024855
0.337686	0.651516	0.950249	1.906719	0.971722	0.021473

0.130735	0.654649	0.955224	1.920729	0.972617	0.017393
0.328119	0.65508	0.960199	1.922655	0.972738	0.012539
0.13679	0.676086	0.965174	2.016583	0.97813	0.012956
0.151082	0.685761	0.970149	2.059847	0.980293	0.010144
0	0.687355	0.975124	2.066974	0.980632	0.005507
0	0.698131	0.9801	2.115161	0.982792	0.002692
0.165995	0.708113	0.985075	2.159794	0.984606	0.000469
0.274696	0.725175	0.99005	2.236087	0.987327	0.002723
0.428447	0.734245	0.995025	2.276646	0.988596	0.006429
0.127305	0.831778	1	2.712772	0.996664	0.003336

APPENDIX H

Wilcoxon Rank Sum test results - Cash Component variable

Data	*Column#*	*Data*	*Column#*	*Data*	*Column#*
3356882	1	2033000	2	2295000	1
3473000	2	9425500	1	7171000	2
8478729	1	3282000	2	1478000	1
3461000	2	8464420	1	2200000	2
10492382	1	3648000	2	1752000	1
4443000	2	4464926	1	2974000	1
8576667	1	2449000	2	5962000	1
3279000	2	2702000	1	6436000	1
16608081	1	11516597	2	7796000	1
5512000	2	2309000	1	8415000	1
2204000	1	7865000	2	9165000	1
7027000	2	2305000	1	10848000	1
2403000	1	4906000	2	4232600	1
7643000	2	1930000	1	5265600	1
3431000	1	8087000	2	6326200	1
7842000	2	2695000	1	6949300	1
3502000	1	9041000	2	3333291	1
8734000	2	4219000	1	5314779	1
5122000	1	4358000	2	5581237	1
2559009	2	3350000	1	5577577	1
3200000	1	1546223	2	6730031	1
4962903	2	4459000	1	2630000	1
3300000	1	3578358	2	5910000	1
4650075	2	5688000	1	7394000	1
4500000	1	1559367	2	4597000	1
6091220	2	5839000	1	4640000	1
4528000	1	2640832	2	4748000	1
2164000	2	7027000	1	1827000	1
5098000	1	1689904	2	2066000	1
3471000	2	3547000	1	3781000	1
1649000	1	7045700	2	4636000	1
5269000	2	3693000	1	5877000	1
1703000	1	8923800	2	5545000	1
5975000	2	5023000	1	1788000	1
1875000	1	8219700	2	2500000	1
3147000	2	9781000	1	3215000	1
3990000	1	9680100	2	3652000	1
2102500	2	11134000	1	4139000	1
3343000	1	9135100	2	2735157	1
1666000	2	1233000	1	3218296	1
2725000	1	2405000	2	4495388	1

Large Sample Approximation
Test Statistic Z = 0.4594
P-Value = 0.677

Sample	*RankSum*	*SampSize*
1	25434	201
2	5941	49

3069000	2	1264000	1	6031442	1
12841316	1	4015000	2	7148851	1
2173000	2	1498000	1	2925300	1
11832192	1	5191000	2	1987956	1
2597000	2	1677000	1	1513819	1
8470000	1	12011000	2	3018431	1
3638658	1	4168300	1	9386000	1
1717655	1	4870100	1	2533000	1
1995711	1	5084000	1	4115000	1
3604053	1	2679000	1	5160000	1
3381331	1	2526000	1	5503000	1
5678000	1	3786000	1	4128000	1
5250000	1	4729000	1	6116000	1
5950000	1	5376000	1	7512000	1
5100000	1	3926000	1	8089000	1
9112000	1	3400000	1	8724000	1
1169000	1	4728000	1	2830000	1
1276000	1	4986000	1	5788000	1
1476000	1	5742000	1	4181000	1
1800000	1	1360000	1	2767000	1
3702000	1	7700000	1	6421000	1
1505000	1	8608000	1		
1951000	1	9154000	1		
3053000	1	10026000	1		
4907000	1	1458000	1		
4242000	1	5465000	1		
6927000	1	5451000	1		
8098000	1	6369000	1		
12855000	1	3933000	1		
13519000	1	6539000	1		
13393000	1	6600000	1		
3139000	1	4222000	1		
3404000	1	7740000	1		
3744000	1	9948000	1		
4649000	1	10208000	1		
6578000	1	10563000	1		
3573333	1	12605000	1		
5015283	1	14069000	1		
2997402	1	15038000	1		
4767471	1	717000	1		
7658922	1	2850000	1		
3724000	1	5421000	1		
2020000	1	7935000	1		
7412000	1	9469000	1		
8447000	1	3399356	1		
9691000	1	5688145	1		
2800000	1	6668756	1		
3461000	1	7891478	1		
2111000	1	5213944	1		
2795000	1	7127000	1		

