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Master Thesis

Institutional Ownership and CEO Compensation

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1. Introduction

Whether agency conflicts are large or rather easy to overcome, conflicts have always existed between firm management and shareholders. Shareholders contract managers who work for them and try to induce them to achieve goals which benefit the shareholders (Jensen and Meckling, 1976). However, due to the misalignment of information and interests, moral hazard may arise, making managers more likely to follow their own interests rather than the interests of the shareholders (Jensen and Smith, 1985). A lot of shareholders may not be able to do much about this because they simply do not have the funds or the voting power to intervene, which is why nowadays legislation exists that provides shareholders with some protection from self-dealing amongst managers.

Although monitoring of firm management by shareholders can be costly and hence not worth the effort for smaller shareholders, large investors and institutions may be able to benefit from monitoring themselves due to the large stakes they have invested in particular firms (Pound, 1988). Institutional ownership can be categorized into two types; active and passive institutional ownership. Active institutions (e.g. pension funds) derive their main income from sources like share ownership, whereas passive institutions (e.g. banks and insurance companies) usually do not obtain their main income from this. Passive institutions are thought to usually not actively intervene in management activity, in part due to their business relations with the firms. Active institutions tend to not engage in business relations with the firm whatsoever and usually only have an investment relation (being a shareholder), which makes them more likely to intervene in management activity. Because active institutions depend to a large extent on income from share ownership and have high amounts of capital invested, they are considered to be the stakeholders that have a direct influence on manager compensation in this and prior research (e.g. Almazan, Hartzell, and Starks, 2005).

This research focuses on the effects of institutional shareholders on compensation schemes, on their efforts to align the interests of managers with their own interests. Compensation schemes of firm management comprise of different components, of which this research focuses on: option grants, restricted stock grants, long-term incentive plans (LTIPs), and bonuses. First of all, option grants can be provided to increase the risk appetite of managers, making them more motivated to engage in growth opportunities, such as Research and Development (R&D) expenditure (Baysinger, Kosnik, and Turk, 1991). Option grants have

grown significantly in the period from the mid 1980's until the end of the twentieth century. Second, restricted stock grants, which have characteristics of both shares and options, are found to have increased since the beginning of the twenty-first century. Murphy (2012) suggests that restricted stock grants may have been used as a substitute for option grants after the start of the twenty-first century. LTIPs have grown in the past decades just as restricted stock grants have. LTIPs are more aimed at long-term performance, in a similar way as restricted stock grants. Bonuses are cash based and have grown more slowly than the equity-linked compensation components (figure 1 and 2 in the theoretical framework provide more details), where the total compensation of CEOs has increased by more than 8 percent annually over the past decades (Goergen and Renneboog, 2011).

Providing equity-linked compensation to managers is one way of aligning interests and so reducing agency costs. For example, by providing shares of the respective firm to managers, these managers are incentivized to maximize share value, as their wealth sensitivity to stock price changes increases (Guay, 1999). Managers are thus more likely to engage in investment opportunities which suit shareholder interests. However, with higher ownership for managers, at some point these managers may actually become risk averse due to their own wealth sensitivity to the stock price and thus less likely to invest in positive NPV projects when these are risky, which diversified shareholders would want the firm to invest in (Driffield, Mahambare, and Pal, 2007).

A major problem with the way that stock option grants have been used is the consistent underpricing of stock options. The increase in the use of stock options from the mid 1980's until the end of the twentieth century is partly explained by changes in legislation in the U.S. and by the pricing of these options, as most firms believed that stock options were worth nearly nothing. This caused compensation for managers to become increasingly high with increases in underpriced option grants without any harm done to other compensation components. The problem of this underpricing came to light around 1998 and concensus on the composition of compensation schemes changed (Frydman and Jenter, 2010; Murphy, 2012). Until now however, research has been focused on the years prior to the change in consensus. This research focused on the period after it became clear that option plans were highly underpriced, trying to find a link between institutional ownership and the height of option grants.

Beside shares and options, restricted stock, which has characteristics of both shares and options, has some advantages and disadvantages as well. One of the advantages of restricted stock is that it reduces the chances of managers engaging in earnings manipulation (Shrieves and Gao, 2002). A disadvantage is the cost of the increased risk that managers bear due to the downside of the restricted stock (Feltham and Wu, 2001). This makes managers themselves also likely to prefer options over restricted stock, provided that options can provide similar payoffs with no downside risk. Hence, it is important to investigate the impact that institutional shareholders can have on the components of compensation, as managers may prefer different structures of compensation than are optimal for the alignment of interests between them and shareholders.

LTIPs, like restricted stock grants, can prevent earnings manipulation from occurring due to the long-term incentives this compensation component provides to managers (Shrieves and Gao, 2002). Therefore, shareholders are likely to prefer higher amounts of LTIPs to be incorporated in the compensation schemes of managers. Managers, on the other hand, receive similar compensation from LTIPs as from other compensation components (LTIPs are comprised of shares, options, and cash), but are assessed on longer periods, which constrains the actions they can make within longer periods of time and thereby providing reason for them to dislike high amounts of LTIPs in their own compensation schemes.

Bonuses provided to managers have not grown as much as other components, but do provide an advantage to shareholders, as the cash based payout of bonuses is easier to calculate and monitor. Thereby bonuses provide a less complex form of compensation to managers in comparison to equity-linked compensation, with the advantage of managers still being assessed on the basis of performance measures (Jensen and Murphy, 1990b). Therefore, it is likely that shareholders would prefer higher amounts of bonuses to be incorporated in compensation schemes. An unanswered question is whether managers prefer this kind of payout as well. Although the payout of cash can seem very pleasant as opposed to equity-linked compensation, of which the value can vary a lot over time, bonuses do not allow for any easy changes that can increase the value of the bonus, nor do bonuses provide room for hidden compensation (Kole, 1997). This will all be explained in more detail in the theoretical framework.

This research provides insight into the influence of institutional shareholders on management compensation, comprising of option grants, restricted stock grants, LTIPs, and bonuses. By looking at the effects of institutional ownership on the relative size of the different components of compensation, we can provide an answer to the research question, which is: Do institutional shareholders have a significant effect on the composition of compensation for managers in firms? In doing so, hypotheses are used to provide testable models for each compensation component. The hypotheses which were tested are drawn from the theoretical framework, which is provided in part 2 of this research. Part 3 provides the necessary explanations for the choice in data and variables that were used in this research. Part 4 is about the methods that were used, such as the choice between random effects and fixed effects models. In part 5 the empirical results are provided and further explained. Finally, in part 6 and 7, the discussion and conclusion respectively, the results are further discussed, some limitations and advice for further research are presented, and concluding remarks are provided on the hypotheses and research question.

2. Theoretical Framework

2.1 Agency theory

Agency theory, used in many academic disciplines (such as political science, economics, and psychology), is applied in situations where cooperating groups or parties have varying interests or risk attitudes. A real and widely discussed example of a relationship between principals and agents is that of shareholders and managers of the respective firm. The shares that can be held by outsiders in a firm are the contracts between the shareholders and the managers, who are principal and agent respectively. According to agency theory, due to this contract the manager should perform and behave such that he or she acts upon the interests of the shareholders (Morck, Shleifer, and Vishny, 1988). This is because the shareholders are invested in the firm and firm management should work with the provided capital in a responsible way suiting the interests of the shareholders. A problem described by agency theory is that agents have interests too which do not align with the interests of principals. Managers are interested in maximizing the potential value of bonuses and wealth awarded to them and to minimize the cost of managerial effort, which can cause misalignment of interests of the two parties involved (Denis, Denis, and Sarin, 1999; Frydman and Jenter, 2010).

Managers can show signs of short-termism, meaning they are more likely to implement strategies in the firm that contain lower added value in the long run and faster payoff to short-term performance measures such as annual sales. Jackson and Petraki (2011) state that managers should receive adjusted compensation due to the dangers of managers becoming more oriented toward this short-termism. This short-term focus of managers has been linked to the conflict of interests between shareholders and managers already decades ago by Narayanan (1985). Furthermore, Grinyer, Russell, and Collison (1998) provide evidence that managers can be focused on the short-term, especially due to their beliefs regarding the weight that investors put on financial reports, which are produces on a quarterly basis. This is further explained by Gigler and Hemmer (2001), who argue that moral hazard problems are more likely to arise when the financial reporting frequency of firms is increased. Gigler, Kanodia, Sapra, and Venugopalan (2012) in turn, argue that by designing compensation contracts for managers with higher long-term incentives could be a solution to the short-term focus of managers and thereby cause better interest alignment between shareholders and managers. In this research, we want to test whether shareholders can stop firm management from pursuing their own interests too much.

When interests do not align, it can be beneficial for these managers to refrain from using the shareholder interests in the decision-making process (Jensen and Smith, 1985). This is a kind of moral hazard, which is quite common in labor contracting and in the hiring of a decision-making organ such as the management of a firm by the shareholders (Holmstrom, 1979). The existence of this moral hazard implies that agents can take advantage of their relationship with principals and provide benefits to themselves rather than to focus on the interests of the principals (Cui, Jo, and Na, 2015; Fama and Jensen, 1983). This advantage of agents can stem from information asymmetry in particular, where agents do not share all information with principals (Eisenhardt, 1989).

2.2 Information asymmetry

Shareholders may not always be aware of the activities that managers undertake or why these managers undertake them in the first place, caused by information asymmetry among the parties. Shareholders are dependent on the release of information by the firm or via reports which are guided through law and regulation meant to reduce information asymmetry (Healy and Palepu, 2000). Beside these mandatory releases of information, shareholders can

gather information themselves via monitoring, although this is found to be a costly activity. Information asymmetry can thus arise due to the lack of information sharing by management, but may also arise due to the incapability of (and the high costs for) shareholders to perform regular monitoring on management activities (Goergen and Renneboog, 2011; Margiotta and Miller, 2000). The lack of transparency of firms and the high costs of monitoring, in combination with the misalignment of interests as discussed earlier, give rise to decision-making processes by managers that suit their personal interests rather than the interests of the shareholders (Cornett, Hovakimian, Palia, and Tehranian, 2003; Denis, Denis, and Sarin, 1999).

Even though monitoring can be quite costly, some investors have a large enough investment such that it is beneficial to actually pay the cost of monitoring considering the potential gains from doing so. Large shareholders, mostly comprising of institutional investors, have a significant amount of capital at stake in one or multiple firms in which they invest, and thereby are more motivated to keep management activity under control (Pound, 1988). Where normally the board of directors are responsible for controlling and evaluating firm management, shareholders may be unsatisfied with the information provided to them or even the performance of the firm itself and therefore engage in monitoring. This is problematic for small shareholders, as they either lack the resources or the motivation to engage in monitoring; when an investor owns 10 shares in a firm worth 10 U.S. dollars each, this person would only gain 1 U.S. dollar for an increase in stock return by 1 percent, making it unlikely for this person to be motivated to pay the relatively high costs of monitoring. However, large shareholders and institutional shareholders are more prone to have the motivation and capital to engage in monitoring of the firm (Franks and Mayer, 2001; Shleifer and Vishny, 1986). These types of shareholders may very well be able to gain from such monitoring, as for example Zeckhauser and Pound (1990) claim that larger shareholders and coalitions of shareholders can significantly reduce the chances of moral hazard.

2.3 Institutional Investors

Institutional investors are organizations or groups of investors that act together and have a large amount of capital which they can invest in shares. The most common institutional investors are pension funds, banks, insurance companies, and investment funds (Gillan and Starks, 2003). These institutional investors are usually well informed on stock market

processes and have specific interests when investing in firms. Although some claim that institutions might be short-term focused, in general, institutions are invested for the long run. For example, Bushee (1998) found that some institutional shareholders can be frequent traders, and that they therefore may influence management behavior of firms such that they decrease innovation (e.g. R&D expenditure) and invest more in short-term achievements. However, Bushee (1998) adds to this that the larger part of the sample of institutions from his research, comprising of different types of institutions, are not frequent traders, but tend to be invested in a firm for longer periods.

Because institutions tend to be invested in firms to gain from long run growth, they are likely to try and affect the probability that firms engage in long-term growth opportunities. Aghion, Van Reenen, and Zingales (2013) find evidence supporting the hypothesis that institutional ownership in firms is accompanied by increases in long-term investments such as increased R&D expenditure. Baysinger, Kosnik, and Turk (1991) find similar evidence, suggesting that institutional investors prefer to be invested in firms which have higher R&D expenditure and focus on long-term growth rather than short-term value maximization. Also, Martin and Nisar (2007) highlight that the Institutional Shareholders' Committee (ISC), a body emphasizing the role and responsibility of institutional investors in corporate governance, has published a code on how institutional investors and management of firms should cooperate to achieve long-term goals and growth for the respective firms.

2.4 Active versus passive institutions

Where there is an agreement that institutional investors can have an impact on firm management through monitoring, the degree to which institutions monitor and have influence may vary between the different types of institutions. In this research, they are classified into two categories: active institutions and passive institutions. Some institutions are more active in monitoring and can be more prone to use their power to influence decision-making of management. Generally, for active institutions it is easier and cheaper to engage in monitoring and to interfere in the decision-making process of firms (Chen, Harford, and Li, 2007). Active institutions can more easily earn from monitoring and interfering as opposed to passive institutions due to higher amounts of capital that are at stake (active institutions can reach higher returns on monitoring with less effort) (Crespi and Renneboog, 2010; Romano, 2001).

In being able to monitor and exercise power over firm management, institutional shareholders can have a significant impact, not only on decision making, but also on the structure of the compensation that managers receive. For example, Johnson and Shackell (1997) find that shareholders (including institutions) tend to become more active and propose new executive compensation schemes to the management of a firm when these schemes do not provide high enough interest aligning incentives to managers. Furthermore, according to Almazan, Hartzell, and Starks (2005), the involvement of active institutional shareholders tends to decrease the total compensation received by managers, and can make the compensation scheme more dependent on firm performance.

The most active institutions are investment funds, hedge funds, and pension funds, who are specialized in the market of equity of publicly traded firms (David, Kochhar, and Levitas, 1998; Almazan, Hartzell, and Starks, 2005). These institutions derive income mainly from sources such as portfolios which contain shares from firms (Ryan and Schneider, 2002). Furthermore, these institutions do not need to have friendly relations with the firms in which they are invested. For example, pension funds do not need to stay friendly with management because they do not need to provide financial services to the firms in which they invest, making them able to actively interfere with how the firm is managed (David, Kochhar, and Levitas, 1998). In the case of investment funds, some papers state that investment funds might be passive institutions because they need to keep the peace between themselves and the managers, as these managers may require financial services from them (e.g. Del Guercio and Tran, 2012). However, most emphasize that investment funds tend to be independent from firm management, and therefore seek no other business relationships with the firms in which they invest (e.g. Ferreira and Matos, 2008). Hedge funds, finally, are funds which entail aggressive strategies that are meant to interfere with management activity and thereby can be directly linked to the category of active institutions (Brav, Jiang, Partnoy, and Thomas, 2008). Active institutions, due to their independence and active strategies, can more easily engage in monitoring, since it provides higher gains on their main income sources (Chen, Harford, and Li, 2007).

Insurance companies, banks, trusts, and research firms are usually considered to be passive institutions. They can also be heavily invested in portfolios containing publicly traded shares but mostly do not derive their main income stream from this source. They hold these

portfolios because of their other activities (Crespi and Renneboog, 2010). Furthermore, insurance companies and banks are the types of institutions that may want to please firm management since they might provide a market for financial services to them (the respective firm could become a customer of the insurance company or bank). This kind of institutions is more dependent on other streams of income, which might come from the firms in which they invest in the first place. Hence, banks and insurance companies are generally expected to be quite passive in their monitoring activity and in the use of their voting power (Brickley, Lease, and Smith, 1988). The research firm as a category has been added to the passive side of institutions, as according to the database (Thomson Reuters Eikon), which provided the categories of institutions, these institutions fit the category of banks, adding that they perform research into the securities of firms and provide advice to other investors on the basis of their research. Summing up, both passive and active institutions would prefer higher alignment of interests between them and management, but only active institutions will actually engage in the monitoring required to make sure that these interests are aligned. This does not mean that all active institutions perform monitoring, as it could also be that some institutions free-ride on the monitoring performed by other institutions.

2.5 Interest alignment between shareholders and management

By implementing specific performance measures in compensation schemes, managers can be incentivized to maximize shareholder value. Examples of performance measures incorporated in compensation schemes of managers are profit, return on investment, and relative total shareholder return (TSR) (Ernst & Young Belastingadviseurs LLP, 2016; Gibbons and Murphy, 1990). The latter example, TSR, is a measure that is incorporated specifically to align the interests of the managers with those of the shareholders, thereby reducing agency costs (Buck, Bruce, Main, and Udueni, 2003). Other non-financial measures are included as well, such as sustainability, as firms tend to use a variety of measures in the incentive schemes of managers to provide higher alignment of interests between managers and stakeholders (Ittner, Larcker, and Rajan, 1997). By monitoring and using their voting power, institutional shareholders can influence management compensation schemes such that relevant performance measures are incorporated to provide higher interest alignment (Hartzell and Starks, 2003; Mehran, 1995).

