CEO compensation structure and the pay for performance sensitivity in the Netherlands.

Master Thesis

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Abstract

This thesis investigates the determinants of CEO compensation structure and total CEO compensation and the effectiveness of both compensation metrics on firm performance. I hand-collect data from annual reports of Dutch listed firms and compile a dataset on CEO compensation of 48 firms over 2009-2014. I find that supervisory board size is positively related to both the percentage of CEOs' equity incentive grants to total compensation and total CEO compensation. I find Tobin's Q and ROA to be positively affected by the percentage of CEOs' equity incentives, whereas TRS is not affected by the percentage of CEOs' equity incentives to total compensation. Lastly, I find total CEO compensation to have a positive effect on all performance metrics (Tobin's Q, ROA, and TSR). The findings of this research imply that CEO compensation structure and total CEO compensation can be severely altered by altering the size of the supervisory board. Also, it pays off to grant the CEO more equity intensive contracts and to pay the CEO more when considering firm performance as the objective.

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1. Introduction

This thesis focuses on CEO compensation structure and the CEO pay for performance sensitivity of Dutch listed corporations. Regarding CEO compensation structure I investigate what determinants determine the structure, especially the magnitude of equity incentive grants to total compensation, of CEO compensation packages. This connects to previous work on the determinants of compensation structure (particularly Lewellen, Loderer and Martin, 1987; Mehran, 1995; Core, Holthausen and Larcker, 1999; Ittner, Lambert, and Larcker, 2003). Also, this study relates to Jensen and Murphy (1990a) and Mehran (1995) by assessing the sensitivity of CEO compensation structure to firm performance. Lastly, the present study contributes to the understanding of the pay for performance sensitivity in the Netherlands by determining whether the total CEO pay for performance elasticity has altered since Duffhues and Kabir (2008). Ultimately, this thesis addresses the question:

What determines the structure of CEO compensation packages of Dutch listed firms and how does firm performance relate to observed CEO compensation packages?

After a few years of moderate growth, CEO compensation of Dutch listed firms has risen sharply in 2014 compared to the compensation of the average European CEO. According to Professor Xavier Baeten of Vlerick Business School remuneration policies of Dutch listed firms are rising disproportionally compared to executive compensation environment of surrounding countries. (Woudt, 2015) Strengthened by the adverse effects on the economy in the aftermath of the 2008 financial crisis, the public debate and associated critics on CEO compensation levels in the Netherlands have emerged heavily. In the 1990s, such a trend of increasing executive pay occurred in the United States as well. At that time, top executives were accused by politicians and union leaders of reaping extraordinary benefits for their own interest at the cost of social equality. A similar kind of argumentation has been expressed by public figures over the past recent years in the Netherlands. Jensen and Murphy (1990a), however, emphasize that one should not question whether executives get paid too much. Rather, they argue, it is relevant to assess whether the compensation schemes that are paid to executives are effective in terms of corporate governance. That is, whether compensation packages contribute to firm performance. This question should be addressed by looking at how executives are paid, rather than how much they get paid. I opt for addressing a similar question regarding CEO pay in the Netherlands. Rather than only assessing the level of compensation paid to CEOs, I analyse what determines the structure of Dutch compensation packages. Subsequently, I evaluate the extent to which observed CEO

compensation packages contributed to firm performance. Especially, as the rise in CEO pay is primarily attributable to the emergence of equity incentive grants (Woudt, 2015), I investigate whether equity grants effectively substantiated the rise in CEO compensation levels. Hence, I assess whether observed CEO compensation structures enhances the alignment of managers' actions with shareholder interests.

Besides delivering a contribution to the public debate on executive compensation in the Netherlands, this study adds to the academic executive compensation literature by focusing the analysis on Dutch listed corporations. As the executive compensation literature is concentrated on the United States and to a less extent to the United Kingdom (Murphy, 1999), I contribute to the understanding about differences in the executive compensation environment across countries. I do so by hand-collecting Dutch executive compensation data and compiling a comprehensive dataset on CEOs total compensation and equity incentive grants.

I present empirical evidence on the determinants of CEO compensation structure and total CEO compensation. The critical assumption for evaluating the determinants of CEO compensation structure and total CEO compensation is that I assume the supervisory board members of Dutch listed firms to be the Dutch equivalent of the U.S. outside directors. Founded by this assumption, I run several regression to test the effect of supervisory board size on CEO compensation structure and total CEO compensation. Additionally, I provide empirical evidence on the pay for performance sensitivity of CEOs' equity incentive grants to total compensation and total CEO compensation. To test the pay for performance sensitivity, I relate the percentage of CEOs' equity incentives to total compensation to three metrics of firm performance. The metrics I employ are Tobin's Q, return on assets (ROA), and total shareholder return (TSR). Thereafter, I do the same for total CEO compensation.

I find that both the percentage of CEOs' equity incentive grants to total compensation and total CEO compensation are positively related to supervisory board size. Regarding the pay for performance relationship, I find that Tobin's Q and ROA are positively affected by the percentage of CEOs' equity incentive grants to total compensation. With respect to total CEO compensation, I find that it is positively related to all three metrics of firm performance. Taking these results together, it becomes evident that the size of the supervisory board has significant positive impact on both the percentage of CEOs' equity grants to total compensation and total CEO compensation. Looking at firm performance, the results suggest that granting the CEO with more equity mostly favours book values and accounting profits,

but not stock returns. On the other hand, increasing the level of total CEO compensation does contribute to all measures of firm performance. This indicates that paying the CEO more leads to better performance of the firm.

The present study differs from previous work on CEO pay in the Netherlands (Dufhuess and Kabir, 2008; Swagerman and Terpstra, 2007) in that it, additionally to total compensation levels, investigates the determinants and effectiveness of equity incentive grants in Dutch CEO compensation schemes. Contrary to previous findings on the CEO pay environment in the Netherlands, I document a positive pay for performance sensitivity. This suggests that either the executive compensation environment in the Netherlands has changed over time or that the different methodologies across different studies result in different outcomes. This study further adds to the academic literature by partially applying the framework of Mehran (1995) to the Dutch executive compensation environment. This enables me to compare the results I find in the Netherlands with results that Mehran (1995) finds for the U.S. In the light of the determinants of the percentage of CEOs' equity incentive grants to total compensation and the effect of the percentage of CEOs' equity incentive grants to total compensation on firm performance are similar to Mehran (1995). This implies that Dutch CEO compensation contracts yield similar outcomes compared to American CEO compensation contracts.

In the light of the public debate on executive compensation in the Netherlands, the results of this thesis imply that it is not necessarily undesirable to pay CEOs more. That is, at least in terms of firm performance I find support for increasing CEO pay. Considering the question how CEOs should get paid, the results I find suggest that if it is desired to boost accounting profits and book values, the supervisory board should grant more equity intensive incentives to the CEO. From the shareholders perspective, however, granting more equity incentives to the CEO does not necessarily lead to more wealth for shareholders since I find no relationship between the percentage of CEOs' equity grants to total compensation and total shareholder return.

I handle to following structure in this thesis. In section 2 I review the existing literature on executive compensation and construct the theoretical framework for this study. In section 3 I develop the hypotheses. Section 4 described the methodology I use for testing the hypotheses. In section 5 I present the regression results and analysis of the results. I conclude this thesis in section 6.

2. Theoretical framework

2.1 Agency Theory

Agency theory is built on the framework introduced by the work of Ronald Coase (1937). In his work "The nature of the firm" he argues why corporations emerge. A corporation arises when it can produce a product more cheaply than the cost of acquiring the product through the market. If a corporation emerge into existence, it is build up from contractual relations that are either internal or external to the firm. It are those contractual relations that give rise to the notion of separation between ownership and control, in which the owners of the firm (external contracts) are not controlling the firm (internal contracts). To address to problems that are associated with the separation between ownership and control, agency theory has been developed.

Ross (1973) described agency theory as problems that arise in a principal-agent relationship in which the agent has control over assets that are owned by the principal. In such a relationship, a conflict of interests is prevalent. This conflict arises from the assumption that both parties maximize utility, but they derive utility from different sources. The agent maximizes his own wealth by making decisions that favour his own welfare. This comes at the cost of the wealth of the principal, since the wealth of the principal is maximized when the agent makes decision such that the welfare of the principal is maximized. The problem of conflicting interests between the principal and the agent in situations of separation between ownership and control can be applied to many cases, of which the stockholder (principal) – manager (agent) relation is relevant for the present research.

Jensen and Meckling (1976) defined a theory of the firm in which elements of agency theory, property rights and finance theory together form a theory that describes the ownership structure of the firm. They describe that the principal can set appropriate incentives to the agent and incur monitoring costs to minimize the loss from sub-optimal decision making of the agent in the view of the principal (monitoring cost). On the other side the agent can spend recourses on the principal to increase commitment (bonding cost). It is, however, impossible to fully align the interests of the agent with interests of the principal. As a result, the decisions of the agent will always diverge to a certain extent from the optimal decision in the principal's point of view (residual loss). Therefore, in a principal – agent relationship there are costs for the principal that are associated with aligning the interests of the agent with the interests of

the principal. Those costs are called agency costs and consist of monitoring costs, bonding costs and residual loss.

The agency costs framework that Jensen and Meckling (1976) describe is perfectly applicable to listed corporations as they are subject to the separation of ownership and control. In listed corporations, the shareholders are the principle whereas top management can be viewed as the agent. Shareholders have funds available and need the knowledge of an entrepreneur to make returns on that available funds. The entrepreneur on the other hand, needs the funds of the shareholder to employ his knowledge since he does not have enough capital himself. But the shareholder has to assure himself that he will receive back his invested funds and that the entrepreneur will not steal from the investor. (Shleifer and Vishny, 1997) In terms of the agency cost framework of Jensen and Meckling (1976), shareholders incur agency costs in order to align the interests of the entrepreneur with those of the shareholders. The agency costs reduce shareholder value, which is the objective that is maximized by shareholders. The notion of agency costs forms the motivation for corporate governance.

2.2   Corporate Governance

After the publication of Jensen and Meckling (1976), the research in the field of corporate governance has emerged. A conclusive definition of corporate governance is given by Denis and McConnel (2003), who define corporate governance as:

> "the set of mechanisms – both institutional and market-based – that induce the self-interested controller of a company (those that make decisions regarding how the company will be operated) to make decisions that maximize the value of the company to its owners (the suppliers of capital)." p. 2

Effective corporate governance thus minimizes the likelihood that managers harm the return on invested funds in the company to investors by taking adverse decisions. Hence, effective corporate governance minimizes agency costs. In an ideal and complete world, Shleifer and Vishney (1997) state that shareholders would led managers sign a contract that perfectly specify what efforts the mangers deliver and how profits are divided amongst both parties in every state of the world. However, due to uncertainty about future states of the world and the inability of shareholders to perfectly monitor the delivered efforts of managers, perfect contracts do not exist in the real world. Rather, as was pointed out by Grossman and Hart (1986), contracts are specified on how to allocate residual control rights between managers

and shareholders. That is, rights to make decisions about events that were not foreseen at the moment the contract was signed. Nevertheless, in practice, managers have extensive residual control rights since contracts leave limited space for interpretation. Also, free rider problems of fragmented shareholders limit effective decision making of owners. (Berle and Means, 1932) As a result, managers have a certain degree of discretion in determining how to allocate funds provided by shareholders. The degree to which managers have discretion in allocating funds is problematic for shareholders. The more discretion the managers has, the more present is the opportunity for the manager to make decisions in favour of his own interest. This problems associated with residual control rights, fragmentation of shareholders and managers' discretion was recognized by Berle and Means (1932) in their seminal work "The modern corporation and private property."

The opportunity for managers to act in discretion give rise to a problem called managerial entrenchment. A precise definition of managerial entrenchment was given by Weisbach (1988). He formulated that 'managerial entrenchment occurs when managers gain so much power that they are able to use the firm to further their own interests rather than the interests of shareholders.' The paragraphs below give an overview on forms of managerial entrenchment that have been recognized in past literature.

First, managers can engage in managerial empire-building. Hope and Thomas (2008) define empire-building as 'opportunistically growing the firm beyond the firm's optimal size or maintaining unutilized resources to increase personal utilities arising from status, power, compensation, and prestige.' Zwiebel (1996) argues that managers can use their discretion in allocating funds to set the optimal capital structure such that their ability to empire-build is maximized subject to ensuring sufficient efficiency of the funds used to prevent a takeover. Obviously empire building comes at the cost of shareholder value optimization, since recourses are allocated inefficiently in order to benefit the manager.

Second, managerial expropriation can be described as managers 'stealing' funds from the shareholders. This can take on complex forms such as transfer pricing: the manager can set up an independent company and sell output of the firm he manages to his own company below market prices. Developments in corporate law however focused on addressing this issue, improving the protection of residual rights of shareholders. (Shleifer and Vishney, 1997)

Third, the manager can make manager-specific entrenching investments. That is, invest in assets that carry a higher value when those assets are managed by the current manager rather than under an alternative manager. In acting so, the manager makes it costly for shareholders to replace him. The strengthening of his position enables the manager to extract higher compensation from shareholders. (Shleifer and Vishny, 1989)

Given managerial entrenchment that could arise from incomplete contracts, corporate governance mechanisms are designed to facilitate the appropriate allocation of funds by managers such that shareholders receive return on their investment.

From a different perspective, one could argue that corporate governance mechanisms are redundant in the presence of long-run market competition. Starting from the work of Stigler (1958), it can be argued that firms that are operating at the optimal size are more efficient than firms that are operating at sub-optimal levels. Therefore, the more efficient firms have minimized cost better than sub-optimal firms. Due to market competition, this forces the sub-optimal firms to optimize their operations because they would run out of business otherwise. Further optimization means further reducing cost, which implies that managers should better allocate funds such that the firm becomes more profitable. From this line of reasoning, it can be inferred that market competition also carries the ability to induce managers to allocate the funds provided by investors efficiently. However, Shliefer and Vishny (1997) explain that market competition indeed induces the efficient allocation of funds, but that it does not prevent managers from expropriating the competitive returns made on the funds invested. Therefore, corporate governance and market competition are complements, rather than substitutes, and that makes studying corporate governance mechanisms relevant.

2.3   *Corporate Governance Mechanisms*

A definition of corporate governance mechanisms was given by Shleifer and Vishny (1997), defining it as 'economic and legal institutions that can be altered through the political process'. Denis and McConnel (2003) provide an overview on the most extensively studied corporate governance mechanisms. Corporate governance mechanisms can either be internal or external to the firm. The internal corporate governance mechanisms that have been studied most extensively are executive compensation, the board of directors and the equity ownership structure of the firm. The most important external mechanisms are external control markets and the legal system.

Although the present study is primarily focussing on executive compensation, it is important to include other corporate governance mechanisms in the scope of this research. That is because different corporate governance mechanisms tend interact with each other, as was explained in Cremers and Nair (2005). By excluding corporate governance mechanisms from this research, I would not give a conclusive description of the workings of executive compensation and its interrelatedness with other corporate governance mechanisms. Therefore, all corporate governance mechanisms and its effectiveness on reducing agency costs will be discussed. Notwithstanding, the focus is placed on executive compensation since that is the subject of research in the present study.

2.3.1 Executive compensation

Optimal Contract approach

Executive compensation contracts are designed to mitigate the incompleteness of residual control rights. According to Shleifer and Vishny (1997), incentive contracts serve as a solution to imperfect contracts by designing them such that they are contingent and long-term focused. Incentives that are specified in the contract should ex ante align interests of mangers with those of shareholders. This can be realized by including performance measures in the contract that correlate with the quality of managers' decision making. In this manner, incentive contracts serve as a remedy to the principal-agent relationship. This approach was labelled as the "optimal contracting approach" by Bebchuk and Fried (2003). Past research has investigated the desirable structure of such incentive contracts. Important assumptions that are incorporated in optimal contracting theory are risk aversion, screening and moral hazard.

In literature that capture the structure of optimal contract, one important assumption is that agents are risk averse. The notion of risk aversion in explained in Ross (1973). When agents are confronted with two payoffs of equal expected value, but one payoff contains uncertainty about the actual pay-off and the other payoff is realized with certainty, risk averse agents will extract the highest utility from the certain pay-off.

Also screening theory (Stiglitz, 1975) is incorporated in optimal contract models. Applied to the shareholder-manager relation, screening theory entails that the manager knows his abilities but the shareholder does not. Also, the shareholder is not able to ex-ante observe the quality of the manager. In a world of incomplete information, shareholders cannot separate good from bad managers and offer therefore wages that are equal to the productivity

of the average manager. (Ackerlof, 1970) If the shareholder could infer that the manager is good, and has therefore better abilities than the average manager, the shareholders are willing to pay the good manager a higher wage. The manager thus has an incentive to reveal his abilities to shareholders if the is good. The good manager incur some costs for revealing his abilities, but those costs are offset by the higher wage the good manager receives. Bad managers have no incentive to reveal their abilities, since that would give them a lower wage that would not offset the screening costs. Therefore, in optimal contracting theory good managers should, according to the principle of screening, be willing to incur a certain level of costs to reveal their abilities.

Hölmstrom (1979) describes how remedies for moral hazard, the third important feature incorporated in contract theory, can improve the optimal contract. It considers optimal sharing of payoffs when only outcomes can be observed. Hölmstrom (1979) models the effort a manager delivers and the possible outcomes (returns on invested funds) associated with different effort levels. The model shows that the manager has an incentive to put in more effort when the marginal return from putting in effort is positive. This implies that the manager should carry more responsibility for outcomes than shareholders. This excess responsibility carried by managers should then be rewarded in excess of the cost of putting in the effort.

The optimal contract thus deals with the degree of risk aversion, the degree to which the manager has good abilities, and the importance of the decision he has to make. This was also recognized in Shleifer and Vishny (1997). Bebchuck, Fried and Walker (2002) identified the three mechanisms through which the optimal contract is determined: (1) the board of directors, which operates at arm's length to specify the compensation structure that maximizes shareholder value; (2) market forces that push executives to accept the compensation structure that best serves the interests of shareholders; (3) if compensation structures are not optimal for shareholders, shareholders can use their voting rights under corporate law to block the contract and propose better structured contracts.

It is beyond the scope of this thesis to review the literature on optimal contracts in depth, as I am interested in assessing the empirical functioning of CEO contracts in the Netherlands. However, some insights from the optimal contract literature does contribute to the understanding of executive compensation. Therefore, it is relevant to provide a comprehensive overview of the insights stemming from optimal contract literature. Such an overview is given in Murphy (1999) and is summarized in the next paragraph.

In a typical optimal contract, also called a hidden action model, the CEO can undertake an unlimited set of actions. The set of actions that can be taken by the CEO produces a stochastic shareholder value, meaning that depending on what action the CEO exerts, shareholder value increases or decreases. For every action, the CEO produce a certain level of shareholder value, for which he receives a certain compensation level and from which he derives a certain level of utility. The shareholder and the CEO can both observe the level of shareholder value and the level of utility of the CEO resulting from the action taken by the CEO, but only the CEO can observe what kind of action he has taken. The optimal contract, assuming that shareholders are risk-neutral and the CEO is risk averse, maximizes the value left for shareholders (the obtained level of shareholder value minus the compensation paid to the CEO) such that the incentives given to the CEO trigger him to maximize his own utility by taking the desired decisions from the shareholders' point of view. The optimal contract thus captures the probability that the CEO took the actions that are desired by the shareholders, as the reward to the CEO is dependent on the likelihood that the desired actions were taken by the CEO. Hence, the effort put in by the CEO is inferred from the observable level of shareholder value.

The inference of actions of the CEO by looking at the level of shareholder value is captured in the "informativeness principle". (Hölmstrom, 1979) This principles embodies that shareholders use performance measures in determining the level of compensation payable to the CEO not because shareholders strive for maximizing performance, they rather use performance measures to infer information about the degree to which the CEO has delivered the desired efforts.

Although the informativeness principle give insights in the design of CEO compensation contracts, it is not the only legitimate argument for the design of optimal contract. That is because the informativeness principle assumes that shareholders know what actions maximize firm value. (Murphy, 1999) In fact, shareholders do not know what actions maximize firm value. That is the reason why shareholders entrust managers to manage funds on their behalf; managers are entitled because they are believed to have superior skills or information regarding deciding on what projects have positive net present value. (Shleifer and Vishny, 1997) Even if shareholders were able to perfectly monitor the actions of CEOs, they could not assess to what extent the actions contributed to shareholder value as firm value is influenced by many other factors. (Murphy, 1999) Due to the noise in linking CEO actions to

shareholder value, contracts are specified subject to the shareholders' objective: shareholder value.

Also, Murphy (1999) argues that there exists a trade-off between the informativeness of performance measures and distortion of incentives linked to performance measures. When pay is tied to performance, executives can target their action to performance measures such that they receive a higher compensation. Examples of forms of manipulation are cutting R&D expenditures to increase profits or start shirking once the maximum performance level specified in the contract has been achieved before the end of the year.

Now that is specified how optimal contracts are specified, the question rises what shape the optimal contract takes. Under the assumption that managers show constant absolute risk aversion, Hölmstrom and Milgrom (1987) argued that the optimal contract is a linear function of the chosen performance measure (i.e. revenues or profit). The rationale behind linear contracts is that when contracts are linear and constant over time, managers have no incentive to manipulate earnings in one year because that will hurt their compensation in future years.