6850000	1	7811000	1
2577700	1	8059000	1
3205600	1	9430000	1

APPENDIX H

Wilcoxon Rank Sum test results - Options Component variable

Data	*Column#*	*Data*	*Column#*	*Data*	*Column#*
2394000	1	603300	2	701434	1
0	2	0	1	0	2
2634750	1	0	2	1468000	1
584018	2	0	1	231630	2
3882800	1	0	2	1054500	1
5857500	2	0	1	524500	1
6592000	1	10629765	2	0	1
1934963	2	0	1	16982500	1
11274337	1	0	2	4980000	1
1876640	2	948750	1	1335000	1
0	1	1738072	2	0	1
1310720	2	960438	1	0	1
569733	1	2444350	2	6360826	1
1205820	2	838750	1	5058000	1
0	1	2902000	2	11992000	1
2776242	2	5925000	1	0	1
971166	1	1323000	2	8086497	1
2579893	2	0	1	2082248	1
682425	1	1016250	2	3564321	1
4800000	2	0	1	4832500	1
0	1	2289871	2	1155535	1
0	2	869500	1	190400	1
6169600	1	0	2	6157500	1
0	2	909833	1	0	1
0	1	0	2	6150329	1
3109910	2	0	1	0	1
0	1	797140	2	5384579	1
0	2	0	1	3987050	1
0	1	1138254	2	0	1
0	2	963200	1	2193746	1
0	1	0	2	1057060	1
0	2	2201250	1	2371594	1
16510	1	0	2	3703165	1
0	2	2122200	1	4940000	1
1077413	1	1110415	2	1683750	1
0	2	2737750	1	0	1
1565850	1	1852206	2	0	1
4304575	2	0	1	532650	1
2475676	1	5537279	2	0	1
49200	2	0	1	2214000	1
2265476	1	2451215	2	6973750	1

Large Sample Approximation
Test Statistic Z = 1.0675
P-Value = 0.8571

Sample	*RankSum*	*SampSize*
1	25710	201
2	5665	49

1258200	2	1903122	1	1480500	1
0	1	426320	2	0	1
0	2	0	1	0	1
0	1	0	2	853600	1
0	2	0	1	1523014	1
0	1	0	2	2290800	1
1982651	1	6009208	1	1627100	1
3136408	1	8783676	1	1056965	1
934876	1	0	1	319872	1
1549145	1	0	1	2004110	1
0	1	1116667	1	2805751	1
3241500	1	0	1	620840	1
7262500	1	1964400	1	2986800	1
0	1	0	1	1190400	1
0	1	0	1	1439600	1
0	1	1177500	1	0	1
0	1	736000	1	0	1
0	1	1100000	1	1152010	1
0	1	2378667	1	1583479	1
0	1	924420	1	2074193	1
0	1	7800960	1	936668	1
0	1	1371850	1		
0	1	0	1		
0	1	0	1		
0	1	174765	1		
0	1	1831360	1		
4713000	1	5387899	1		
14358476	1	5910021	1		
0	1	2223840	1		
0	1	3469040	1		
22895627	1	32633900	1		
890725	1	0	1		
728000	1	14700000	1		
1080450	1	0	1		
855450	1	0	1		
0	1	0	1		
2761333	1	8221250	1		
0	1	0	1		
954000	1	17648125	1		
575700	1	124502	1		
1237950	1	0	1		
1500576	1	12537139	1		
653200	1	0	1		
6395279	1	0	1		
2316000	1	320688	1		
3598800	1	312891	1		
2334000	1	4164024	1		
0	1	3587250	1		
0	1	2840112	1		
0	1	5010027	1		