When management is provided with performance measures that are not based on shareholder returns directly, distortions in interest alignments can arise. For example, when managers are assessed mostly on the short-term measure of profit, the managers can postpone or even forego long-term investments and thus keep profits artificially high for the current year (Ittner, Larcker, and Rajan, 1997). Murphy (2012) finds similar proof of managerial earnings manipulation, where a manager who is rewarded based on accounting profits in the short-term might be more motivated to increase the profits in the coming year by deferring certain costs, even though this will backfire in the long run. This kind of manipulation can be overcome to some extent by implementing a larger and broader set of performance measures, although in that case the interests of the shareholders are no longer as present in the compensation schemes (Lambert and Sponem, 2005). To avoid this earnings manipulation, what could also be done is to implement a different kind of payout in the compensation scheme, beside the use of only cash.

The second way in which interest alignment can be achieved is by equity-linked compensation. There has long been emphasis on the use of equity-linked compensation to replace cash bonuses. Even though some also argue that separating firm ownership and management would be the most efficient way of operating a firm (Fama, 1980), this separation can be the cause of non-aligned incentives. In order to re-align the incentives of managers and shareholders, management should also own a substantial number of shares in the firm. Having a single entity (board of managers) that makes decisions for the firm as if it owns the firm (the manager is also a shareholder) has been popular since its introduction by Berle and Means (1932) (e.g. Gormley, Matsa, and Milbourn, 2013; Smith and Stulz, 1985). When managers own shares in the company, they obtain the same interests as shareholders to some degree (Brailsford, 2002). When this is the case, the wealth of managers becomes sensitive to firm performance (stock price) in the same way as the wealth of shareholders (Murphy, 1999). An important issue with share plans and other equity-linked compensation plans is the complexity of these plans. There may even be hidden compensation sometimes, which is not apparent immediately to shareholders because this is compensation that has not been paid yet or will not be paid due to underperformance (it is not presented in the calculation of compensation awarded) (Kole, 1997).

Geiler and Renneboog (2011) show that due to a bad form of executive compensation (too high amounts, wrong performance measures or bad compositions) there exists abuse of managerial power and managers become self-dealing, which can be overcome by providing a better composition of compensation including share plans. Eisenhardt (1989) agrees, stating that adequate implementation of share plans can cause higher alignment of interests. Furthermore, Donaldson and Davis (1991) find that due to a lack of share plans for management, shareholders would have to exercise their voting power more often to have more control over management decisions that provide higher gains for them (relatively higher return on equity). This implies that managers forego actions that would lead to higher shareholder return and which might also benefit the firm. Also, Bizjak, Brickley, and Coles (1993) argue that share plans can provide managers with long-term incentives, since the provision of shares entails transaction costs such as taxes, which make the shares more profitable over a longer period. Overall it seems equity-linked compensation can be beneficial in the right amounts, but getting compensation schemes to provide these optimal amounts is harder than it appears.

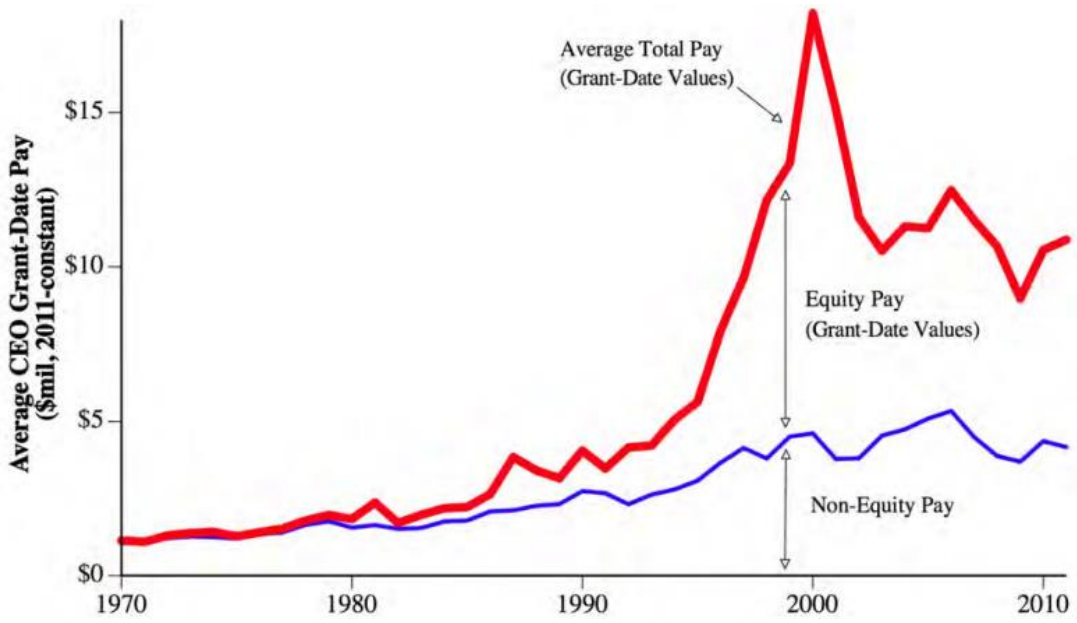
2.6 History of compensation

Over the past decades, manager compensation has grown significantly, even past the inflation level since the end of the twentieth century, increasing in most western countries by more than 8 percent annually (Goergen and Renneboog, 2011). One reason for this increase could be increased managerial power, which is an important determinant for the actual pay received by managers (Frydman and Jenter, 2010). Furthermore, competitiveness amongst firms can be a reason for the increase in compensation too. Firms have made high positions more appealing to the best managers by increasing the compensation of these positions (Murphy, 2012). In doing so firms can attract better managers for these positions which benefits the firm. It is also quite likely that incentive scheme contracts have not been optimally measured at times, thereby causing manager compensation to ultimately be higher than expected (Murphy, 2012). An example from the mid 1980's until the end of the twentieth century is the undervaluation of the options which were granted to managers (Murphy, 2002; Zhou, 2001).

The increase in manager compensation is not only due to the involvement of firms and managers themselves, but can also be partially explained by the pressure shareholders have

put on the increase in equity-linked compensation, with which both managers and compensation committees agreed (Murphy, 2012). Shareholders wanted the incentives of managers to change, and focused on how managers were paid. For example, CEOs were generally paid to increase firm size and follow other performance goals that were set out for them, but received almost no rewards for extraordinary performance and hardly any disciplinary actions were taken on them when they did not meet the goals set (Jensen and Murphy, 1990a). The idea behind providing more equity-linked compensation to managers was so these managers would not only have an incentive to maximize the value of the firm, but would more generally be motivated to increase the potential growth of the firm in the long run. Furthermore, shareholders wanted these managers to also be punished or rewarded with higher amounts when things would go bad or excellent respectively. By increasing these incentives and changing the structure of compensation, agency costs could thereby be reduced (Jensen and Meckling, 1976; Murphy 2012). The interest in equity-linked compensation started to grow in the mid 1980's, where firms started to pay management with more shares and options, and thereby making the managers more aligned to shareholder interests (Murphy, 1999). Figure 1 below, coming from Murphy (2012), presents data on the history of equity-linked compensation and cash based compensation of S&P500 firms.

Figure 1: Executive pay divided in equity-linked and cash based compensation



In the 1990's, within the S&P 500, firms their managers have seen their compensation grow to a large extent by an increase in stock options without any harm done to the absolute value of other compensation components (Frydman and Jenter, 2010). This increase in stock option grants can in part be explained by the change in U.S. government legislation, which changed the disclosure rules such that firms only needed to provide the number of options granted and not the dollar value anymore, as issued by the Securities and Exchange Commission (SEC) in the U.S. (Murphy, 2012). This also led to firms reporting values that were calculated by themselves. For example, firms with higher volatility would prefer using alternative calculations of the value rather than the Black-Scholes calculation and thus were able to report the lowest possible values from the different kinds of calculation (Kwon and Yin, 2006; Murphy, 1996).

Furthermore, even nowadays there are high amounts of equity-linked compensation to be found in compensation schemes. For example, among all publicly traded firms in the Netherlands in 2016, almost 80 percent of long-term incentive plans are composed of share plans, while 15 percent consists of stock options and only 5 percent is cash-based compensation (Ernst & Young Belastingadviseurs LLP, 2016). The effects of the height of equity-linked compensation and in general the composition of manager compensation are important to research, since both stock grants and options may induce different incentives to managers which can change the alignment of their interests with stakeholders.

2.7 Shares

Given that compensation schemes can be comprised to large extents of share plans, it is important to provide further information and insight on the impact of these share plans. Jensen and Meckling (1976) argue that managers require incentives to maximize firm value, stating that share plans in compensation schemes can be crucial to avoid interest misalignment. On the other hand, Chow (1982) finds that even with small manager ownership, managers can be persuaded to overweigh firm value maximizing actions due to shareholder activism. There appears to be a turning point in the height of managerial ownership (convexity), such that large ownership of firm managers may be harmful for the firm as for example (hostile) takeovers might not occur when managers have enough voting power to restrain these takeovers from happening (Weston, 1979). Furthermore, large manager ownership may make these managers more risk averse, given a larger portion of their own

wealth is at stake (Driffield, Mahambare, and Pal, 2007). This may provide reason for other types of compensation to be added to the compensation composition, such as stock options.

2.8 Stock options

Smith and Stulz (1985) found that managers who are too risk averse tend to forego positive net present value investments (NPV). Prior research embraces that managers tend to be risk averse of nature (e.g. Guay, 1999; Smith and Stulz, 1985). In order to provide a higher risk appetite to the management of the firm, the managers would thus need to be given incentives that mitigate (part of) this risk aversion. Options are provided to managers in order to align their risk appetite with the risk appetite of the stakeholders of the firm. For example, Coles, Naveen, and Naveen (2004) find that when managers are provided with higher amounts of options, thereby increasing their wealth sensitivity to stock volatility (risk), they are more likely to increase R&D expenditure. Also, Amihud and Lev (1981) find that managers can be very risk averse when they lack stock option plans in their compensation schemes, as they may become more anxious about keeping their position in the firm. This means managers who are relatively risk averse would require a higher dose of these incentives, implying a larger share in stock options would be needed in their total compensation. The proof for this is found in option pricing theory, which finds that an increase in volatility (risk) is associated with an increase in the value of options (Rajgopal and Shevlin, 2001).

Research on the effect of stock option grants on the financial decisions of management has been widely conducted, providing insight into the effects these option grants may have on shareholders of the firm. For example, Berger, Ofek, and Yermack (1997) found a positive relation between the leverage of a firm and the stock option holdings of managers. Furthermore, Coles, Naveen, and Naveen (2006) found evidence suggesting that managers are more likely to increase R&D expenditure and take on more risk in financial decision making in general when they have higher amounts of option grants in their compensation schemes. Similarly, DeFusco, Johnson, and Zorn (1990) provide evidence for their theory, stating that managers who are provided with more options are more likely to engage in risky projects. This may be a very convenient way of aligning the interests of shareholders and managers, providing reasons to both parties to invest in the firm for long-term growth. Also, Guay (1999) finds that even though the payoff slope for managers becomes more convex than that of shareholders when stock options are introduced, the interests of shareholders and managers

are better aligned with managers becoming more likely to engage in investments that provide long-term growth. Holmstrom and Kaplan (2003) even find that stock options make managers able to obtain value from firm restructuring activities just like shareholders do.

Unfortunately, option plans can have unwanted side-effects as well. Managers who are relatively more compensated in stocks and options rather than salary (cash) are more prone to manipulate earnings in ways that suit their interests best, such as the performance measures for their compensation schemes (Shrieves and Gao, 2002). This manipulation of earnings can have some serious effects on the stock price as well, which makes this a very relevant issue for shareholders (Bartov and Mohanram, 2004). Furthermore, there is a distinct risk of overcompensating managers with stock options, in part due to the complexity of the pricing of these options (Black and Scholes, 1973). With amounts of stock options that are relatively too high, managers may even be induced with motivation to take on excessive risk (Ju, Leland, and Senbet, 2014).

Managers could also become overinvested in their own firm, as with higher amounts of option grants they gain a more undiversified portfolio which contains high amounts of risk for these managers (Coffee, 1986). This will make managers risk averse once again, showing that option plans may not be the right tool to get managers to engage in growth opportunities and spend more on Research and Development (R&D) (Easterbrook, 1984). Also, Yermack (1997) found that managers have a taste for using their influence in trying to obtain option awards prior to the delivery of good news to outsiders. Hence, it is important for outsiders such as institutional investors to monitor the timing of options provided to managers and keep control of the amount of options granted to managers (Bartov and Mohanram, 2004).

2.9 Restricted stock

An alternative to shares and options is restricted stock, which has characteristics of both shares and options. In the first place, restricted stocks have a time period in which they cannot be resold (or in the case of options, cannot be exercised). This means that managers are not able to get rid of the restricted stocks that were granted to them in that period. On the other hand, restricted stocks have a linear payoff, just like shares (Shrieves and Gao, 2002). Similar to shares and options, restricted stock grants serve a purpose of aligning manager and shareholder interests.

A disadvantage of restricted stocks as opposed to other equity-linked compensation is that when the volatility of the stock price is changed by manager behavior, for example when new investment opportunities are undertaken, restricted stock bears higher risks (the linear payoff implies downside risk) for the managers which means the firm must compensate them for this risk with higher amounts of compensation (Feltham and Wu, 2001). Lambert and Larcker (2004) find similar evidence, stating that restricted stocks are the most expensive kind of compensation in that it provides a high amount of compensation to the manager for relatively low effort.

An advantage of restricted stocks as opposed to options is that restricted stocks bear little motivation for managers to engage in earnings manipulation (Shrieves and Gao, 2002). Zhang, Bartol, Smith, Pfarrer, and Khanin (2008) even find that higher amounts of restricted stock are associated with less earnings manipulation of managers. This is explained by the combination of two characteristics of restricted stock, which are the longer term of ownership of the stock (restricted stock cannot be sold for a period after the grant) and the downside risk (similar to shares). For example, when a manager receives a lot of restricted stocks, and this manager is unable to sell the stocks for 5 years, he will be less likely to engage in earnings manipulation, as it will backfire on his own wealth in the future. Particularly this last argument is relevant for institutional shareholders, which is why in this paper it is believed that institutional shareholders are likely to increase the height of restricted stock grants provided to firm management.

2.10 Long-term Incentive Plans

Beside the distinction among different kinds of payouts in compensation schemes, another important comparison to make is that between long-term and short-term incentives (Murphy 2012). Most firms use both short-term and long-term plans for their managers, such that long-term growth of the firm is not in danger but the short-term focus on for example sales in the current year is not lost either (Murphy, 2012). Since the mid 1990's, beside an increase in equity-linked compensation, long-term incentive plans (LTIPs) have become increasingly popular (Buck, Bruce, Main, and Udueni, 2003). Firms incorporate LTIPs in the structure of managers their compensation as a way to better align the interests of management with the shareholders (Westphal and Zajac, 1994). Even though the payout of LTIPs can take the form of cash, shares, and options, which makes it hard to factually interpret

the effects of LTIPs on managerial behavior, consensus exists that LTIPs are provided because they are viewed as a good way to align interests with stakeholders (Pepper, Gore, and Crossman, 2013).

LTIPs are not a lot different from normal compensation plans, but focus on the longer run, setting performance goals for horizons longer than 3 years (Kole, 1997). Hence, when managers are paid to a larger extent on their long run activity at the firm, these managers are more incentivized to increase firm performance over the long run, for example by increasing R&D expenditure (Engesaeth, 2015). LTIPs, like restricted stock grants, can also prevent managers from engaging in earnings manipulation to a larger extent than other forms of compensation (Shrieves and Gao, 2002). For these reasons, shareholders are likely to find firms with higher degrees of LTIPs in the total compensation scheme of the managers more attractive to invest in. On the other hand, managers will likely disapprove of high LTIPs since they have preferences to focus on the short-term. A question that remains is whether institutional shareholders influence their existing investment positions to provide managers with higher amounts of LTIPs.

2.11 Bonuses

Where LTIPs, restricted stock grants, and option plans are equity-based types of compensation, the bonus provided to CEOs is cash-based but still depends on performance measures of the firm, in contrast to salary. The bonus can therefore be viewed as a kind of variable salary. In the decades prior to the twenty-first century, CEOs have been provided with higher and higher compensation packages, but this has mostly been due to increases in equity-based compensation (Murphy, 2012). Salaries and bonuses provided to CEOs on the other hand, have grown more slowly, as was already deductible from figure 1 provided in section 2.6 on the history of compensation (in the figure, the salaries and bonuses form the 'Non-Equity Pay' part, drawn as a blue line).

Even though the bonus provided to CEOs does not provide incentives in its payout, the performance measures on which the height of this bonus is assessed do. These characteristics make bonus plans for CEOs a less complex form of compensation in comparison to equity-linked compensation (Jensen and Murphy, 1990b). This is also a reason why shareholders may prefer bonuses over other forms of compensation when the costs of monitoring are relatively high, since bonuses are more easily monitored due to their simplicity. After 1998, when it was

discovered that options were highly underpriced, providing higher bonuses rather than non-transparent and complex equity-linked compensation plans may have been viewed as a welcome change of compensation structures for shareholders. Until now however, no evidence supports this theory, making it even more interesting to incorporate in this research.

2.12 Institutional power

A remaining question is whether institutional shareholders are practically able to pressure firm management in changing compensation structures. Institutional investors commonly have portfolios of investments, which contain shares from many firms, making it unlikely for them to own a majority of the shares in one firm and implying that, in order to have a significant amount of voting power in a company, institutional shareholders must work together with other shareholders and thus form coalitions (Shleifer and Vishny, 1986). Data on the existence of such coalitions are usually hard to find, but information on the percent of shares they own can be easily obtained, which can indicate up to what point these institutional investors can exercise power on firm management (Crespi and Renneboog, 2010). Furthermore, Gillan and Starks (2000) find that the cost of creating shareholder coalitions has reduced tremendously since 1992, when new legislation allowed shareholders to communicate more directly with each other in the United States. Also, the mere presence of institutional investors and their potential voting power in a firm can cause firms to attempt to better align interests of management with those of the shareholders, for example to avoid conflicts and interventions in firm activity (Almazan, Hartzell, and Starks, 2005).