However, more recent research (Ditmann, Maug, and Spalt, 2010) suggested that the optimal contract is increasing and convex for medium to high outcomes and disproportionally decreasing for very low outcomes. This finding was founded by the argument given in Ditmann and Maug (2007) that observed contracts are typically not linear because linear contracts fail to incorporate option schemes. One important assumption for the predicted convex contract is that managers are loss averse, which is absent in prior specified models. This means that the CEO becomes risk-loving once his compensation falls below the reference wage. The reference wage refers to the notion that individuals evaluate their wealth against a benchmark, rather than on absolute levels. The findings of Ditmann, et al. (2010) could be of much relevance for the present study, as it suggests that high compensation levels can originate from equity based incentives.

Managerial power approach

As explained in the previous paragraphs, executive compensation has been widely studied from a principal-agent perspective. It describes a specific contract that should align the interests of managers with the interests of shareholders. This approach falls under the "optimal contracting approach". However, the determination of the compensation scheme itself can also be viewed as an agency problem. Bebchuk and Fried (2003) labelled this

alternative view as the "managerial power approach". They recognized this approach by looking at previous work. Those researches implied that incentive schemes seemed to reflect to some extent rent-seeking of the manager rather than providing the manager with appropriate incentives. For example, Bertrand and Mullainathan (2001) concluded that contract schemes do not take into account the origination of every dollar earned. That is, CEOs receive equal compensation for every dollar that is earned due to luck as for every dollar earned that is caused by good management. Also, Blanchard, Lopez-de-Silanes and Shleifer (1994) found that managers do not use financial windfalls to invest in positive net present value projects, they rather use the proceeds to strengthen their own independence at the firm. Furthermore, it was shown by Yermack (1997) that CEOs are able to influence the determination of the stock grants dates: CEOs were able to shift the grant date of options to favourable dates (i.e. right before earnings announcements).Those examples support the managerial approach to contract schemes, which is presented as a supplement to the optimal contract approach. Accordingly, Bebchuck, Fried and Walker (2002) identified limitations on the mechanisms of the optimal contracting approach.

First it is argued that there are reasons to not assume that directors negotiate on arm's length with executive and only serve the interests of shareholders rather than their own. The main problem is the pervasive influences of the CEO on the determination of the remuneration structure. That influence is prevalent on all the aspects of the contract-determination process.

The first point where managers can exert influence over their board member is at the appointment of directors. When a CEO can exert influence over the appointment of directors, he is enabled to prevent the appointment of board members that will bargain his payment scheme downwards. (Bebchuk, et al., 2002) Insights from psychology (Main, O'Reilly, and Wade, 1995) have supported the concept of CEOs capturing board members, stating that CEOs use their social influence on board members to seek for rents.

Then, when a board member is appointed, he can be influenced by his fellow board members, the CEO and a combination of both. Especially board members in place with limited interests in effectively bargaining the CEO wage can prevent new board members to set more efficient compensation schemes. (Bebchuk, et al., 2002) This typically occurs when the boards' attitude towards the CEO is polite and deference, rather than critical. (Jensen, 1994) Even if directors overcome the explained complications in setting executive contracts,

they often lack the financial incentives or information to effectively do so. (Bebchuk, et al., 2002)

The last issue that can prevent board members to negotiate at arms' length with CEOs is the lack of sufficient incentives. In the majority of cases, there is no direct benefit specified for the director to lower the CEO's compensation. Baker, Jensen and Murphy (1988) argue that the lack of monetary benefits for the director is associated with improving the CEO compensation package is an important reason why directors could refrain from it. Furthermore, the relative costs for the director to improve CEO payment schemes are more substantial than the associated benefits. It is argued in Bebchuk, et al. (2002) that the director carries the risk of being removed from the board. In that case, the director will lose his wage and have to incur non-monetary costs such as reputation damage.

The second mechanism on which Bebchuk, et al. (2002) identified limitations is the power of market forces. This mechanism works through either the labour market, the market for corporate control, capital markets, and product markets or a combination of those.

The labour market in the view of optimal contracting is regarded as a mean of discipline since CEOs reduce promotion opportunities to larger firms if they underperform. However, Fee and Hadlock (2003) found that the majority of CEO replacements are internal to the firm. Furthermore, it is argued in Bebchuk, et al. (2002) that the ability of CEOs to become CEO at another company depends mostly on overall firm performance. It is therefore unlikely that the managerial labour market will lessen rent-seeking activities of CEOs. Indeed, Fee and Hadlock (2003) found high correlations between the hiring grants paid to CEOs at new employers and the value of equity holdings of CEOs in their current employer. Hence, if the prospects for CEOs to get promoted to larger firms has an effect on the desired pay levels from the perspective of the CEO, it is fair to expect that this increases the desired pay levels (especially equity based compensation).

Besides the managerial labour market, the market for corporate control is regarded as a mechanism that should deter the CEO from optimistic behaviour. After all, if the CEO exerts poor management, the market value of the company will plunge. Companies with decreasing market value are vulnerable to takeovers. If the firm receives a hostile takeover bid, it is likely that the CEO will lose his job. (Jensen and Ruback, 1983) However, Bebchuk, et al. (2002) argue that it is doubtful to assume that a CEO that increases his wage will also experience a significant increase in takeover threats since the effect of increased compensation on the

market value of the firm is limited. Agrawal and Walkling (1994) provided empirical evidence on this line of reasoning, stating that there was no significant difference between compensation levels of executives of targeted firms and non-targeted firms in the US in the 1980s.

Another market that may discipline the decision making of the CEO is the market for capital. Bebchuk, et al, (2002) argue that managers might need to return to equity markets to attract capital for growing the company. It the managers are value-maximizing, optimal contracting suggest that managers restrain from overcompensating themselves as that would increase the cost of capital. The increase of cost of capital, however, is limited when managers over compensate themselves, as the effects to the CEO of raising his wage are not proportional to the increase in cost of capital.

The last market that should restrict the managers' opportunistic behaviour is the product market. The idea of products markets and managers' discipline in the optimal contracting view is that product markets force managers to make efficient decisions. Considering the case that CEOs would make decisions to benefit themselves at the cost of efficiency, the product of the firm would become inferior to products from competitors, which harms profits and thereby increase the likelihood of becoming insolvent. This was refuted in Eisenhower (1989) as he argues that the majority of listed companies have sufficient recourses and market power to absorb inefficiencies stemming from self-benefitting decision making of managers.

The third limitation to optimal contracting that is discussed in Bebchuk, et al. (2002) is the power of shareholders. As is discussed in the previous two paragraphs, it is reasonable not to expect market forces and arms' length bargaining between the board and executives to ensure the optimal contract. Nonetheless, the right of shareholders is left as a disciplining mechanisms in the optimal contracting approach. If shareholders think that the compensation paid to executives does not reflect the performance of the company, they have the right to challenge the compensation package in court. In practice, however, courts have sporadic reviewed compensation arrangements. (Barris, 1992) Thus, the obstacles that shareholders face when they want to challenge compensation packages in reduce the effectiveness of their right block the proposed compensation package.

Furthermore, shareholders have the right to vote against compensation plans (this is also the case in the Netherlands). It is however argued in Bebchuk, et al. (2002) that is not

always optimal for shareholders to vote against undesirable compensation schemes, as this could expel good managers.

The above explained limitations support the arguments for the managerial power approach. An important feature of the managerial power approach is outrage. According to Bebchuk and Fried (2003), outrage refers to the extent to which a compensation package that is favourable to managers but suboptimal to shareholders accepted by outsiders. The more outrage a compensation package is expected to be perceived by outsiders, the more reluctant are executives and directors to propose and approve such compensation packages. Johnson, Porter, Shackell-Dowell (1997) found evidence on the effects of outrage on compensation schemes. CEOs who received negative media exposures about their compensation schemes in the US experienced relative low wage increases in the years afterwards and saw the pay-performance ratio being increased.

As the cost of outrage to the CEO can be substantial, it is in the interest of the CEO to cover his rent-seeking activities. The coverage of rent-seeking activities is called camouflage and is the second building block of the managerial power approach. (Bebchuk and Fried, 2003) Part of camouflaging excessive pay structures is the manner in which it is disclosed to outsiders. If the transparency of payment schemes is weak or the payment scheme is disclosed in way that is not salience, the manager reduces the likelihood of incurring substantial outrage costs.

Empirical findings on executive compensation

Now that the most important theoretical mechanisms of executive compensation have been explored, it contributes to the context of this research to review empirical findings on the effectiveness of executive compensation and its components. Antle and Smith (1986) identified that the compensation and incentives to a CEO can take on three forms: (1) flow compensation that consists of the annually payments of base salary, short-term incentive and the grants of new equity incentives, (2) changes to the value of stock and options holdings of the CEO in firm he manages and (3) the threat of being expelled or taken over by another company. The type of compensation and incentives that are of importance to this research are flow compensation and incentives coming from the change in value of stock and option holdings. Therefore, type (3) is considered to be beyond the scope of this research. Murphy (1999) provided a comprehensive review on executive compensation literature. He concludes

that executive pay packages typically consist of four components: base salary, an annual performance bonus, stock options and long-term incentive plans.

Base salary

The level of base salary payable to the CEO is typically determined by letting a reward consultant run an industry adjusted benchmark. It is conventional in such benchmarks to correct salary levels for the size of the firm. As a result, the relation between compensation levels and firm size is enhanced and tend to be a self-enforcing mechanism. (Rosen, 1982) Besides the self-enforcement of the size effect, pay levels below the 50th percentile of the market are often labelled as below market. Therefore, pay levels of such firms are driven up towards competitive levels. If this adjustment towards competitive levels is persistent across industries, pay levels are artificially driven up to excessive levels. Murphy (1999) recognized this effect as being the "ratchet" effect. Lastly, as is argued in Murphy (1999), due to benchmarking base salaries reflect company characteristics rather than skills of the manager. The question then rises why base salaries are paid, even if they seem to be flawed. The main answer to this question is that forms of fixed income are preferred to forms of variable income by the CEO when the level of income is of the same magnitude. This concept was described in Harris and Raviv (1979), stating that agents prefer payoffs in which they bear less risk compared to payoffs associated with more risk when the expected payoffs are equal. Moreover, other compensation components such as the annual bonus and stock option grants are often specified as a percentage of base salary. Therefore, the CEO prefers a dollar increase in base salary compared to a dollar increase in variable income. (Murphy, 1999)

Short Term Incentives

Short term incentives (STI) is a variable component of the executives' pay contract. The level of STI payable to a manager depends on one-year performance measures. Typical performance measures are profitability, earnings per share, and personally related goals. STI is typically specified as a percentage of base salary. A minimum level of the performance measure needs to be achieved in order to activate the STI. This is referred to as the threshold. A target STI is awarded if the a priori set targets are achieved. If actual performance has outperformed the specified target, the CEO is entitled to receive a STI amount above the target. The maximum STI payable to a manager is specified as maximum percentage of base salary and is referred to as the bonus cap. The range between the threshold and the bonus cap is called the incentive zone. As mentioned in section 2.1.1.1, the performance measures used

to determine the amount of STI to be awarded to the manager can be viewed as informativeness tools. Those tools are used to infer the actions taken by managers. However, there are some problems associated with the use of STI and the measures that determine the amount of STI payable to the CEO.

One problem is that STI stimulates the managers to boost short-term profits at the cost of future profits. The manager can for example cut R&D expenditures to increase profits in the current year to ensure het achieves the threshold on his STI. But cutting R&D expenditure is likely to reduce future profits. (Dechow and Sloan, 1991)

The second problem is that accounting measures can be manipulated by managers due to accounting accruals. Managers can use accruals to transfer profits made in a good year to future years in order to cover up profits when the firm underperforms. (Healy, 1985)

Furthermore, Hölmstrom and Milgrom (1987) and Healy (1985) argue that incentive zones can have adverse effects on managers' efforts. To see how this works, consider a manager that at the half of the performance year has reached the cumulative profit level that will reward him with the maximum amount of STI payable. Any extra unit of profit will not result in additional reward for the manager. As the manager is able to revise his efforts on a daily basis and given that he has reached his bonus cap, he no longer has an incentive to put in effort. This mechanism also works the other way around. If at close to year-end the manager has not reached the cumulative profit level that will activate his threshold STI, he has no incentive to put in effort to realize extra profit in the current year as this is not sufficient to pass the threshold. He would rather defer profits to the next performance year in order to boost the future STI payable. Those two examples explain that the two ends of the incentive zone can be subject to giving adverse incentives to the manager from the perspective of the shareholder.

The outlined potential problems of STI seem to be persistent in practice. That is, STI has empirically been found not to enhance shareholder value to a significant extent. Jensen and Murphy (1990a) tested to what extent the cash compensation (base salary and STI) of the CEO would change in a two-year time period when shareholder value would increase by $ 100 million. They found that the median cash compensation to the CEO would only rise with $ 6,700. One can observe that such a reward is to a large extent disproportional to the increase in shareholder value and therefore insignificant for the CEO.

STI seems not to be a strong alignment instrument for shareholders. It is, however, still useful to grant STI to managers. This follows from the informativeness principle that is discussed earlier in this research. Using accounting measures in determining the amount of STI payable is still to some extent relevant, as they provide information on whether the executive put in the desired effort. (Hölmstrom, 1979) It should be noted tough, that there seems to be a payoff at work between inferring the actions taken by managers and providing managers with adverse incentives.

Equity based incentives

A component of executive pay that is considered to have stronger alignment ability than STI, is equity based incentives. Equity incentives are typically part of long-term incentive plans (LTI), which entail an at-target amount of equity incentives granted in a specific year. The actual amount of equity incentives that will actually vest a few years later (typically three years in the Netherlands) is dependent on performance measures taken over the vesting period, hence the term LTI. Equity incentives can take on several forms, of which stock options, restricted shares, performance shares, phantom shares and stock appreciation rights are the most common forms in the Netherlands. The motivation for using equity grants in compensation schemes is given in Guay, et al. (2003), stating that the 'fundamental reason for the use of equity incentives is the desire by firms to link changes in executive wealth directly to changes in the stock price, thereby providing executives with incentives to maximize shareholder wealth.' Equity incentives can either come from flow compensation (granting of options or shares) or equity ownership in the company. In this section, I contemplate equity incentives coming from flow compensation. In the next section, I will treat incentives coming from managerial equity ownership. As the academic literature is mainly focused on stock options as equity incentive, so is the review on equity incentives in this research.

Granting of stock options

The granting of stock options is one of one the tools that can be used to link the wealth of the CEO to changes in shareholder value. It was noted in Jensen and Murphy (1990b) that 'year-to-year stock option grants provide incentives if the size of the grant is based on performance.' Stock options give the recipient (in the context of this research the recipient is the CEO) the right to buy a share of stock at a pre-determined price (exercise price) before a given maturity. Executive options are typically granted during a performance year and vest

over time. (Murphy, 1999) It should be noted, however, that stock options only become valuable to the CEO if the stock price exceeds the exercise price. That is, options provide the CEO with upward potential, but no downward potential. This means that the option grows in value as the stock price increases, but turns worthless when the stock price drops below the exercise price. As a result, the value of options increases with volatility of the stock price since higher volatility of the stock price increases the probability that it will exceed the exercise price of the option. Correspondingly, CEOs that receive stock option grants are simultaneously given incentives to engage in riskier decision making to increase the probability of stock price appreciation. (DeFusco, Johnson, Zorn, 1990). Likewise, it can be argued that CEOs refrain from paying out dividends when they receive stock option grants as option value is reduced with expected dividends. This could motivate CEOs to reduce the dividend policy as this increases their stock option value. Core, Guay and Larcker (2003) tackle the manipulation of dividends argument by stating that this can easily be prevented by letting the board of directors specify a continuing dividend policy. Finally, as stock options only contain upward potential, the incentive value of stock options can evaporate when the stock price sufficiently falls below the exercise price. (Murphy, 1999)

Valuation issues of stock options

At first, it should be clarified that the value of an option is different for shareholders of the company issuing the option than for to managers of the issuing company. To see how this works, one can look at the granting of options from an opportunity cost perspective. The opportunity cost to shareholders of stock option grants are correctly represented by the amount an outside investor would be willing to pay for the options. As an outside investor is able to freely trade and short-sell the option. Furthermore, the outside investor is typically well diversified, having small positions in a large variety of companies. Those features on the option are incorporated in the price that an outside investor is willing to pay. The executive, on the other hand, is not permitted to trade or short-sell the option. Also, contrary to the outside investor, the executive is not diversified by having his human and (parts of) his physical capital invested in one specific company.

Besides the opportunity cost argument, the academic executive compensation literature places option valuation techniques under scrutiny. The main techniques for valuing options are Black-Scholes, Binomial Tree and Monte-Carlo models. Al these models artificially replicate potential future stock prices and discount back the possible payoffs from the option under the risk-neutrality assumption in order obtain the price of the option today.

(Hull, 1993) An important input in those valuation models is stock price volatility. Guay (1999) analysed the effects of stock price volatility on option prices. He showed that because of the sensitivity of option value to stock price volatility, the economic impact on the value of CEO stock option grants coming from changes in stock price volatility can be significant. Another sensitivity issue in option valuation models comes from the term structure of the option. For options of short maturities, the sensitivity of the option price to maturity is relatively low. In contrast, the maturity of long-term options has severe effects on the option price. As options granted to executives typically have maturities of 10 years, executive stock options values are overly sensitive to the term structure of the option. This originates from the fact that the option value is determined based on the maturity of the option (typically 10 years), while the CEO can forfeit or early exercise the options. Therefore, valuing the option based on the entire term structure results in overvalued option prices. (Murphy, 1999) Furthermore, as was stressed earlier in this section, the CEO is not allowed to trade his options. Therefore, the options he receives from option grants are not as liquid as regular options on stock of the specific company. Taking the complications of valuing executive stock option compared to regular options into account, the actual value of options granted to CEOs should thus be somewhat lower than the value derived from option valuation models. (Hall and Murphy, 2002)

Effectiveness of stock option incentives

To see how measurement issues regarding stock option grants can lead to diverge results in evaluating the pay for performance relationship, I give an overview on the most cited empirical work that tested the relationship between equity incentives from flow compensation and firm performance or examined the determinants of equity grants.

Ittner, et al., (2003) investigated the determinants of annual equity grants to CEOs of new economy firms (high-growth companies, often in technology). Remuneration data was gathered using mail surveys in the years 1999 and 2000, resulting in data on 217 unique firms in the US and Canada. It was found that investment opportunities, the number of employees, leverage, firms with a high tax rate, cash flow and cash level per employee are significant determinants for annual equity grants.

Yermack (1995) studied the empirical effectiveness of stock option grants as a performance incentive. In his study, the sensitivity of stock option grants to firm value was measured by taking the first derivative of Black-Scholes and linking that to Tobin's Q and

CEO's equity holdings in the firm. He found that it is expected that CEO's alter their equity holdings in the firm in response to option grants they receive in order to maintain an 'equilibrium' amount of shareholdings in the company. Furthermore, contradictive to what agency theory would predict, he reported a negative relation between the incentives arising from stock option grants and the firm's growth opportunities as measured by Tobin's Q.

Frye (2004) evaluated the effects of EBI on firm performance for US based 153 and 212 firms on the periods 1992-1994 and 1997-1999, respectively. He defined equity incentives as the percentage of stock based grants to total compensation. In both periods, he documented a positive relation between the percentages EBI granted and firm performance, measured by Tobin's Q.

Eaton and Rosen (1983) found no significant relationship between stock option incentives and firm size. Neither did they find a significant relation between stock option incentives and CEO age. A sample of US highest ranked executives was used for the period 1970-1973. The option incentive value was taken by taking the difference between the market stock price and exercise price and adjust for mortality rates to incorporate the probability that CEO dies before he exercises the options.

A study that actually did document stock options to reduce agency cost was done by Lewellen, et al., (1987). They studied executives of 49 large manufacturing corporations in the US over the period 1964 through 1973. Stock options were valued by taking the year-end exercise value in the year the options were granted. In other words, the difference between the year-end closing market stock price and the exercise price was taken to approximate the stock option value. The incentives coming from stock options were denoted as taking the annual stock options grants over the annual total compensation. It was found that equity incentives are positively related to the firms' leverage, growth opportunities (measured by taking the market value of equity over the book value of equity) and age of the executive.

Smith and Watts (1992) related measures of investment opportunities (growth opportunities and firm size) to executive compensation policies. They found that firms with higher investment opportunities pay higher compensation packages and grant more stock options. Compared to unregulated firms, regulated firms tend to grant less stock options and pay lower compensation levels. US executive compensation data for the years 1966, 1970, 1974, 1978, 1982 and 1986 are used in this research. The approximation for stock incentives is defined as the percentage of firms using stock option in their incentive plans.

Gaver and Gaver (1993) supplemented the work of Smith and Watts (1992) by investigating the relation between investment opportunities and executive compensation for 237 growth and 237 non-growth firms in the US for the year 1985. They noted that stock options are more prevalent in growth firms relative to non-growth firms, when firms are not controlled for size. When firms are controlled for size, however, the effect evaporated: when controlling for firm size, no significant difference in the incidence of stock option was found between growth and non-growth firms. Stock options were measured by using a dummy variable, indicating whether a firm uses stock option in the remuneration policy or not.

In Bizjak, Brickley, and Coles (1993) it was tested to what extent equity incentives are adopted to favour short-term or long-term stock returns. The analysis provided evidence to assume that firms with severe information asymmetry, hence growth firms, will set equity incentives such that both short-term and long-term returns are maximized. They also documented a weaker relation between CEO remuneration, total CEO wealth and the market value of the firm for growth-firms relative to non-growth firms. The researchers consulted remuneration information of 430 large US corporations over the period 1975 through 1989. The measurement of equity incentives was captured in the dollar change of CEO wealth that corresponds with a $ 1,000 change in the firm's market value.