10068000	1	3511200	1
0	1	5497660	1
6690846	1	3103017	1

APPENDIX H

Wilcoxon Rank Sum test results - Total Compensation variable

Data	*Column#*	*Data*	*Column#*	*Data*	*Column#*
5750882	1	2636300	2	2996434	1
3473000	2	9425500	1	7171000	2
11113479	1	3282000	2	2946000	1
4045018	2	8464420	1	2431630	2
14375182	1	3648000	2	2806500	1
10300500	2	4464926	1	3498500	1
15168667	1	13078765	2	5962000	1
5213963	2	2702000	1	23418500	1
27882418	1	11516597	2	12776000	1
7388640	2	3257750	1	9750000	1
2204000	1	9603072	2	9165000	1
8337720	2	3265438	1	10848000	1
2972733	1	7350350	2	10593426	1
8848820	2	2768750	1	10323600	1
3431000	1	10989000	2	18318200	1
10618242	2	8620000	1	6949300	1
4473166	1	10364000	2	11419788	1
11313893	2	4219000	1	7397027	1
5804425	1	5374250	2	9145558	1
7359009	2	3350000	1	10410077	1
3200000	1	3836094	2	7885566	1
4962903	2	5328500	1	2820400	1
9469600	1	3578358	2	12067500	1
4650075	2	6597833	1	7394000	1
4500000	1	1559367	2	10747329	1
9201130	2	5839000	1	4640000	1
4528000	1	3437972	2	10132579	1
2164000	2	7027000	1	5814050	1
5098000	1	2828158	2	2066000	1
3471000	2	4510200	1	5974746	1
1649000	1	7045700	2	5693060	1
5269000	2	5894250	1	8248594	1
1719510	1	8923800	2	9248165	1
5975000	2	7145200	1	6728000	1
2952413	1	9330115	2	4183750	1
3147000	2	12518750	1	3215000	1
5555850	1	11532306	2	3652000	1
6407075	2	11134000	1	4671650	1
5818676	1	14672379	2	2735157	1
1715200	2	1233000	1	5432296	1
4990476	1	4856215	2	11469138	1

Large Sample Approximation
Test Statistic Z = 0.8978
P-Value = 0.8154

Sample	*RankSum*	*SampSize*
1	25633	201
2	5742	49

4327200	2	3167122	1	7511942	1
12841316	1	4441320	2	7148851	1
2173000	2	1498000	1	2925300	1
11832192	1	5191000	2	2841556	1
2597000	2	1677000	1	3036833	1
8470000	1	12011000	2	5309231	1
5621309	1	10177508	1	11013100	1
4854063	1	13653776	1	3589965	1
2930587	1	5084000	1	4434872	1
5153198	1	2679000	1	7164110	1
3381331	1	3642667	1	8308751	1
8919500	1	3786000	1	4748840	1
12512500	1	6693400	1	9102800	1
5950000	1	5376000	1	8702400	1
5100000	1	3926000	1	9528600	1
9112000	1	4577500	1	8724000	1
1169000	1	5464000	1	2830000	1
1276000	1	6086000	1	6940010	1
1476000	1	8120667	1	5764479	1
1800000	1	2284420	1	4841193	1
3702000	1	15500960	1	7357668	1
1505000	1	9979850	1		
1951000	1	9154000	1		
3053000	1	10026000	1		
4907000	1	1632765	1		
4242000	1	7296360	1		
11640000	1	10838899	1		
22456476	1	12279021	1		
12855000	1	6156840	1		
13519000	1	10008040	1		
36288627	1	39233900	1		
4029725	1	4222000	1		
4132000	1	22440000	1		
4824450	1	9948000	1		
5504450	1	10208000	1		
6578000	1	10563000	1		
6334666	1	20826250	1		
5015283	1	14069000	1		
3951402	1	32686125	1		
5343171	1	841502	1		
8896872	1	2850000	1		
5224576	1	17958139	1		
2673200	1	7935000	1		
13807279	1	9469000	1		
10763000	1	3720044	1		
13289800	1	6001036	1		
5134000	1	10832780	1		
3461000	1	11478728	1		
2111000	1	8054056	1		
2795000	1	12137027	1		