Another important point of view is legislation, as governments try to help shareholders in reducing the risks of bad behavior from managers but also have to protect management from too much influence by shareholders. In the Netherlands and the United Kingdom for example, for more than a decade there has been an act giving shareholders certain power over the compensation schemes of managers, which is called “Say on Pay” (Delman, 2010; Ferri and Maber, 2013). In the United States, this “Say on Pay” legislation has only been implemented in 2011 (the Dodd-Frank Act). Even then the legislation in the United States did not provide a binding vote but only an advisory vote for shareholders to cast (Thomas and Van der Elst, 2015). This means that shareholders can vote on whether they approve of the compensation schemes provided to management. Even though the vote itself is mandatory (firms must provide this vote to shareholders), the outcome of this vote cannot overrule firm and

management decisions (Thomas, Palmiter, and Cotter, 2011). However, in the first year of this vote more than half of the firms in the United States, from a sample by Cotter, Palmiter, and Thomas (2013), stated that they would change the compensation schemes of management to gain higher approval rates from shareholders. This implies that, before the use of this legislation, these firms did not provide compensation schemes to management which were to the satisfaction of most shareholders.

Beside gaining the approval of shareholders, to maintain a strong position for potential new investors firms also seek endorsement with institutional investors by trying to gain a well-established profile at firms such as Institutional Shareholder Services (ISS), which are consultants of institutional investors (Rock, 1991). This is mainly due to the large increase in institutional ownership among publicly traded firms. The consultancy firms provide institutional investors with further insights into the firms in which the institutions want to invest, providing even more information than normal investors would obtain. Thereby, ISS and other consultancy firms increase the likelihood of institutional shareholder activism and increase the power with which these investors can intervene in the firms in which they are invested (Cotter, Palmiter, and Thomas, 2013). This means that institutional investors are better equipped to influence management and firm decision-making. Furthermore, the active institutional investors are more likely to use the services of these consultancy firms, as they are able to obtain higher gains from engaging in the costly practice of monitoring and gathering information from these consultancy firms (Romano, 2001).

Institutional investors thus are empowered to large extents, allowing them to intervene in the firm in several ways. First, as described, institutional shareholders can submit proposals to firms on subjects in which they want to see changes, such as the strategy with regard to R&D expenditure or the compensation schemes of managers (Johnson and Shackell, 1997). Also, institutional shareholders may combine their power and act as a coalition to intervene in firm management by using their voting power (Shleifer and Vishny, 1986). Another means is to threaten to sell the shares held, i.e. to exit the firm entirely as an institutional shareholder. Palmiter (2002) finds that large shareholders can use their position in a firm to influence management behavior simply by threatening to exit the firm if management does not follow up on the institutional shareholder her demands. However, there is no wide recognition of this last kind of shareholder activism.

2.13 Previous Research

Research on executive compensation gained increasing attention for the influence of institutional shareholders after the increase in equity-linked compensation started in the beginning of the 1990's. Most of the research papers on this subject find a significant negative link between the height of executive compensation and the presence of institutional shareholders. Chen, Harford, and Li (2007), just like Hartzel and Starks (2003), found a significant negative relation between the level of compensation and institutional ownership, suggesting that institutional shareholders have a monitoring role and thereby reduce the principal-agent problem. Where Hartzell and Starks (2003) use a variable for institutions that covers the 5 largest institutions, Chen, Harford, and Li (2007) divide the different types of institutions into two groups, namely dependent and independent institutions (which are the passive and active institutions as mentioned in this research, respectively).

Almazan, Hartzell, and Starks (2005) found evidence that monitoring costs may differ across institutions, leading to a distinction between active and passive institutions. Crespi and Renneboog (2010) found that shareholders form coalitions to gain more voting power and thereby influence managerial decision-making and manager compensation, but find differing results among different categories of investors, again stating there can be active institutional shareholders, but also passive ones. The point brought forth in both Almazan, Hartzell, and Starks (2005) and Crespi and Renneboog (2010) is that some (institutional) shareholders are more active than others. Banks and insurance companies are more passive, where investment funds and pension funds are more active (Gillan and Starks, 2003).

Research focused on the difference between active and passive institutions is generally based on the idea presented by Brickley, Lease, and Smith (1988), who find that institutions that have no potential business relations with the firm in which they are invested can be labeled active institutions. David, Kochhar, and Levitas (1998) present evidence that institutions with potential business relations with the firm are more prone to being passive institutions, as they cannot fully profit from monitoring because they are easily penalized by firm management (e.g. the firm enters in a business relation with a competitor of the institution). They find that passive institutions are banks, trusts, and insurance companies, and label investment funds, pension funds, and mutual funds as being active. The exact same reasoning is provided by Chen, Harford, and Li (2007), who find that insurance companies and

banks are passive, while investment funds and public pension funds are active. Kochhar and David (1996) find that pension funds are active institutions and are a dominant financial institution, whereas insurance companies and banks can have business relations with firms and hence are passive institution. Also, Del Guercio and Hawkins (1999) provide evidence that pension funds can be very active and use proposals on strategies of firm management as a way to maximize fund value.

Almazan, Hartzell, and Starks (2005) find that investment funds are active institutions, in part due to the characteristics of being less strictly regulated and having a lower potential for business relations with the firm as opposed to passive institutions. They argue that these are important reasons why monitoring is a lot easier and less harmful for the business of the active institutions than it is for passive institutions. Crespi and Renneboog (2010) present evidence for the same division of institutions, with banks and insurance companies found to be passive institutions, while investment funds are more active, although they use a sample from the United Kingdom (UK) and state that shareholders in general are more active in the UK than in the U.S. or other countries in Europe.

Chen, Harford, and Li (2007) find that active institutions are more prone to monitor firms rather than to trade shares across firms and markets. They focused on the distinction between institutions that are either trading shares (exiting a position in a firm) or perform monitoring activities on the firm, and find that active institutions more often "engage in long-term beneficial adjustments to their holdings" (p. 30). Crespi and Renneboog (2010) provide evidence for the existence of coalitions of institutional shareholders, and further state that a limitation of their and other research is the lack of data on existing coalitions, as databases provide research with nothing more than indirect measures of potential coalitions of institutions. This lack of direct data on coalitions of institutions applies to all the papers that have been covered in this research.

Beside the height of compensation, the composition of the compensation schemes provided to managers has been tested for effects by different shareholder influences. David, Kochhar, and Levitas (1998) found that not only is the level of compensation affected by the influence of institutional shareholders, but also the composition of this compensation, generally involving an increase in long-term incentives with higher involvement of institutional shareholders. However, they do not provide insight into the details of the long-term

incentives, such as what kind of reward it offers (whether the manager can obtain a high amount of options or whether it is mostly shares that are provided). This is a problem that is still existent in databases, which usually incorporate measures of LTIPs that simply provide a U.S. dollar value of the entire incentive plan, without specifying its components.

Almazan, Hartzell, and Starks (2005) have focused on the effect of institutions on the compensation structure of managers, providing evidence that active institutions have a significant negative effect on the total compensation provided to managers, at the same time leading to higher sensitivity to performance. David, Kochhar, and Levitas (1998) find that passive institutions have no significant impact on the mix of CEO compensation, whilst active institutions reduce the compensation for CEOs and increase the amount of long-term incentives incorporated in the compensation scheme.

Hartzell and Starks (2003) provide evidence on increasing pay-for-performance sensitivity of CEO compensation when active institutional ownership increases, making a distinction between performance based compensation and other types of compensation. They further obtain similar results as other research on this subject, finding that active institutional ownership has a negative influence on the total amount of compensation provided to CEOs.

Khan, Dharwadkar, and Brandes (2005) used a different measure of institutional ownership, incorporating the concentration of institutional ownership into a model without accounting for the difference between active and passive institutions. They merely investigated the effect of institutional shareholders with more than 5 percent ownership on the compensation for CEOs. They also found that total compensation decreases due to higher concentrations of institutional ownership.

Prior research has shown that executive compensation and institutional ownership can be related to a number of firm characteristics, making these characteristics important additions to the models that are used by researchers on institutional ownership and executive compensation. Coles, Naveen, and Naveen (2005) for example, investigate the effects on both leverage and R&D expenditure and find significant relations between the compensation structure of managers and management decision-making regarding types of finance and growth opportunities. They find that both leverage and R&D expenditure are positively influenced by an increase in the sensitivity of CEO wealth to stock volatility.

Dong, Wang, and Xie (2010) find evidence on CEO stock option grants, stating that CEOs with higher stock option grants will choose debt over equity more often (higher leverage). Smith and Watts (1992) find that executive compensation is related not only to the size of the firm, but also to firm performance such as sales and profit. Also, they provide evidence that executive compensation is linked to characteristics that provide insight into the growth opportunities of the firm, such as dividend yield and R&D expenditure. Aggarwal and Samwick (1999) find that executive compensation is affected by the price volatility of the firm. However, these researchers do not incorporate institutional ownership into their models.

Concerning institutional ownership, Gompers and Metrick (2001) found that institutional investors have a preference for certain firm characteristics, in particular return on assets (ROA), and are more likely to invest in firms which perform better and tend to outperform the market average. Eakins, Stansell, and Werheim (1998) find that the price-earnings ratio (P/E ratio) can be an important determinant for institutional investors in making investment decisions on publicly traded firms. Kochhar and David (1996) show that active institutions can have a significant positive impact on the innovation of the firm (e.g. increased R&D expenditure). Aghion, Van Reenen, and Zingales (2010) present evidence in support of institutions increasing the likelihood of R&D expenditures increasing in firms using a variable for institutions that is the sum of all institutional investors rather than different variables for different institutions.

2.14 Hypotheses

This theoretical framework works towards a number of claims on the influence of institutional shareholders on the compensation of CEOs, leading to the hypotheses which this research tests. First, the LTIPs provided in compensation plans provide incentives for increased long-term growth (for example by increased R&D expenditure), indicating that active institutional shareholders can potentially gain more from their investments and thus are motivated to provide firm management with higher LTIPs.

Second, after the boom in equity-linked compensation, around 1998 it became clear that options were underpriced, as for example managers thought that options were worth almost nothing and hence ‘free’ to give in compensation schemes. However, options were worth a lot more, making this a problem not only for the firm, but also for shareholders. It seems likely that institutional shareholders became eager to decrease the option grants to managers.

Third, restricted stock grants have been found to provide high amounts of risk on the manager without being beneficial for stakeholders such as institutional shareholders (other types of compensation are less expensive). Therefore, the idea is that institutional shareholders are eager to decrease the amount of restricted stock grants to managers.

Fourth, provided that active institutions prefer compensation structures that are less complex and are more easily measured by both the firm and outsiders for control, it would seem logical to prefer increases in the bonuses provided to CEOs, which, even though they are cash-based and hence do not provide incentives through the actual payout, still depend on performance measures of the firm and hence can help align interests in this way.

Fifth and last, total compensation has been found by many research papers, such as Hartzell and Starks (2003), to be negatively linked with (active) institutional ownership. This research follows that line and argues that when active institutions are able to influence the composition of compensation, they are also likely to decrease the height of the total amount of compensation.

The main research question was: Do institutional shareholders have a significant effect on the composition of compensation for managers in firms? From this main question and the theoretical framework, four testable hypotheses were derived:

- H1: Active institutional ownership has a positive and significant effect on the height of LTIPs in compensation schemes of CEOs, whereas no significant effect is found for passive institutional ownership.
- H2: Active institutional ownership has a negative and significant effect on the height of option grants in compensation schemes of CEOs, whereas no significant effect is found for passive institutional ownership.
- H3: Active institutional ownership has a positive and significant effect on the height of restricted stock grants in compensation schemes of CEOs, whereas no significant effect is found for passive institutional ownership.
- H4: Active institutional ownership has a positive and significant effect on the height of bonuses in compensation schemes of CEOs, whereas no significant effect is found for passive institutional ownership.

- H5: Active institutional ownership has a negative and significant effect on the height of total compensation in compensation schemes of CEOs, whereas no significant effect is found for passive institutional ownership.

3. Data and Variables

For this research I use data from a subset of firms listed in the S&P500 and focus on the time period after the year 1998, which is when options, and equity-linked compensation in general, became the topic of conversation as firms and shareholders started to notice that options were not valued in the right way in compensation schemes (Murphy, 2012; Lublin and Scism, 1999). This lead to consensus that option grants were too high at that point in time and that they needed to revalue these options and provide less options in compensation schemes in the future. That means that data was needed from the year 1999 onwards, providing a large enough time period to work with. However, the database used for executive compensation data provides relevant data up to the year 2005. Hence, the selected period ranges from 1999 until 2005 was selected for the data sample used in this research.

3.1 Compensation

Compensation data on CEOs has been retrieved from the ExecuComp database of the Wharton Research Data Services (WRDS), providing detailed information on the compensation composition of managers for 364 firms out of 500 firms in the S&P500. Not all firms from the S&P500 were found in this database, as the database uses firm specific codes (such as an ISIN or CUSIP) which are either not retrievable or the database lacks data on those particular firms. I have used a 6-digit and 8-digit CUSIP and the ISIN codes of the 500 firms in the S&P500 to obtain the data. It is likely that the use of even more types of codes may provide a higher number of firms, or that the sources from which I have originally obtained the firm specific codes was outdated or not correct. However, by combining all three of the firm specific code outputs, I got data on a total of 364 firms. Furthermore, even though the database provides data on multiple managers per firm, the positions of these managers are different for each firm, where sometimes not even the CEO of a firm is found in the data. Hence, to use data on the same position in the firm and thus provide consistency among the firms, only the CEOs of each firm were incorporated in this research, as this is the only position that is consistently retrievable in each firm from the data. Of the 364 firms, 321 firms provided data on

compensation up to the year 2005, after which there was no relevant data on compensation left for any of the 364 firms.

The variables concerning CEO compensation from the ExecuComp database are: LTIP payouts, options granted, restricted stock, bonus, and total compensation. All variables are expressed in thousands of U.S. dollars. Bonus is equal to the dollar value of a bonus earned by the manager (which is not part of any of the other variables, such as LTIP or options granted). Total Compensation is equal to the sum of all compensation components, including LTIP payouts, options granted, restricted stock, and bonus. Restricted stock grants equal the U.S. dollar value of all restricted stock granted during the relevant fiscal year. Options granted measures the total U.S. dollar value of all stock options granted to the respective manager, calculated with the Black-Scholes formula. LTIP compensation is equal to the portion of total compensation which is based on the LTIP (performance measures tracking 3 or more years). Below, table 1 provides the summary statistics of manager compensation (see appendix A for detailed information on variation of these variables).

Table 1. CEO compensation: Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
LTIP payouts	2037	526.70	1692.42	0	22686.67
Options Granted	2034	4653.87	11901.45	0	244538.70
Restricted Stock	2037	1078.24	3127.11	0	47880.00
Bonus	2037	1470.89	2065.02	0	29000.00
Total Comp.	2037	8998.58	13646.98	20	245016.90

As can be seen in this table, the portion of LTIP payouts is rather small with a mean percentage that is lower than 6 percent of the mean of total compensation. So, even though it is claimed that the popularity of LTIPs has increased, it is still a rather small amount compared to other forms of compensation. Furthermore, over 50 percent of the mean total compensation is comprised of options. Furthermore, the standard deviation is relatively small as well, just like the standard deviation for bonuses. Restricted stock and LTIPs provide standard deviations of over 3, making these the more varying payouts among firms.

3.2 Institutional Ownership

Data on institutional ownership was retrieved from Eikon, a Thomson Reuters database. This database provided data on ownership of 311 out of the 321 relevant firms. However, some firms provided data for only 1 year, so 294 firms were left after selecting only firms with data for the entire research period. The database provided data on the percentage ownership of the following types of institutional investors: Banks and Trusts, Hedge Funds, Insurance Companies, Investment Funds, Investment Funds/Hedge Funds, Pension Funds, and Research Firms. The distinction between Hedge Funds, Investment Funds, and Investment Funds/Hedge Funds lies in the rights the particular institutional investor has.

The category designation of Hedge Funds and Investment Funds in this database are somewhat confusing and therefore deserve further explanation. Eikon designates investors as Hedge Funds when they only use a passive strategy, even though the category is named Hedge Fund, which would imply active strategy. Funds that use active strategies are categorized as Investment Advisor/Hedge Fund. Within the category Investment Funds/Hedge Funds, there are firms which can take the role of being an investment fund or a hedge fund management firm, the latter being permitted to use aggressive strategies such as selling short, leveraging, and performing arbitrage. With Investment Funds, the Eikon database sums the institutional shareholders which are registered with the Securities and Exchange Commission (SEC) and manage assets on behalf of clients and other institutions, but can also be comprised of a group of individuals who manage their own funds.

I then divide these institutions between Active Institutions (AI) and Passive Institutions (PI) (following Almazan, Hartzell, and Starks (2005) and others). The AI consists of the categories Investment Funds, Investment Funds/Hedge Fund, and Pension Funds. The PI variable will consist of Banks and Trusts, Insurance Companies, and Research Firms. Furthermore, the institutional ownership variables are lagged by 1 period, following Almazan, Hartzell, and Starks (2005). Below, table 2 provides summary statistics on the two categories of institutions (for details on variation, look at appendix A). What is remarkable is the mean percentage ownership of passive institutions, which is below 3 percent, whereas the average ownership of active institutions comprises of over 40 percent. For a detailed summary of all types of institutions that are incorporated in this research, see appendix B.