Matsunaga (1995) uses a sample of 123 firms for the period starting in 1979 and ending in 1989 to test the relation between stock option grants and firm value. The value of option grants are determined by applying the dividend discounted Black-Scholes model. The Black-Scholes value of granted options was found to be positively associated with firm value, measured by the market to book ratio.

Mehran (1995) examined executive compensation packages of 153 US manufacturing companies for the years 1979 and 1980. His findings suggest that it is the structure of compensation, rather than the level of compensation, matters for setting effective incentives. In the sample used, it turned out that percentage of compensation that is equity based is positively related to firm performance. Equity incentives included the dollar value on grant date of stock options, phantom stocks, restricted stocks, performance shares and stock appreciation rights. Firm performance was measured as return on assets and Tobin's Q. The value of stock option grants was determined by using Black-Scholes.

Chourou, Abaoub, and Saadi (2008) investigated the determinants of stock grants and the pay for performance sensitivity of stock grants for Canadian firms in the period 2001-

2004. Regarding the determinants of stock option grants, they found that stock grants are positively related with growth opportunities and firm size. A negative association was found between stock grants and leverage, age of the CEO, and CEO and blockholder ownership.

The above explained empirical results do not provide a conclusive direction for the effect of stock incentives on firm performance. The divergent findings imply that the valuation technique used for inferring the equity value contained in the annual compensation package, the method to measure equity grants, the chosen time period, and the type of firms included in the sample all effect the pay for performance relationship regarding stock incentives.

Alternative motivations for equity incentive grants

Besides aligning managers' interests with shareholders' interests, one could think of alternative motives for granting managers with equity incentives. EBI could also be granted as a substitute for cash. When firms are facing cash constraints, they could chose to compensate executives with stock based compensation rather than cash based compensation. Often, stock based compensation does not require an immediate cash out to the firm. By using stock based compensation, the firm can postpone cash payments to the executives. (Dechow, Hutton, and Sloan, 1996) Besides serving as a substitute for cash, EBI can also be driven by tax motivations. As EBI are tax deductible, they could serve as an instrument to boost net compensation to CEOs. Typically, as is argued in Core, et al. (2003), firms with lower marginal tax rates are expected to use more EBI due to the benefits of future tax deduction.

Empirical findings on total compensation

In order to understand the pay for performance relationship in the Netherlands, it is relevant to look at results that previous research have found about aggregate compensation levels. As came forward in the previous section, incentives to managers can either be derived from flow compensation or the equity holdings of the manager in the firm. The distinction between those two types of incentive sources can also be made for the pay for performance relationship. Murphy (1999) refers to the explicit relation between pay and performance when the executive's wealth is tied to shareholder value through his equity holdings. On the other hand, the implicit relation between pay and performance refers to the connection between shareholder value and flow compensation (base salary, STI and granting of equity incentives).

<u>Implicit pay for performance</u>

Aggregate compensation levels can be expected to differ across industries. Carrol and Ciscel (1982) found that executives in the utility industry earn significantly lower average wages than executives in transportation or unregulated industries. They also recognized that regulated industries tend to reward executives less than unregulated industries, because regulated industries are less exposed to financial risk and reward is calibrated to governmental levels. Joskow, Rose and Wolfram (1996) found similar results on executive pay in the (regulated) utility industry relative to other industries. Their findings support the notion that regulated industries tend to favour consumers over shareholders, thereby reducing executive compensation levels.

Consistent with previous findings on regulated industries, Crawford, Ezzell and Miles (1995) showed that deregulation in the banking industry lead to a dramatic increase in aggregate CEO pay levels. Especially the sensitivity between stock option grants, STI and firm performance rose substantially after deregulation. Similar results were found for deregulation in the market for corporate control and CEO pay levels in the financial industry. (Hubbard and Palia, 1995)

Looking at undifferentiated for industry, aggregate pay levels, it is evident that pay levels increased dramatically in the U.S. since the 1980s. (Murphy, 1999) The rise is mainly attributable to the emergence of stock option grants, which has proven to substantiate the pay-performance relationship in the U.S. Hall and Liebman (1998) showed that the strong increase in the pay-performance sensitivity that is observed in the period 1980-1994 is attributable to the emergence of stock option grants.

It was also found that aggregate pay levels are positively related to firm size. Several explanations for this observation were given by Rosen (1982), of which one is that larger companies are better able to attract high-skilled managers. Furthermore the positive relationship between CEO pay and firm size is found to be consistent over time and across industries. Kostiuk (1990) showed that average elasticity between executive pay and firm size was approximately equal to the 1930 level. With respect to the present research it can be expected that firm size is positively related to CEO pay, as Abowd and Bognanno (1995) proved the relationship to be consistent across countries (including the Netherlands).

In the earlier mentioned research, Gaver and Gaver (1993) also documented that growth firms paid higher cash compensation to executives compared to non-growth firms.

Although Gaver and Gaver (1993) did not investigate the pay for performance relationship, it is relevant to take note of the observed difference in compensation levels between growth and non-growth firms.

Smith and Watts (1992) related measures of investment opportunities (growth opportunities and firm size) to executive compensation policies. They found that firms with higher investment opportunities pay higher compensation packages and grant more stock options.

Core, Holthausen, and Larcker, (1999) found a positive relation between total annual compensation and firms' growth opportunities (measured by Tobin's Q). Also, board size was found to be significant positively related to annual total compensation. CEO ownership was found to be negatively related to total compensation, as was blockholders equity ownership.

Regarding measuring the pay for performance relationship, Jensen and Murphy (1990b) found that the pay for performance elasticity equalled 0.00325. They related total pay, computed as the sum of flow compensation, stockholdings gains and dismissal, to firm value for 73 US manufacturing firms in the period 1969-1983.

Hall and Liebman (1998) deployed a fifteen year dataset on US firms starting in 1980 and ending in 1994. It was found that the increase in pay for performance sensitivity that they observed is primarily attributable to the emergence of managerial equity holdings. Additionally it was found that the responsiveness of flow compensation to firm performance increased over the time period due to the introduction of equity grants in compensation packages. However, the impact of equity holdings to the pay for performance sensitivity was found to be 50 times larger than the impact of flow compensation.

An international study of executive compensation in twelve countries was given by Abowd and Bognanno (1995). Reward data from several international consultancy firms was used in order to construct the multinational dataset for the period 1984 through 1992. The authors concluded that the typical U.S. CEO earned more than their international peers of equally sized corporations. The explanation for higher compensation to US CEOs compared to non-US CEOs was threefold: (1) U.S. CEOs received a relatively large part of their compensation in the form of equity, (2) US CEOs were subject to more favourable tax rates, and (3) US CEOs favoured from relatively high purchasing power. Abowd (1990) tested the relation between executive pay and corporate performance. He used a sample of 250 US corporations for the period 1981-1986. Accounting-based measures proved to be a weak

predictor of executive compensation. The relationship between after-tax economic performance and stock returns turned out to be stronger predictors of executive pay. This implicates that increasing pay is more sensitive to after-tax economic performance and stock returns than to accounting measures, although accounting measures are often used to determine variable payments.

Murphy (1985) used an eighteen years data set (1964-1981) to conduct his research on the pay for performance relationship on 73 manufacturing firms in the US. He found that CEO total pay is positively related to stock abnormal returns and sales of the firm. Equity compensation, however, was found to be negatively correlated with sales and abnormal stock returns. Murphy (1985) also emphasized as he noted significant difference between cross-sectional and time-series coefficients that it is important to control for firm and CEO characteristics.

Coughlan and Schmidt (1985) also found that CEO pay is positively related to abnormal annual stock returns. Changes in sales growth contribute to the changes in pay as well, but were nog found to significantly alter the effects of CEO pay on stock returns.

Bebchuk, Cremers, and Peyer (2011) provided an alternative measure of CEO compensation and defined the CEO pay slice (CPS) as the amount of remuneration captured by the CEO relative to total compensation paid to the top five executives. Data on US executives ranging from 1993 to 2004 was used. It was found that CPS is negatively related to firm performance (measured as ROA, Tobin's Q and stock returns), indicating that dominant CEOs in terms of their relative remuneration to other executives harm firm performance.

Explicit pay for performance

Jensen and Murphy (1990a) state that the most powerful alignment of interests between shareholders and managers is the direct ownership of the firm's equity by managers. They argue that the appropriate measure considering CEO stock ownership is the percentage of the companies' shares outstanding that is held by the CEO, rather than the dollar value of equity owned or the equity holdings value as percentage of annual cash compensation. When the CEO owns a large proportion of the common shares outstanding, a significant drop in shareholder value directly links to the wealth of the CEO. Therefore, looking at CEO stock ownership and the alignment of manager-shareholder interests from a shareholder perspective, it is evident to state that the larger the equity holdings of the CEO in the company, the stronger is the link between CEO wealth and shareholder value. The typical example that is

given to support the argument for CEO ownership originates from Jensen and Meckling (1976). Under the assumption that monitoring is costly and imperfect, the CEO has some discretion to purchase perquisites. As long as the CEO does not own 100 per cent of the shares outstanding, he can fully enjoys the benefits and only bears a fraction of the cost due to his fractional ownership of equity. In line with this assertion, Morck, Shleifer and Vishny (1988) concluded that equity ownership of the CEO often is too low for ensuring sufficient alignment with shareholder value. That is, managerial stock ownership was found to strengthen firm value when it ranges between zero and five per cent, weaken firm value when it ranges between five and 25 per cent, and again strengthen firm value when it exceeds 25 per cent. They consulted 371 US based firms in the year 1980 to conduct their results. Further, McConnell and Servaes (1990) investigated the relationship between managerial equity ownership and firm performance. It was found that firm performance increases with equity ownership of the manager as long as equity ownership does not exceed 50 per cent. Mehran (1995) also documents a positive relation between managers' equity holdings in the firm and firm performance (measured as ROA and Tobin's Q).

Another view on the equity holdings of the CEO is given in Core and Guay (1999), and Himmelberg, Hubbard, and Palia (1999). In contrast with the previously presented work, these authors assume that contracts are specified optimally and that, as a result, the equilibrium level of managerial equity ownership is set at the shareholder value-maximizing level. This view implicates that it is not trivial to expect higher equity ownership of the CEO in firms where intensively monitoring is required. Consequently, the optimal equity ownership view does not necessarily expect low-ownership firms to perform poorly because they lack to provide high-powered stock incentives to the CEO. It is rather expected that the optimal level of stock ownership is determined by firm and CEO characteristics. (Core, et al., 2003) In accordance with optimal equity holdings, Core and Guay (1999) predicted and found that annual option and stock grants are used to obtain the ex-ante specified optimal incentive level of CEOs' equity holdings. Further, Himmelberg, et al. (1999) conclude that managerial ownership is determined by firm characteristics.

Research on pay for performance of Dutch corporations

There is very limited research available on executive compensation in the Netherlands. The work that is available on Dutch executive compensation will be discussed in this section.

Abowd and Bognanno (1995) did an additional interesting finding, especially for the present study. The Netherlands was included in their sample and they computed the pay for performance relationship for the Netherlands. The typical Dutch CEO experienced a pay to sales elasticity of 0.057 in the period 1984-1992.

Conversely, Duffhues and Kabir (2008) found a negative relationship between pay and performance. They collected a hand-craft dataset on Dutch executive remuneration packages by consulting annual reports of Dutch listed firms in the period 1998-2001. As individual information about the CEO's compensation was often not available, the database was constructed using the total compensation paid to the entire executive board. The observed compensation levels were corrected to 2000 constant prices to correct for time effects. The authors noted that total compensation levels increased over time, mainly due to the rise of stock option grants. It was found that ROA, ROS, annual stock returns and Tobin's Q all were significant negatively related to total compensation, after controlling for industry, leverage, market value of equity and time.

Swagerman and Terpstra (2007) reviewed the main trends in Dutch executive compensation and its environment. They observed a severe increase in Dutch executive compensation packages in the year 2002, 2003 and 2004. They attribute the rise in pay to the increased preference of supervisory boards to grant equity incentives to executives. A notable trend that was observed is that stock option grants were to a large extent replaced by performance shares grants, thereby increasing the value of equity grants. The authors attribute the shift to performance shares and the accompanying rise in equity value grants to the emphasis that is given in the Netherlands to good corporate governance practices and shareholder value creation. One would expect that the shift to performance shares grants would enhance the pay for performance relationship in terms of shareholder value.

Duffhues, Kabir, Mertens, and Roosenboom (2002) conducted a research on the relation between stock option grants and firm performance for 113 firms listed on the Amsterdam Stock Exchange in the year 1998. Stock option values were derived using the information that was disclosed in annual reports. They documented a positive relation between stock option grants and firm operating performance (ROA and ROE).

2.3.2 *Other corporate governance mechanisms*

After having discussed executive compensation extensively, I will proceed by discussing other corporate governance mechanisms. The remaining corporate governance mechanisms

will not be discussed as elaborately as was done for executive compensation, because in the context of this research the other mechanisms serve as a complement to executive compensation. It is therefore rather interesting to evaluate the impact of the remaining corporate governance mechanisms on firm performance.

Board of directors

The separation of ownership and control in organizations result in a division between decision systems. At the one hand, managers are entitled to initiate and implement certain decisions and strategies. On the other hand, directors serve as a control organ to the organization by monitoring and ratifying (if necessary) the decisions made by managers. (Fama and Jensen, 1983) This section focusses on the role of the monitoring device of the company: the board of directors (supervisory board in the Netherlands). The existing literature indicates that the board of directors can severely influence both the compensation paid to executives and the value of the firm. As was recognized by Mehran (1995), 'one of the most important tasks of the director is to set the level and structure of the compensation to top executives, which raises the issue of how the composition of the board affects the structure of executive compensation.' Core, et al., (1999) investigated the influence of board structure on executive compensation. They reported a positive relation between the level of executive compensation and both board size and the number of outsider directors. An outsider director is considered a director that is not involved with the daily decision making of the firm and therefore acts independently, or as is described in Weisbach (1988) outside directors are 'not full-time employees of the company … that are believed to play a larger role in monitoring management.' Similar to results of Holthausen, et al. (1999), Ryan and Wiggins (2004) argued that independent directors have a bargaining advantage over the CEO resulting since independent directors are less connected with the CEO. The more the independency of the board, the better compensation aligns CEO interests with shareholders' interest. They found that firms with more outside directors contained in the board award more equity based compensation. This relationship between outside directors and equity awards in compensation packages was also documented in Mehran (1995).

Weisbach (1988) investigated the effect of the number of outside directors on CEO turnover. He hypothesized that boards containing more outside directors can more effectively monitor management. Outsider intensive boards are therefore more likely to replace the CEO when the firms has underperformed since outside directors' careers are not tied to the CEO's. Weisbach (1988) indeed found that boards containing relatively many outsiders are more likely to replace the CEO when the firm underperformed. Therefore, it can be expected that

the more outsiders the board entails, the more effective is the monitoring of management's actions, the better is the performance of the firm.

Although one can reason the effects of board composition on firm value, board composition itself is typically found not to correlate with firm performance. That is since board composition was found the correlate with board actions. Boards with relatively many outside directors and smaller boards were found to make better decisions on e.g. acquisitions and executive compensation. (Hermalin and Weisbach, 2001)

The academic research on the composition of the board of directors shows that shareholders would typically prefer to have more outside directors. But does increasing the number of (outside) directors, and thereby altering the decision making of the board, unambiguously lead to better performance of the firm?

Yermack (1996) assessed the relationship between board size and firm value, measured by Tobin's Q, using 452 US firms in the period 1984-1991. He found that firm value decreases as board size increases. More specific, as boards typically contained at least 6 members, the highest cost to shareholders was documented for boards growing from medium size to large size (6 to 12 members). The argument for favouring small boards over large boards was given in Lipton and Lorge (1992). They stated that although the monitoring ability of the board might increase with the number of members, it is plausible that this effect is offset by less outspoken evaluations of managerial outcomes and slower decision-making as the number of board members increases. Consistent with the findings of Ryan and Wiggins (2004), it was also found in Yermack (1996) that smaller boards can more effectively set appropriate incentives to the CEO.

Whereas Yermack (1996) suggested that firm value is a decreasing function of board size, Coles, Daniel, and Naveen (2008) re-examined the relationship between board size and firm value. Coles, et al. (2008) take into account the complexity of the firm and conclude that the optimal board size to firm value is a U-shaped relationship, implying that 'simple' firms should have small boards and 'complex' firms should have large boards. As complex firms require industry- and firm-specific knowledge, it enhances the quality of the board to include several insiders and this adds to firm value.

From a corporate governance perspective, the reviewed literature suggests that it is optimal for shareholders to: (1) approve the by executives proposed board members such that

the boards entails sufficient outside directors and (2) depending on the complexity of the firm, strive for boards being as small as possible.

Ownership structure

The third internal corporate governance mechanism that is discussed, is the ownership structure of the firm. The ownership structure of the firm is referred to as 'the identities of a firm's equity holders and the size of their positions.' (Denis and McConnell, 2003) One can expect that overlap between ownership and control reduce agency cost. This is, however, not trivial due to the complex relation between ownership and control and firm value. The complexity is explained in Denis and McConnell (2003). At first, it is reasonable to expect that equity ownership of the manager in the firm enhances the alignment between shareholders' and managers' interests. Yet, as the proportion of the manager's equity holdings in the firm increases, their abilities to pursue self-benefitting strategies without severe threat of dismissal harms the alignment between shareholders and managers. Thus, converging ownership and control through managers' equity holdings give rise a trade-off between alignment and entrenchment.

Other than managerial equity ownership, one can analyse the monitoring effects of different types of shareholders on managers' actions. Typically, the other types of shareholders are individual investors and institutional investors. In their review on corporate governance, Denis and McConnell (2003) give an overview of the types of shareholders and their characteristics.

First, individual shareholders typically have very small positions in firms. Therefore, especially in the U.S., firms are owned by a dispersed spectrum of shareholders. The dispersed shareholder has no or very limited incentives to spend recourses on monitoring management or influence the decision making of managers. This is recognized as the free-rider problem of dispersed shareholders. Due to the free-rider problem, dispersed shareholders commonly do not coordinate their actions. Hence, dispersed shareholders do not contribute to monitoring management. If shareholders own a more significant share in the company, the incentive to control management is larger.

Therefore, the second group of shareholders are the outside blockholders in the company. Outside blockholders are third parties, such as institutional investors, other companies and investment firms that own substantial parts of the company outstanding shares. Blockholders can use their control in the company to influence managerial decision making.

If blockholders use their control in favour of shareholder value, one can speak of the shared benefits of control: not only the blockholder, but all the shareholders benefit from the control in the company of the blockholder. Contrary to shared benefits, blockholders can also use control to gain private benefits of control. As with managerial equity ownership, the contribution of blockholders to shareholder value also depends on the trade-off between shared and private benefits of control.

Recognizing the trade-offs that are associated with the ownership structure, the question rises what ownership structures are most favourable in terms of firms performance. There is ample research available that investigate the relationship between ownership structure and firm value, of which several work is discussed in this research.

McConnell and Servaes (1990) estimated the relation between Tobin's Q and equity ownership structure of U.S. firms for the years 1976 and 1986. Focussing on insider ownership, they established a positive relation between insider corporate ownership up to 50 per cent and firm value. This finding supports the equity ownership of managers and directors. Also, a significant positive relation was found between firm value and the proportion of shares held by institutional investors.

In line with McConnell and Servaes (1990), Morck, et al. (1988) investigated the effects of managerial ownership on firm value. They reported a significant nonlinear relationship between managerial ownership and firm value. It was found that as managerial ownership increases when the manager owns a very small part of the outstanding equity (between 0-5 per cent), the value of the firm increases. When the manager owns an intermediate level of the firm's equity (5-25 per cent), increasing his position in the firm harms the value of the firm until a specific point (25 per cent) at which firm value starts to moderately increase again.

Mehran (1995) attempted to replicate the results found by Morck, et al. (1988). He also reported a positive relationship between the percentage of shares held by managers and performance of the firm. The relationship he found did not show non linearity.

Cho (1998) tested the indirect effect of ownership structure on firm value by assessing to what extent investments are affected by the ownership structure of the firm. Similar to Morck, et al. (1988), Cho (1998) reported a nonlinear relationship between insider ownership and investments of the firm. The relation was found to be positive below insider ownership

levels of 7 per cent, negative for levels between 7 and 38 per cent and positive again for levels higher than 38 per cent.

The reviewed empirical work on managerial ownership and firm value suggest that a moderate level of managerial ownership strengthens the alignment between managers' and shareholders' interests.

Demsetz and Lehn (1985) explained the determinants of ownership structure and investigated the effect of outsider ownership structure on firm performance. A sample of 511 U.S. firms was used. They found that the ownership structure of the firm depends on the market value of equity, firm-specific risk and the extent to which the firm is regulated. With respect to the optimal ownership structure for firm value, Demsetz and Lehn (1985) documented results that are contradictive to what Berle and Means (1932) would suggest. Whereas Berle and Means suggest that ownership concentration (hence, reducing shareholder dispersion) would increase firm value, Demsetz and Lehn (1985) did not found a significant relationship between ownership concentration and firm performance.