16918000	1	11322200	1
2577700	1	13556660	1
9896446	1	12533017	1

APPENDIX H

Wilcoxon Rank Sum test results - Cash % variable

Data	*Column#*	*Data*	*Column#*	*Data*	*Column#*
0.583716	1	0.771157	2	0.76591	1
1	2	1	1	1	2
0.762923	1	1	2	0.501697	1
0.85562	2	1	1	0.904743	2
0.729896	1	1	2	0.624265	1
0.431338	2	1	1	0.850079	1
0.56542	1	0.18725	2	1	1
0.628888	2	1	1	0.274825	1
0.595647	1	1	2	0.610207	1
0.74601	2	0.708771	1	0.863077	1
1	1	0.819009	2	1	1
0.842796	2	0.705878	1	1	1
0.808347	1	0.667451	2	0.39955	1
0.863731	2	0.697065	1	0.510055	1
1	1	0.735918	2	0.345351	1
0.73854	2	0.312645	1	1	1
0.782891	1	0.872347	2	0.291887	1
0.771971	2	1	1	0.718502	1
0.88243	1	0.810904	2	0.610268	1
0.347738	2	1	1	0.535786	1
1	1	0.403072	2	0.853462	1
1	2	0.836821	1	0.932492	1
0.348484	1	1	2	0.489745	1
1	2	0.862101	1	1	1
1	1	1	2	0.427734	1
0.662008	2	1	1	1	1
1	1	0.768137	2	0.468588	1
1	2	1	1	0.314239	1
1	1	0.597528	2	1	1
1	2	0.78644	1	0.63283	1
1	1	1	2	0.814325	1
1	2	0.626543	1	0.712485	1
0.990398	1	1	2	0.599578	1
1	2	0.702989	1	0.265755	1
0.635074	1	0.880986	2	0.59755	1
1	2	0.781308	1	1	1
0.718162	1	0.83939	2	1	1
0.328153	2	1	1	0.885982	1
0.574529	1	0.622605	2	1	1
0.971315	2	1	1	0.592438	1
0.54604	1	0.495242	2	0.391955	1

Large Sample Approximation
Test Statistic Z = -1.2922
P-Value = 0.0981

Sample	*RankSum*	*SampSize*
1	24639	201
2	6736	49

0.709235	2	0.399101	1	0.802914	1
1	1	0.904011	2	1	1
1	2	1	1	1	1
1	1	1	2	0.699601	1
1	2	1	1	0.498486	1
1	1	1	2	0.568525	1
0.647297	1	0.40956	1	0.852258	1
0.353859	1	0.356685	1	0.705578	1
0.680994	1	1	1	0.927873	1
0.699382	1	1	1	0.720257	1
1	1	0.693448	1	0.662314	1
0.636583	1	1	1	0.869265	1
0.41958	1	0.706517	1	0.671881	1
1	1	1	1	0.86321	1
1	1	1	1	0.848918	1
1	1	0.742764	1	1	1
1	1	0.8653	1	1	1
1	1	0.819257	1	0.834005	1
1	1	0.707085	1	0.725304	1
1	1	0.595337	1	0.571553	1
1	1	0.496743	1	0.872695	1
1	1	0.862538	1		
1	1	1	1		
1	1	1	1		
1	1	0.892964	1		
1	1	0.749004	1		
0.595103	1	0.502911	1		
0.360609	1	0.51869	1		
1	1	0.638802	1		
1	1	0.653375	1		
0.369069	1	0.168222	1		
0.778961	1	1	1		
0.823814	1	0.34492	1		
0.776047	1	1	1		
0.844589	1	1	1		
1	1	1	1		
0.564092	1	0.605246	1		
1	1	1	1		
0.758567	1	0.460073	1		
0.892255	1	0.852048	1		
0.860856	1	1	1		
0.712785	1	0.301869	1		
0.755649	1	1	1		
0.536818	1	1	1		
0.784818	1	0.913795	1		
0.729206	1	0.947861	1		
0.545384	1	0.615609	1		
1	1	0.687487	1		
1	1	0.647369	1		
1	1	0.587211	1		