Table 2. Institutional ownership: Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Active Inst. Ownership	2058	41.91	13.08	0	74.26
Passive Inst. Ownership	2058	2.95	3.24	0	30.69

3.3 Control variables

Prior research has shown that executive compensation and institutional ownership can be related to a number of firm characteristics, which we thus would like to control for in our analysis. Smith and Watts (1992) find that executive compensation relates to not only the size of the firm, but also to the firm performance captured by measures such as sales. Also, executive compensation is linked to characteristics such as dividend yield and R&D expenditures providing insight into the growth opportunities of the firm. In the case of institutional ownership, Gompers and Metrick (2001) found that institutional investors have a preference for certain firm characteristics, in particular return on assets, and are more likely to invest in firms which perform better and tend to outperform the market average.

Because of these relations, control variables are added to the models coming from the Thomson Reuters Datastream database. Two control variables for the investment opportunities of the firm are Tobin's Q and R&D expenditure divided by capital in the respective years. Following Aggarwal and Samwick (1999), the volatility of the firm is controlled for by using price volatility as a control variable. Furthermore, following Almazan, Hartzell, and Starks (2005), the dividend yield and leverage of the firm are included as control variables as well. Following Jensen and Murphy (1990a), a control variable for firm performance is added, which is return on assets (ROA), since this may influence the level and structure of the compensation awarded to CEO's. The price-earnings ratio (P/E ratio) and sales per share are two variables which are also included to control for firm performance. Table 3 shows the summary statistics of the control variables used in this research.

Table 3: Control Variables: Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
ROA	2046	6.59	13.09	-415.02	88.87
Dividend Yield	2036	1.45	1.63	0	17.4
R&D/Capital	2058	0.03	0.07	0	1.29
Leverage	2058	36.08	169.87	-7317	1714.29
Sales/Shares	2055	23.93	25.99	0.094	274.326
Price Volatility	1970	27.64	9.89	11.88	81.02
Tobin's Q	2058	0.16	0.25	0	5.51
P/E Ratio	1827	57.15	545.85	1.2	21061.1

4. Method

The data used in this research are panel data, as we have data of the same variables in a number of firms over a time period. Therefore, first we need to estimate whether we need to use a fixed effects panel estimator or a random effects panel estimator. The use of fixed effects models over random effects models has been tested with a Hausman test. The Hausman test provides a chi-squared score which is significant at the 0,01 level for LTIP payouts, and does not provide strong evidence that random effects models are good for the models of options granted and total compensation. The outputs of the Hausman test can be found in appendix C (the tests only show the outputs considering active institutional models, but passive models provide very similar outputs). For the purpose of consistency, the models used in this research are all fixed effects models. All the relevant fixed effects models can be found in their most original form in the appendixes E and F, providing the necessary details if wished for. To highlight what the initial relations (without control variables) between institutional ownership and compensation components are, see appendix D for all simple regressions between institutional ownership and the different types of compensation.

Furthermore, we wanted to measure the influence of institutional ownership on compensation for CEOs, but not the other way around. For example, in the case of LTIP payouts, we find from the theoretical framework that it is highly likely that there is some form of endogeneity going on between institutional ownership and LTIP payouts. This is due to the idea that instituions prefer to invest in firms that are focused on the long-term rather than on

short-term value maximization. In turn, firms that are focused on long-term growth are more likely to have (higher) LTIPs incorporated in their compensation schemes, thereby increasing the chance of endogeneity existing between institutional ownership and the compensation of CEOs (specifically, LTIP payouts).

Therefore, some extra models have been built which were provided with Instrumental Variables (IVs) such that the potential endogeneity is covered for. Unfortunately, the only statistically good IVs available from the databases are the number of shares outstanding of the firm and the trading volume of shares. The use of models with these IVs (that provide an underidentification statistic and Sargan test statistic) shows proof of good models with non-weak IVs in the following cases: active institutional ownership on LTIP payouts and restricted stock grant, and passive institutional ownership on LTIP payouts and bonuses. The Sargan test statistic and F test statistic can be checked in table 4 below. The other models provided bad scores on the Sargan test statistic with values that are worse than the 0.1 significance level. The results from these models can be found in appendix G.

Table 4. Sargan and F test results for active (1) and passive (2) models

	LTIP payouts (1)	Restricted stock grants (1)	LTIP payouts (2)	Bonus (2)
Sargan (Chi-sq)	0.73	0.79	0.58	0.11
F test (P-value)	0.03	0.03	0.02	0.00

The IVs that were chosen provided some good models concerning underidentification and overidentification (Sargan test statistic). The use of these IVs can be further explained by the lack of independent influence on compensation components, whereas the number of shares and the trading volume are believed to have a direct influence on institutional ownership. If the number of shares changes, there is a change in ownership structure (even though this may be very small), and when the trading volume changes for a particular share this influences the stock price (and volatility) and thereby ownership structures, but not compensation for CEOs directly. Even though the IVs seem to be proper and are believed to be so, concerns may exist on the validity of these instrumental variables (e.g. the trading volume can have a direct effect on one of the exogenous variables in the model, such as price volatility) and the models that

use IVs must therefore be assessed carefully. Beside this, as has been described earlier, the institutional ownership variables have been lagged by 1 period, and as it is unlikely that compensation data from a period T will influence institutional ownership in the period prior to T, we think that endogeneity is not a big concern in providing insights based on the models without IVs.

5. Empirical Results

Here the results are presented from the models which were used to determine the influence of institutional investors on the different components of manager compensation. To remind the reader, institutional ownership has been lagged by one period, thus by one year, to obtain a model which estimates the influence of institutional ownership on compensation. First we deal with active institutions, followed by the results on passive institutions. By comparing both in the end, a clear image is provided of the differences between both groups of institutions.

5.1 Active institutions

In table 5, the coefficients and significance values from the model of every types of compensation are visible. First, what is noticeable is that the models provide very good F-test statistics, with only the model of restricted stock grants being not significant. However, with a p-value of 0.1333, there is still some action which can be analyzed from the restricted stock grants model. This implies that the independent variables form a model which provides significant explanatory value for the dependent variable. This, even though the R-squared statistics are very low in most cases. However, this is rather normal considering we are dealing with panel data, which measures R-squared cross-sectional rather than as a time-series.

Table 5. Coefficients and significance of active institutional ownership models

Independent Variable	LTIP payouts	Options granted	Restricted stock grants	Bonus	Total Compensation
Active Inst. Own.	12.23**	-147.15***	14.11	28.76***	-92.69*
	(5.06)	(47.99)	(11.00)	(5.43)	(52.02)
ROA	10.82	-17.96	29.15*	23.61***	39.75
	(8.13)	(77.26)	(17.68)	(8.72)	(83.61)
Dividend Yield	-176.82***	-849.30*	-12.70	67.77	-1085.65*
	(54.35)	(514.29)	(118.19)	(58.30)	(558.81)
R&D/Capital	6816.96***	48048.25**	-2325.87	-1455.36	51926.53**
	(2488.41)	(23548.76)	(5411.68)	(2669.59)	(25586.87)
Leverage	0.08	0.42	0.06	-0.02	0.52
	(0.16)	(1.53)	(0.35)	(0.17)	(1.67)
Sales/Shares	-1.37	61.15	20.23**	20.89***	109.45***
	(4.12)	(39.42)	(8.97)	(4.42)	(42.40)
Price Volatility	30.83**	332.94**	53.59*	-45.09***	373.53**
	(14.82)	(140.49)	(32.22)	(15.89)	(152.35)
Tobin's Q	-61.52	290.28	-338.53	-40.85	-99.38
	(213.11)	(2017.27)	(463.47)	(228.63)	(2191.32)
P/E Ratio	0.11	-5.09***	0.34	0.034	-4.72***
	(0.16)	(1.56)	(0.36)	(0.18)	(1.68)
Constant	-865.70*	1089.31	-1557.50	650.96	602.39
	(484.70)	(4596.81)	(1054.10)	(519.99)	(4983.89)
R-squared	0.024	0.029	0.011	0.069	0.03
F-test	3.39***	3.94***	1.53	9.82***	3.42***
N	1489	1486	1489	1489	1489

* p<0.10 ** p<0.05 *** p<0.01

Considering the output for the model of the LTIP payouts, we expected a positive and significant relation and it appears to be present in the results as well. LTIPs have become popular in the years prior to the selected period of 1998 to 2005 and it appears that active institutional shareholders view LTIPs as a desirable type of compensation in this period as well. Active institutional ownership indeed has a positive significant effect at the 0.016 level. With an increase of 1 standard deviation in active institutional ownership, the amount of LTIP payouts increases by approximately 160 thousand dollars. This may seem high, but given that the standard deviation of LTIP in this sample is 1692 (the mean is 527), this still only explains 10 percent of the overall variation. These numbers do provide evidence in support of the first hypothesis drawn from the theoretical framework, as active institutional ownership does have a positive effect on the height of LTIPs in CEO compensation schemes. Therefore we cannot reject H1.

The effect of active institutional ownership on the amount of options granted is negative and significant at the 0.02 level. The coefficient is also quite large, which means that when the percentage ownership of active institutions increases, the amount of options granted decreases a lot (for every increase in active institutional ownership by one standard deviation (13.08), the amount of options granted decreases by more than 1900 thousand dollars). Compared to the standard deviation of options granted (11901.45), this effect is slightly bigger than is the case for LTIPs with a decrease in options granted of more than 16 percent. This provides evidence in support of H2, which we thus cannot reject; active institutional ownership has a positive effect on the amount of options granted to CEOs.

Active institutional ownership appears to have no significant effect on the height of restricted stock grants. The positive coefficient is quite small and is not significant (significance is found only at the 0.2 level). Even if it were significant, an increase of 1 standard deviation in active institutional ownership would increase restricted stock grants by approximately 185 thousand dollars, which is only 6 percent given the standard deviation of restricted stock is 3127. Although a modified model is obtained in the section on IVs later on, the evidence provided thus far does not support H3, which stated that active institutional ownership has a positive effect on the height of restricted stock grants.

Active institutional ownership positively predicts the size of the bonus as well. The coefficient, which is over 28 and significant at the 0.01 level, tells us that active institutional

ownership has a positive influence on the bonus provided to CEOs. This means that with a 1 standard deviation increase in active institutional ownership, the bonuses for CEOs will increase by approximately 375 thousand dollars, which is an increase of more than 18 percent given the standard deviation of bonuses is 2065. Hence, we cannot reject the fourth hypothesis (H4), as this model thus provides evidence in support of H4, stating that active institutional ownership has a positive effect on the height of bonuses for CEOs.

Finally, a similar model to the prior ones has been made for the total compensation provided to CEOs. This model provides a compilation of all prior models by using total compensation as the dependent variable, which includes all compensation components previously discussed. It shows that when active institutional ownership increases by standard deviation, the total compensation for CEOs decreases by more than 1200 thousand dollars. Compared to the standard deviation of total compensation (13646.98), this is a decrease of almost 9 percent. This implies that even though active institutions can have different preferences for different components of compensation (as the other models clearly show), there is an overall tendency for lowering the total compensation for CEOs. Hence, this model supports H5 in finding a negative effect of active institutions on the height of total compensation for CEOs and we cannot reject H5 at this point.

5.2 Active institutions with IVs

There is also the possibility of using IVs, which are the number of shares outstanding and the total trading volume of shares per firm, which are found to be good instruments for the model with LTIP payouts as a dependent variable. The fixed effects model with IVs shows an increase in the coefficient of active institutional ownership, which is now slightly less significant. Active institutional ownership now has a greater impact where a 1 standard deviation increase in ownership now accounts for an increase in LTIP payouts of 605 thousand dollars. This is an increase of almost 36 percent in LTIP payouts, taking the standard deviation of 1692 thousand dollars into account. This further provides support for H1, as active institutions now have an even bigger positive influence on LTIP payouts. Hence, we cannot reject H1 on the basis of models of active institutional ownership. The summary of the model with IVs can be found in table 6 at the end of this section, together with the IV model of restricted stock grants. The extended model can be found in appendix G.

In the case of restricted stock grants there is also the possibility of using IVs which provide an improved model: here we find a positive significant influence by active institutional ownership on restricted stock grants to CEOs. The instruments are found to be good in this model and the F-test provides an improved p-value of 0.0316. Given that restricted stock grants have a standard deviation of 3127 thousand dollars, the increase of 2432 thousand dollars per increase of 1 standard deviation in active institutional ownership would suggest that active institutions have a very high preference for restricted stock grants as compared to other compensation components (active institutions account for more than 77 percent of the total increase in restricted stock grants). Contrasting the initial fixed effects model (without IVs), this provides evidence in support of H3. Provided that the model itself is improved as well, we would no longer have to reject H3 concerning the part of active institutional ownership. In table 6 at the end of this section the two models are put next to each other for comparison, while the extended model can be found in appendix G.

Table 6: Fixed effects models with (1) and without (2) IVs for active institutions

Independent Variable	LTIP payouts (1)	LTIP payouts (2)	Restricted stock grants (1)	Restricted stock grants (2)
Active Inst. Own.	46.26*	12.23**	186.29***	14.11
	(27.11)	(5.06)	(63.77)	(11.00)
ROA	8.69	10.82	21.77	29.15*
	(8.37)	(8.13)	(19.70)	(17.68)
Dividend Yield	-160.74***	-176.82***	30.64	-12.70
	(55.46)	(54.35)	(130.46)	(118.19)
R&D/Capital	9307.96***	6816.96***	8875.55	-2325.87
	(3062.51)	(2488.41)	(7204.31)	(5411.68)
Leverage	0.07	0.08	0.02	0.06
	(0.16)	(0.16)	(0.39)	(0.35)
Sales/Shares	-6.22	-1.37	-3.13	20.23**
	(5.51)	(4.12)	(12.95)	(8.97)
Price Volatility	21.92	30.83**	15.56	53.59*
	(16.29)	(14.82)	(38.31)	(32.22)
Tobin's Q	164.23	-61.52	761.42	-338.53
	(274.13)	(213.11)	(644.87)	(463.47)
P/E Ratio	0.10	0.11	0.31	0.34
	(0.17)	(0.16)	(0.39)	(0.36)
Underid. Test	43.55***		43.55***	
Sargan stat.	0.12		0.07	
F-test	2.81***	3.39***	2.05**	1.53
N	1468	1489	1468	1489

* p<0.10 ** p<0.05 *** p<0.01

5.3 Passive institutions

Looking at the passive institutions, what was predicted is that there is no significant influence by passive institutional ownership on any of the components of compensation. Table 7 provides the coefficients for each of the different categories of compensation.

Table 7. Coefficients and significance of passive institutional ownership models

Independent Variable	LTIP payouts	Options granted	Restricted stock grants	Bonus	Total Compensation
Passive Inst. Own.	12.93	-138.07	23.81	46.56**	-54.98
	(17.92)	(169.86)	(38.89)	(19.36)	(184.06)
ROA	11.29	-24.78	29.68*	24.69***	36.02
	(8.15)	(77.50)	(17.68)	(8.80)	(83.69)
Dividend Yield	-179.04***	-821.83	-14.94	63.14	-1067.27*
	(54.46)	(516.10)	(118.23)	(58.83)	(559.45)
R&D/Capital	6124.96**	56534.42**	-3048.12	-2944.52	57542.41**
	(2476.39)	(23467.34)	(5376.45)	(2675.32)	(25439.63)
Leverage	0.09	0.35	0.07	-0.00	0.49
	(0.16)	(1.54)	(0.35)	(0.18)	(1.67)
Sales/Shares	0.036	43.03	21.69**	23.91***	97.99**
	(4.09)	(39.11)	(8.88)	(4.48)	(42.00)
Price Volatility	33.07**	307.43**	55.83*	-40.46**	354.91**
	(14.82)	(140.80)	(32.18)	(16.01)	(152.27)
Tobin's Q	-137.67	1214.25	-425.36	-218.05	483.01
	(211.15)	(2001.21)	(458.43)	(228.11)	(2169.16)
P/E Ratio	0.11	-5.14***	0.35	0.04	-4.74***
	(0.16)	(1.56)	(0.36)	(0.18)	(1.67)
Constant	-433.24	4181.95	-1076.25	1635.88***	-2762.52
	(448.48)	(4254.87)	(973.68)	(484.50)	(4607.12)
R^2	0.02	0.02	0.01	0.05	0.02
F-test	2.78***	2.95***	1.38	7.22***	3.07***
N	1489	1486	1489	1489	1489

** p<0.10 ** p<0.05 *** p<0.01*

Some of the numbers provided seem to underline the expectations which were drawn from the theoretical framework. Passive institutional ownership does not have a significant impact on LTIP payouts, as the level of significance is 0.471. The coefficient of LTIP payouts is also quite small at a value just below 13. This is similar to the coefficient of active institutional ownership, but provides no significance in this model. The output of this model thus supports the hypothesis on LTIP payouts, as we see a positive effect by active institutions and no significant effect by passive institutions.

Considering options granted, we find similar evidence as with LTIP payouts. The influence of passive institutional ownership is not significant and the coefficient is similar to the coefficient of active institutional ownership. The model itself is good, with an F-test statistic of 0.0018. In this case, no similar model with IVs can be built as has been done for active institutional ownership, as the IVs turn out to be weak in such a model and hence, are not included in this research. Hence, we cannot reject the hypothesis on options granted (H2), as we have found evidence that active institutional ownership has a negative significant effect on the height of options granted to CEOs, whereas passive institutions lack a significant effect.