As is noted in Thomsen, Pedersen, and Kvist (2006), research on outsider blockholders and firm value of U.S. based firms typically find no significant relation. This might originates from the fact that U.S. corporations are typically characterised by dispersed ownership. Corporations in the European Union (E.U.), opposed to U.S. corporations, are typically characterised by higher concentrated ownership, lower investor protection and objectives of blockholders that differ from only maximizing shareholder value. Thomsen, et al. (2006) therefore argue that the results on U.S. based firms may not apply to E.U. based firms. To establish whether the relationship between ownership structure and firm performance differs between the U.S. and the E.U., a comparative between the two continents was conducted. The results confirm previous research on ownership structure and firm performance in the U.S.: no significant relation was found between outsider blockholder ownership and firm value in 489 U.S. firm for the period 1990-1998. Neither a relationship was found between blockholder ownership and firm value in 109 United Kingdom (U.K.) based firms in the same period. Looking at the relationship between blockholder ownership and firm performance of 276 firms based in continental Europe, however, Thomsen, et al. (2006) found a significant negative relationship between outsider blockholder (owner of at least 10 per cent interest in the company's shares outstanding) ownership, firm value and accounting returns in the period 1990-1998.

Looking at the effects of outsider ownership on firm value in Anglo-Saxon countries, one is unable to observe an evident effect. On the other hand, the results of Thomsen, et al. (2006) support the suggestion that blockholders in continental Europe act differently compared to blockholders in the Anglo-Saxon countries since in continental Europe, blockholders tend to affect firm value.

Another finding that is interesting for the argument for the present research was given in Mehran (1995). He noticed that equity based incentives is a decreasing function of percentage of shares held by insider and outsider blockholders. The rationale behind this is that when insiders and outsiders own substantial parts of the company, they have significant control over the decision making of the firm. It is therefore less requisite to grant managers with equity as an alignment instrument, since the insiders and outsider blockholder serve as monitors.

External control market

The external control market, also called the market for corporate control, is one of the two external corporate governance mechanisms. Denis and McConnell (2003) identify the market for corporate control as 'a court of last resort for assets that are not being utilized to their full potential.' The rationale behind the control market as a corporate governance mechanisms is as follows. Consider a manager that is entrenched and making self-benefitting decisions, thereby not allocating the assets under management efficiently. As a result, firm value is lower than its potential value. If markets work efficiently, investors and competitors will recognize that the firm is not managed well and that the firm therefore is undervalued. Consequently, the firm is subject to takeover threat. When the firm is taken over, the manager will lose his job. This is costly for the manager due to loss of income and incurrence of costs associated with reputation damage. Accordingly, an efficient market for corporate control disciplines the decision making of the manager. (Walsh and Seward, 1990)

There is ample research available that assessed the efficiency of the market for corporate control. Typically it is tested whether a takeover creates shareholder value. The consistent pattern in those researches is that the shareholders of target firms earn severe premiums while shareholders of acquiring firms earn an ambiguous rate of return on the takeover. (Walsh and Seward, 1990)

The market for corporate control is considered to be a relatively important discipline mechanism in the U.S. and the U.K. Therefore, corporations in those areas developed several antitakeover mechanisms to protect shareholders and managers. In the Netherlands, however,

the supervisory board and blockholders serve as the most important control mechanisms. Accordingly, in the Netherlands takeover defences are primarily employed to limit shareholders' power rather than to protect managers. (Kabir, Cantrijn, and Jeunink, 1997) Therefore, the market for corporate control is of less relevance for the context of this research.

Legal system

External financiers engage in transferring funds to firms since financiers in exchange receive certain control rights. One can look at external finance as a contract between a legal entity, being the firm, and the investor. The contract provides the investors with rights on the assets on the firm. If managers do not adhere to the contract, the investors have the right to enforce the contract in court. (Shleifer and Vishny, 1997) Therefore, contracts is a mechanism through with the actions of managers are disciplined. However, it was shown in Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997) that not every legal system is equally effective in enforcing the legal rights of shareholders. Countries with poor legal rules and quality of law enforcement tend to have relatively small and narrow capital markets. The explanation behind this observation is that because legal rules and law enforcement should protect external financiers from expropriation by managers, poor legal rules and law enforcement refrain investors from participating in capital markets. (Porta, et al., 1997) According to the findings in Porta, et al. (1997), countries under French civil law have the weakest investor protection by the legal system and henceforth the narrowest capital markets. Countries in which common law is prevalent have the strongest investor protection.

Voting is one of the other important rights shareholders have. However, it is argued in Shleifer and Vishny (1997), that 'voting rights are expensive to exercise and enforce.' This is due to the required physical attendance at general shareholder meetings in order to bring out a vote, which makes exercising voting rights for small investors costly.

Corporate governance and firm performance

All the internal and external corporate governance mechanisms taken together form the corporate governance system in the firm. As follows from the literature on the different corporate governance mechanisms, it can be expected that corporate governance differs across firms and across borders. Since the ultimate objective of corporate governance is providing returns to the funds invested by external financiers, it is contributes to the understanding of corporate governance practices to assess the effects of corporate governance on firm

performance. Two seminal works that evaluated the effect of corporate governance on firm performance are therefore reviewed.

The first work that is discussed was conducted by Gompers, Ishii and Metrick (2003). In order to quantify the quality of corporate governance per company, they developed a corporate governance index (GCI). The index consists of 24 provisions concerning corporate governance provisions. Firms are scored accordingly against those 24 provisions: for every provision that limits shareholder rights, the firm 'scores' one point. This is done for the years 1990, 1993, 1995 and 1998 for U.S. firms. Subsequently, a portfolio is conducted that sells the highest index score companies portfolio (weakest shareholder rights) and buys the lowest index score companies portfolio (strongest shareholder rights). In a four factor (risk premium, size, value and momentum) model, it was found that the low score portfolio generated significant positive alpha whereas the high score portfolio generated significant negative alpha. Furthermore, the GCI was found to be negatively related to Tobin's Q. The results support the notion that effective corporate governance delivers returns to external financiers.

In a reaction to Gompers, et al. (2003), Bebchuk, Cohen, and Ferrell (2009) conducted a similar research. One of the main critics on Gompers, et al. (2003) was that they put equal weights on all the provision incorporated in their index, despite the fact that some provisions are more relevant than others. Therefore, Bebchuk, et al. (2009) took the same provisions taken in Gompers, et al, (2003), but scored U.S. firms according the relative importance of the provisions for the period 1990 through 2003. This was down by conducting an index consisting of the by academics and practitioners six most important provisions: staggered boards, limits to shareholder amendments of the bylaws, supermajority requirements for mergers, supermajority requirements for charter amendments, poison pills and parachute arrangements. For each of these provisions that is included in the companies' practices, the company receives a point. The total score on these six provisions determines the companies' position in the index, which was called the Entrenchment index (E index). It was found that the higher the E index score, the lower is firm value measured by Tobin's Q. Compared to the GCI, Bebchuk, et al. (2009) found that the GCI correlation with Tobin's Q is mainly driven by the provisions incorporated in the E index: the 18 provisions that are not incorporated in the E index but are incorporated in the GCI appeared not to significantly correlate with Tobin's Q. Further, Bebchuk, et al. (2009) also documented negatives effects of high E index scores on stock returns.

Taking the work of Gompers, et al. (2003) and Bebchuk, et al. (2009) together, it is evident that weak corporate governance seem to harm firm performance.

<u>Dutch corporate governance environment</u>

Swagerman and Terpstra (2007) described the Dutch corporate governance environment. As the corporate governance environment is relevant for executive pay, it contributes to the context of this study to summarize the main trends in Dutch corporate governance recognized by Swagerman and Terpstra (2007).

First, The Dutch corporate governance environment has been influenced by foreign business as Dutch firms severely acquired firms from all over the world during the 1990s and 2000s. Furthermore, contemporary globalization also contributed to international influences on Dutch corporate governance mechanisms. The last source of the internationalisation of Dutch corporate governance is the emergence of foreign CEOs leading Dutch firms. The different attitudes that those foreign CEOs bring to board room also altered Dutch corporate governance.

Besides the internationalisation of Dutch corporate governance, the technological revolution has made it possible to monitor CEOs more effectively. Analysts and shareholders can extract information from the CEO and the firm more easily and this reduces monitoring costs. As a result, information is more effectively and more rapidly reflected in the firm's share price. This evolution has placed the CEO under intensified audit.

Also, deregulation of several industries such as telecommunications, postal services and utilities has favoured competition. As mentioned before, competition diminishes the likelihood of opportunistic behaviour of the CEO. Additionally, deregulation attracted more foreign investors to invest in Dutch firms. This contributed the monitoring of shareholders to executives as foreign investors typically are more active compared to Dutch investors.

Lastly, the Dutch corporate governance code (code tabaksblat) has been revised in 2008. The revision was mainly focused on increasing the internal control systems. The code consist of best provision to which Dutch listed firms have to adhere. If firms do not comply with one or more of the best practices, they have to declare in the annual report why the best practice is not adhered to. The best practices entail guidelines on the roles and division of the supervisory board and the executive board, remuneration packages, and the independence, composition, and expertise of the supervisory board committees.

3. Hypothesis development

The main objective of this thesis is to contribute to the understanding about the functioning of observed CEO compensation packages in the Netherlands. Besides supplementing prior academic work on Dutch compensation arrangements, I want to contribute to the public debate on executive compensation levels by trying to interpret why CEOs receive compensation amounts that are perceived to be disproportional to the wage of the average citizen. Supplementary to analysing the aggregate level of compensation, I follow the view of Jensen and Murphy (1990a) and investigate whether it is the structure, rather than the level, of compensation that matters in measuring the effectiveness of executive compensation. Therefore, this thesis attempts to address and answer the question: *What determines the structure of CEO compensation packages of Dutch listed firms and how does firm performance relate to observed CEO compensation packages?*

The approach to addressing this question is twofold. First, in order to understand why observed compensation structures may differ across firms, it is desired to assess what determinants determine the structure of compensation packages. Once it is evident what determines the structure of compensation packages, I proceed by testing the pay for performance sensitivity of Dutch CEO compensation packages. I follow Jensen and Murphy (1990a) and Mehran (1995) and first test the pay structure for performance relation as it contributes to the understanding of the Dutch executive compensation environment to evaluate what compensation structure most effectively align managers' and shareholders' interests. Second, to address earlier findings of Duffhues and Kabir (2008), I test the total pay for performance sensitivity to assess whether the effectiveness of executive pay as a corporate governance mechanism has altered over the past decade.

In the theoretical framework, I discussed, to the best of my knowledge, prior academic work that is relevant for this study. The findings and arguments presented in the theoretical framework serve as support for the construction of the hypotheses in the present research. In the remaining of this section, I argue the formulation of the hypotheses for this study.

3.1 *Determinants of CEO compensation in the Netherlands*

In the light of previous research on the determinants of CEO compensation structure, it is evident that it is affected by several factors. As came forward in the literature review, such factors are among others accounting performance (Shleifer and Vishny, 1997; Jensen and

Murphy, 1990b), ownership structure (Mehran, 1995) and investment opportunities (Ittner, et al., 2003). Although these factors each tend to influence the composition of executive compensation, there is only one organ that ultimately determines the structure of executive compensation. That organ is the board of directors in the U.S., or equivalently the supervisory board in the Netherlands. As is described in the code Tabaksblat, the supervisory board is responsible for determining the balance between fixed and variable compensation and balance between short-term and long-term focussed remuneration, such that total remuneration is directed towards long-term value creation. The supervisory board, tough, takes into account the characteristics of the firm, ownership structure, and characteristics of the CEO in determining the compensation structure. But, I assume that the composition of the supervisory boards affects the extent to which firm characteristics, ownership structure and CEO characteristics are effectively translated into the compensation structure. Thus, the composition of the supervisory board ultimately determines the structure of executive compensation.

Although the organization structure of Dutch boards differs from American boards, I argue that the Dutch supervisory board is similar to the outside directors of U.S. boards. In the U.S., one-tier boards are the standard organizational structure of governing top management. In one-tier boards, both insider and outsider and executive and non-executive directors participate. In the Netherlands, however, firms have to separate executive from non-executive directors. Hence, Dutch firms have a two-tier board in which non-executive directors constitute the supervisory board and executive directors constitute the executive board. The separation between supervision and day-to-day management supports the independence of supervisory directors, since they do not have any direct authority to make decisions. Moreover, the code Tabaksblat requires that the supervisory board is composed such that members can, relative to each other and to members of the executive board, act independently and critically. This includes, amongst others, that supervisory board members did not occupy an executive position in the firm during the past five years and did not have any interests tied to the company until a year prior to appointment as supervisory director.[1] The required independence and critical attitude of supervisory board members are characteristics comparable to the characteristics of the U.S. outside director. As supervisory boards have to justify deviations from the code Tabaksblat in the annual report, deviating from the code is

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[1] A detailed description of the best practice provisions regarding the independence of members of the supervisory board can be found in provision III.2.2 in the Code Tabaksblat

costly. Consequently, I assume the requirements of the code Tabaksblat on members of the supervisory board to be fully applicable to supervisory board members in this research and therefore assume the supervisory board members to be the Dutch equivalent of the U.S. outside, independent directors.

Previous studies estimated the effect of outsider board members on the relative size of equity incentive grants to total compensation (Mehran, 1995; Core, et al., 1999; Hothausen, et al., 1999; Ryan and Wiggins, 2004). The consensus of those studies is that equity incentive grants increase as the number of outsiders in the board increases. The economic rationale is that outside directors are more independent from top management than inside directors. In that sense, outside directors have a bargaining advantage over the CEO compared to inside directors. This enables outside directors to better determine the compensation structure that serves the interests shareholders. Serving the interests of shareholders implies tying pay to firm performance, and hence grant more equity incentive intensive contracts.

Since I assume all supervisory board members to be independent, the composition of the supervisory board is such that it solely consists of outside directors. Rather than considering the composition of supervisory boards, as all members are assumed to be independent, I consider the size of the supervisory board relevant for the creation of executive compensation schemes.

Accordingly, I hypothesize that the structure of executive compensation is affected by the size of the supervisory board. More specifically, I hypothesize that:

H1: The percentage of equity incentive grants to total compensation is positively related to the size of the supervisory board.

Besides examining the relation between executive compensation structure and supervisory board size, I assess how supervisory board size affects total CEO compensation. Considering board structure and total compensation, Core, et al. (1999) argue that both board size and the number of outside directors is positively related to total compensation levels. Since I assume all member of the Dutch supervisory board to be equivalent to the U.S. outside director, the results of Core, et al. (1999) suggest a positive relation between supervisory board size and the level of total compensation paid to the CEO.

On the other hand, larger boards typically have superior monitoring abilities compared to smaller boards. (Weisbach, 1988) Also, larger boards are more independent from

executives compared to smaller boards (Ryan and Wiggins, 2004). Considering these arguments, it is sensible to expect larger supervisory boards to reduce the managerial power of CEOs. If the CEO has low managerial power, the ability to extract excessive rents through compensation schemes is limited. Hence, according to this line of reasoning, larger supervisory boards can be expected to set lower total compensation levels compared to small boards.

However, as the critical assumption of this thesis is that the Dutch supervisory board consists solely of the equivalents of U.S. outside directors, the setting of this research is similar to the setting in Core, et al. (1999). Therefore, I expect to observe a positive relation between the size of the supervisory board and total CEO compensation. Accordingly, I hypothesize that:

H2: Total CEO compensation is positively related to the size of the supervisory board.

If I find results that reject H2, it is more likely that supervisory board size reduces the managerial power of the CEO.

3.2   *Firm performance and CEO compensation structure*

The literature review declared that the listed corporation is subject to the concept of separation between ownership and control. When ownership and control are separated, those who own the company (shareholders) have different interests than those how manage the company (managers). The costs associated with mitigating the conflicts of interest between managers and shareholders, are recognized as agency costs. Effective corporate governance should minimize agency cost. Hence, corporate governance is designed to align the actions of managers with the interests of shareholders. Corporate governance consist of several mechanisms, of which executive compensation is of special interest in this research. As the first hypothesis dealt with the determinants of executive compensation, the remaining hypotheses in this research deal with the effectiveness of executive compensation as a corporate governance instrument.

The interest that shareholders pursue is receiving a return on their invested funds in the firm. Shareholders thus want mangers to take decisions that favour the performance of the firm. The manager's interest, however, is to maximize his own wealth. As the manager has some discretion in making decisions, the manager is not expected to automatically make decisions that maximize firm performance. Therefore, executive compensation should provide

the executive with the appropriate incentives (make firm performance the interest of the executive as well) such that firm performance is maximized.

Since aligning the interests of managers with shareholders' interests is the main objective of executive compensation, the effectiveness of executive compensation in enhancing firm performance has been widely studied. Studying this relationship is often referred to as evaluating the pay for performance sensitivity.

In general, the evidence on the pay for performance relationship suggest that total compensation marginally contribute to the performance of the firm. For example, Jensen and Murphy (1990b) documented that the elasticity between executives' total compensation and firm performance is less than one per cent. Also, economic performance and stock returns tend to be more sensitive to pay than accounting performance. (Abowd, 1990) Other researches that found a positive relation between performance, measured by stock returns, and executive pay are Murphy (1985) and Coughlan and Schidt (1985).

The U.S. orientated pay for performance research seem to point into a weak but positive relation between total pay and firm performance. Looking at Dutch prior work on the pay for performance sensitivity, however, Duffhues and Kabir (2008) found that total executive compensation is negatively associated with firm performance. The negative relationship might stem from the chosen time period. Their sample consisted of Dutch firms listed in the period 1998-2001. As was pointed out in Swagerman and Terpstra (2007), equity grants emerged in the years 2002 to 2004. Prior to 2002, compensation schemes in the Netherlands thus consisted primarily of cash components (base salary and STI). Given that cash compensation is typically only very weak related to firm performance (Jensen and Murphy, 1990a; Murphy, 1999), this can explain why Duffhues and Kabir (2008) observed a different pay for performance sensitivity compared to U.S. orientated research.

In the light of previous research on Dutch executive pay, this research focusses on whether the effect of Dutch total compensation levels today have changed over the past decades in terms of pay for performance sensitivities. Additionally, this research tries to explain movements in executive pay structures in the years since Duffhues and Kabir (2008) and the associated effects on the pay for performance sensitivity. As was noticed in Woudt (2015), Dutch executive pay levels increased over the recent past years due to the expansion of equity incentive grants in compensation schemes. Therefore, the environment of Dutch executive compensation schemes seems to have shifted from cash intensive contracts towards

equity intensive contracts. A similar trend occurred in the U.S. during the 1990s. Over that period, it was documented that equity incentive grants contributed to both the increase in total compensation levels and strengthening of the pay for performance sensitivity. (Murphy, 1999; Hall and Liebman, 1998)

Given the more robust empirical effects of equity incentives on firm performance compared to cash incentives, I expect that equity incentive intensive contracts are more effective in serving shareholders' interests than cash incentive intensive contracts. As was discussed in the literature review, there are several types of incentives that originate from pay contracts. The type of incentives that is considered relevant for this study is the incentives coming from flow compensation. The reason for only considering flow compensation in this research is that the approach to assessing the pay for performance sensitivity is from a corporate governance perspective. Since the CEO is allowed to purchase equity on his private account, the equity holdings of the CEO can be affected by both equity grants coming from flow compensation and private transactions. As private transactions are not part of corporate governance mechanisms, analysing incentives coming from equity holdings of the CEO would conflict with the corporate governance approach used in this research.

In accordance with the above reasoning and the empirical findings in previous academic work, I hypothesize that:

H3: Firm performance is positively related to the percentage of granted equity incentives to total CEO compensation.

3.3   Firm performance and total CEO compensation

Further, it contributes to the explanatory ability of this research to assess whether the pay for performance sensitivity has altered since Duffhues and Kabir (2008). As was argued in Woudt (2015), the rise in CEO pay in the Netherlands is mainly attributable to the emergence of equity grants. A similar trend was documented in the U.S., for which Hall and Liebman (1998) showed that it improved the pay for performance sensitivity. Further, Jensen and Murphy (1990b), Abowd and Bognanno (1995), Coughlan and Smith (1985), and Murphy (1985) all documented a positive pay for performance relationship for U.S. based firms. Although Duffhues and Kabir (2008) documented a negative pay for performance elasticity over the period 1998-2001 in the Netherlands, I expect the pay for performance elasticity to be positive over the period 2009-2014. Particularly since equity grants have emerged and the

academic literature suggests that the emergence of equity grants enhances the pay for performance sensitivity. Accordingly, I hypothesize H3 as follows:

H4: Firm performance is positively related to total CEO compensation

4. Methodology

4.1 Research Method

The hypotheses established in section 3 are tested using both cross-sectional and panel regressions. To test H1 and H2, I first run several cross-sectional regressions with different set ups. In every cross-sectional regression, I add a group of control variables to observe whether the addition of a group of control variables alters the direction of the coefficient of interest. After running the cross-sectional regressions, I run an industry fixed effect regression. I use the two-digit SIC code to identify the industry group to which each firm in the sample belongs. The industry group serves as the panel dimension, while I take the year of observation as the time dimension. I expect that compensation structure and level is primarily affected by within industry variation of industry-specific characteristics. Therefore, I test H1 and H2 using cross-sectional and industry fixed effects regressions. H3 and H4 are tested using industry fixed effect regressions. The models that I use to test H1, H2, H3 and H4 are explained below.