0.404894	1	0.689884	1
1	1	0.594468	1
0.323914	1	0.752413	1

APPENDIX H

Wilcoxon Rank Sum test results - Options % variable

Data	*Column#*	*Data*	*Column#*	*Data*	*Column#*
0.416284	1	0.228843	2	0.23409	1
0	2	0	1	0	2
0.237077	1	0	2	0.498303	1
0.14438	2	0	1	0.095257	2
0.270104	1	0	2	0.375735	1
0.568662	2	0	1	0.149921	1
0.43458	1	0.81275	2	0	1
0.371112	2	0	1	0.725175	1
0.404353	1	0	2	0.389793	1
0.25399	2	0.291229	1	0.136923	1
0	1	0.180991	2	0	1
0.157204	2	0.294122	1	0	1
0.191653	1	0.332549	2	0.60045	1
0.136269	2	0.302935	1	0.489945	1
0	1	0.264082	2	0.654649	1
0.26146	2	0.687355	1	0	1
0.217109	1	0.127653	2	0.708113	1
0.228029	2	0	1	0.281498	1
0.11757	1	0.189096	2	0.389732	1
0.652262	2	0	1	0.464214	1
0	1	0.596928	2	0.146538	1
0	2	0.163179	1	0.067508	1
0.651516	1	0	2	0.510255	1
0	2	0.137899	1	0	1
0	1	0	2	0.572266	1
0.337992	2	0	1	0	1
0	1	0.231863	2	0.531412	1
0	2	0	1	0.685761	1
0	1	0.402472	2	0	1
0	2	0.21356	1	0.36717	1
0	1	0	2	0.185675	1
0	2	0.373457	1	0.287515	1
0.009602	1	0	2	0.400422	1
0	2	0.297011	1	0.734245	1
0.364926	1	0.119014	2	0.40245	1
0	2	0.218692	1	0	1
0.281838	1	0.16061	2	0	1
0.671847	2	0	1	0.114018	1
0.425471	1	0.377395	2	0	1
0.028685	2	0	1	0.407562	1
0.45396	1	0.504758	2	0.608045	1

Large Sample Approximation
Test Statistic Z = 1.2922
P-Value = 0.0981

Sample	*RankSum*	*SampSize*
1	25812	201
2	5563	49

0.290765	2	0.600899	1	0.197086	1
0	1	0.095989	2	0	1
0	2	0	1	0	1
0	1	0	2	0.300399	1
0	2	0	1	0.501514	1
0	1	0	2	0.431475	1
0.352703	1	0.59044	1	0.147742	1
0.646141	1	0.643315	1	0.294422	1
0.319006	1	0	1	0.072127	1
0.300618	1	0	1	0.279743	1
0	1	0.306552	1	0.337686	1
0.363417	1	0	1	0.130735	1
0.58042	1	0.293483	1	0.328119	1
0	1	0	1	0.13679	1
0	1	0	1	0.151082	1
0	1	0.257236	1	0	1
0	1	0.1347	1	0	1
0	1	0.180743	1	0.165995	1
0	1	0.292915	1	0.274696	1
0	1	0.404663	1	0.428447	1
0	1	0.503257	1	0.127305	1
0	1	0.137462	1		
0	1	0	1		
0	1	0	1		
0	1	0.107036	1		
0	1	0.250996	1		
0.404897	1	0.497089	1		
0.639391	1	0.48131	1		
0	1	0.361198	1		
0	1	0.346625	1		
0.630931	1	0.831778	1		
0.221039	1	0	1		
0.176186	1	0.65508	1		
0.223953	1	0	1		
0.155411	1	0	1		
0	1	0	1		
0.435908	1	0.394754	1		
0	1	0	1		
0.241433	1	0.539927	1		
0.107745	1	0.147952	1		
0.139144	1	0	1		
0.287215	1	0.698131	1		
0.244351	1	0	1		
0.463182	1	0	1		
0.215182	1	0.086205	1		
0.270794	1	0.052139	1		
0.454616	1	0.384391	1		
0	1	0.312513	1		
0	1	0.352631	1		
0	1	0.412789	1		

0.595106	1	0.310116	1
0	1	0.405532	1
0.676086	1	0.247587	1