The model on restricted stock grants provides similar output as that of LTIP payouts, but the F-test of the model provides a p-value of only 0.1902, which means the model is not very good. This is a similar outcome as was provided with active institutional ownership. In the case of active institutional ownership, the model could be adjusted with IVs to provide an improved model. This could not be achieved for passive institutional ownership, as the model only provided a larger p-value of 0.3. Therefore, it was not incorporated in this research. These results also support the third hypothesis (H3), stating that where active institutional ownership has a positive significant influence on restricted stock grants to CEOs, passive institutional ownership does not have a significant influence. Hence, we cannot reject H3.

A remarkable observation is the influence of passive institutional ownership on bonus. Passive institutional ownership, in a similar way as active institutional ownership, has a positive and significant impact on the restricted stock grants in compensation schemes of CEOs in this model. One explanation would be the very low standard deviation of passive institutional ownership, which is only 3.24. This implies that if passive institutional ownership were to increase by 1 standard deviation, it would influence bonuses for CEOs by only 150 thousand dollars, which is only 7 percent taking the standard deviation of bonuses into

account. Furthermore, a model on bonuses with IVs is presented later on, which provides very different insights. Until now, the results do not support H4, showing that passive institutions can have a significant effect on bonuses, just like active institutions.

Finally, a model is presented on total compensation, which provides output in line with the other models: a non-significant influence of passive institutional ownership on the total compensation provided to CEOs. Just as with active institutional ownership, this model provides a compilation of all other models, as the dependent variable is the sum of all other dependent variables from the previously discussed models. It shows that passive institutions do not have a significant effect on total compensation for CEOs, but that the coefficient is negative and a bit smaller than the coefficient of active institutional ownership. When passive institutional ownership would increase by 1 standard deviation, total compensation for CEOs will decrease by nearly 180 thousand dollars, which is a decrease of only 1.3 percent taking the standard deviation of total compensation into account. Hence these results support the hypothesis on total compensation (H5), stating that active institutional ownership has a negative and significant effect on the height of total compensation for CEOs, where no significant effect is found for passive institutional ownership.

5.4 Passive institutions with IVs

In the case of LTIP payouts, we could also incorporate IVs into the model just as has been done with active institutional ownership in this model. This provides a model which can be found in table 8 at the end of this section, and as the extended version in appendix G. The model increases the coefficient of passive institutional ownership on LTIP payouts by a large amount, going from nearly 13 all the way up to 340. However, even in this improved model the coefficient is not significant, and only reaches a p-value of 0.143. Even though the coefficient is still not significant, the result is rather remarkable, suggesting that something may be wrong with the IVs or even that in some cases passive institutional ownership can have a significant effect on LTIP payouts (though this would require serious specification, where we are interested in the effect of institutions in general).

Considering bonuses, if we incorporate IVs into the model, the IVs turn out to be barely strong at a Sargan chi-squared p-value of 0.1107. Furthermore, the model with IVs actually finds that passive institutions would have a negative effect on bonus, though it is far from significant at a p-value of 0.757. This is in line with what we expected from passive institutional

ownership in the hypothesis on bonuses (H4). Hence, based on the results from the model on bonuses with IVs, we would not be able to reject H4.

Table 8. Fixed effects models with (1) and without (2) IVs for passive institutions

Independent Variable	LTIP payouts (1)	LTIP payouts (2)	Bonus (1)	Bonus (2)
Passive Inst. Own.	340.12	12.93	-68.77	46.56**
	(232.07)	(17.92)	(222.49)	(19.36)
ROA	9.59	11.29	23.43	24.69***
	(9.24)	(8.15)	(8.86)	(8.80)
Dividend Yield	-156.23**	-179.04***	63.83	63.14
	(61.95)	(54.46)	(59.39)	(58.83)
R&D/Capital	9191.70***	6124.96**	-3528.49	-2944.52
	(3412.45)	(2476.39)	(3271.47)	(2675.32)
Leverage	0.16	0.08	-0.03	-0.00
	(0.189)	(0.16)	(0.18)	(0.18)
Sales/Shares	-6.25	0.04	26.77	23.91***
	(6.26)	(4.09)	(6.01)	(4.42)
Price Volatility	18.98	33.07**	-35.62	-40.46**
	(19.12)	(14.82)	(18.33)	(16.01)
Tobin's Q	-87.94	-137.67	-234.37	-218.05
	(239.26)	(211.15)	(229.37)	(228.12)
P/E Ratio	0.15	0.11	0.03	0.04
	(0.19)	(0.16)	(0.18)	(0.18)
Underid. Test	9.06**		9.06**	
Sargan stat.	0.58		0.11	
F-test	2.25**	2.78***	6.60***	7.22***
N	1468	1489	1468	1489

* p<0.10 ** p<0.05 *** p<0.01

5.5 Robustness

To provide robustness to all models and not just the models that work properly with the selected IVs, a robustness check has been performed by introducing a bootstrap to the models. This is a resampling method which approximates more robust standard errors and p-values based on a sample of 50 replications. This is a very relevant method for panel data as the randomly selected sample must be provided by means of a panel and cannot be provided on the basis of individual record (Sanchez, 2011). By running the same models with this bootstrap, it was possible to provide more robust standard errors. The outputs from the models can be found in appendix H and I (for active and passive institutions, respectively).

The point of introducing a bootstrap to the models is to see whether the previously presented models provide outcomes that represent most of the firms incorporated in this research. That is, we want to make sure that there are not just a couple of outliers in the sample that determine the variation for the models. Hence, by using these bootstrapped models we can show that the distributions are fairly normal and that in this particular research we can provide concluding remarks on the market rather than on some specific firms.

Fortunately for this research, the outputs from the models with bootstraps did not provide significant changes to the standard errors and p-values of the variables of the models. However, for the model of active institutional ownership and total compensation, it turns out that active institutional ownership would not have a significant influence on the total amount of compensation for CEOs, which means the influence on total compensation would be similar in the case of active and passive institutional ownership. This result implies that the error terms are not independently and identically distributed, suggesting that there may be correlation within individual firms. Hence the influence on total compensation is not measurable in all firms, but in specific firms. This may for example be explained by a number of firms providing excessive amounts of compensation (as a total amount), which are not conform a competitive market, for which institutions try to correct the firm. This would also imply that H5 would have to be rejected, as active institional ownership does not necessarily have a negative significant effect on total compensation provided to CEOs. Our theory is that active institutional ownership only specifically wants a reduction in the total compensation of CEOs when the firm provides an excessively high compensation scheme to its CEO, compared to other firms with similar firm characteristics.

6. Discussion

6.1 Prior and future research

Looking at the distinction between active and passive institutions, the results from this research provide similar evidence as the results from other papers such as Almazan, Hartzell, and Starks (2005) and David, Kochhar, and Levitas (1988). Even though Almazan, Hartzell, and Starks (2005) claim that a lot of debate exists on how active pension funds are, the inclusion of pension funds in this research has provided the view that pension funds indeed are active institutions. Furthermore, this research has made a distinction between two types of hedge funds (Investment Funds/Hedge Funds and Hedge Funds), something prior research has had no concrete attention for. Also, this research underlines the constitution of the category of passive institutions drawn in previous research, which states that banks, insurance companies, trusts, and research firms all fit the category of passive institutions. This is also found by David, Kochhar, and Levitas (1998), who state that institutions that may have intentions of being more than just an investment relation of the firm, such as a financial services provider to the firm, are considered passive institutions.

Considering the distinction on long-term versus short-term compensation, where most research is aimed at R&D expenditure or investment opportunities, this research provides new insights into the effect of institutional ownership on LTIPs, or more generally: the incorporation of long-term compensation contracts for CEOs. Therefore, this research provides insights that may be seen as complementary to the papers by Aghion, Van Reenen, and Zingales (2013), and Baysinger, Kosnik, and Turk (1991), who find that institutions prefer to invest in firms that are focused on long-term growth rather than short-term value maximization. Considering that this preference is a big explanation for the concerns about potential endogeneity, we cannot conclude with certainty that when active institutions invest more in particular firms, they also tend to increase the height of LTIPs in compensation schemes for the CEOs of these firms, and thereby cannot confirm the long-term view that active institutions would have according to previous research. However, the results (and in particular the output of the models with IVs) point in the direction of this statement and provide support for the finding by David, Kochhar, and Levitas (1998) that active institutions increase the long-term incentives in compensation schemes.

Looking at options granted, one relevant article that has produced results on option grants is provided by Almazan, Hartzell, and Starks (2005). Although they combine option grants with stock grants initially, they do look at the pay-for-performance sensitivity of option grants and the influence of institutions on that variable, but not on the overall value of option grants for CEOs. This research does provide models with option grants and restricted stock grants separately, thereby providing new insights into the influence of institutions on the different components of compensation rather than focusing on the total amount of compensation that is sensitive to performance. Furthermore, this research has focused on a period where the consensus is thought to have changed considering option grants in compensation schemes, making shareholders keen on reducing the amount of options granted to CEOs due to underpricing of these options. Until now, no research has performed empirical tests to find proof of this change in consensus. This research provides a start to proving this change, with empirical results from the period just after the change in consensus. However, for future research it is highly advisable to include a period prior to this change.

In the case of restricted stock, an interesting finding is that an increase in active institutional ownership is associated with a large increase in restricted stock grants. Where Lambert and Larcker (2004) claim that restricted stock grants are the most expensive type of compensation, we find that this seems to be relatively irrelevant for institutional shareholders, who prefer increases in the amount of restricted stock grants that are provided to CEOs. One cause for this may be that restricted stock grants bear very little motivation for managers to engage in earnings manipulation (Shrieves and Gao, 2002). This is further explained by Bryan, Nash, and Patel (2006), who state that large firms are increasingly hard to monitor, especially when the monitoring is aimed at management activity. Provided that this research has used a sample of S&P500 firms, it may very well be true that the activism of institutional shareholders in increasing restricted stock grants in this sample is based on the preference for a reduction of incentives for managers to engage in earnings manipulation, which is hard to control for due to the difficulty of monitoring the firm. It is advisable for future research on this type of compensation to focus on earnings manipulation of managers in these firms, or to compare the outcomes of this research to results when the sample of firms is replaced by mid-cap or small-cap firms.

Considering the bonus for CEOs, what is remarkable is that both active and passive institutional ownership have a significant effect on the height of the bonus for CEOs. In the case of active institutional shareholders, this may be explained by the problems of valuing option grants for managers and the general complexity of equity-linked compensation which became disturbing to shareholders around the start of the period selected in this research. This would make it more appealing to provide higher bonuses, which are cash-based, as a replacement for some of the equity-linked compensation. For passive institutional ownership, an explanation could be that even without monitoring, the height of bonuses that are granted is easy to measure, due to the simplicity that comes with the characteristic of bonuses being cash-based. However, the model on bonuses which incorporates IVs shows a major difference from our first finding, as in this model the p-value for passive institutional ownership is over 0.7, implying that there is no significant effect from passive institutional ownership at all. Therefore, this result would again be considered to complement the other papers that distinguish between passive and active institutions (e.g. Almazan, Hartzell, and Starks, 2005).

Models on total compensation are largely provided in previous research, providing an overall picture of the influence that institutional shareholders have on the total compensation provided to managers. Hence, what is found in these models is a mix of effects coming from the other models on separate components of compensation. For example, the negative significant influence by active institutional ownership, coming from the initial fixed effects model, could entirely be due to the preferred decrease in option grants. This explanation is actually very likely, given that only the model for option grants provides a negative coefficient. In turn, this may indicate that active institutions are not interested in decreasing total compensation for managers, but are more interested in decreasing some specific elements of the compensation scheme, which cannot be detected in the model of total compensation.

Another explanation could be that there are outliers in the sample of firms which provide excessive amounts of compensation to their CEOs, which is not conform a competitive market, for which active institutions try to correct the firm. No other research underlines this, as most research embraces the idea that total compensation is in fact decreased by (active) institutions in general. The model with bootstrap for total compensation actually confirms the idea that institutions may not prefer lower compensation, but are more likely to prefer a specific structure of the compensation schemes. This model indicates that there is no

significant effect by either active or passive institutions on the total value of compensation provided to CEOs. Where prior research generally finds significant negative relations of institutional ownership on similar measures of total compensation as the one used in this research, the findings presented in this paper provide some reason for doubt on the claims by these authors (e.g. David, Kochhar, and Levitas, 1998).

On the other hand, Hartzell and Starks (2003) claim that institutions may be interested in providing higher pay-for-performance sensitivity to managers by incorporating certain incentive driven compensation plans such as higher amounts of restricted stock grants and LTIPs, which is supported by the results from this research. To generalize this theory: there appear to be varying preferences of institutional shareholders considering the use of different compensation components in manager compensation.

The question with which this research started was: Do institutional shareholders have a significant effect on the composition of compensation for managers in firms? A simple answer would be yes, but there are some remarks to keep in mind. First, passive institutions are likely to have no significant effect on any of the compensation components, whereas active institutions do significantly influence compensation components and thereby the compensation structure of CEOs. Furthermore, the composition of compensation can also affect institutional ownership (endogeneity may exist). Although we can quite safely state that the endogeneity has been covered for to a large extent, this may still be a factor to keep in mind (f.e. in the models that could not be improved by incorporating IVs). Finally, this research has used the S&P500 index, which is comprised of the largest firms in the United States, which may bias the results towards the influence of institutions on large firms. Hence, even though the answer to the research question is yes, there are serious differences among institutions and firms that need to be controlled for.

6.2 Limitations

Although most results either provide similar evidence as prior research or new insights provided by similar models, there are also some limitations to this research which have to be mentioned. First, some models were barely good enough to draw conclusions on, such as the models on restricted stock grants, which provided quite high F-test p-values.

Second, even though this research covered the endogeneity by lagging the institutional ownership variables, there may still be endogeneity present in the models which was not covered for by this lagging of institutional ownership. The problem is that only some models were found to provide good IVs in this research. Even though there is no practical explanation for a potential effect of compensation schemes for CEOs in year T on the ownership of shares in the year prior to T, this is something worth noting, although for example Almazan, Hartzell, and Starks (2005) do not mention this problem in their research apart from stating that they use a lagged variable.

One particularly important limitation is the width of the claims that can be made from this research, as only a subset of the S&P 500 has been used to gather data from. Some statements can be made about institutional ownership and its influence on large firms, but no mid-cap or low-cap firms have been incorporated in this research, leaving a large part of the total market of publicly traded firms unattended. This could be seen as not only a limitation, but also as an advice for future research: prior research has had a tendency to focus on larger firms, which may be preferable from a data point of view. However, mid-cap and low-cap publicly traded firms can provide very different results, as even from this research we can see that there are arguments in favor of institutions preferring other structures of compensation for large firms as opposed to smaller firms, for example due to the increased difficulty of monitoring larger firms (Bryan, Nash, and Patel, 2006).

Finally, in some cases the robustness checks and incorporation of IVs provided very different outcomes from the initial models, suggesting more research is needed before any final claims can be made. Even for panel data the R-squared of the models is quite low, suggesting that better models could be created that predict higher amounts of the variation that is present. However, this paper provided important new insights and some careful conclusions can still be drawn on the topics covered in this research.

7. Conclusion

The purpose of this research was to investigate the influence of institutions on the compensation schemes of CEOs. From the previous sections we can conclude that this research has produced some similar results to those of prior research, but also provides new insights into the influence of institutional shareholders on the different components of compensation. Where prior research has provided evidence that there is a difference between the influence that active and passive institutions have on the amount of compensation, this paper underlines these findings and supports the division of passive and active institutions, and provides interesting new perspectives. This research was conducted on a subsample of the S&P 500 and focused on the period 1999-2005, where similar research papers focused mostly on periods before 1999.

We focused on all the relevant compensation components that comprise the total compensation of CEOs, which include: LTIPs, restricted stock grants, option grants, and bonuses. A lot of prior research has focused on the general claims of (active) institutions affecting the total amount of compensation for managers. Almazan, Hartzell, and Starks (2005) mostly provide research on a measure that includes both option grants and restricted stock grants, whereas this research provides insights into both components of compensation separately. An important finding is that option grants were significantly reduced by increases in institutional ownership. An even more remarkable finding is that all other types of compensation were found to be positively affected by active institutional ownership.

Furthermore, as opposed to prior research (which used a variable that sums salary and bonuses) we specifically focused on bonuses, as bonuses have a distinctive characteristic of being sensitive to performance. Considering these bonuses, an explanation for the results, which suggest that active institutional ownership increases the height of bonuses for CEOs, can be found in Bryan, Nash, and Partel (2006). They state that it is increasingly hard to monitor larger firms. Due to this characteristic of larger firms, it is likely that the results from this research, which are based on a sample of the largest firms in the world, point in the direction of institutions wanting to reduce the chance of managers engaging in earnings manipulation. In the case of bonuses, we could explain the preferred increase in bonuses as stemming from the characteristic that bonuses are cash based and hence less complex ways of compensation, making it easier to monitor the compensation provided to managers.

Furthermore, this research finds that active institutions increase the amount of restricted stock grants, which suggests that institutions prefer the advantages of restricted stocks to be incorporated in the compensation schemes of CEOs. The advantage described by Shrieves and Gao (2002) is a decrease in earnings manipulation with increased amounts of restricted stock. A side note would be that restricted stock grants also bear long-term incentives for managers, due to the characteristic that restricted stock cannot be sold in the first period (usually several years) after granting, making the managers their own wealth sensitive to firm performance over longer periods of time. The results on LTIP payouts are also in support of this theory.