4.2 Theoretical construct for testing H1 and H2

In order test H1 and H2, I model the following equations:

(1) CEO compensation structure $= f$ (supervisory board size, control variables)
(2) CEO total compensation level $= f$ (supervisory board size, control variables)

Model (1) and (2) describe the effect of supervisory board size on the structure and total level of observed CEO compensation packages, respectively. As became evident in the literature review, several other factors than board composition have empirically been proven to affect compensation structures and levels. Therefore, I include control variables to control for firm characteristics effects, ownership structure effects, and CEO characteristics effects.

In order to accurately model the creation of executive compensation structure and level by the supervisory board, I contemplate the effects of the control variables on CEO compensation that are derived from the literature.

4.2.1   Firm characteristics

Firm size: Due to the complexity of large firms compared to small firms, large firms demand better-skilled managers. Better-skilled managers ask for higher compensation than less-skilled managers. Therefore, larger firms are expected to pay higher compensation. (Smith and Watts, 1992) Also, compensation packages are partially determined based on benchmark results. As benchmark correct for firm size, compensation packages are corrected for firm size as well. (Rosen, 1982) Lastly, due to diminishing marginal utility of the CEO, CEOs of larger firms require higher incentives to obtain to same level of utility compared to CEOs of smaller firms. (Himmelberg, et al., 1999) Regarding firm size and the structure of compensation, however, no evident relationship was constructed. Previous work (Eaton and Rosen, 1983; Gaver and Gaver, 1993) did not found a relation between firm size and equity grants. Nevertheless, I still include firm size in model (1) and (2). The motivation for including firm size is twofold: first, as firm size affects base salary, compensation structure and level is affected by firm size as I include base salary in the measures for compensation structure and total compensation. Second, as CEOs of larger firms require higher incentives, it follows from Ditmann, et al. (2010) that equity grants are expected to deliver greater incentive potential than cash. Hence, larger firms are expected to grant relatively more equity compared to smaller firms.

Accounting performance: The actual award of STI is often dependent of the one-year accounting performance of the firm. Therefore, accounting performance is linked to cash compensation through STI awards. On the other hand, Abowd (1990) mentioned that accounting measures are weak predictors of executive compensation. However, as accounting measures are used to determine the actual payment of variable rewards, I expect both the structure and level of CEO compensation to be positively related to accounting performance.

Cash balance of the firm: In order to assess to what extent firms use equity grants as a substitute for cash payments, it is desired to include the cash balance of the firm in the analysis. As equity grants do not require an immediate cash out to the firm, Dechow, et al. (1996) argue that firms with low cash levels can use equity grants to postpone cash payments. If firms indeed use equity as a substitute for cash if cash levels are low, I expect to observe an inverse relation between the firm's cash level and the percentage of equity grants to total compensation.

Investment opportunities: Several researches documented that the growth opportunities are positively associated to the level of equity incentive grants given to executives. (Ittner, et al., 2003; Smith and Watts 1992, Chourou, et al., 2008) When the firm has ample investment opportunities, the upward potential of equity incentives is significant to the CEO. Accordingly, I expect the percentage of equity grants to total compensation to be positively related to investment opportunities.

Leverage: One of the functions of leverage is that is serves as a disciplining mechanisms. Due the interest obligations that are associated with leverage, the free cash flows available to the firm are reduced when leverage increases. Furthermore, the manager has to take into account the credit worthiness of the firm in making investment decisions when it attracts leverage. The reduction of free cash flows and credit worthiness considerations of the firm reduce the likelihood of managerial expropriation of cash flows. The higher leverage, the more significant is the disciplining function of leverage. (Lewellen, et al., 1987) As leverage mitigate the likelihood of opportunistic behaviour of the CEO, one can view leverage as an agency cost reducing instrument. Likewise, equity incentive grants serve as an alignment instrument between shareholder and managers. Therefore, I expect the percentage of equity grants to total compensation to be a decreasing function of leverage.

4.2.2   *Ownership structure*

Outside blockholder concentration: As was noted in Thomsen, et al. (2006), European blockholders seem to be more active compared to U.S. blockholders. In accordance with the relative activity of European blockholders, one can expect blockholders to engage actively in the decision making and monitoring (through voting rights) of management. Consequently, less equity incentives are required to support the desired actions taken by managers. Mehran (1995) reported results that are in consistence with this line of reasoning: he found equity grants to be a decreasing function of outside blockholder ownership. Accordingly, I expect equity incentive grants to decline as outsider equity ownership concentration increases.

CEO equity ownership: In the view of Core and Guay (1999) and Himmelberg, et al. (1999), the granting of equity incentives by the supervisory board can be used to provide executives with the equilibrium value-maximizing level of equity holdings in the firm. Indeed, Mehran (1995) documented that equity incentives decreases as insider ownership increases. Therefore, I expect the percentage of equity grants to total compensation to be a decreasing function of the level of CEO equity ownership in the firm.

4.2.3   CEO characteristics

Age of CEO: Although Murphy (1999) argued that base salary only tend reflect firm characteristics rather than skills of the manager, I argue that it is sensible to expect compensation levels and structures to be affected by the age of the CEO. As was explained in Smith and Watts (1992), better-skilled managers demand higher wages than less-skilled managers. Older CEOs are generally more experienced than younger CEOs, hence I expect older CEOs to be better-skilled than young CEOs. Therefore, I expect the age of the CEO to be positively related to total compensation levels.

The expected effect of CEO age on compensation structure is unambiguous, however. Whereas Lewellen, et al. (1987) reported a positive relation between CEO age and equity incentive grants, Eaton and Rosen (1983) did not observed any relation between CEO age and equity incentive grants. Besides the empirical results that suggest either a positive or no relationship, there is also an economic explanation for expecting a negative relationship between equity grants and CEO age. Such an argument is given in Mehran (1995), formulating that as the risk-averse CEO grows towards his date of retirement, he might prefer (certain) cash payments over (uncertain) equity grants. Therefore, I expect CEO age to be negatively related with the magnitude of equity grants.

CEO tenure: In the context of managerial entrenchment, a CEO that is in place for a long time can be a sign of an entrenched manager. Firms with a CEO that has a strong position in the firm are subject to high replacement costs of the CEO and paying high compensation to CEOs. (Shleifer and Vishny, 1989) As the likelihood of an entrenched manager increases with tenure, thereby increasing potential agency costs, I expect the percentage of equity grants to total compensation to be positively related to CEO tenure.

4.2.4   Empirical model (1) and (2)

Given the theoretical motivation for the control variables, equation (1) is translated into an empirical model. Empirical model (1) tests the effect of supervisory board size on the structure of compensation packages after controlling for firm characteristics, ownership structure, CEO characteristics. Empirical model (1) is operationalized as:

$$CEO\ compensation\ structure_{it} = \alpha + \beta_1 Supervisory\ board\ size_{it} + \beta_2 Firm\ size_{it} +$$
$$\beta_3 Accounting\ performance_{it} + \beta_4 Cash\ balance_{it} + \beta_5 Investment\ opportunities_{it} +$$
$$\beta_6 Leverage_{it} + \beta_7 Outside\ blockholder\ concentration_{it} +$$
$$\beta_8 CEO\ equity\ ownership_{it} + \beta_9 CEO\ age_{it} + \beta_{10} CEO\ Tenure_{it} + \beta_{11}\theta_{it} + \beta_{12}\lambda_{it} + \epsilon_{it}$$

where i denotes the panel dimension and t denotes the time dimension per variable. Further, α denotes the intercept, β_j denote the coefficients of the independent variables, θ denotes the group of industry dummy variables, λ denotes the group if time dummy variables and ε denotes the error term.

Given the theoretical foundations for empirical model (1) and the hypothesis (H1) I formulized in section 3, I expect the direction of β_1 to be significantly positive.

Similar to empirical model (1), I construct empirical model (2) to test H2. Empirical model (2) tests the relation between the size of the supervisory board and the level of total CEO compensation, after controlling for firm characteristics, ownership structure, and CEO characteristics. I operationalise empirical model (2) as:

$$Total\ CEO\ Compensation_{it} = \alpha + \beta_1 Supervisory\ board\ size_{it} + \beta_2 Firm\ size_{it} +$$
$$\beta_3 Accounting\ performance_{it} + \beta_4 Cash\ balance_{it} + \beta_5 Investment\ opportunities_{it} +$$
$$\beta_6 Leverage_{it} + \beta_7 Outside\ blockholder\ concentration_{it} +$$
$$\beta_8 CEO\ equity\ ownership_{it} + \beta_9 CEO\ age_{it} + \beta_{10} CEO\ Tenure_{it} + \beta_{11}\theta_{it} + \beta_{12}\lambda_{it} + \epsilon_{it}$$

where i denotes the panel dimension and t denotes the time dimension per variable. Further, α denotes the intercept, β_j denote the coefficients of the independent variables, θ denotes the group of industry dummy variables, λ denotes the group if time dummy variables and ε denotes the error term.

In connection with H2, I expect to observe a significant positive sign for β_1.

4.3   Theoretical constructs for testing H2 and H3

Considering the third and fourth hypothesis, formed in section 3, I operationalise two models that differ from model (1) and (2). Equation (3) and (4) describe the models that I design in order to test hypotheses 3 and 4. Equation (3) and (4) are constructed as:

(3) Firm performance = f (CEO compensation structure, control variables)
(4) Firm performance = f(CEO total compensation, control variables)

Equation (3) describes the relation between frim value and CEO compensation structure, after controlling for other effects that influence firm performance. Equation (4) describes the relation between firm performance and total CEO compensation, after controlling for other effects. In determining what control variables to include, I contemplate prior researches and economic reasoning. Regarding firm characteristics, I adopt the work of Mehran (1995), Gompers, et al. (2003) and Bebchuk, et al. (2011) to determine the control variables. Considering corporate governance, I infer from the work of Gompers, et al. (2003), Mehran (1995), and Yermack (1996) what variables to include. Further, I reason that CEO characteristics are expected to affect firm performance.

4.3.1   Firm characteristics

Firm size: Although the effects of firm size on firm performance can be argued to be endogenous through economies of scale (Lewellen, et al., 1987), it is a standard control variable in models that explain firm performance (Gompers, et al., 2003; Mehran, 1995; Bebchuk, et al., 2011; Yermack, 1996). In previous work that evaluated the effect of compensation structures on firm performance (Mehran, 1995; Bebchuk, et al., 2011), firm size was found to be significantly related to firm performance.

Leverage: In leveraged buyouts, is was found that higher levels of leverage are associated with a higher takeover premium. This implies the tax savings associated with leverage deliver sufficient amounts of firm value to justify a higher takeover premium. (Jenkinson and Stucke, 2011) Leverage is also considered to be a standard control variable. (Mehran, 1995; Bebchuk, et al., 2011) In the context of this research, I expect leverage to enhance firm performance due to tax savings.

Investment opportunities: Investing in projects delivers a certain amount of net present value to the firm. Hence, if managers choose profitable projects, investment opportunities will enhance firm performance. On the other hand, if managers choose projects to enhance their private benefits (hence, invest in projects with negative net present value), firm performance will decrease. (Gompers, et al., 2003)

Growth opportunities: Firms with higher growth opportunities can be expected to have a higher growth option value incorporated in their stock price. Therefore, firm with more growth opportunities could exert higher firm value and stock returns. Accounting performance, however, could be lowered due to R&D outlays. In both Bebchuk, et al. (2011)

and Mehran (1995) growth opportunities were found to affect firm performance. Therefore, I incorporate growth opportunities in my model.

Firm age: Firm age was found affect firm performance (measured by Tobin's Q) in Bebchuk, et al. (2011). As it is reasonable to expect companies that are longer in existence to have accumulated more assets and firm specific knowledge, thereby being more profitable, I include firm age in the model as well.

4.3.2 Corporate governance

As was proven in Gompers, et al. (2003) and Bebchuk, et al. (2008), the quality of corporate governance provisions in the company affects firm performance. As executive compensation is only a part of the total corporate governance mechanisms in the company, it is desirable to include other corporate governance provisions in models (3) and (4) as well. In the absence of sufficient data to conduct a corporate governance index, I include several proxies for corporate governance mechanisms. By doing this, I try to approximate the effects of corporate governance quality that would otherwise have been captured in model (3) and (4) if a corporate governance index was available. As the data used for this research only contains Dutch based firms, I assume that the effects of the legal system do not vary across industries and firms.

The corporate governance mechanisms that I use to capture the quality of corporate governance are supervisory board size, CEO ownership, and blockholder ownership.

Supervisory board size: As was pointed out in Yermack (1996), smaller boards typically take decisions more effectively. Effective decision making benefits firm performance since bad decisions taken by management are prevented. Accordingly, Yermack (1996) delivered evidence that smaller boards make firms perform better. Therefore, I include the size of the supervisory board in the model.

CEO equity ownership: Jensen and Murphy (1990a) give a strong argument for including CEO equity ownership in the model, stating that direct equity ownership of the CEO is the strongest method to align interests between managers and shareholders. That is since through equity ownership, performance is directly linked to the wealth level of the CEO. Accordingly, it was documented in Mehran (1995) that CEO stock ownership favoured firm performance.

Outside blockholder concentration: Outsider equity ownership is typically not found to correlate with firm performance in the U.S. (Demsetz and Lehn, 1985) Thomsen, et al. (2006), however, noted that blockholder concentration is negatively related with firm performance in continental Europe. This suggest that blockholders in Europe are able to influence decisions that favour their interests, rather than common shareholders' interests. To control for this effect in the Netherlands, I include blockholder concentration in the model.

4.3.3 CEO characteristics

CEO age: I expect an older CEO to have more experience in managing companies compared to younger CEOs. The more experience the CEO has, the better the decision making of that CEO. And the better the decision making of the CEO, the better is the performance of the firms. Therefore, I include CEO age as a proxy for the experience of the CEO.

CEO tenure: A CEO with a long tenure can be a sign of an entrenched manager, which is harms firm performance. (Shleifer and Vishny, 1989). Conversely, a long sitting CEO has accumulated firm specific qualities and knowledge that can contribute to firm performance. Bebchuk, et al. (2011) recorded negative effects of CEO tenure on firm value. But as explained, the effect of CEO tenure on firm performance is not unambiguous. Since I expect CEO tenure to exert effects on firm performance, I include it into the model.

4.3.4 Empirical model (3) and (4)

Given the theoretical motivation for the control variables in the third and fourth model, I translate equation (3) and (4) into empirical model (3) and (4). Empirical model (3) tests the effect of CEO compensation structure on firm performance after controlling for firm characteristics, quality of corporate governance, CEO characteristics and industry. Empirical model (3) is operationalized as:

$$Firm\ performance_{it} = \alpha + \beta_1 CEO\ compensation\ structure_{it} + \beta_2 Firm\ size_{it} + \beta_3 Leverage_{it} + \beta_4 Investment\ opportunities_{it} + \beta_5 Growth\ opportunities_{it} + \beta_6 Firm\ age_{it} + \beta_7 Supervisory\ board\ size_{it} + \beta_8 CEO\ equity\ ownership_{it} + \beta_9 Outside\ blockholder\ concentration_{it} + \beta_{10} CEO\ age_{it} + \beta_{11} CEO\ Tenure_{it} + \beta_{12}\theta_{it} + \beta_{13}\lambda_{it} + \epsilon_{it}$$

where i denotes the panel dimension and t denotes the time dimension per variable. Further, α denotes the company specific intercept, β_j denote the coefficients of the independent

variables, θ denotes the group of industry dummy variables, λ denotes the group of time dummy variable and ε denotes the error term.

Empirical model (3) connects to H3 in the sense that β_1 gives the direction of the effect of compensation structure on firm performance. Following H3, I expect to observe a positive sign for β_1.

Empirical model (4) tests the effect of total CEO compensation on firm performance after controlling for firm characteristics, quality of corporate governance, CEO characteristics and industry. Empirical model (4) is operationalized as:

$$Firm\ performance_{it} = \alpha + \beta_1 Total\ CEO\ compensation_{it} + \beta_2 Firm\ size_{it} + \beta_3 Leverage_{it} + \beta_4 Investment\ opportunities_{it} + \beta_5 Growth\ opportunities_{it} + \beta_6 Firm\ age_{it} + \beta_7 Supervisory\ board\ size_{it} + \beta_8 CEO\ equity\ ownership_{it} + \beta_9 Outside\ blockholder\ concentration_{it} + \beta_{10} CEO\ age_{it} + \beta_{11} CEO\ Tenure_{it} + \beta_{12}\theta_{it} + \beta_{13}\lambda_{it} + \epsilon_{it}$$

where i denotes the panel dimension and t denotes the time dimension per variable. Further, α denotes the company specific intercept, β_j denote the coefficients of the independent variables, θ denotes the group of industry dummy variables, λ denotes the group of time dummy variable and ε denotes the error term.

Empirical model (4) is designed to test H4. In the light of H4, I expect to observe a significant positive sign for β_1 in empirical model (4).

4.3.5 Empirical model (3) and (4) with a lag term

I also test whether CEO pay has a lagged effect on performance. That entails that I test whether the compensation received by the CEO in year t enhances the performance of the company in year t+1. Although all compensation measures in this research are accrued to year t and are thereby contemporary, it adds to explanatory ability of this research to verify whether the incentive scheme given to the CEO in year t also favours the performance of the firm in year t+1. Considering stock returns, Jensen and Murphy (1990b) and Joskow, et al. (1996) show that CEO compensation favours contemporaneous stock returns, but also lagged stock returns of one and even two periods.

Besides the potential lagged effects of CEO compensation on stock returns, I implicitly argue that CEO compensation can favour lagged profitability and Tobin's Q. Consider an

incentive scheme in year t that motivated the CEO to start a project that benefits the company in year t. In accordance the incentive scheme, the CEO gets rewarded since he achieved the specified targets. The project, however, turns out to boost firm performance also after year t. Accordingly, the benefits of the project are reflected in firm performance measures at later years than only at year t. Especially when the CEO receives a relative equity intensive incentive scheme, the upward potential of equity induces him to run projects to favour long-term firm performance. Corresponding to this line of reasoning, I expect performance in year t+1 to be positively related with the percentage of equity grants to total compensation received by the CEO in year t. On the other hand, since base salary is not tied to performance and short-term incentives are typically tied to one-year performance, I do not expect total CEO compensation in year t to be related with firm performance in year t+1.

4.4   Data description

In order test the constructed hypotheses, I collect a hand-crafted data set. As there is no database available to extract Dutch executive compensation data from, I manually collect CEO compensation data by consulting annual reports of Dutch listed firms. I decid to collect remuneration data for the period 2009-2015. The reason for the selecting this time period is connected with the Dutch corporate governance code, called 'de code Tabaksblat'.

In 2003, the commission Tabaksblat developed the first corporate governance code for Dutch listed corporations. The first version of the code Tabaksblat was put into force as of December 2004. The code Tabaksblat serves as a set of advisory best corporate governance provisions. Listed firms are expected to adhere to the code Tabaksblat, but the code is not juridical binding. However, firms are obliged to explain deviations from the code Tabaksblat in the annual report. In 2008, the code was revised and was put into operation as of January the first 2009. The revised 2008 version of the code is still in operation today. Compared to the first version of the code Tabaksblat, the revised code required listed firms to disclose information on executive compensation on a more detailed level in the annual report. This includes disclosing comprehensive information on equity incentives such as stock options and performance shares. As I am particularly interested in the value of granted stock incentives to the CEO, I decided to let 2009 be the starting year of the dataset for this research. Also, prior research on Dutch executive compensation packages was constructed on time periods between 1998 and 2001 (Duffhues and Kabir, 2008; Duffhues, et al., 2002). By selecting a time period that is more recent, this research provides insights on whether the Dutch executive compensation environment has changed over time.

Although the revised code Tabaksblat required more detailed remuneration disclosure, I found that the quality of compensation disclosure on other executives than the CEO is not consistent across firms. Especially firms of smaller size often lack sufficient data provision on remuneration for executives other than the CEO. Therefore, I decide to focus this research on CEO compensation solely.

Accordingly, I hand-collected remuneration data from annual reports of firms that were listed on the AEX, AMX and AScX index as of march 2015. I compile the data into a panel dataset for CEO compensation. The aggregates I extract for constructing the total Euro value of CEO compensation in year t were base salary, short term cash bonus accrued to year t, (at target) long term cash bonus accrued to year t and the fair Euro value of (at target) equity grants accrued to year t. Items that I include in equity grants consist of stock options, restricted shares, performance shares, stock appreciation right, phantom shares and stock performance units. Although the actual value to be vested over a predetermined period of time of equity incentives is not known at the time of grant, I assume that the value of equity grants at the time of grant is equal to the opportunity costs of the equity grant to the CEO. That is, the welfare maximizing CEO is assumed to be indifferent between receiving the equity grant and receiving the fair Euro value of the equity grant at the time of grant. Accordingly, I recognize the value of equity grants as the fair value of the grant at the time equity was granted. Most of the firms disclose the fair value of equity grants in the annual report. The majority of firms uses Black Scholes to determine the fair value of equity grants. In some cases, firms use binomial option pricing or Monte Carlo simulations to obtain the fair value of equity grants. Although the theoretical framework implies that different equity valuation methods may produce different values for the same grant, I assume that firms disclose the appropriate fair value that result in the intended value of the equity grant irrespective the valuation method. If the firm discloses the fair value of equity grants, I directly record the equity grant with the corresponding fair value. If the firm does not disclose the fair value directly, but does disclose the inputs for determining the fair value and the corresponding valuation method[2], I manually compute the fair value by putting the inputs in either the Black Scholes or binomial option pricing model to obtain the fair value. Consequently, I multiply the number of granted equity units with the manually computed fair value. If the firm neither discloses the fair value nor the inputs for determining the fair value of equity grants, I compute the fair value of equity grants by taking the Euro value of the at-target percentage of

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[2] I only found firms to disclose inputs for either Black Scholes or binomial option pricing model

base salary for equity grants that is stated in the remuneration policy. If the firm disclosed remuneration in U.S. Dollars (USD) or British Pound Sterling (GBP), I convert the figures to Euros (EUR) using the end-of-year exchange rate.