In general, previously conducted research emphasizes the statement that institutions have a tendency to decrease compensation for managers. In doing so, distinctions in institutions have been made, showing that active and passive institutions exist with differing impacts on compensation. Some research has already focused on the influence of institutions on the structure of compensation, but still most of the time this is based on a distinction between fixed salary and bonuses versus pay-for-performance pay. This research has made a distinction in the biggest and most relevant components of compensation, showing that institutions can have differing effects on, and thus preferences for, each of the components of compensation schemes. By comparing the different components of compensation in similar models, this research to some point casts doubt on the statement that institutions would prefer to decrease the compensation received by managers. Future research should definitely stay focused on the area of preferences of institutions, and try to find ways in which these preferences can be measured and hence analyzed beyond the theoretical framework.

In particular, future research needs to focus on the effects of institutions on smaller firms, such as firms that are traded on mid-cap and small-cap indexes. As these firms are more easily monitored, there may also be differing preferences of institutions that invest in smaller firms as opposed to larger firms when it comes to compensation structures. By investigating all sizes of firms, some statements, including those made in this research, could be provided with decisive evidence. Also, something that could really be of added value in this kind of research is to incorporate a longer period, for example by obtaining data beyond the year 2005, or the years prior to 1999, in order to investigate the decrease in option grants further. Finally, future research on this subject should be aimed more in the direction of earnings manipulation.

In conclusion, we see that the results from this research have provided some support for previously conducted research, but also cast doubt on the explanations provided by these researchers. In general, we can conclude that institutions do influence the compensation schemes provided to CEOs. Whether institutions really interfere in order to reduce compensation for managers is still an open debate, but this research has provided food for thought on this. We found that institutions may not have such significant effects on the height of compensation as has been previously stated, but that decreases in the height of total compensation may stem from preferences of institutions to incorporate specific compensation schemes, thereby decreasing some unwanted compensation components, and increasing components that reduce earnings manipulation and provide long-term incentives.

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9. Appendix

Appendix A: Details on variation of variables provided in this research

Variable		Mean	Std. Dev.	Min	Max		Obs.
Active Inst. Own.	overall	41.90555	13.08309	0	74.26	N =	2058
	between		10.08309	2.917143	65.33143	n =	294
	within		8.4785	0.1712619	82.94269	T =	7
Passive Inst. Own.	overall	2.946497	3.243147	0	30.6917	N =	2058
	between		2.492415	0.6301428	15.79549	n =	294
	within		2.07942	-12.51517	20.21364	T =	7
LTIP payouts	overall	526.7004	1692.421	0	22686.67	N =	2037
	between		1061.779	0	6728.571	n =	294
	within		1319.428	-6139.695	18277.16	T =	6.92857
Options Granted	overall	4653.866	11901.45	0	244538.7	N =	2034
	between		6835.35	0	58848.12	n =	294
	within		9754.698	-54194.25	213901.4	T =	6.91837
Restricted Stock	overall	1078.238	3127.113	0	47880	N =	2037
	between		1986.315	0	17163.07	n =	294
	within		2411.162	-12543.25	36982.59	T =	6.92857
Bonus	overall	1470.89	2065.016	0	29000	N =	2037
	between		1631.551	0	13558.61	n =	294
	within		1264.525	-12087.72	16912.28	T =	6.92857
Total Comp.	overall	8998.582	13646.98	20	345016.9	N =	2037
	between		8580.031	419.9853	59719.26	n =	294
	within		10617.44	-49725.35	217875.2	T =	6.92857

Appendix B: Summary statistics on ownership per type of institution

Variable	Obs	Mean	Std. Dev.	Min	Max
Bank and Trust	2290	1.223749	1.804577	0	23.34
Hedge Fund	2240	0.5401964	1.430612	0	29.56
Insurance Company	2011	0.5638339	1.684018	0	16.33
Investment Fund	2300	18.10463	7.070803	0	48.21
Investment Fund/Hedge Fund	2302	19.15487	7.894126	0	47.6
Pension Fund	2298	4.345117	1.518764	0	15.19
Research Firm	2293	0.6287549	1.547059	0	26.6

Appendix C: Hausman test results for active institutional ownership models

Figure C1: Hausman test results for LTIP payouts

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
allactive	1.95474	7.044073	-5.089332	4.012697
nractiveinst	1.808952	.6393006	1.169651	.6695353
roa	3.542828	1.036056	2.506771	4.494893
ceopercent~s	6.430336	-6.785149	13.21548	14.13294
dividendyi~d	-188.9727	54.46489	-243.4376	58.14789
marketcapi~n	2.79e-06	5.76e-07	2.21e-06	1.75e-06
rdcapital	3085.332	-416.0056	3501.337	3354.003
totaldebte~y	4.393179	3.159788	1.233391	2.880418
salespersh~e	-3.283105	8.73546	-12.01856	8.022678
cashflowsa~s	6.489111	5.459222	1.029889	4.732666
pricevolat~y	16.69863	-2.562906	19.26153	15.40205
tobinsq	-39.24698	12.6452	-51.89218	65.8757
marketvalue	.0002846	-.0009636	.0012482	.0013982
priceearni~o	.2136005	.2307444	-.0171439	.0432948

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 25.74
Prob>chi2 = 0.0071
(V_b-V_B is not positive definite)

Figure C2: Hausman test results for options granted

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
allactive	-276.8772	-105.0227	-171.8545	134.692
nractiveinst	-10.17976	9.581466	-19.76122	19.20471
roa	175.576	209.9785	-34.40245	167.7389
ceopercent~s	-486.2302	24.26	-510.4902	427.3707
dividendyi~d	384.3794	-173.7697	558.1491	1798.803
marketcapi~n	.00005	.0000737	-.0000237	.0000491
rdcapital	89775.04	8327.938	81447.1	87108.83
totaldebte~y	81.96169	60.73319	21.2285	92.54555
salespersh~e	40.59886	15.84669	24.75217	206.7414
cashflowsa~s	126.8063	31.88951	94.91683	150.4704
pricevolat~y	1091.601	215.2953	876.3058	410.256
tobinsq	3396.169	3521.738	-125.5692	2968.63
marketvalue	-.097787	-.0988059	.0010189	.0443772
priceearni~o	-1.08129	-.7993829	-.2819076	2.164561

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 15.83
Prob>chi2 = 0.1474

Figure C3: Hausman test results for restricted stock grants

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
allactive	-24.78542	-10.72061	-14.06481	14.34347
nractiveinst	2.920013	2.554975	.3650389	2.207261
roa	17.26771	33.1207	-15.85299	16.70411
ceopercent~s	.8268586	-15.77446	16.60132	48.41173
dividendyi~d	56.40045	225.137	-168.7365	200.8323
marketcapi~n	2.19e-06	-1.64e-07	2.35e-06	5.71e-06
rdcapital	1053.76	-2439.819	3493.579	10619.38
totaldebte~y	.6498551	16.95507	-16.30521	10.18376
salespersh~e	18.01534	14.36292	3.652423	25.30531
cashflowsa~s	-22.5212	.1553195	-22.67652	16.57733
pricevolat~y	-28.06153	32.07925	-60.14078	49.37171
tobinsq	-268.0138	-73.27712	-194.7367	256.6574
marketvalue	.0018924	-.004341	.0062335	.004789
priceearni~o	-.3661093	-.2993825	-.0667268	.1812246

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 7.71
Prob>chi2 = 0.7393

Figure C4: Hausman test results for bonus

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
allactive	-8.672924	-1.468157	-7.204767	4.930934
nractiveinst	3.382863	3.600659	-.2177963	.884972
roa	11.24033	14.19132	-2.950997	5.075727
ceopercent~s	43.37149	22.25139	21.1201	18.20383
dividendyi~d	-7.007534	-91.87035	84.86281	74.03192
marketcapi~n	5.97e-06	4.40e-06	1.58e-06	2.30e-06
rdcapital	-2771.454	-2693.269	-78.18488	4580.809
totaldebte~y	-1.525305	1.41695	-2.942255	3.591943
salespersh~e	10.85616	8.762311	2.093849	10.98815
cashflowsa~s	5.570642	-2.098598	7.669241	5.927074
pricevolat~y	-67.92645	-17.16146	-50.76499	20.84215
tobinsq	-319.2714	-261.0456	-58.22581	56.19922
marketvalue	.0004153	-.0035549	.0039702	.0017376
priceearni~o	-.181232	-.0987834	-.0824485	.0169072

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 12.95
Prob>chi2 = 0.2964
(V_b-V_B is not positive definite)

Figure C5: Hausman test results for total compensation

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
allactive	-287.3125	-99.09252	-188.22	137.5451
nractiveinst	-7.351483	20.48897	-27.84045	19.68415
roa	206.0486	274.7222	-68.67359	169.3407
ceopercent~s	-389.22	-6.052803	-383.1672	434.9298
dividendyi~d	225.0527	412.843	-187.7903	1842.311
marketcapi~n	.0000464	.0000794	-.000033	.0000497
rdcapital	74793.65	601.7508	74191.9	89730.27
totaldebte~y	66.38776	96.89072	-30.50297	94.79965
salespersh~e	120.1861	43.58581	76.60026	213.0408
cashflowsa~s	38.97177	3.879998	35.09177	153.9134
pricevolat~y	1029.564	308.4858	721.078	422.2315
tobinsq	3150.559	2527.047	623.5123	2932.633
marketvalue	-.0998612	-.1200576	.0201964	.0447618
priceearni~o	-1.294459	-.8615317	-.4329269	2.107568

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 16.27
Prob>chi2 = 0.1314

Appendix D: Results of regressions of active and passive institutional ownership models

Figure D1: Active institutional ownership on LTIP payouts

Source	SS	df	MS		
Model	10302389.9	1	10302389.9		
Residual	3.2886e+09	1742	1887837.17		
Total	3.2989e+09	1743	1892664.8		

Number of obs	=	1744			
F(1, 1742)	=	5.46			
Prob > F	=	0.0196			
R-squared	=	0.0031			
Adj R-squared	=	0.0026			
Root MSE	=	1374			

ltippayouts	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allactive	6.194015	2.651463	2.34	0.020	.9936302	11.3944
_cons	171.3359	119.5188	1.43	0.152	-63.07963	405.7513

Figure D2: Active institutional ownership on options granted

Source	SS	df	MS		
Model	448848120	1	448848120		
Residual	2.7821e+11	1739	159983818		
Total	2.7866e+11	1740	160149832		

Number of obs	=	1741			
F(1, 1739)	=	2.81			
Prob > F	=	0.0941			
R-squared	=	0.0016			
Adj R-squared	=	0.0010			
Root MSE	=	12648			

optionsgra~s	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allactive	-40.90554	24.42139	-1.67	0.094	-88.80393	6.99285
_cons	6636.436	1101.106	6.03	0.000	4476.805	8796.067

Figure D3: Active institutional ownership on restricted stock grants

Source	SS	df	MS		
Model	278480.059	1	278480.059		
Residual	1.5376e+10	1742	8826844.76		
Total	1.5377e+10	1743	8821940.37		

Number of obs	=	1744			
F(1, 1742)	=	0.03			
Prob > F	=	0.8590			
R-squared	=	0.0000			
Adj R-squared	=	-0.0006			
Root MSE	=	2971			

restricted~t	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allactive	1.018358	5.733317	0.18	0.859	-10.22655	12.26327
_cons	937.3514	258.4383	3.63	0.000	430.4695	1444.233

Figure D4: Active institutional ownership on bonus

Source	SS	df	MS	Number of obs =	1744
				F(1, 1742) =	12.06
Model	46815670.3	1	46815670.3	Prob > F =	0.0005
Residual	6.7640e+09	1742	3882877.82	R-squared =	0.0069
				Adj R-squared =	0.0063
Total	6.8108e+09	1743	3907509.37	Root MSE =	1970.5

bonus	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allactive	13.2038	3.802595	3.47	0.001	5.745666	20.66193
_cons	807.1999	171.4079	4.71	0.000	471.0129	1143.387

Figure D5: Active institutional ownership on total compensation

Source	SS	df	MS	Number of obs =	1744
				F(1, 1742) =	0.49
Model	99508861.9	1	99508861.9	Prob > F =	0.4846
Residual	3.5469e+11	1742	203609917	R-squared =	0.0003
				Adj R-squared =	-0.0003
Total	3.5479e+11	1743	203550192	Root MSE =	14269

totalcompe~n	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allactive	-19.25015	27.53612	-0.70	0.485	-73.25747	34.75717
_cons	9746.527	1241.234	7.85	0.000	7312.062	12180.99

Figure D6: Passive institutional ownership on LTIP payouts

Source	SS	df	MS	Number of obs =	1744
				F(1, 1742) =	3.15
Model	5950289.63	1	5950289.63	Prob > F =	0.0762
Residual	3.2930e+09	1742	1890335.51	R-squared =	0.0018
				Adj R-squared =	0.0012
Total	3.2989e+09	1743	1892664.8	Root MSE =	1374.9

ltippayouts	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allpassive	-17.428	9.823088	-1.77	0.076	-36.69429	1.838281
_cons	494.8665	45.2644	10.93	0.000	406.0882	583.6448

Figure D7: Passive institutional ownership on options granted

Source	SS	df	MS	Number of obs =	1741
				F(1, 1739) =	3.08
Model	491895375	1	491895375	Prob > F =	0.0797
Residual	2.7817e+11	1739	159959064	R-squared =	0.0018
				Adj R-squared =	0.0012
Total	2.7866e+11	1740	160149832	Root MSE =	12647

optionsgra~s	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allpassive	-158.4803	90.37395	-1.75	0.080	-335.7333	18.77278
_cons	5364.642	416.6417	12.88	0.000	4547.471	6181.814

Figure D8: Passive institutional ownership on restricted stock grants

Source	SS	df	MS	Number of obs =	1744
				F(1, 1742) =	3.28
Model	28934762.5	1	28934762.5	Prob > F =	0.0701
Residual	1.5348e+10	1742	8810394.54	R-squared =	0.0019
				Adj R-squared =	0.0013
Total	1.5377e+10	1743	8821940.37	Root MSE =	2968.2

restricted~t	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allpassive	38.43161	21.20686	1.81	0.070	-3.161964	80.02518
_cons	859.9488	97.72034	8.80	0.000	668.2873	1051.61

Figure D9: Passive institutional ownership on bonus

Source	SS	df	MS	Number of obs =	1744
				F(1, 1742) =	0.13
Model	500069.462	1	500069.462	Prob > F =	0.7206
Residual	6.8103e+09	1742	3909465.42	R-squared =	0.0001
				Adj R-squared =	-0.0005
Total	6.8108e+09	1743	3907509.37	Root MSE =	1977.2

bonus	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allpassive	5.052354	14.12659	0.36	0.721	-22.6545	32.75921
_cons	1363.409	65.09475	20.94	0.000	1235.737	1491.081

Figure D10: Passive institutional ownership on total compensation

Source	SS	df	MS	Number of obs =	1744
				F(1, 1742) =	1.79
Model	365103992	1	365103992	Prob > F =	0.1806
Residual	3.5442e+11	1742	203457452	R-squared =	0.0010
				Adj R-squared =	0.0005
Total	3.5479e+11	1743	203550192	Root MSE =	14264

totalcompe~n	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allpassive	-136.5171	101.9097	-1.34	0.181	-336.3952	63.36111
_cons	9344.032	469.5957	19.90	0.000	8423.002	10265.06

Appendix E: Fixed effects models for active institutional ownership

Figure E1: Active institutional ownership on LTIP payouts

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0249                         Obs per group: min =         1
       between = 0.0346                                        avg =       5.2
       overall = 0.0051                                        max =         6

                                                F(9,1194)          =      3.39
corr(u_i, Xb)  = -0.6701                        Prob > F           =    0.0004
```

ltippayouts	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allactive	12.22654	5.059334	2.42	0.016	2.300365	22.15271
roa	10.81983	8.131677	1.33	0.184	-5.134134	26.7738
dividendyield	-176.8218	54.34591	-3.25	0.001	-283.4459	-70.19766
rdcapital	6816.955	2488.412	2.74	0.006	1934.809	11699.1
totaldebtequity	.082049	.1621208	0.51	0.613	-.2360244	.4001225
salespershare	-1.371386	4.123584	-0.33	0.740	-9.461664	6.718892
pricevolatility	30.83006	14.81682	2.08	0.038	1.760149	59.89997
tobinsq	-61.52491	213.1137	-0.29	0.773	-479.644	356.5941
priceearningsratio	.1100426	.1638143	0.67	0.502	-.2113532	.4314385
_cons	-865.703	484.701	-1.79	0.074	-1816.663	85.25741
sigma_u	1306.5967					
sigma_e	1192.7933					
rho	.54543827	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(285, 1194) =     2.89           Prob > F = 0.0000
```

Figure E2: Active institutional ownership on options granted

```
Fixed-effects (within) regression               Number of obs      =      1486
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0289                         Obs per group: min =         1
       between = 0.0703                                        avg =       5.2
       overall = 0.0536                                        max =         6

                                                F(9,1191)          =      3.94
corr(u_i, Xb)  = -0.2910                        Prob > F           =    0.0001
```

optionsgrantedbs	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allactive	-147.1513	47.99847	-3.07	0.002	-241.3223	-52.98034
roa	-17.96217	77.25829	-0.23	0.816	-169.5397	133.6153
dividendyield	-849.3017	514.296	-1.65	0.099	-1858.329	159.7252
rdcapital	48048.25	23548.76	2.04	0.042	1846.565	94249.93
totaldebtequity	.4156189	1.534196	0.27	0.787	-2.594409	3.425646
salespershare	61.14696	39.42273	1.55	0.121	-16.19877	138.4927
pricevolatility	332.937	140.4922	2.37	0.018	57.2972	608.5768
tobinsq	290.2756	2017.265	0.14	0.886	-3667.512	4248.063
priceearningsratio	-5.091818	1.551531	-3.28	0.001	-8.135856	-2.04778
_cons	1089.316	4596.812	0.24	0.813	-7929.436	10108.07
sigma_u	8482.8341					
sigma_e	11287.044					
rho	.36095496	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(285, 1191) =     1.95           Prob > F = 0.0000
```

Figure E3: Active institutional ownership on restricted stock grants

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0114                         Obs per group: min =         1
       between = 0.0096                                        avg =       5.2
       overall = 0.0056                                        max =         6

                                                F(9,1194)          =      1.53
corr(u_i, Xb)  = -0.2093                        Prob > F           =    0.1333
```

restrictedstockg~t	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allactive	14.11103	11.0028	1.28	0.200	-7.475948	35.69801
roa	29.15073	17.68439	1.65	0.100	-5.545211	63.84667
dividendyield	-12.70449	118.189	-0.11	0.914	-244.5856	219.1767
rdcapital	-2325.874	5411.682	-0.43	0.667	-12943.34	8291.591
totaldebtequity	.0608043	.3525728	0.17	0.863	-.630927	.7525355
salespershare	20.22946	8.967779	2.26	0.024	2.635098	37.82382
pricevolatility	53.59398	32.22294	1.66	0.097	-9.625899	116.8139
tobinsq	-338.5348	463.4698	-0.73	0.465	-1247.841	570.771
priceearningsratio	.3433721	.3562556	0.96	0.335	-.3555846	1.042329
_cons	-1557.502	1054.105	-1.48	0.140	-3625.607	510.6019
sigma_u	2437.2783					
sigma_e	2594.0313					
rho	.4688747	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(285, 1194) =     3.48           Prob > F = 0.0000
```

Figure E4: Active institutional ownership on bonus

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0689                         Obs per group: min =         1
       between = 0.0824                                        avg =       5.2
       overall = 0.0776                                        max =         6

                                                F(9,1194)          =      9.82
corr(u_i, Xb)  = -0.1929                        Prob > F           =    0.0000
```

bonus	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allactive	28.76261	5.427703	5.30	0.000	18.11371	39.4115
roa	23.60573	8.723743	2.71	0.007	6.490164	40.72131
dividendyield	67.76872	58.30283	1.16	0.245	-46.61867	182.1561
rdcapital	-1455.362	2669.593	-0.55	0.586	-6692.976	3782.253
totaldebtequity	-.0205198	.1739248	-0.12	0.906	-.3617521	.3207125
salespershare	20.89208	4.423822	4.72	0.000	12.21275	29.57141
pricevolatility	-45.09604	15.89563	-2.84	0.005	-76.28252	-13.90955
tobinsq	-40.84908	228.6305	-0.18	0.858	-489.4113	407.7131
priceearningsratio	.0342643	.1757415	0.19	0.845	-.3105323	.3790609
_cons	650.9619	519.9919	1.25	0.211	-369.2377	1671.162
sigma_u	1524.2544					
sigma_e	1279.6404					
rho	.58658182	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(285, 1194) =     6.72           Prob > F = 0.0000
```

Figure E5: Active institutional ownership on total compensation

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0251                         Obs per group: min =         1
       between = 0.0548                                        avg =       5.2
       overall = 0.0438                                        max =         6

                                                F(9,1194)          =      3.42
corr(u_i, Xb)  = -0.3057                        Prob > F           =    0.0004
```

totalcompensatio~e	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allactive	-92.68799	52.02214	-1.78	0.075	-194.753	9.376991
roa	39.7547	83.61323	0.48	0.635	-124.2905	203.7999
dividendyield	-1085.653	558.8069	-1.94	0.052	-2182.006	10.69971
rdcapital	51926.53	25586.87	2.03	0.043	1726.307	102126.8
totaldebtequity	.5213201	1.666993	0.31	0.755	-2.749241	3.791881
salespershare	109.4488	42.40038	2.58	0.010	26.26121	192.6363
pricevolatility	373.5299	152.3526	2.45	0.014	74.62122	672.4386
tobinsq	-99.38005	2191.322	-0.05	0.964	-4398.651	4199.891
priceearningsratio	-4.720121	1.684405	-2.80	0.005	-8.024844	-1.415398
_cons	602.3872	4983.894	0.12	0.904	-9175.777	10380.55
sigma_u	10311.422					
sigma_e	12264.789					
rho	.41411969	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(285, 1194) =     2.63           Prob > F = 0.0000
```

Appendix F: Fixed effects models for passive institutional ownership

Figure F1: Passive institutional ownership on LTIP payouts

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0206                         Obs per group: min =         1
       between = 0.0440                                        avg =       5.2
       overall = 0.0084                                        max =         6

                                                F(9,1194)          =      2.78
corr(u_i, Xb)  = -0.6592                        Prob > F           =    0.0031
```

ltippayouts	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allpassive	12.92952	17.91721	0.72	0.471	-22.22319	48.08223
roa	11.29817	8.147132	1.39	0.166	-4.686117	27.28246
dividendyield	-179.04	54.45927	-3.29	0.001	-285.8865	-72.19345
rdcapital	6124.956	2476.397	2.47	0.014	1266.381	10983.53
totaldebtequity	.0876929	.1625258	0.54	0.590	-.231175	.4065608
salespershare	.03631	4.089191	0.01	0.993	-7.98649	8.059111
pricevolatility	33.067	14.8225	2.23	0.026	3.985965	62.14804
tobinsq	-137.6708	211.1545	-0.65	0.515	-551.9459	276.6043
priceearningsratio	.113599	.1641893	0.69	0.489	-.2085328	.4357307
_cons	-433.2432	448.4757	-0.97	0.334	-1313.131	446.6449
sigma_u	1282.3593					
sigma_e	1195.4462					
rho	.53503353	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(285, 1194) =     2.90           Prob > F = 0.0000
```

Figure F2: Passive institutional ownership on options granted

```
Fixed-effects (within) regression               Number of obs      =      1486
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0218                         Obs per group: min =         1
       between = 0.0786                                        avg =       5.2
       overall = 0.0501                                        max =         6

                                                F(9,1191)          =      2.95
corr(u_i, Xb)  = -0.3271                        Prob > F           =    0.0018
```

optionsgrantedbs	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allpassive	-138.0659	169.8591	-0.81	0.416	-471.3223	195.1905
roa	-24.7797	77.50657	-0.32	0.749	-176.8443	127.2849
dividendyield	-821.8262	516.1047	-1.59	0.112	-1834.402	190.7495
rdcapital	56534.42	23467.34	2.41	0.016	10492.5	102576.3
totaldebtequity	.3494174	1.54022	0.23	0.821	-2.67243	3.371265
salespershare	43.03039	39.11007	1.10	0.271	-33.70191	119.7627
pricevolatility	307.4321	140.8011	2.18	0.029	31.18628	583.6779
tobinsq	1214.254	2001.21	0.61	0.544	-2712.034	5140.543
priceearningsratio	-5.141347	1.557313	-3.30	0.001	-8.19673	-2.085965
_cons	-4181.953	4254.871	-0.98	0.326	-12529.83	4165.925
sigma_u	8487.8571					
sigma_e	11328.351					
rho	.35954401	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(285, 1191) =     1.91           Prob > F = 0.0000
```

Figure F3: Passive institutional ownership on restricted stock grants

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0103                         Obs per group: min =         1
       between = 0.0152                                        avg =       5.2
       overall = 0.0080                                        max =         6

                                                F(9,1194)          =      1.38
corr(u_i, Xb)  = -0.1859                        Prob > F           =    0.1902
```

restrictedstockg~t	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allpassive	23.81303	38.8997	0.61	0.541	-52.50634	100.1324
roa	29.68036	17.68808	1.68	0.094	-5.022826	64.38354
dividendyield	-14.94089	118.2355	-0.13	0.899	-246.9133	217.0315
rdcapital	-3048.123	5376.458	-0.57	0.571	-13596.48	7500.234
totaldebtequity	.0692873	.3528566	0.20	0.844	-.6230006	.7615753
salespershare	21.69278	8.877964	2.44	0.015	4.274628	39.11092
pricevolatility	55.83277	32.18083	1.73	0.083	-7.304505	118.97
tobinsq	-425.3563	458.4334	-0.93	0.354	-1324.781	474.0684
priceearningsratio	.3485011	.3564683	0.98	0.328	-.3508728	1.047875
_cons	-1076.249	973.6768	-1.11	0.269	-2986.557	834.0589
sigma_u	2422.0035					
sigma_e	2595.4101					
rho	.46548028	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(285, 1194) =     3.45           Prob > F = 0.0000
```

Figure F4: Passive institutional ownership on bonus

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0516                         Obs per group: min =         1
       between = 0.0797                                        avg =       5.2
       overall = 0.0691                                        max =         6

                                                F(9,1194)          =      7.22
corr(u_i, Xb)  = -0.2345                        Prob > F           =    0.0000
```

bonus	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allpassive	46.56093	19.35648	2.41	0.016	8.584433	84.53743
roa	24.69026	8.801585	2.81	0.005	7.42197	41.95856
dividendyield	63.13827	58.83394	1.07	0.283	-52.29114	178.5677
rdcapital	-2944.521	2675.324	-1.10	0.271	-8193.381	2304.339
totaldebtequity	-.0036668	.1755813	-0.02	0.983	-.3481491	.3408155
salespershare	23.91066	4.417673	5.41	0.000	15.24339	32.57792
pricevolatility	-40.45643	16.01317	-2.53	0.012	-71.87352	-9.039338
tobinsq	-218.0538	228.1163	-0.96	0.339	-665.6073	229.4997
priceearningsratio	.0444909	.1773785	0.25	0.802	-.3035174	.3924992
_cons	1635.876	484.5013	3.38	0.001	685.3075	2586.445
sigma_u	1540.5148					
sigma_e	1291.4754					
rho	.58726313	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(285, 1194) =     6.57           Prob > F = 0.0000
```

Figure F5: Passive institutional ownership on total compensation

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0226                         Obs per group: min =         1
       between = 0.0550                                        avg =       5.2
       overall = 0.0412                                        max =         6

                                                F(9,1194)          =      3.07
corr(u_i, Xb)  = -0.3270                        Prob > F           =    0.0012
```

totalcompensatio~e	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
allpassive	-54.976	184.0605	-0.30	0.765	-416.0941	306.1421
roa	36.01982	83.69416	0.43	0.667	-128.1842	200.2238
dividendyield	-1067.27	559.4512	-1.91	0.057	-2164.887	30.34673
rdcapital	57542.41	25439.63	2.26	0.024	7631.063	107453.8
totaldebtequity	.4880681	1.669601	0.29	0.770	-2.78761	3.763746
salespershare	97.99606	42.00759	2.33	0.020	15.57914	180.413
pricevolatility	354.9117	152.2691	2.33	0.020	56.16693	653.6564
tobinsq	483.0093	2169.155	0.22	0.824	-3772.771	4738.79
priceearningsratio	-4.742121	1.68669	-2.81	0.005	-8.051328	-1.432915
_cons	-2762.515	4607.117	-0.60	0.549	-11801.46	6276.431
sigma_u	10360.162					
sigma_e	12280.623					
rho	.41578286	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(285, 1194) =     2.62           Prob > F = 0.0000
```

Appendix G: Fixed effects models with IVs

Figure G1: Active institutional ownership on LTIP payouts

```
FIXED EFFECTS ESTIMATION
------------------------

Number of groups =       276                  Obs per group: min =         2
                                                             avg =       5.3
                                                             max =         6

IV (2SLS) estimation
--------------------

Estimates efficient for homoskedasticity only
Statistics consistent for homoskedasticity only

                                                    Number of obs =      1468
                                                    F(  9,  1183) =      2.81
                                                    Prob > F      =    0.0029
Total (centered) SS     =   1716767832              Centered R2   =   -0.0161
Total (uncentered) SS   =   1716767832              Uncentered R2 =   -0.0161
Residual SS             =   1744428460              Root MSE      =      1210

------------------------------------------------------------------------------
  ltippayouts |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
--------------+---------------------------------------------------------------
   allactive |   46.25792   27.10716     1.71   0.088    -6.871133    99.38697
         roa |    8.69539   8.374449     1.04   0.299    -7.718228    25.10901
dividendyield |  -160.7376   55.45872    -2.90   0.004    -269.4347   -52.04053
   rdcapital |   9307.955    3062.51     3.04   0.002     3305.545    15310.37
totaldebtequity |   .071238   .1645602     0.43   0.665     -.251294    .3937701
salespershare |  -6.217368   5.505107    -1.13   0.259    -17.00718    4.572443
pricevolatility |    21.9168   16.28572     1.35   0.178    -10.00263    53.83623
      tobinsq |   164.2318    274.131     0.60   0.549    -373.0551    701.5186
priceearningsratio |   .1014533   .1662004     0.61   0.542    -.2242935    .4272002
------------------------------------------------------------------------------

Underidentification test (Anderson canon. corr. LM statistic):          43.546
                                                 Chi-sq(2) P-val =      0.0000
------------------------------------------------------------------------------

Weak identification test (Cragg-Donald Wald F statistic):               22.409
Stock-Yogo weak ID test critical values: 10% maximal IV size             19.93
                                         15% maximal IV size             11.59
                                         20% maximal IV size              8.75
                                         25% maximal IV size              7.25
Source: Stock-Yogo (2005).  Reproduced by permission.
------------------------------------------------------------------------------

Sargan statistic (overidentification test of all instruments):           0.120
                                                 Chi-sq(1) P-val =      0.7285
------------------------------------------------------------------------------

Instrumented:         allactive
Included instruments: roa dividendyield rdcapital totaldebtequity salespershare
                      pricevolatility tobinsq priceearningsratio
Excluded instruments: tradingvolume numberofshares
------------------------------------------------------------------------------
```

Figure G2: Active institutional ownership on restricted stock grant

FIXED EFFECTS ESTIMATION

Number of groups = 276 Obs per group: min = 2
avg = 5.3
max = 6

IV (2SLS) estimation

Estimates efficient for homoskedasticity only
Statistics consistent for homoskedasticity only

Number of obs = 1468
F(9, 1183) = 2.05
Prob > F = 0.0316
Total (centered) SS = 8073922254 Centered R2 = -0.1956
Total (uncentered) SS = 8073922254 Uncentered R2 = -0.1956
Residual SS = 9653441634 Root MSE = 2846

restrictedstockg~t	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
allactive	186.289	63.76737	2.92	0.003	61.30725	311.2707
roa	21.77086	19.7002	1.11	0.269	-16.84083	60.38255
dividendyield	30.63796	130.4621	0.23	0.814	-225.063	286.339
rdcapital	8875.554	7204.305	1.23	0.218	-5244.624	22995.73
totaldebtequity	.020463	.3871144	0.05	0.958	-.7382673	.7791932
salespershare	-3.134472	12.95031	-0.24	0.809	-28.51662	22.24768
pricevolatility	15.56359	38.31083	0.41	0.685	-59.52426	90.65143
tobinsq	761.4235	644.8707	1.18	0.238	-502.4997	2025.347
priceearningsratio	.3126781	.3909729	0.80	0.424	-.4536148	1.078971

Underidentification test (Anderson canon. corr. LM statistic): 43.546
Chi-sq(2) P-val = 0.0000

Weak identification test (Cragg-Donald Wald F statistic): 22.409
Stock-Yogo weak ID test critical values: 10% maximal IV size 19.93
15% maximal IV size 11.59
20% maximal IV size 8.75
25% maximal IV size 7.25
Source: Stock-Yogo (2005). Reproduced by permission.

Sargan statistic (overidentification test of all instruments): 0.066
Chi-sq(1) P-val = 0.7975

Instrumented: allactive
Included instruments: roa dividendyield rdcapital totaldebtequity salespershare pricevolatility tobinsq priceearningsratio
Excluded instruments: tradingvolume numberofshares

Figure G3: Passive institutional ownership on LTIP payouts

FIXED EFFECTS ESTIMATION

Number of groups = 276 Obs per group: min = 2
avg = 5.3
max = 6

IV (2SLS) estimation

Estimates efficient for homoskedasticity only
Statistics consistent for homoskedasticity only

Number of obs = 1468
F(9, 1183) = 2.25
Prob > F = 0.0172
Total (centered) SS = 1716767832 Centered R2 = -0.2559
Total (uncentered) SS = 1716767832 Uncentered R2 = -0.2559
Residual SS = 2156016378 Root MSE = 1345

ltippayouts	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
allpassive	340.1244	232.0754	1.47	0.143	-114.735	794.9838
roa	9.595117	9.243148	1.04	0.299	-8.52112	27.71135
dividendyield	-156.2266	61.95089	-2.52	0.012	-277.6481	-34.80507
rdcapital	9191.704	3412.453	2.69	0.007	2503.419	15879.99
totaldebtequity	.1563392	.1896463	0.82	0.410	-.2153608	.5280392
salespershare	-6.251734	6.264689	-1.00	0.318	-18.5303	6.026832
pricevolatility	18.9779	19.12331	0.99	0.321	-18.5031	56.45891
tobinsq	-87.94351	239.255	-0.37	0.713	-556.8747	380.9876
priceearningsratio	.14831	.1867393	0.79	0.427	-.2176923	.5143123

Underidentification test (Anderson canon. corr. LM statistic): 9.056
Chi-sq(2) P-val = 0.0108

Weak identification test (Cragg-Donald Wald F statistic): 4.524
Stock-Yogo weak ID test critical values: 10% maximal IV size 19.93
15% maximal IV size 11.59
20% maximal IV size 8.75
25% maximal IV size 7.25
Source: Stock-Yogo (2005). Reproduced by permission.