Regarding the funds listed on the Amsterdam Stock Exchange and the funds entailed in the dataset for conducting this research, there are some discrepancies between the two. Several firms are excluded from the dataset since they had their initial public offering on the Amsterdam Stock Exchange after 2009 or were delisted during 2009-2015, thereby not having sufficient observations to be included in the dataset. These firms include Altice, NN Group, Corbion, Flow Traders, Gemalto, Grandvision, IMCD, Kiadis Pharma, Lucas Bols, and Probiodrug. Three more firms are excluded since no remuneration data for the CEO was disclosed in the annual report (Air-France KLM, Aperam, and Refresco Group). Lastly, ING Group is not included in the sample since ING was owned by the state for the majority of years in the chosen time period. As the state sharply controlled variable compensation of ING Group directors, I assume the remuneration figures of ING Group not to represent levels that are compatible with other firms in the sample.

The restrictions that I impose on the sample result in an initial dataset on remuneration data containing 399 observations of 57 unique companies (7 observations per company). Additionally to hand-collecting remuneration data, I collect the number of supervisory board members in performance year t, the age of the CEO in year t, the number of shares owned by the CEO in year t, and tenure of the CEO in year t from annual reports.

I impose further restrictions on the dataset, since not all firms are included in the Bureau van Dijk (BvD) database. Therefore, I exclude 9 more companies from the dataset. The firms not included in BvD are Aegon, Arcelor Mittal, Bink Bank, Delta Lloyd, KAS Bank, Royal Dutch Shell, Unibail Rodamco, Van Lanschot, and Value 8. Due to this restriction the dataset is reduced to 336 observations of 48 unique companies. Further, BvD has no observations available over 2015 yet. Therefore, I shorten the time period of the sample to 2009-2014, thereby losing 48 observations.

Ultimately, after imposing the restrictions on the dataset, the final sample consists of 288 observations of 48 unique companies over the period 2009-2014. I supplement the remuneration data with control variables. Based on the 48 companies for which I compile CEO remuneration data, I consult Compustat Global and BvD to obtain data on the control variables. From the Compustat Global Fundamentals Annually, I extract book value of total

assets, balance sheet deferred tax liability, operating income after depreciation, capital expenditures (capex), cash and cash equivalents, research and development expenditures (R&D expenditures), long term debt, and the four digit SIC code. Compustat observations of AMG and SBM offshore were denoted in USD, whereas the observations of RELX were denoted in GBP. I converted the observations into EUR using the year-end OANDA exchange rate of the specific fiscal year. Considering R&D expenditures, there are 164 values missing. Therefore, following Bebchuk, et al. (2011), I include a dummy variable that takes on 1 if R&D is missing and I assign a value of zero to the missing R&D expenditures observation. Data on the daily closing share price and the number of shares outstanding is retrieved from Compustat Global Security Daily's database. Finally, the year of incorporation of the firm, book value of equity per share and the BvD independence indicator are retrieved from the BvD database. [3]

I proceed by explaining what aggregates I use to operationalise the theoretical constructs presented in the research method.

4.4.1 Dependent variables

Equity incentive grants to total compensation: I follow the methodology of Mehran (1995) and define equity incentive grants to total compensation as the percentage of granted equity incentives to total compensation in year t. Total compensation (TC) consists of the sum of base salary, short term cash incentives, long term cash incentives and equity incentives received by the CEO in year t. The components I included in total compensation are recorded as is described earlier in this section. In equation form, compensation structure is defined as:

$$\% \ of \ equity \ grants \ to \ TC = \frac{Total \ equity \ incentive \ grant}{Total \ compensation}$$

Total compensation: The sum of base salary, short term cash incentives accrued to year t, long term cash incentive accrued to year t and the total fair euro value of equity incentive grants accrued to year t.

Firm performance: For operationalising firm performance, I follow Mehran (1995) and Bebchuk, et al. (2011) by approximating firm performance with thee proxies.

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[3] Several accounting aggregates that were extracted from Compustat and BvD missed a few observations. I supplemented the missing values by consulting annual reports, except for R&D expenditures since the magnitude of missing values was too large (164 missing values).

Tobin's Q: The first proxy I adopt for firm performance is firm value. For measuring firm value I use Tobin's Q (Q) consistent with the definition employed in Kaplan and Zingales (1997) and Bebchuk, et al. (2011). Accordingly, I computed Q by taking the market value of equity plus book value of assets minus the sum of book value of equity and deferred taxes, divided by book value of assets. In equation form, I define Q as:

$$Q = \frac{Market\ value\ of\ equity + Book\ value\ of\ assets - Book\ value\ of\ equity - Deferred\ tax\ liability}{Book\ value\ of\ assets}$$

where market value of equity is constructed by multiplying the year-end closing share price by the number of shares outstanding, and the book value of equity is obtained by multiplying the year-end book value of equity per share by the number of shares outstanding.

ROA: The second proxy for firm performance is ROA. I computed ROA by taking operating income after depreciation to total assets, which is consistent with Bebchuk, et al. (2011) and Gompers, et al. (2003). ROA is calculated as:

$$ROA = \frac{Operating\ income\ after\ depreciation}{Total\ Assets}$$

Annual Total Shareholder Return: In order to also capture the effects of CEO compensation on shareholder wealth, I adopt the annual total shareholder return (TSR) as the third, pure capital market based proxy for firm performance. Additional to capital gains, TSR includes the return received by shareholders originating from dividend and stock split events. To compute TSR, I first multiplied the daily closing price with the Compustat daily return factor. The Compustat daily return factor includes reinvestments of dividends, compounding effects of reinvested dividends, stock splits, and stock dividends. By multiplying the unadjusted closing price with the daily return factor, I obtain the adjusted closing price that captures the total return to shareholders at that point in time. After obtaining the TR adjusted closing price, I select the year closing prices from 2008 up to 2014 to calculate the annual TSR. I calculate TSR according to the following formula:

$$TSR = LN\left(\frac{TR\ adjusted\ year\ closing\ price}{TR\ adjusted\ year\ opening\ price}\right)$$

4.4.2   Explanatory variables

Supervisory Board Size: The number of supervisory board members in year t, obtained from the annual report.

Compensation structure: See definition under section *4.4.1*

Total Compensation: See definition under *4.4.1*

4.4.3   Control Variables

Firm size: Firm size is approximated by taking the book value of total assets.

Accounting performance: I adopt ROA as the proxy for accounting performance. ROA is defined as is explained under *4.4.1*.

Cash balance: I operationalise the cash balance as the balance sheet value of cash and cash equivalents. To control for size effects, I construct the cash balance as percentage of total assets.

Investment opportunities: In accordance with Bebchuk, et al. (2011), I proxy the investment opportunities to the company by taking capex over total assets.

Growth opportunities: Growth opportunities is operationalised by taking R&D expenditures to revenues, which is similar to Mehran (1995).

Leverage: Leverage is defined as the book value of long-term debt over total assets. This is consistent with Duffhues and Kabir (2008), Mehran (1995) and Bebchuk, et al. (2011).

Firm age: Firm age is operated as the years since incorporation at year t.

Outside blockholder concentration: To the best of my knowledge, there is no comprehensive data of sufficient quality available to construct the number of significant outside blockholders and the corresponding interests in the company. The BvD database, however, provides an annual independence indicator that I adopt as a proxy for outside blockholder concentration. The BvD independence indicator scores the firm based on the number of significant outside blockholders and the aggregated interest of significant outside blockholders in the company. The different scores and the associated definitions are presented in table 1. [4] I operate the BvD independence indicator by including a group of dummy variables in the regressions. Each dummy variable represents a degree of the BvD independence index. Each independence degree dummy takes on the value of 1 if the company has a BvD independence rating that is equal to that specific degree.

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[4] Based on Kraft, S. (July 14th, 2011). *Corporate Governance and Stock Returns in the Netherlands.* Retrieved from: UvA-DARE

CEO equity ownership: The number of shares owned by the CEO divided the number of shares outstanding.

CEO age: Number of years since CEO is born at year t.

CEO tenure: Number of years since CEO was appointed CEO at year t.

Table 1

BvD Independence Indicator Degrees	
Score	**Description**
A+	No shareholder(s) with > 25% ownership (direct or total) and 6 or more identified shareholders.
A	No shareholder(s) with > 25% ownership (direct or total) and 4 or 5 identified shareholders.
A-	No shareholder(s) with > 25% ownership (direct or total) and 1 to 3 identified shareholders.
B+	No shareholder(s) with > 50% ownership (direct or total), but 1 or more shareholders with >25% and 6 or more identified shareholders.
B	No shareholder(s) with > 50% ownership (direct or total), but 1 or more shareholder with >25% and 4 or 5 identified shareholders.
B-	No shareholder(s) with > 50% ownership (direct or total), but 1 or more shareholder with >25% and 1 to 3 identified shareholders.
C	Any company with a shareholder with >50% total ownership.
D	Any company with a shareholder with >50% direct ownership.
U	Classification for companies that do not fall under the above mentioned categories

5. Empirical results and analysis

5.1 Sample description

Compensation structure and total compensation: Summary statistics for compensation structure (panel A) and total compensation (panel B) are presented in table 2. Panel A supports the assertion of professor Baeten, stating that equity grants have risen over the past previous years, as both the mean and median magnitude of equity incentive grants to total compensation increased over the period 2009-2014. The average CEO of a Dutch listed firm received 21.4 per cent of his total compensation in equity grants in 2009, whereas the same

average CEO received 25.7 per cent of his total compensation in equity grants in 2014. The mean percentage of equity incentive grant to total CEO compensation has been steadily increasing between 2009 and 2013. The only decrease in the mean magnitude of equity grants to total compensation occurred in 2014, but the 2014 mean equity incentive grant to total compensation is still 4.3 per cent higher than it was in 2009. This reveals that CEO compensation structures indeed have shifted towards more equity intensive compensation contracts between 2009 and 2014. Although the average trend has been towards more equity intensive contracts, still 81 out of the 288 CEO compensation schemes included in the sample (28.13 per cent) do not grant any equity incentives. However, in line with the average trend on compensation structure, the number contracts that do not grant any equity incentives reduced over the period 2009-2014. Sixteen firms did not grant any equity in 2009, whereas only eight firms did not grant any equity in 2014. Thus, both the incidence and the magnitude of equity grants have risen over the period 2009-2014.

Table 2

Panel A: Equity incentive grants to total compensation						
Year	**Mean**	**St. dev**	**Min.**	**Med.**	**Max.**	**Obs.**
2009	0.214	0.208	0	0.185	0.74	48
2010	0.216	0.207	0	0.22	0.64	48
2011	0.221	0.21	0	0.22	0.65	48
2012	0.233	0.21	0	0.18	0.66	48
2013	0.263	0.206	0	0.245	0.74	48
2014	0.257	0.184	0	0.265	0.57	48
Total	**0.234**	**0.204**	**0**	**0.225**	**0.74**	**288**
Panel B: Total Compensation ('000 EUR)						
Year	**Mean**	**St. dev**	**Min.**	**Med.**	**Max.**	**Obs.**
2009	1,225	1,106	235	650	4,742	48
2010	1,423	1,293	239	916	5,832	48
2011	1,364	1,163	232	940	5,113	48
2012	1,319	1,202	232	877	5,289	48
2013	1,579	1,590	319	953	6,674	48
2014	1,589	1,447	269	1,120	6,170	48
Total	**1,417**	**1,306**	**232**	**921**	**6,674**	**288**

Looking at total compensation, which is displayed in panel B of table 2, I observe an increase in total compensation levels over the period 2009-2014. Both mean and median total compensation rose during 2009 and 2010, after which it fell during 2011-2012. Although total

compensation fell in 2011 and 2012, it did not drop below the 2009 level. Starting in 2013, total compensation started to rise again, resulting in the mean total compensation level of 2014 being 364 thousand EUR higher than the 2009 mean level. The differences between mean and median total compensation levels indicate that the distribution of total compensation is positively skewed (skewness is 1.74). Most of the observations on total compensation are below the average, with a minority of observations having a very high compensation level relative to the average causing the average to be significantly higher than the median. In order to reduce the skewness of total compensation, thereby reducing the standard deviation of total compensation and increasing the likelihood of significant results, I adopt the natural logarithm of total compensation. Further, since the magnitude of total compensation is much higher compared to most variables entailed in the sample, it is desirable to operationalise total compensation by taking the natural logarithm of total compensation. After adopting the natural logarithm of total compensation, the distribution of total compensation suits the normal distribution better (skewness is reduced to 0.35). The summary statistics of the natural logarithm of total compensation are presented in table 3.

Table 3

Summary Statistics						
Variable	**Mean**	**St. dev**	**Min.**	**Med.**	**Max.**	**Obs.**
% of CEOs' equity grant to TC	0.234	0.204	0	0.225	0.743	288
Total compensation ('000 EUR)	1,417	1,306	232	921	6,674	288
LN Total compensation	13.814	0.821	12.353	13.733	15.714	288
Supervisory board size	5.503	2.005	2	5	12	288
Tobin's Q	1.373	0.559	0.527	1.262	4.517	288
ROA	0.071	0.066	-0.223	0.073	0.334	288
TSR	0.099	0.371	-1.598	0.136	1.249	288
Total assets ('000,000)	5,530	9,210	9.69	1,680	48,000	288
LN Total assets	21.028	1.960	16.087	21.240	24.595	288
CAPEX	0.033	0.034	0	0.022	0.167	288
Cash	0.070	0.091	-0.149	0.054	0.409	288
R&D expenditures	0.021	0.053	0	0	0.474	288
R&D missing	0.569	0.496	0	1	1	288
Leverage	0.167	0.132	0	0.152	0.552	288
Firm age	62.167	62.949	3	33	331	288
CEO equity ownership	0.003	0.017	0	0	0.118	288
CEO age	54.104	6.130	39	54	72	288
CEO tenure	6.313	5.199	1	5	24	288

Explanatory variables and control variables: The summary statistics on all the variables used in this research appear in table 3. The average supervisory board size is 5.5 members, compared to a median supervisory board size of five members. Tobin's Q ranges from 0.559 to 4.517 with an average value of 1.373. The average ROA and TSR are 0.071 and 0.099, respectively. Since the EUR value of total assets carries a significant higher order of magnitude compared to the other variables, I adopt total assets by taking the natural logarithm of it. This is consistent with standard economic research on executive compensation and firm performance, such as Mehran (1995) and Bebchuk, et al. (2011). The summary statistics of the remaining firm characteristics are displayed in table 3. Considering the average CEO, table 3 shows that he carries a 0.003 per cent equity interest in the company. Note that distribution of CEO equity ownership is significantly right-skewed, since 78 CEOs have a zero interest in the company and 276 CEOs have an interest in the company smaller than one per cent. The other figures of the CEO entail an average age of 54 and an average tenure of 6.3 years. The distribution of the dummy variables on industry and the BvD independence degree are displayed in table 4. The BvD independence indicator is invariant on firm level, but does vary within industries. Also, the independence is concentrated at the A+ degree since 29 out of the 48 firms have score A+. Regarding industry, firms are concentrated in the manufacturing industry as 22 out of the 48 companies fall under this industry group.

Table 4

Frequency matrix industry and independence degree						
Dummy group	A+	B+	C	D	U	**Total industry**
10-14 Mining	0	1	0	0	0	**1**
15-17 Construction	2	1	0	0	0	**3**
20-39 Manufacturing	15	2	0	3	2	**22**
40-49 Transportation and Public Utilities	2	2	0	0	0	**4**
50-51 Wholesale Trade	1	1	0	0	0	**2**
52-59 Retail Trade	2	1	0	0	0	**3**
60-67 Finance, Insurance, Real Estate	3	0	1	0	0	**4**
70-89 Services	4	2	1	1	1	**9**
Total independence degree	**29**	**10**	**2**	**4**	**3**	**48**

5.2   Regression results and analysis

In this section I use regression analysis to estimate empirical models (1), (2), (3), and (4). For estimating model (1), I perform several regressions with different settings on the percentage of CEOs' equity incentive grants to total compensation and supervisory board size. Estimates of the model (1) regressions appear in table 5. I contemplate identical regression settings to

model (1) for obtaining regression estimates on model (2). For estimating model (2), I run several regressions on the natural logarithm of total CEO compensation and supervisory board size. The estimates of model (2) are shown in table 6. After analysing the determinants of compensation structure and total compensation, I estimate model (3) and (4) by running industry fixed effects regressions on firm performance, measured by Tobin's Q, ROA, and TSR, and CEO's equity incentive grants to total compensation and total CEO compensation, respectively. The regressions results for model (3) and (4) are presented in table 7 and 8. Lastly, I estimate the lagged effect of CEOs' total compensation and compensation structure on firm performance. Table 9 displays the regressions estimates for lagged compensation effects on firm performance.

5.2.1 *Determinants of CEO compensation structure*

I run several regressions on compensation structure to see whether different regression settings alter the direction of the determinants of compensation structure. The regression results on compensation structure are presented in table 5. First, I perform a cross-sectional regression on the percentage of CEOs' equity grants to total compensation and supervisory board size. In this regression, displayed under (1) in table 5, I only control for firm characteristics. The coefficient of supervisory board size is significantly positive at the one per cent significance level, indicating that, after controlling for firm characteristics, supervisory boards that contain more members grant more equity intensive incentives. The sign of supervisory board's coefficient remains significantly positive after adding ownership structure characteristics and CEO characteristics to the cross-sectional regression. The regression results including firm characteristics and ownership structure appears under (2) in table 5. The results of the regression including firm characteristics, ownership structure and CEO characteristics is shown under (3) in table 5. Besides the stable direction of the supervisory board coefficient in regressions (1) to (3), the magnitude of the coefficient hardly changes after adding ownership structure (from 0.04 to 0.038) and CEO characteristics (from 0.038 to 0.039) to the regression. The stable coefficients for supervisory board size in regressions (1) to (3) imply that the size of Dutch supervisory boards has similar effects on the relative magnitude of CEO equity grants to total compensation to the effect of number of outside directors in U.S. boards on CEO equity grants to total compensation. Particularly, the settings of regression (1) to (3) in this research are comparable to the analysis in Mehran (1995). Mehran (1995) documents that the percentage of CEOs' equity incentives to total compensation is positively associated with the prevalence of outside directors, which is

similar to the results I find in regressions (1) to (3). Regressions (1) to (3), however, do not control for industry specific effects. Therefore, I add industry fixed-effects to the regression to control for industry effects and evaluate the difference in CEO compensation determinants across industries. The estimation results of the industry fixed effects are shown under (4) in table 5. The explanatory ability of the model increases from a R^2 of 0.409 in regression (1) to a R^2 of 0.573 in regression (4). Considering a F-statistic of 14.06, the variables in model (4) are jointly significant in explaining CEO compensation structure. After adding industry fixed effects, the coefficient for supervisory board size is still positive. Its magnitude is altered severely tough, as it decreases from 0.039 in regression (3) to 0.016 in regression (4). Also, adding industry fixed effects to the regression lowers the significance of the effect of supervisory board size on the percentage of CEOs' equity grants to total compensation. The coefficient of supervisory board size is significant at the 10 per cent level in regression (4), whereas it was significant at 1 per cent level in regressions (1) to (3). This implies that the explanatory power of supervisory board size in explaining the percentage of CEOs' equity incentive grants to total compensation is reduced after including industry fixed effects. However, since it is still significant at the 10 per cent significance level, I am allowed to interpret the effect of supervisory board size on CEO compensation structure. Given that the coefficient of supervisory board size is significantly positive in all the regressions I operate to explain the CEOs' equity incentive grants to total compensation, I infer that the effect of supervisory board size CEO's equity grants is robust to adding firm characteristics, ownership structure, CEO characteristics, time, and industry to the analysis. Therefore, the regression estimates do not provide evidence for rejecting H1. Accordingly, the percentage of CEOs' equity grants to total compensation tend to be positively related to the size of the supervisory board. More precisely, after controlling for firm characteristics, ownership structure, CEO characteristics, time, and industry, the percentage of CEOs' equity grants to total compensation tend to increase with 1.6 percent as the supervisory board grows in size by one person, ceteris paribus.

Other factors that, according to regressions (4), tend to positively influence CEOs' equity grants to total compensation are firm size (LN Total assets), balance sheet cash and cash equivalents (Cash), investment opportunities (CAPEX), leverage, and CEO equity ownership. The percentage of CEOs' equity grants to total compensation is negatively affected by CEO age. Compared to firms with an independence score of C, firms with score B+, D and U tend to grants less equity intensive compensation schemes to the CEO.

Table 5

Empirical model 1: Determinants of Compensation structure regressions

OLS regression analysis of the percentage of CEOs' equity incentives to total compensation, supervisory board size and different groups of control variables. The variables are defined as is described in section 4. Regression (1) only controls for firm characteristics and time, regression (2) adds ownership structure, regression (3) adds CEO characteristics. In regression (4), industry fixed effects are added. Industry dummies are determined as is described in table 4. The t-statistics, based on standard errors, appear in parentheses. The significance levels are indicated by: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Variables	% CEOs' equity incentive grant to TC.			
	(1)	(2)	(3)	(4)
Supervisory board size	0.040***	0.038***	0.039***	0.016*
	(4.405)	(4.099)	(4.133)	(1.761)
Firm characteristics:				
LN Total assets	0.020**	0.020*	0.021**	0.040***
	(1.988)	(1.967)	(2.105)	(4.247)
ROA	0.260	0.259	0.209	0.157
	(1.595)	(1.525)	(1.229)	(0.981)
Cash	0.378***	0.401***	0.433***	0.486***
	(3.311)	(3.467)	(3.719)	(4.606)
CAPEX	0.869***	1.073***	1.103***	1.192***
	(2.943)	(3.237)	(3.340)	(3.108)
Leverage	-0.064	-0.061	-0.088	0.245**
	(-0.707)	(-0.660)	(-0.947)	(2.427)
Ownership Structure:				
A+		-0.063	-0.094*	-0.090
		(-1.260)	(-1.774)	(-1.647)
B+		-0.091*	-0.131**	-0.133**
		(-1.747)	(-2.339)	(-2.326)
D		-0.062	-0.084	-0.109*
		(-1.017)	(-1.360)	(-1.824)
U		-0.045	-0.093	-0.152**
		(-0.726)	(-1.383)	(-2.265)
CEO equity ownership		1.369**	1.075*	1.100**
		(2.434)	(1.837)	(2.090)
CEO characteristics:				
CEO age			-0.004**	-0.005***
			(-2.277)	(-2.689)
CEO tenure			0.003	0.002
			(1.278)	(0.802)
Constant	-0.475***	-0.411**	-0.149	
	(-2.798)	(-2.310)	(-0.727)	
Observations	288	288	288	288
R-squared	0.409	0.432	0.442	0.573
Industry FE	No	No	No	Yes
Year dummies	Yes	Yes	Yes	Yes

Most of the coefficient estimations are in line with previous literature. However, the academic literature suggests a different directions for cash and cash equivalents, leverage and CEO equity ownership. The direction of the cash coefficients reject the alternative motivation for granting equity. The alternative motivation for granting equity to the CEO is that firms with low cash levels can postpone an immediate cash out by paying the CEO in equity since equity does not require an immediate cash out. (Dechow, et al., 1996) According this alternative motivation, firms with low cash levels award equity intensive incentive schemes. However, the result I find contradicts the alternative motivation for using equity grants. This could imply that Dutch corporations do not suffer sufficiently from low cash levels to grant equity as a substitute for cash. I also find a positive coefficient for leverage, implying that firms in the Netherlands do not consider leverage a strong enough discipline mechanism to be a substitute for equity incentives. Lastly, past literature suggests that the percentage of equity incentives declines with CEO equity ownership since there appears to be an optimal percentage of equity holdings for the CEO. (McConnell and Servaes, 1990; Morck, et al., 1988) The positive coefficient for CEO equity ownership could suggest that CEOs of Dutch firms have not yet reached the optimal equity holdings level.

5.2.2   Determinants of total CEO compensation

I adopt the same analysis structure on total CEO compensation as I used for explaining the determinants of CEO compensation structure. I first regress the natural logarithm of total compensation on supervisory board size and only control for firm characteristics. Subsequently, I add ownership structure and CEO characteristics to the cross-sectional regressions to evaluate how adding control groups alter the direction of the supervisory board size coefficient. Table 6 presents the results of the cross-sectional regression, which are displayed under (1), (2) and (3). The coefficients for supervisory board size are all positive and significant at the 1 per cent level in regressions (1) to (3). The coefficient for supervisory board size increases as I add groups of control variables: from 0.166 to 0.172 after adding ownership structure and from 0.172 to 0.187 after adding CEO characteristics. Similarly to the analysis of compensation structure, I add industry fixed effects to the last regression (4) to evaluate how the specific environments across industries alters the coefficient of supervisory board size. After adding industry fixed effects, the coefficient for supervisory board size is still significant at the one per cent significance level. The magnitude of the effect of supervisory board size on total compensation is somewhat lowered after adding industry fixed effects: the coefficient for supervisory board size decreased from 0.187 in regression (3) to

0.105 in regression (4). Also, the explanatory ability of the regression increases from a R^2 of 0.763 in regression (1) to 0.853, implying that adding the variables contributes to the explanatory power of the estimation model. Moreover, the F-statistic of regression (4) is 59.43, implying that the model is jointly significant in explaining total CEO compensation. Given that the significance level is not altered and the stable positive direction of the supervisory board size coefficients is stable, the effect of supervisory board size on total compensation is quite robust. Therefore, the estimates do not support the rejection of H2. That is, total CEO compensation of Dutch listed firms tend to be positively related to the size of the supervisory board. After controlling for firm characteristics, ownership structure, CEO characteristics, time, and industry, total CEO compensation of Dutch listed firms tend to increase with 10.5 per cent as the supervisory board size increases with one member, ceteris paribus.

Besides supervisory board size, I find total assets, ROA, cash, leverage, CEO equity ownership and CEO tenure to significantly affect total CEO compensation. Total CEO compensation rises with total assets, ROA, cash, leverage, and CEO tenure. Only CEO equity ownership appears to negatively affect total compensation. Compared to firms with independence score C, firms with independence score B+ and D pay significantly lower compensation levels to the CEO. Regarding firm size, it is consistent with standard executive literature to observe a positive association between firm size and total compensation. The positive relation between ROA and total compensation most likely originates from the dependence of variable pay on ROA, meaning that higher levels of ROA result in higher variable pay, which in turn results in higher total compensation. The firm's cash and cash equivalents is typically not included in models that attempt to explain executive compensation. The positive direction for the cash coefficient I observe suggests that firms with higher more cash use it to pay higher compensation to the CEO compared to firms with low cash levels. The direction of the leverage coefficient is against what agency theory predicts since leverage is expected to serve as a discipline mechanism, but it is consistent with the observed direction of leverage in Duffhues and Kabir (2008). According to agency theory, higher leverage should be associated with lower compensation. The positive direction of leverage, however, suggests that the increased firm risk associated with attracting leverage require higher remuneration to the CEO to compensate for increased risk. The negative sign of CEO equity ownership suggests that the necessity to grant high incentives to the CEO reduces when his equity holdings, thus his connection with firm performance, increases.

Table 6

Empirical model 2: Determinants of total CEO compensation regressions.

OLS regression analysis of the natural logarithm of total CEO compensation, supervisory board size and different groups of control variables. The variables are defined as is described in section 4. Regression (1) only controls for firm characteristics and time, regression (2) adds ownership structure, regression (3) adds CEO characteristics. In regression (4), industry fixed effects are added. Industry dummies are determined as is described in table 4. The t-statistics, based on standard errors, appear in parentheses. The significance levels are indicated by: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Variables	Natural logarithm of total CEO compensation			
	(1)	(2)	(3)	(4)
Supervisory board size	0.166***	0.172***	0.187***	0.105***
	(7.240)	(7.225)	(7.922)	(4.715)
Firm characteristics:				
LN Total assets	0.208***	0.204***	0.200***	0.262***
	(8.161)	(7.980)	(7.965)	(11.744)
ROA	1.736***	1.674***	1.653***	1.402***
	(4.179)	(3.846)	(3.851)	(3.669)
Cash	0.624**	0.686**	0.581**	0.677***
	(2.141)	(2.314)	(1.975)	(2.692)
CAPEX	0.249	0.499	0.358	-0.591
	(0.331)	(0.587)	(0.430)	(-0.646)
Leverage	-0.392*	-0.443*	-0.436*	0.650***
	(-1.690)	(-1.862)	(-1.859)	(2.693)
Ownership Structure:				
A+		-0.120	-0.024	-0.124
		(-0.936)	(-0.182)	(-0.954)
B+		-0.218	-0.123	-0.261*
		(-1.637)	(-0.871)	(-1.910)
D		-0.216	-0.148	-0.297**
		(-1.382)	(-0.943)	(-2.087)
U		-0.089	0.043	-0.248
		(-0.558)	(0.255)	(-1.548)
CEO equity ownership		-2.799*	-4.103***	-4.066***
		(-1.940)	(-2.779)	(-3.238)
CEO characteristics:				
CEO age			-0.001	-0.004
			(-0.249)	(-0.835)
CEO tenure			0.019***	0.017***
			(3.462)	(3.308)
Constant	8.442***	8.629***	8.587***	
	(19.479)	(18.904)	(16.567)	
Observations	288	288	288	288
R-squared	0.763	0.770	0.781	0.853
Industry FE	No	No	No	Yes
Year dummies	Yes	Yes	Yes	Yes

5.2.3   CEO compensation structure and firm performance

Table 7 presents the industry fixed effects regression estimates for the effect of compensation structure on firm performance. I run three regressions: I regress the percentage of CEOs' equity incentive grants to total compensation on (1) Tobin's Q, (2) ROA, and (3) TSR. All the regressions in table 7 are industry fixed effects regressions, in which I control for firm characteristics, corporate governance proxies, CEO characteristics, and year dummies. The F-statistics are 6.42 for regression (1), 5.22 for regression (2), and 6.72 for regression (3). This implies that the variables are jointly significant in all regressions, but they carry less explanatory power compared to model (1) and model (2). The R^2 of the three regressions also indicate that the regression can explain a fairly part of the variation in the firm performance metrics, but these regressions are less robust than models (1) and (2). Since the F-statistics and R^2 are comparable to Mehran (1995), I proceed by interpreting the CEO's equity incentive grants to total compensation coefficients to test H3.

I find that firm performance measured by Tobin's Q and ROA is significantly positively affected by the percentage of CEOs' equity incentive grants to total compensation. Holding all else equal, Tobin's Q increases with 0.596 when the CEO receives one percent more of his total compensation in equity. With respect to ROA, a one percent increase in the CEOs' equity incentive grants to total compensation is associated with a 0.064 increase in ROA, ceteris paribus. My findings on the percentage of CEOs' equity incentives to total compensation are consistent with Mehran (1995), as he finds a positive relation between the percentage of CEOs' equity grants to total compensation and both Tobin's Q and ROA as well, after controlling for firm characteristics, ownership structure and board structure. Contrary to Tobin's Q and ROA, the coefficient for the percentage of CEOs' equity grants to total compensation is not significant. The regression estimates imply that the percentage of CEOs' equity grants to total compensation is mainly contributing to measurements of firm performance that include book values and accounting measures of performance. That is, the only pure capital market based measurement of firm performance, TSR, does not appear to be affected by the extent to which CEO receives equity incentives. The absence of a significant relationship between the CEO equity incentives to total compensation and TSR is remarkable, as agency theory would suggest that CEO equity incentives should have the strongest relation with pure capital market based measurements of performance. Particularly since the wealth of the CEO is directly connected to capital market performance through equity incentive grants.

Table 7

Empirical model 3: Compensation structure and firm performance regressions. Industry fixed effects regression analysis of firm performance, measured by Tobin's Q (1), ROA (2), and TSR (3), the percentage of CEOs' equity incentives to total compensation and control variables considering firm characteristics, corporate governance proxies, CEO characteristics and time dummies. The variables are defined as is described in section 4. The industry dummies are determined as is described in table 4. The t-statistics, based on standard errors, appear in parentheses. The significance levels are indicated by: *** p<0.01, ** p<0.05, * p<0.1.

Variables	Tobin's Q (1)	ROA (2)	TSR (3)
% of CEOs' equity incentive grant to TC	0.596***	0.064***	0.174
	(3.068)	(2.681)	(1.359)
Firm characteristics:			
LN Total assets	0.020	-0.009**	-0.003
	(0.626)	(-2.406)	(-0.136)
Leverage	-0.814**	-0.039	-0.403*
	(-2.456)	(-0.951)	(-1.852)
CAPEX	1.809	0.314**	1.103
	(1.461)	(2.074)	(1.356)
R&D expenditures	1.865***	-0.157*	-0.305
	(2.736)	(-1.890)	(-0.682)
R&D missing	0.276***	0.000	0.041
	(3.522)	(0.007)	(0.805)
Firm age	-0.002***	-0.000	-0.000
	(-3.204)	(-1.173)	(-0.320)
Corporate governance proxies:			
Supervisory board size	-0.012	0.007*	0.015
	(-0.381)	(1.816)	(0.739)
CEO equity ownership	-5.825***	-0.240	-1.772
	(-3.239)	(-1.093)	(-1.500)
A+	-0.171	-0.009	0.058
	(-0.963)	(-0.402)	(0.495)
B+	-0.544***	-0.036	-0.011
	(-2.944)	(-1.609)	(-0.092)
D	0.111	0.034	0.013
	(0.570)	(1.422)	(0.102)
U	-0.402*	-0.034	-0.050
	(-1.829)	(-1.250)	(-0.347)
CEO characteristics:			
CEO age	-0.006	-0.000	-0.002
	(-0.954)	(-0.308)	(-0.536)
CEO tenure	-0.007	-0.000	0.008
	(-1.040)	(-0.004)	(1.633)
Observations	288	288	288
R-squared	0.400	0.352	0.411
Industry FE	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes

The finding under regression (3), however, implies that the percentage of equity incentive grant to total compensation does not contribute to stock performance of the firm. Several explanation for observing no relation between CEO equity grants and TSR are sensible. It can be the case that the actions of the CEO are not fully adopted into the share price of the firm, thereby manipulating the relation between granted CEO equity incentives and firm capital market performance. Alternatively, it can be that my measure for equity incentives is not accurate for determining the effect of equity incentives given to the CEO on capital market performance of the firm. In connection with H3, if I only look at TSR as the measure of firm performance, the coefficient of the percentage of CEOs' equity grants to total compensation provides motivation for rejecting the hypothesis that firm performance is positively affected by the percentage of granted equity incentives to total CEO compensation. On the other hand, looking at accounting performance (ROA) and a hybrid between book value and capital market value (Tobin's Q), the regression estimates do not provide evidence for rejecting H3. Therefore, since two of the three performance measures are significantly positive related with the percentage of CEOs' equity incentives to total compensation, I do not reject the hypothesis that firm performance is positively affected by the percentage of granted equity incentives to total compensation.

5.2.4 Total CEO compensation and firm performance

The industry fixed effects regression estimates for empirical model (4) are presented in table 8. Table 8 displays the coefficients for the natural logarithm of total CEO compensation on Tobin's Q (1), ROA (2), and TSR (3). I run these three regressions using identical models, in which only the performance metric differs across the regressions. That is, in all regressions I control for firm characteristics, corporate governance proxies, CEO characteristics, and year dummies. The F-statistics for regression (1), (2), and (3) are 7.03, 6.2, and 7.08, respectively. Therefore, the variables are jointly significant in explaining each performance metric. The R^2 of the three regressions lay around 0.4, implying that this model has similar explanatory power to estimates of empirical model (3). Accordingly, I interpret the coefficients of total CEO compensation in estimation of empirical model (4) for testing H4.

The regression estimates reveal that the coefficient estimates of total CEO compensation are significant at the one percent significance level and positive to all firm performance metrics.

Table 8

Empirical model 4: Total CEO compensation and firm performance regressions.

Industry fixed effects regression analysis of firm performance, measured by Tobin's Q (1), ROA (2), and TSR (3), the natural logarithm of total CEO compensation and control variables considering firm characteristics, corporate governance proxies, CEO characteristics and time dummies. The variables are defined as is described in section 4. The industry dummies are determined as is described in table 4. The t-statistics, based on standard errors, appear in parentheses. The significance levels are indicated by: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Variables	Tobin's Q (1)	ROA (2)	TSR (3)
LN of Total CEO compensation	0.355***	0.048***	0.145***
	(4.437)	(4.979)	(2.746)
Firm characteristics:			
LN Total assets	-0.048	-0.019***	-0.033
	(-1.328)	(-4.360)	(-1.387)
Leverage	-0.914***	-0.055	-0.458**
	(-2.795)	(-1.402)	(-2.114)
CAPEX	2.487**	0.389***	1.312
	(2.071)	(2.687)	(1.650)
R&D expenditures	1.686**	-0.188**	-0.407
	(2.511)	(-2.327)	(-0.915)
R&D missing	0.207***	-0.009	0.015
	(2.658)	(-0.949)	(0.283)
Firm age	-0.002***	-0.000	-0.000
	(-3.308)	(-1.256)	(-0.348)
Corporate governance proxies:			
Supervisory board size	-0.043	0.002	0.000
	(-1.369)	(0.573)	(0.021)
CEO equity ownership	-3.754**	0.028	-0.974
	(-2.088)	(0.128)	(-0.818)
A+	-0.178	-0.009	0.059
	(-1.026)	(-0.408)	(0.517)
B+	-0.510***	-0.030	0.011
	(-2.808)	(-1.360)	(0.090)
D	0.143	0.039*	0.032
	(0.747)	(1.710)	(0.250)
U	-0.383*	-0.029	-0.034
	(-1.779)	(-1.114)	(-0.237)
CEO characteristics:			
CEO age	-0.009	-0.001	-0.003
	(-1.432)	(-0.734)	(-0.754)
CEO tenure	-0.011	-0.001	0.006
	(-1.595)	(-0.671)	(1.252)
Observations	288	288	288
R-squared	0.422	0.392	0.424
Industry FE	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes

When total CEO compensation rises with one percent, Tobin's Q increases with 0.355, ROA increases with 0.048, and TSR increases with 0.145, ceteris paribus. These findings suggest that total CEO compensation does contribute to firm performance. Since I find all three metrics of firm performance to be significantly positively affected by total CEO compensation, the regression estimates provide conclusive evidence not to reject H4. That is, given the significant positive estimated coefficients of total CEO compensation on Tobin's Q, ROA, and TSR, I do not reject the hypothesis that firm performance is positively affected by total CEO compensation. Also, the regression estimates I find for total CEO compensation on firm performance are different compared to Duffhues and Kabir (2008). As Duffhues and Kabir report a negative relationship between total CEO compensation and firm performance measured by Tobin's Q, ROA, and annual stock returns, the results I find suggest that the executive compensation environment in the Netherlands might has altered. An alternative explanation for the opposite direction of the total CEO compensation coefficients I find compared to Duffhues and Kabir (2008) is that both studies do not contemplate an identical methodology. Duffhues and Kabir (2008) only take into account cash compensation (base salary, short-term cash incentive and other cash payments) in their definition of total compensation, whereas I exclude other cash payments and include equity incentive grants in my definition of total compensation. Moreover, Duffhues and Kabir (2008) control for firm characteristics, time, and industry in their regressions. In addition to those control variables, I also control for corporate governance provisions of the firm and CEO characteristics. In comparing the results of Duffhues and Kabir (2008) with the results I find, I take into account the differences in approaching the pay for performance relationship of CEO compensation in the Netherlands between Duffhues and Kabir (2008) and this study. Accordingly, it is evident that I document a positive pay for performance sensitivity of CEO total compensation in The Netherlands whereas Duffhues and Kabir (2008) document a negative relationship. The source of the opposing direction of the pay for performance sensitivity between the two studies is probably the definition of total compensation, as I also find significantly positive coefficients on all metrics of firm performance when I only control for firm characteristics (results not enclosed here).

5.2.5   *CEO compensation and lagged performance*

As I explain in section 4, I also run empirical model (3) and (4) on lagged performance to test whether compensation paid to the CEO in year t does contribute to firm performance in year

t+1. As I find a contemporaneous effect of both CEOs' equity incentive grants to total compensation and total CEO compensation itself on firm performance (except for TSR in the case of CEOs' equity incentive grants), it adds to the explanatory ability of this research to verify whether there is also a lagged relationship prevalent. In order to test the lagged relationship, I perform industry fixed effects regressions again. However, this time I regress the remuneration of the CEO in year t-1 on firm performance in year t. The results of the percentage of CEOs' equity incentives to total compensation in year t-1 on firm performance in year t are presented in table 9. Table 10 shows the regression results of the natural logarithm of total CEO compensation in year t-1 on firm performance in year t. Since I lose one year of observations in performing the non-contemporaneous regressions, the number of observations in the non-contemporaneous regression models is 240 compared to 248 observations in the contemporaneous regressions. I first discuss the results of compensation structure on lagged firm performance, after which I discuss the results of total CEO compensation on lagged firm performance.

The estimated non-contemporaneous coefficients of the percentage of CEOs' equity incentive grant to total compensation are comparable the contemporaneous coefficients. Similarly, the R^2 of the lagged regressions are of the same magnitude compared to the contemporaneous regressions as well. The lagged effect of the percentage of CEOs' equity incentives to total compensation on Tobin's Q is slightly reduced from 0.596 to 0.395. Testing the lagged effect of compensation structure on Tobin's thus does not alter the direction of the coefficient. Nevertheless I note a decrease in significance to a p-value smaller than 5 per cent rather than 1 per cent of the non-contemporaneous coefficient compared to the contemporaneous coefficient. Looking at ROA, the coefficient of the percentage of CEOs' equity incentives to total compensation is even slightly increased after incorporating the lagged effect on ROA (0.064 to .066). The significance level is not altered, implicating that this year's equity incentives provide decent incentives to the CEO to favour the firm's profitability in the next year. Considering TSR, the coefficient is still insignificant. That implies that I find no evidence for assuming the percentage of CEOs' equity incentive grants to total compensation received by the CEO in year t to boost the stock returns in year t+1. Looking at Tobin's Q and ROA, however, I document a lagged positive relationship between the percentage of CEOs' equity incentive grants to total compensation and firm performance.