Sargan statistic (overidentification test of all instruments): 0.306
Chi-sq(1) P-val = 0.5803

Instrumented: allpassive
Included instruments: roa dividendyield rdcapital totaldebtequity salespershare pricevolatility tobinsq priceearningsratio
Excluded instruments: tradingvolume numberofshares

Figure G4: Passive institutional ownership on bonus

```
FIXED EFFECTS ESTIMATION
------------------------

Number of groups =       276                   Obs per group: min =         2
                                                              avg =       5.3
                                                              max =         6

IV (2SLS) estimation
--------------------

Estimates efficient for homoskedasticity only
Statistics consistent for homoskedasticity only

                                                      Number of obs =      1468
                                                      F(  9,  1183) =      6.60
                                                      Prob > F      =    0.0000
Total (centered) SS     =   2035719087                Centered R2   =    0.0266
Total (uncentered) SS   =   2035719087                Uncentered R2 =    0.0266
Residual SS             =   1981550201                Root MSE      =      1289

------------------------------------------------------------------------------
       bonus |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  allpassive |  -68.76608   222.4875    -0.31   0.757    -504.8335    367.3014
         roa |   23.42672   8.861279     2.64   0.008     6.058937    40.79451
dividendyield|   63.83487   59.39147     1.07   0.282    -52.57027     180.24
   rdcapital |  -3528.496   3271.472    -1.08   0.281    -9940.463    2883.471
totaldebtequity|  -.0312933   .1818113    -0.17   0.863     -.387637    .3250504
 salespershare |   26.77115   6.005872     4.46   0.000     14.99986    38.54244
pricevolatility|  -35.6194   18.33326    -1.94   0.052    -71.55192    .3131261
      tobinsq |  -234.3724   229.3705    -1.02   0.307    -683.9302    215.1855
priceearningsratio|   .0310101   .1790244     0.17   0.862    -.3198712    .3818915
------------------------------------------------------------------------------

Underidentification test (Anderson canon. corr. LM statistic):           9.056
                                                   Chi-sq(2) P-val =    0.0108
------------------------------------------------------------------------------

Weak identification test (Cragg-Donald Wald F statistic):                4.524
Stock-Yogo weak ID test critical values: 10% maximal IV size             19.93
                                         15% maximal IV size             11.59
                                         20% maximal IV size              8.75
                                         25% maximal IV size              7.25
Source: Stock-Yogo (2005).  Reproduced by permission.
------------------------------------------------------------------------------

Sargan statistic (overidentification test of all instruments):           2.544
                                                   Chi-sq(1) P-val =    0.1107
------------------------------------------------------------------------------

Instrumented:         allpassive
Included instruments: roa dividendyield rdcapital totaldebtequity salespershare
                      pricevolatility tobinsq priceearningsratio
Excluded instruments: tradingvolume numberofshares
------------------------------------------------------------------------------
```

Appendix H: Fixed effects models with bootstrap for active institutional ownership

Figure H1: Active institutional ownership on LTIP payouts

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0249                         Obs per group: min =         1
       between = 0.0346                                        avg =       5.2
       overall = 0.0051                                        max =         6

                                                Wald chi2(9)       =     24.70
corr(u_i, Xb)  = -0.6701                        Prob > chi2        =    0.0033

                                  (Replications based on 286 clusters in firmidstata)
```

ltippayouts	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
allactive	12.22654	3.625601	3.37	0.001	5.120492	19.33259
roa	10.81983	6.244077	1.73	0.083	-1.418333	23.058
dividendyield	-176.8218	104.9338	-1.69	0.092	-382.4882	28.84464
rdcapital	6816.955	3197.742	2.13	0.033	549.4961	13084.41
totaldebtequity	.082049	3.238972	0.03	0.980	-6.26622	6.430318
salespershare	-1.371386	5.754627	-0.24	0.812	-12.65025	9.907476
pricevolatility	30.83006	17.47261	1.76	0.078	-3.415623	65.07574
tobinsq	-61.52491	123.2669	-0.50	0.618	-303.1236	180.0738
priceearningsratio	.1100426	.1943601	0.57	0.571	-.2708961	.4909814
_cons	-865.703	459.4131	-1.88	0.060	-1766.136	34.73003
sigma_u	1306.5967					
sigma_e	1192.7933					
rho	.54543827	(fraction of variance due to u_i)				

Figure H2: Active institutional ownership on options granted

```
Fixed-effects (within) regression               Number of obs      =      1486
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0289                         Obs per group: min =         1
       between = 0.0703                                        avg =       5.2
       overall = 0.0536                                        max =         6

                                                Wald chi2(9)       =     20.87
corr(u_i, Xb)  = -0.2910                        Prob > chi2        =    0.0132

                                  (Replications based on 286 clusters in firmidstata)
```

optionsgrantedbs	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
allactive	-147.1513	76.78351	-1.92	0.055	-297.6442	3.341584
roa	-17.96217	131.7296	-0.14	0.892	-276.1475	240.2232
dividendyield	-849.3017	389.5172	-2.18	0.029	-1612.741	-85.86209
rdcapital	48048.25	44435.49	1.08	0.280	-39043.71	135140.2
totaldebtequity	.4156189	14.65066	0.03	0.977	-28.29915	29.13039
salespershare	61.14696	86.24003	0.71	0.478	-107.8804	230.1743
pricevolatility	332.937	219.1261	1.52	0.129	-96.54233	762.4163
tobinsq	290.2756	5122.935	0.06	0.955	-9750.492	10331.04
priceearningsratio	-5.091818	5.387389	-0.95	0.345	-15.65091	5.46727
_cons	1089.316	4740.508	0.23	0.818	-8201.91	10380.54
sigma_u	8482.8341					
sigma_e	11287.044					
rho	.36095496	(fraction of variance due to u_i)				

Figure H3: Active institutional ownership on restricted stock grant

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0114                         Obs per group: min =         1
       between = 0.0096                                        avg =       5.2
       overall = 0.0056                                        max =         6

                                                Wald chi2(9)       =     12.23
corr(u_i, Xb)  = -0.2093                        Prob > chi2        =    0.2009

                                  (Replications based on 286 clusters in firmidstata)
```

restrictedstockg~t	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
allactive	14.11103	7.676665	1.84	0.066	-.9349541	29.15702
roa	29.15073	15.4895	1.88	0.060	-1.208137	59.5096
dividendyield	-12.70449	100.038	-0.13	0.899	-208.7753	183.3664
rdcapital	-2325.874	2217.347	-1.05	0.294	-6671.794	2020.047
totaldebtequity	.0608043	8.64612	0.01	0.994	-16.88528	17.00689
salespershare	20.22946	14.24657	1.42	0.156	-7.69331	48.15222
pricevolatility	53.59398	31.80328	1.69	0.092	-8.739304	115.9273
tobinsq	-338.5348	486.5956	-0.70	0.487	-1292.245	615.175
priceearningsratio	.3433721	1.53332	0.22	0.823	-2.66188	3.348624
_cons	-1557.502	937.5694	-1.66	0.097	-3395.105	280.0997
sigma_u	2437.2783					
sigma_e	2594.0313					
rho	.4688747	(fraction of variance due to u_i)				

Figure H4: Active institutional ownership on bonus

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0689                         Obs per group: min =         1
       between = 0.0824                                        avg =       5.2
       overall = 0.0776                                        max =         6

                                                Wald chi2(9)       =     70.82
corr(u_i, Xb)  = -0.1929                        Prob > chi2        =    0.0000

                                 (Replications based on 286 clusters in firmidstata)
```

bonus	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
allactive	28.76261	8.745779	3.29	0.001	11.6212	45.90402
roa	23.60573	9.608764	2.46	0.014	4.772904	42.43857
dividendyield	67.76872	49.53634	1.37	0.171	-29.32073	164.8582
rdcapital	-1455.362	1337.163	-1.09	0.276	-4076.153	1165.43
totaldebtequity	-.0205198	4.89229	-0.00	0.997	-9.609231	9.568192
salespershare	20.89208	9.193981	2.27	0.023	2.872213	38.91195
pricevolatility	-45.09604	16.47763	-2.74	0.006	-77.39159	-12.80048
tobinsq	-40.84908	390.4099	-0.10	0.917	-806.0384	724.3402
priceearningsratio	.0342643	.158686	0.22	0.829	-.2767545	.3452831
_cons	650.9619	607.9031	1.07	0.284	-540.5062	1842.43
sigma_u	1524.2544					
sigma_e	1279.6404					
rho	.58658182	(fraction of variance due to u_i)				

Figure H5: Active institutional ownership on total compensation

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0251                         Obs per group: min =         1
       between = 0.0548                                        avg =       5.2
       overall = 0.0438                                        max =         6

                                                Wald chi2(9)       =     16.29
corr(u_i, Xb)  = -0.3057                        Prob > chi2        =    0.0610

                                 (Replications based on 286 clusters in firmidstata)
```

totalcompensation	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
allactive	-92.68799	81.67639	-1.13	0.256	-252.7708	67.39479
roa	39.7547	133.7416	0.30	0.766	-222.374	301.8834
dividendyield	-1085.653	456.2815	-2.38	0.017	-1979.948	-191.3577
rdcapital	51926.53	48561.44	1.07	0.285	-43252.14	147105.2
totaldebtequity	.5213201	22.76065	0.02	0.982	-44.08873	45.13137
salespershare	109.4488	87.68523	1.25	0.212	-62.41113	281.3086
pricevolatility	373.5299	223.892	1.67	0.095	-65.2904	812.3503
tobinsq	-99.38005	6619.752	-0.02	0.988	-13073.86	12875.1
priceearningsratio	-4.720121	4.325117	-1.09	0.275	-13.1972	3.756953
_cons	602.3872	5639.306	0.11	0.915	-10450.45	11655.22
sigma_u	10311.422					
sigma_e	12264.789					
rho	.41411969	(fraction of variance due to u_i)				

Appendix I: Fixed effects models with bootstrap for passive institutional ownership

Figure I1: Passive institutional ownership on LTIP payouts

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0206                         Obs per group: min =         1
       between = 0.0440                                        avg =       5.2
       overall = 0.0084                                        max =         6

                                                Wald chi2(9)       =     14.14
corr(u_i, Xb)  = -0.6592                        Prob > chi2        =    0.1175

                                  (Replications based on 286 clusters in firmidstata)
```

ltippayouts	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
allpassive	12.92952	9.377465	1.38	0.168	-5.449975	31.30901
roa	11.29817	6.316435	1.79	0.074	-1.081813	23.67816
dividendyield	-179.04	106.7521	-1.68	0.094	-388.2702	30.19028
rdcapital	6124.956	3805.912	1.61	0.108	-1334.495	13584.41
totaldebtequity	.0876929	2.364171	0.04	0.970	-4.545996	4.721382
salespershare	.03631	5.304843	0.01	0.995	-10.36099	10.43361
pricevolatility	33.067	15.00653	2.20	0.028	3.654744	62.47926
tobinsq	-137.6708	117.2456	-1.17	0.240	-367.4679	92.12627
priceearningsratio	.113599	.1435741	0.79	0.429	-.1678012	.3949991
_cons	-433.2432	412.3197	-1.05	0.293	-1241.375	374.8886
sigma_u	1282.3593					
sigma_e	1195.4462					
rho	.53503353	(fraction of variance due to u_i)				

Figure I2: Passive institutional ownership on options granted

```
Fixed-effects (within) regression               Number of obs      =      1486
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0218                         Obs per group: min =         1
       between = 0.0786                                        avg =       5.2
       overall = 0.0501                                        max =         6

                                                Wald chi2(9)       =     13.34
corr(u_i, Xb)  = -0.3271                        Prob > chi2        =    0.1477

                                (Replications based on 286 clusters in firmidstata)
```

optionsgrantedbs	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
allpassive	-138.0659	101.4625	-1.36	0.174	-336.9287	60.79691
roa	-24.7797	153.8596	-0.16	0.872	-326.339	276.7796
dividendyield	-821.8262	406.7491	-2.02	0.043	-1619.04	-24.61259
rdcapital	56534.42	39627.18	1.43	0.154	-21133.42	134202.3
totaldebtequity	.3494174	35.01217	0.01	0.992	-68.27317	68.97201
salespershare	43.03039	91.60125	0.47	0.639	-136.5048	222.5655
pricevolatility	307.4321	250.7988	1.23	0.220	-184.1246	798.9888
tobinsq	1214.254	6043.669	0.20	0.841	-10631.12	13059.63
priceearningsratio	-5.141347	6.151603	-0.84	0.403	-17.19827	6.915572
_cons	-4181.953	8894.138	-0.47	0.638	-21614.14	13250.24
sigma_u	8487.8571					
sigma_e	11328.351					
rho	.35954401	(fraction of variance due to u_i)				

Figure I3: Passive institutional ownership on restricted stock grant

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0103                         Obs per group: min =         1
       between = 0.0152                                        avg =       5.2
       overall = 0.0080                                        max =         6

                                                Wald chi2(9)       =     18.18
corr(u_i, Xb)  = -0.1859                        Prob > chi2        =    0.0331

                                (Replications based on 286 clusters in firmidstata)
```

restrictedstockg~t	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
allpassive	23.81303	19.01552	1.25	0.210	-13.45669	61.08276
roa	29.68036	14.84248	2.00	0.046	.5896283	58.77108
dividendyield	-14.94089	95.34298	-0.16	0.875	-201.8097	171.9279
rdcapital	-3048.123	2306.431	-1.32	0.186	-7568.644	1472.398
totaldebtequity	.0692873	9.295288	0.01	0.994	-18.14914	18.28772
salespershare	21.69278	15.42859	1.41	0.160	-8.546707	51.93226
pricevolatility	55.83277	31.92868	1.75	0.080	-6.746293	118.4118
tobinsq	-425.3563	585.3345	-0.73	0.467	-1572.591	721.8782
priceearningsratio	.3485011	1.076672	0.32	0.746	-1.761737	2.458739
_cons	-1076.249	1044.051	-1.03	0.303	-3122.552	970.054
sigma_u	2422.0035					
sigma_e	2595.4101					
rho	.46548028	(fraction of variance due to u_i)				

Figure I4: Passive institutional ownership on bonus

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0516                         Obs per group: min =         1
       between = 0.0797                                        avg =       5.2
       overall = 0.0691                                        max =         6

                                                Wald chi2(9)       =     54.86
corr(u_i, Xb)  = -0.2345                        Prob > chi2        =    0.0000

                                  (Replications based on 286 clusters in firmidstata)
```

bonus	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
allpassive	46.56093	22.80971	2.04	0.041	1.854715	91.26715
roa	24.69026	11.24368	2.20	0.028	2.653055	46.72747
dividendyield	63.13827	48.25295	1.31	0.191	-31.43579	157.7123
rdcapital	-2944.521	1446.821	-2.04	0.042	-5780.237	-108.8052
totaldebtequity	-.0036668	5.648842	-0.00	0.999	-11.07519	11.06786
salespershare	23.91066	8.393067	2.85	0.004	7.460549	40.36077
pricevolatility	-40.45643	17.21088	-2.35	0.019	-74.18914	-6.72372
tobinsq	-218.0538	328.503	-0.66	0.507	-861.9078	425.8002
priceearningsratio	.0444909	.1867516	0.24	0.812	-.3215354	.4105173
_cons	1635.876	652.6911	2.51	0.012	356.6252	2915.127
sigma_u	1540.5148					
sigma_e	1291.4754					
rho	.58726313	(fraction of variance due to u_i)				

Figure I5: Passive institutional ownership on total compensation

```
Fixed-effects (within) regression               Number of obs      =      1489
Group variable: firmidstata                     Number of groups   =       286

R-sq:  within  = 0.0226                         Obs per group: min =         1
       between = 0.0550                                        avg =       5.2
       overall = 0.0412                                        max =         6

                                                Wald chi2(9)       =     21.89
corr(u_i, Xb)  = -0.3270                        Prob > chi2        =    0.0092

                                (Replications based on 286 clusters in firmidstata)
```

totalcompensation	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
allpassive	-54.976	96.44816	-0.57	0.569	-244.0109	134.0589
roa	36.01982	149.1764	0.24	0.809	-256.3605	328.4002
dividendyield	-1067.27	431.7465	-2.47	0.013	-1913.478	-221.0625
rdcapital	57542.41	41558.7	1.38	0.166	-23911.16	138996
totaldebtequity	.4880681	27.73458	0.02	0.986	-53.8707	54.84684
salespershare	97.99606	80.91932	1.21	0.226	-60.6029	256.595
pricevolatility	354.9117	257.7243	1.38	0.168	-150.2187	860.0421
tobinsq	483.0093	7373.014	0.07	0.948	-13967.83	14933.85
priceearningsratio	-4.742121	4.998465	-0.95	0.343	-14.53893	5.05469
_cons	-2762.515	8956.2	-0.31	0.758	-20316.34	14791.31
sigma_u	10360.162					
sigma_e	12280.623					
rho	.41578286	(fraction of variance due to u_i)				