Table 9

Empirical model 3 with a lag term: compensation structure in year t-1 and firm performance in year t.

Industry fixed effects regression analysis of firm performance, measured by Tobin's Q (1), ROA (2), and TSR (3), the percentage of CEOs' equity incentive grants to total compensation in year t-1 and control variables considering firm characteristics, corporate governance proxies, CEO characteristics and time dummies. The variables are defined as is described in section 4. The industry dummies are determined as is described in table 4. The t-statistics, based on standard errors, appear in parentheses. The significance levels are indicated by: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Variables	Tobin's Q (1)	ROA (2)	TSR (3)
% of CEOs' equity incentive grants to TC, t-1	0.395**	0.066***	0.179
	(2.003)	(2.925)	(1.459)
Firm characteristics:			
LN Total assets	0.026	-0.011***	-0.022
	(0.741)	(-2.682)	(-1.009)
Leverage	-0.774**	-0.057	-0.506**
	(-2.014)	(-1.302)	(-2.111)
CAPEX	2.294	0.278*	0.728
	(1.582)	(1.686)	(0.804)
R&D expenditures	1.315*	-0.122	-0.745
	(1.675)	(-1.360)	(-1.520)
R&D missing	0.249***	-0.001	0.018
	(2.842)	(-0.112)	(0.331)
Firm age	-0.002**	-0.000	0.000
	(-2.599)	(-1.173)	(0.793)
Corporate governance proxies:			
Supervisory board size	-0.002	0.009**	0.034
	(-0.071)	(2.137)	(1.538)
CEO equity ownership	-5.472***	-0.418*	-1.217
	(-2.669)	(-1.790)	(-0.950)
A+	-0.221	-0.022	0.005
	(-1.122)	(-0.961)	(0.044)
B+	-0.602***	-0.046**	-0.043
	(-2.931)	(-1.984)	(-0.331)
D	0.027	0.015	-0.074
	(0.122)	(0.598)	(-0.546)
U	-0.512**	-0.050*	-0.145
	(-2.101)	(-1.789)	(-0.952)
CEO characteristics:			
CEO age	-0.010	-0.000	-0.004
	(-1.434)	(-0.580)	(-0.794)
CEO tenure	-0.008	-0.000	0.005
	(-0.951)	(-0.406)	(0.915)
Observations	240	240	240
R-squared	0.383	0.357	0.406
Industry	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes

Table 10

Empirical model 4 with a lag term: total CEO compensation in year t-1 and firm performance in year t.

Industry fixed effects regression analysis of firm performance, measured by Tobin's Q (1), ROA (2), and TSR (3), total CEO compensation in year t-1 and control variables considering firm characteristics, corporate governance proxies, CEO characteristics and time dummies. The variables are defined as is described in section 4. The industry dummies are determined as is described in table 4. The t-statistics, based on standard errors, appear in parentheses. The significance levels are indicated by: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Variables	Tobin's Q (1)	ROA (2)	TSR (3)
LN total compensation, t-1	0.008	0.002**	0.005
	(1.149)	(2.090)	(1.130)
Firm characteristics:			
LN Total assets	0.041	-0.008**	-0.015
	(1.181)	(-2.106)	(-0.723)
Leverage	-0.747*	-0.055	-0.504**
	(-1.927)	(-1.245)	(-2.091)
CAPEX	2.339	0.281*	0.730
	(1.602)	(1.684)	(0.804)
R&D expenditures	1.448*	-0.102	-0.694
	(1.843)	(-1.135)	(-1.420)
R&D missing	0.248***	-0.001	0.018
	(2.815)	(-0.107)	(0.335)
Firm age	-0.002***	-0.000	0.000
	(-2.705)	(-1.367)	(0.682)
Corporate governance proxies:			
Supervisory board size	-0.000	0.009**	0.034
	(-0.004)	(2.174)	(1.556)
CEO equity ownership	-5.138**	-0.357	-1.046
	(-2.491)	(-1.516)	(-0.816)
A+	-0.255	-0.028	-0.014
	(-1.280)	(-1.245)	(-0.116)
B+	-0.656***	-0.056**	-0.070
	(-3.170)	(-2.380)	(-0.547)
D	-0.008	0.008	-0.095
	(-0.037)	(0.306)	(-0.692)
U	-0.564**	-0.059**	-0.173
	(-2.291)	(-2.113)	(-1.129)
CEO characteristics:			
CEO age	-0.011	-0.001	-0.004
	(-1.539)	(-0.723)	(-0.866)
CEO tenure	-0.009	-0.001	0.004
	(-0.980)	(-0.665)	(0.686)
Observations	240	240	240
R-squared	0.375	0.345	0.403
Industry FE	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes

Considering the coefficients of total CEO compensation in year t-1 on firm performance in year t, which are displayed in table 10, it is evident that the coefficients are dramatically altered compared to the contemporaneous regression results. Although the R^2 of the non-contemporaneous regressions are roughly the same as the contemporaneous regressions, both the effect on Tobin's Q and TSR turns insignificant in the non-contemporaneous regression. Only the effect ROA remains significant, although the significance level decreases to a p-value smaller than 5 percent. Albeit the coefficient of total CEO compensation remains significant in the lagged relationship, the coefficient drops dramatically from 0.048 in the contemporaneous model to 0.002 in the non-contemporaneous model. Given the insignificant results on Tobin's Q and TSR and the dramatic decrease in the effect on ROA, the non-contemporaneous regression results of total CEO compensation on firm performance do not point to a lagged positive relationship.

5.2.6 Robustness check

The industry fixed effects regressions I employ in section 5.2.1 to 5.2.5 are based on the SIC code aggregate industry categories. The reason for grouping the firms based on their aggregate industry category in the first place is that by using aggregate industry groups, I obtain a less fragmented distribution of firms across the sorts of industry. The downside of employing aggregate industry groups instead of the two-digit SIC code sub-industry is that the formation of industry groups is less specific. In using aggregate industry groups, a firm from i.e. the tobacco industry (two-digit SIC code 21) is placed in the same industry group as a firm from industry primary metal industries (two-digit SIC code 33), while those industries are severely heterogeneous. A more specific method of grouping firms by industry is to group firms based on their two-digit SIC code. Therefore, I check whether the results I obtain under 5.2.1 to 5.2.5 are robust to using two-digit SIC code industry dummies rather than aggregate industry group dummies. For the sake of brevity, I present the robustness regressions on industry in the appendix.

Table 11 in the appendix presents the robustness regressions on two-digit SIC code industry dummies of model (1) and (2). The coefficient for the effect of supervisory board size on the percentage of CEOs' equity grants to total compensation is not robust to incorporating two-digit SIC code industry dummies. After adding the new industry dummies, the coefficient of supervisory board size is still positive, but turns insignificant (t-statistic is 1.145). On the contrary, the coefficient of supervisory board size on total CEO compensation

is robust to operating two-digit SIC code industry dummies: it only reduces by roughly 0.03 to 0.087 and is still significant at the 1 percent level.

The robustness check on industry for model (3) are presented in table 12 in the appendix. The effect of the percentage of CEOs' equity grants to total compensation on Tobin's Q is robust to employing two-digit SIC code industry dummies. The same holds for ROA, although the significance level decreases for both Tobin's Q and ROA to 5 percent. The coefficient for the percentage of CEOs' equity grants to total compensation on Tobin's Q alters to 0.435 (was 0.596) and alters to 0.054 for ROA (was 0.064). TSR remains insignificant after incorporating two-digit SIC industry dummies.

Model (4) is the most robust to employing two-digit SIC industry dummies. The robustness results of model (4) are presented in table 13 in the appendix. The coefficient for total CEO compensation remains significant at the one percent level in the regressions on Tobin's Q, ROA, and TSR. The sign of the coefficients also remain positive, being 0.275 (was 0.355) on Tobin's Q, 0.053 (was 0.048) on ROA, and 0.196 (0.145) on TSR. Note that the coefficients on ROA and TSR even increase after incorporating two-digit SIC industry dummies.

6. Concluding remarks and limitations

The listed corporation is problems associated with the separation between ownership and control. These problems arise from the deviating interests of shareholders of the company and the managers of the company. Agency theory describes the costs that are associated with a principal agent relation in which the principal has different interests compared to the agents. In the listed corporation, the principal is the shareholder and the agent is the manager of the firm. Corporate governance is designed to reduce agency costs and to align managers' actions with shareholders' interests. One of the corporate governance mechanisms is executive compensation, on which I focus this thesis.

Executive compensation and the pay for performance sensitivity have been widely studied, especially in the U.S. There is, however, little known about executive compensation outside the U.S. Therefore, this study provides empirical evidence on the determinants of CEO compensation structure and total CEO compensation and their relationship with firm performance in the Netherlands. I thereby add to the work of Duffhues and Kabir (2008) by testing the CEO pay for performance sensitivity in a more elaborated and more recent setting. Additionally to testing the standard pay for performance sensitivity in the Netherlands, I adopt

the set-up of Mehran (1995) and test the relationship between CEO compensation structure and firm performance. Furthermore, this study analyses how CEO compensation structure and levels are constructed by testing the determinants of CEO compensation structure and total CEO compensation. Ultimately, I address the question: *What determines the structure of CEO compensation packages of Dutch listed firms and how does firm performance relate to observed CEO compensation packages?*

Regarding the determinants of CEO compensation structure, I find a positive relationship between supervisory board size and the percentage of CEOs' equity incentive grants to total compensation. This indicates that the larger the supervisory board, the more equity intensive is the compensation paid to the CEO. A possible explanation for this result is that larger boards operate more independently from the CEO, which make them better serve the interests of the shareholder and thereby grant more compensation that is directly tied to shareholder value. Besides a positive effect of supervisory board size on the percentage of CEOs' equity grants to total compensation, I find that firm size, firms' cash and cash equivalents, firms' investment opportunities, and firms' leverage all have a positive influence on the percentage of CEOs' equity incentive grants to total compensation. Lastly, I find that older CEOs receive less equity intensive incentives compared to younger CEOs, implying that CEOs prefer to receive cash compensation as to shift towards retirement.

Looking at total compensation, I also find a positive relationship between supervisory board size and total CEO compensation. This result implies that total CEO compensation grows with the size of the supervisory board. An interpretation of this finding is that the more members the supervisory board contains, the more knowledge is present in the supervisory board. Consequently, that knowledge is converted into more complex compensation schemes that result in higher levels of total compensation. I.e., the fair value of complex equity incentive schemes carrying long vesting periods is typically severely sensitive to valuation inputs that can result in relatively high value. Other positive effects on total CEO compensation I find are firm size, ROA, cash and cash equivalents, leverage, and CEO tenure.

With respect to the relationship between the percentage of CEOs' equity incentive grants to total compensation and firm performance, I document a positive relation on firm performance measured by Tobin's Q and ROA. TSR, on the other hand, is not affected by the percentage of CEOs' equity incentive grants to total compensation. That is, the percentage of CEOs' equity grants to total compensation mainly contributes to accounting and book value measures of performance. That is contradictive to what the literature suggests. Since the value

of CEOs' equity incentive grants to total compensation is directly connected to TSR, it would be sensible to observe a positive relationship between the percentage of CEOs' equity incentive grants to total compensation and TSR. Especially since equity incentives are designed to align CEOs' interests with shareholders' interests. The result on TSR I find, however, suggest that granting more equity incentives to the CEO does not contribute to shareholder returns. One explanation for not observing a positive effect of CEO equity incentives on TSR is that capital markets do not fully observe the actions taken by the CEO, thereby not reflecting all available information in the share price which results in mispriced stock prices.

Considering total CEO compensation, I find that all metrics of firm performance are positively affected by total CEO compensation. That is, Tobin's Q, ROA, and TSR all increase when the CEO gets paid more. This implies that it contributes to accounting performance, the book value and market value of the firm to pay the CEO more. In that sense, I find conclusive evidence for stating that total CEO compensation is an effective corporate governance mechanism. This implies that the CEO is effectively stimulated to make decisions that improve firm performance when he receives higher compensation.

In relating this study to prior work, it becomes evident that I find contrasting results to Duffhues and Kabir (2008). Whereas they find a negative pay for performance sensitivity, I find a positive pay for performance sensitivity. This implies that the effectiveness of CEO compensation schemes on firm performance has improved over the past years. Alternatively, as Duffhues and Kabir (2008) do not include equity incentives in their definition of total compensation, it is sensible to reason that the inclusion of equity incentives in total compensation severely alters the direction of the pay for performance sensitivity.

This thesis also connects to Mehran (1995). In assuming that the supervisory board is the Dutch equivalent, I make the setting for analysing the percentage of CEOs' equity incentive grants to total compensation comparable to the findings of Mehran (1995). Given that the directions I find for the effect of supervisory board size on the percentage of CEOs' equity incentive grants to total compensation and effect of the percentage of CEOs' equity incentive grants are identical to Mehran (1995), I infer that the mechanism of CEO equity grants in the Netherlands is similar to the mechanism in the U.S.

Taking all the results I find together, this thesis suggest that CEO compensation structure and total CEO compensation can be severely altered by altering the size of the

supervisory board. That is, the public debate should focus the critics on executive compensation schemes on the supervisory board, and supervisory board size specifically, to effectively alter CEO compensation structure and level. Also, it contributes to the profitability and growth potential of the firm to reward the CEO with more equity intensive compensation schemes. Looking at total CEO pay levels from a corporate governance perspective, it is effective to pay the CEO more since paying the CEO more contributes to both the book value and market value of the firm. Therefore, criticizers of CEO compensation should place compensation schemes with limited equity incentives under scrutiny. Also, paying the CEO more is not typically adverse in terms of firm performance. One can question the ethical and social effects of increasing CEO pay, but that is beyond the scope of this research. From a corporate governance perspective, this thesis provides evidence for increasing CEO pay as it contributes to firm performance.

I have to note, tough, that one should carefully interpret the findings of this research. As I discuss in the robustness check, especially the results I find for supervisory board size on the percentage of CEOs' equity incentive grants to total compensation are vulnerable. Since the significance of the relationship disappears after incorporating two-digit SIC code dummies, the relationship is not severely robust and one should therefore be careful with making conclusions best on the relationship.

Furthermore, I note there are several limitations to the data I contemplate for conducting this research. Especially the measurement of equity incentive grants needs to be placed under scrutiny. As is mentioned in section 2, making an accurate valuation of equity incentives is complex. Since I assumed that the fair values are correctly reported by firms, there is a severe chance of valuation inconsistencies considering the equity incentives in this research. That is because firms are free to choose the valuation method for determining the fair value of equity incentive grants. As different valuation methods often result in non-similar valuations for the same security, it is likely that the fair values in the data sample are not entirely consistent. That might explain why I do not find a relationship between the percentage of CEOs' equity incentive grants to total compensation and TSR.

Also, since the data provision in the Netherlands on several critical variables for conducting this type of analysis is poor, the results can be biased to the lack of sufficient approximation of the true effects of several variables. Especially the lack of availability of a comprehensive corporate governance index and more detailed information on the ownership structure of outside blockholders might severely bias the results.

Given the limitations of this research, I suggest that future research is needed that focuses more deeply on equity incentives. It is for example still unclear what type of equity incentive is most effective in aligning shareholders' interests with managers' actions. It is also desired to compile a dataset that incorporates independent, consistent valuations of equity incentive grants to more accurately analyse the working of equity incentive grants.

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8. Appendix

Table 11

Robustness check on determinants of CEO compensation structure and total CEO compensation.

Two-digit SIC code fixed effects regressions of the percentage of CEOs' equity incentives to total compensation (1) and tot CEO compensation (2) on supervisory board size and different groups of control variables. The variables are defined as is described in section 4. The t-statistics, based on standard errors, appear in parentheses. The significance levels are indicated by: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Variables	% of CEOs' equity grants to TC (1)	LN CEO total compensation (2)
Supervisory board size	0.011	0.087***
	(1.145)	(3.996)
Firm characteristics:		
LN Total assets	0.046***	0.291***
	(4.840)	(13.581)
ROA	0.282	1.758***
	(1.605)	(4.426)
Cash	0.259**	0.156
	(2.166)	(0.575)
CAPEX	1.053**	1.252
	(2.398)	(1.262)
Leverage	0.092	0.329
	(0.769)	(1.223)
Ownership Structure:		
A+	-0.224***	-0.384**
	(-2.760)	(-2.089)
B+	-0.266***	-0.607***
	(-3.185)	(-3.223)
D	-0.195**	-0.554***
	(-2.154)	(-2.705)
U	-0.270***	-0.567***
	(-2.952)	(-2.737)
CEO equity ownership	-8.718*	-18.521*
	(-1.872)	(-1.760)
CEO characteristics:		
CEO age	-0.009***	-0.005
	(-4.375)	(-1.219)
CEO tenure	0.006**	0.023***
	(2.429)	(4.250)
Constant	-0.312	7.360***
	(-1.326)	(13.827)
Observations	288	288
R-squared	0.678	0.899
Industry 2 digit SIC code FE	Yes	Yes
Year dummies	Yes	Yes

Table 12

Robustness check on effect of percentage of CEOs' equity incentives to total compensation on firm performance.

Two-digit SIC code fixed effects regressions of the percentage of CEOs' equity incentives to total compensation on Tobin's Q (1), ROA (2), and TSR (3) and different groups of control variables. The variables are defined as is described in section 4. The t-statistics, based on standard errors, appear in parentheses. The significance levels are indicated by: *** p<0.01, ** p<0.05, * p<0.1.

Variables	Tobin's Q (1)	ROA (2)	TSR (3)
% of CEOs' equity grants to TC	0.435**	0.054**	0.147
	(2.565)	(2.402)	(0.995)
Firm characteristics:			
LN Total assets	0.078***	-0.008**	-0.013
	(2.851)	(-2.221)	(-0.530)
Leverage	-0.452	-0.016	0.031
	(-1.357)	(-0.363)	(0.108)
CAPEX	3.317***	0.540***	1.664
	(2.827)	(3.447)	(1.629)
R&D expenditures	1.411**	-0.262***	-1.161**
	(2.422)	(-3.361)	(-2.288)
R&D missing	0.176**	-0.017	0.024
	(2.090)	(-1.483)	(0.330)
Firm age	0.000	0.000*	0.001
	(0.478)	(1.902)	(1.023)
Corporate governance proxies:			
Supervisory board size	-0.022	0.008**	0.012
	(-0.840)	(2.315)	(0.531)
CEO equity ownership	13.133	2.068	11.090
	(1.032)	(1.216)	(1.001)
A+	0.198	0.045	0.270
	(0.879)	(1.485)	(1.377)
B+	0.034	0.043	0.309
	(0.146)	(1.401)	(1.536)
D	0.818***	0.130***	0.241
	(3.316)	(3.952)	(1.123)
U	0.226	0.060*	0.164
	(0.890)	(1.768)	(0.740)
CEO characteristics:			
CEO age	0.001	0.000	-0.002
	(0.111)	(0.339)	(-0.337)
CEO tenure	-0.005	0.001	0.009
	(-0.759)	(0.615)	(1.563)
Constant	-1.055*	0.033	-0.172
	(-1.696)	(0.402)	(-0.318)
Observations	288	288	288
R-squared	0.689	0.597	0.463
Industry two digit SIC code FE	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes

Table 13

Robustness check on effect of total CEO compensation on firm performance.

Two-digit SIC code fixed effects regressions of effect of total CEO compensation on Tobin's Q (1), ROA (2), and TSR (3) and different groups of control variables. The variables are defined as is described in section 4. The t-statistics, based on standard errors, appear in parentheses. The significance levels are indicated by: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Variables	Tobin's Q (1)	ROA (2)	TSR (3)
LN CEO total compensation	0.275***	0.053***	0.196***
	(3.770)	(5.624)	(3.100)
Firm characteristics:			
LN Total assets	0.016	-0.021***	-0.064**
	(0.486)	(-4.903)	(-2.192)
Leverage	-0.465	-0.021	0.009
	(-1.418)	(-0.496)	(0.031)
CAPEX	3.175***	0.479***	1.374
	(2.755)	(3.219)	(1.372)
R&D expenditures	1.219**	-0.305***	-1.335***
	(2.110)	(-4.091)	(-2.659)
R&D missing	0.125	-0.026**	-0.010
	(1.492)	(-2.407)	(-0.131)
Firm age	0.000	0.000**	0.001
	(0.804)	(2.413)	(1.253)
Corporate governance proxies:			
Supervisory board size	-0.042	0.004	-0.004
	(-1.569)	(1.144)	(-0.176)
CEO equity ownership	14.760	2.591	13.424
	(1.177)	(1.600)	(1.232)
A+	0.216	0.053*	0.311
	(0.976)	(1.866)	(1.621)
B+	0.122	0.066**	0.406**
	(0.530)	(2.235)	(2.033)
D	0.889***	0.147***	0.309
	(3.639)	(4.655)	(1.453)
U	0.286	0.077**	0.239
	(1.139)	(2.389)	(1.097)
CEO characteristics:			
CEO age	-0.002	-0.000	-0.002
	(-0.359)	(-0.005)	(-0.464)
CEO tenure	-0.008	-0.000	0.005
	(-1.294)	(-0.381)	(0.941)
Constant	-3.242***	-0.404***	-1.329*
	(-3.976)	(-3.836)	(-1.875)
Observations	288	288	288
R-squared	0.698	0.635	0.481
Industry two digit SIC code FE	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes