The effect of Executive Compensation Dispersion and Risk Avoidance on Firm Performance

Master thesis Financial Economics

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Abstract

This study examines the relationship between CEO Pay Slice (CPS) – the fraction of total compensation of the top five executives that is captured by the CEO – and firm performance and the relationship between risk avoidance and firm performance as well. Further, this research studies whether the financial crisis has an effect on CPS or risk avoidance. This research used U.S. listed firms only and the sample is drawn from the years 1997-2012. There was a negative relation found between crisis and CPS. Before the crisis, CPS was higher than during the crisis. This paper found a negative relation between risk avoidance and CPS which is not in accordance with prospect theory which states that there should be a positive relation. There was a positive relationship found between crisis and risk avoidance which means that risk avoidance was higher during the crisis. There was no significant relationship found between CPS and firm performance which is in contradiction with earlier research. It was hypothesized that risk avoidance would be negative related with firm performance but I was not able to find a robust relationship between risk avoidance and firm performance.

Keywords: Executive compensation, CEO Pay Slice, Firm performance, Risk Avoidance, Agency theory and financial crisis

Table of Contents

1. Introduction

Prior to the 1970s, we observe little dispersion in executive pay across top managers, and moderate pay-performance sensitivities. From the mid-1970s to the mid-2000s, the level of CEO compensation and the dispersion across top managers increased and managers' wealth was closer tied to firm performance due to equity incentives (Frydman & Jenter, 2010). In 1975, CEOs earned on average 34% more than non-CEOs and in 2007, this percentage has increased to 50%. The increase in payment and dispersion led to a debate about CEO payment and CEO payment structures. The financial crisis, which emerged early 2008 has drawn even more attention to this debate and the possible role of executive compensation in worsening the crisis (Faulkender et al., 2010). Many view the high level of CEO compensation as the result of powerful CEOs setting their own pay. In contrast, others view the high level of CEO compensation as a result of an efficient market for managerial talent (Frydman & Jenter, 2010). In fact, in most companies, decisions over executive pay are made by independent members of the board of directors. However, it is likely that CEOs and other top managers have at least some influence on both the level and structure of their pay (Murphy, 1999). In a paper of Frydman and Jenter (2010), there was evidence found that the power of the CEO is positively correlated with CEO payments.

The power of a CEO can be explained by several factors such as CEO duality, stock ownership, and executive compensation dispersion. The latter is measured by CEO Pay Slice (CPS), which is CEO compensation as a fraction of the total compensation of the top 5 executives. A CEO with a higher CPS has relatively more power than a CEO with a lower CPS. This is because a higher CPS could reflect the relative importance of the CEO and this CEO has been able to extract a larger proportion of total executive compensation. Since dispersion of executive compensation can be seen as a measurement of power and the importance of the CEO, dispersion should be able to explain part of the firm performance. Bebchuk, Cremers and Peyer (2011) argue that CPS is negatively related with firm performance.

The fact that CEOs with more control within the firm negatively affects firm performance is because of an agency problem. The interest of the CEO is not aligned with the interest of the shareholders. Especially in the case of a powerful CEO, it is important that the interest of the CEO is aligned with the interests of shareholders. A powerful CEO cannot only influence their own pay by using their managerial power, they can also make decisions about for example

mergers and acquisitions or capital structure that do not align shareholder interest and therefore does not maximize shareholder value. Dittmann, Yu and Zhang (2015) argue that there are risk-taking incentives needed to induce the CEO to act on behalf of the shareholders. CEO's stock and option compensation exposes the CEO to great amounts of firm-specific risk. They show that a CEO would reduce the firms' risk even if this will destroy firm value if he is risk-averse. A measure for these risk-taking incentives is risk avoidance. Risk avoidance is the required increase in firm value per increase in firm risk that any new project must meet in order to be accepted by the CEO.

Another factor that explains the power of a CEO is managerial entrenchment. CEOs can entrench themselves in multiple ways. They can choose an organizational structure that makes them (almost) irreplaceable, e.g. high ownership, or invest in assets that are specific to them and thereby making it costly for shareholder to replace them (Novaes & Zingales, 1995). Entrenched CEOs have the power to take actions that do not maximize shareholder wealth but benefits the CEO (Shleifer & Vishny, 1989). On one hand, entrenched CEOs are more risk-averse and are reluctant to take any risks that could benefit shareholders but harm the CEO himself because the CEO is not as diversified as shareholders and therefore more exposed to firm risk (Berger, Ofek, & Yermack, 1997). On the other hand, entrenched managers are more likely to overinvest as a consequence of the agency problem of free cash flow (Pawlina & Renneboog, 2005). However, a research of Dittmann, Yu and Zhang (2015) shows that risk avoidance is on average 12% higher for more entrenched CEOs.[1] This is in favor of the assumption that entrenched CEOs do not take unnecessary risks that could harm themselves. A research of Bebchuk, Cremers and Peyer (2011) examines how managerial entrenchment is correlated with CPS. As mentioned earlier, CPS and firm performance are negatively correlated and the authors show that this negative relation is especially concentrated among firms with higher entrenchment levels. In firms with higher entrenchment levels, the CEO is relatively protected from market discipline and the threat of removal. This leads to higher potential agency problems and having a CPS level that is relatively less optimal (Bebchuk, Cremers & Peyer, 2011). Because CPS is correlated with entrenchment which is in turn related with risk avoidance, there could be a correlation between CPS and risk avoidance. Therefore, I want to examine the relation between CPS and risk avoidance and whether this has an effect on firm performance. This has led to part of my research question:

[1] Entrenchment is measured by E-index as defined in Bebchuk, Cohen and Ferrell (2009).

What is the effect of the financial crisis on executive compensation dispersion and risk avoidance and how are they related to firm performance?

I first want to research whether the financial crisis has an effect on executive compensation dispersion as the crisis emerged a social outcry towards the high CEO compensation worldwide. Furthermore, the crisis may have an effect on risk avoidance as well as it is likely that CEOs that have more power are more risk-averse because they are more careful with investments to secure position at the expense of the shareholders. This is especially important during the crisis where the main focus of CEOs is probably job preservation. Shareholders will anticipate to this and will set a higher risk avoidance for the CEO. This research contributes to existing literature by examining the effect of the crisis on executive compensation dispersion and risk avoidance. In addition, this study examines the relation between risk avoidance and CPS and the effect of CPS and risk avoidance on firm performance. This is to my knowledge not researched yet and might give a new perspective on the relation between CPS and firm performance which was already found in Bebchuk, Cremers & Peyer (2011).

This study found evidence for a negative relation between CPS before the crisis and CPS during the crisis which means that executive compensation dispersion before the crisis was higher than during the crisis. Further, I examined the relation between risk avoidance (γ =3) and CPS and I found a significant negative relation. Unexpectedly, a CEO with a low CPS has a higher risk avoidance which means that a project must be more profitable for each percent in additional risk in order to be accepted. I also found evidence for a positive relation between crisis and risk avoidance which means that risk avoidance was higher during the crisis. In this paper, I attempted to replicate the study of Bebchuk, Cremers and Peyer (2011) but I was not able to find a significant relation between CPS and firm performance which is not in accordance with their results since they found a negative relation. Moreover, when risk avoidance is included in the models, there was still no significant relationship between CPS and firm performance found. I found a positive relation between risk avoidance (γ=3) and Tobin's Q but there was no significant relation found when ROA is used as firm performance measure in the latest models. This indicates that this relationship is not robust and it can be concluded that there is no relationship between risk avoidance and firm performance.

In the next section, the hypotheses are discussed in order to give an answer to the research question. In section 3, a theoretical framework is provided. I discuss executive compensation as corporate governance and how executive compensation is related to agency theory. Furthermore, I discuss the components of executive pay to give a clear view where the CEO can use his power to extract a larger portion of the total pay, i.e. a higher CPS. The last section of the theoretical framework is about risk avoidance. In section 4, I discuss how I collected the data, the data sample and summary statistics of the variables. After that, I elaborate on the methodologies that are used for each hypothesis. I discuss the obtained results in section 5 and lastly, in section 6, I give a conclusion which is followed by limitations of this study and recommendations for further research.

2. Hypotheses

Executive compensation is under heavy debate because one believes that the executive compensation is too high and the financial crisis has drawn even more attention to this debate. Due to the financial crisis, the society became more aware of the exceptional high compensation for executives and that awareness put a lot of pressure on the executive compensation. I expect that CEO compensation is relatively more under debate than executive compensation in general because the CEO generally earns more than other executives and is more "in the picture" than other executives. Therefore, it is likely that the CEO has to give in more of his compensation than executives due to pressure of society and this will result in a lower CPS during the crisis.

Hypothesis 1: The CPS during the crisis is lower than the CPS before the crisis

A CEO with a high CPS has more discretion in his choices because of his power within the firm. Powerful CEOs might fear losing their power and might take less risks than CEOs with less power who have less to lose by risk behavior. This idea is consistent with prospect theory of Kahneman and Tversky (1979) which states that behavior depends on the domain the individual is in. When the individual, in this case the CEO, is in a domain of losses, there is less to lose and this will lead to risk-seeking behavior. When the CEO is in a domain of gains, he will act more risk-averse because he does not want to lose any of those gains. If the lack of power puts people in the domain of losses and powerful people are in the domain of gains, then power should have a negative impact on risky behavior (Anderson & Galinsky, 2006). Therefore, I expect that a

powerful CEO will act more risk-averse which leads to a higher risk avoidance set by shareholders.

Hypothesis 2: Risk avoidance is positively related with executive compensation dispersion

As researched earlier, executive compensation dispersion as measured by CPS negatively affects firm performance. This is because CEOs with a higher CPS are more powerful and can act in contrast to shareholders interest by making decisions that do not maximize shareholder wealth, e.g. empire building. Before expanding the research of Bebchuk et al. (2011) with risk avoidance, I want to replicate this research about the relationship between CPS and firm performance with my own data set. This had led to my third hypothesis:

Hypothesis 3: CPS is negatively related with firm performance

CEOs may make investment decisions that do not align the shareholders' interests which affects firm performance. One measurement which should be taken into account when making an investment decision is risk avoidance. Since I expect risk avoidance to be correlated with CPS, risk avoidance might also be related with firm performance or might change the effect of CPS on firm performance. I expect that executive compensation dispersion still negatively correlates with firm performance when risk avoidance is taken into account in the model. I expect risk avoidance to be negatively related with firm performance as well because a more risk-averse CEO has a higher risk avoidance set by the shareholders and this will negatively affect firm value because profitable but risky projects might be passed up.

Hypothesis 4: Executive compensation dispersion and risk avoidance negatively affects firm performance

3. Theoretical Framework

In this section, I discuss the main theories related with this research. First, I discuss executive compensation as part of corporate governance and how this works. Second, I discuss the agency theory and the agency problems concerned with executive compensation and how executive compensation can be used as a tool to reduce these agency problems. Third, I elaborate on the remuneration structure to see where CEOs can use their power and this remuneration structure consists mainly of base salaries, annual bonus plans, stock options, and long-term incentive plans. Furthermore, I explain how executive pay is determined and the influence of CEO in that

process. Lastly, I discuss the risk aversion of the CEO and the measure that is used in this research, namely risk avoidance.

3.1 Corporate Governance

Executive compensation is an element of corporate governance. Corporate governance is defined as the set of mechanisms that induce self-interested controllers of a company to make decisions that maximize the value of the firm to its owners (Denis & McConnell, 2003). These mechanisms include, among others, board structure variables, debt financing, and shareholdings by insiders (Haniffa & Hudaib, 2006). Corporate governance is needed because most firms have a separation of ownership and control: shareholders are the owners and management is in control. Ownership and control are rarely completely separated within any firm but this overlap between ownership and control may lead to several agency problems. The goal of executive compensation is aligning the interests of managers with the interests of owners. This can be achieved by pay-performance sensitivity whereby compensation depends on performance (Denis & McConnell, 2003). Executive compensation should be at that particular level that it attracts the right executives at the lowest cost, retain the right executives at the lowest cost and motivates executives to take actions that create long-run shareholder value (Conyon, 2006).

In a research of Core, Holthausen and Larcker (1999), it was found that firms with weaker corporate governance have greater agency problems and that CEOs at firms with greater agency problems are able to extract higher compensation. The authors also found that corporations with greater agency problems perform worse. In order to enhance the efficacy of corporate governance structure, efforts have been undertaken by various countries via the establishment of Corporate Governance Guidelines. Most of the countries have nowadays each established the UK Combined Code of Corporate Governance ("the Code") which is a set of principles of good corporate governance and applies to listed companies (Haniffa & Hudaib, 2006). It is widely regarded as an international benchmark for good corporate governance practice. The Code, however, is a guideline and offers a lot of flexibility. It is not required to meet these principles (Arcot, Bruno, & Faure-Grimaud, 2010). For example in the Netherlands, you may either comply with the code or explain explicitly why you do not. In the Code, it is described what the level of executive compensation shall be. For example, in the Dutch Corporate Governance Code, it is stated that the remuneration structure shall be simple and transparent. It shall discourage the executive to act in their own interests or take risks that do not align the adopted strategy. Further,

it states that the level and structure of remuneration shall be determined by reference to the firm's results, the share price performance and other non-financial indicators that are relevant to the firm's long-term value creation, e.g. loyalty and product quality (Corporate Governance Code Monitoring Committee, 2009).

Thus, it is important to have a good corporate governance structure to reduce agency problems within the firm. The Code provides guidelines how to establish a strong corporate governance structure. The Code, however, is not a requirement and therefore it is not the ultimate solution for agency problems related to executive compensation.

3.2 Agency Theory

The standard economic approach for understanding executive compensation is agency theory. Agency theory states that there is a relationship between an agent (manager) and a principal (shareholders) whereby the agent should act on behalf of the principal. However, it is likely that there is a conflict of interest between both parties. Executive compensation should align those interests. In this principal-agent model, shareholders set the pay of the executives (Conyon, 2006). It is crucial to choose the optimal compensation scheme to motivate the agent to act on behalf of the principal and to put the right amount of effort forth that is needed to meet the principal's objectives (Godes & Mayzlin, 2008).

Agency theory states that there are a few human assumptions. The first one is self-interest of the agent. A self-interested agent will act in his own interests when there are no incentives that motivate him to act in the interest of the principal. The second one is bounded rationality. When individuals make a decision, their rationality is limited by for example the available information or the time available to make the decisions. The third and last human assumption is risk aversion. Individuals would prefer a less risky alternative if it has the same payoff as the more risky alternative. It is assumed that the agent is more risk-averse than the principal. The idea behind the higher risk aversion of agents than of principals is that agents cannot diversify their employment whereas principals are able to diversify their investments. Therefore, agent should be risk-averse and principal should be risk neutral. Agency theory states that there are a few organizational assumptions as well. One of the assumptions is that there is a partial goal conflict between the agent and the principal. The goal of the agent and principal is (partially) different and therefore it is necessary to make sure the agent will act on behalf of the principal. Goal

congruence is attempted to achieve by establishing a contract between both parties that the agent should act on behalf of the principal (Eisenhardt, 1989).

Although there is a contract between both parties, the agent is still able to violate the contract due to information asymmetry. In the typical principal-agent relationship, the principal has less information than the agent about: (1) the characteristics of the agent, e.g. ability or risk aversion, and (2) the behavior of the agent, i.e. decisions and actions of the agent (Zajac, 1990). These agency problems due to information asymmetry are known as moral hazard and adverse selection. Moral hazard refers to lack of effort on the part of the agent. The agent may simply not put forth the effort that is agreed on in the contract. This is also called shirking (Eisenhardt, 1989). The moral hazard problem within the relationship between CEO and shareholders is managerial opportunism and is arising from low firm ownership (Conyon, 2006). Managerial opportunism is referred to as the insider's use of company information for personal use and benefit. An example of managerial opportunism is that managers sell their shares when they perceive the shares to be overvalued. Executives use inside information that the shares are overvalued and sell their shares for their own benefit. This will cause a drop in share value (Chalmers, Dann, & Harford, 2002). By increasing the ownership of the CEO, this moral hazard problem can be mitigated. The ownership of the CEO can be increased by offering a contract that includes performance-based compensation, e.g. stock options. This sort of executive compensation provides CEOs incentives that align the interests of both parties. An optimal contract should minimize agency costs, including managerial opportunism (Conyon, 2006).

The other agency problem that arises from the principal-agent relationship is adverse selection. There is adverse selection when the ability of the agent is misrepresented. Adverse selection occurs because abilities or skills are not completely verifiable at time of hiring or while the agent is working (Eisenhardt, 1989). An example of adverse selection is the situation where the CEO has private information about his characteristics that would be relevant in the decision of the firm whether to hire the CEO. Adverse selection is particularly likely to be present when the CEO is an outsider. It is assumed that the characteristics of a CEO candidate within the firm are better known than from a CEO candidate from the outside. This adverse selection problem suggests that hiring an outsider CEO will be a worse decision in terms of firm performance implications (Zajac, 1990). A way to attract the right CEO for the right firm is by offering a right

compensation scheme. The compensation scheme can be for example very dependent on performance whereby it is unattractive for non-skilled CEOs to apply for this job. In the next section, I discuss the different elements of compensation scheme and whether they are an appropriate incentive to reduce the agency problems.

3.3 Remuneration Structure

It is important to have a remuneration structure that incentivizes the manager to act in the interest of the shareholders instead of its own interest to reduce agency costs. Since 1990, there has been a high growth in executive compensation in U.S. firms, particularly a high growth in incentive pay (Harvey & Shrieves, 2001). For example, a research of Byrd, Parrino and Pritsch (1998) reports that for Fortune 500 firms the median incentive-based compensation is 72% of total compensation, which shows that incentive-based pay is an important element of executive compensation. Most of executive pay is structured with four basic components: a base salary, an annual bonus, stock options, and long-term incentive (Murphy, 1999). I discuss these components in the following subsections.

3.3.1 Base Salaries

Base salaries for executives are typically determined through competitive benchmarking based on general industry salary surveys and analyses of the selected industry or market peers. The surveys typically adjust for company size (Murphy, 1999). There is a positive relationship between company size and salary; CEO of a larger company earns more than CEO of a smaller company (Agarwal, 1981). One explanation of the positive empirical relationship between executive compensation and company size is that a firm has a hierarchical structure and due to a competitive market, salaries at the lowest level in the management hierarchy are approximately the same. The higher the level in the management hierarchy, the higher the salary and since large companies have more management levels in their hierarchy, the salary of the CEO in a larger firm is higher than that of the CEO in a smaller firm (Simon, 1957). As said earlier, incentive pay has become relatively a larger part of total compensation than non-incentive pay, i.e. base salary. However, executives are still eager to have an as high as possible base salary. Executives have three reasons why they pay that much attention to base salary. First, base salaries are a key component of executive employment contracts and gives them a guaranteed salary independent of firm performance. Second, risk-averse executives will prefer an increase in base salary because this is a fixed component of executive compensation, rather than an increase in

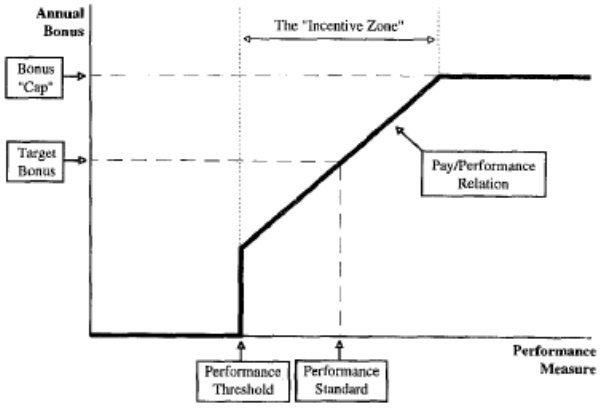
incentive-based compensation, i.e. dependent of firm performance. The third and last reason is that most of the other components of compensation are dependent of base salary, for example bonus is expressed as a percentage of base salary (Murphy, 1999).

This fixed component of executive compensation provides no incentive to align the mutual interests and to reduce agency problems because it does not depend on performance. However, since it is assumed that agents are risk-averse, this fixed component needs to be included in the optimal contract to reduce agency costs. When this fixed component is not included in the optimal contract, compensation is completely dependent of performance and this could deter risk-averse but highly skilled executives. By including a base salary, these risk-averse executives are attracted as well.

3.3.2 Annual Bonus Plans

An annual bonus plan is a contract that provides incremental cash compensation to base salary. Survey data of Hay Management Consultants (1991) shows that 91% of the firms in their sample offers an annual bonus plan to its top executives and it accounts for approximately 20% of total CEO compensation (Holthausen, Larcker, & Sloan, 1995). This bonus is paid annually and is based on a single-year's performance. If the firm did very well during that particular year, the bonus will be distributed to its top executives. A typical bonus plan consists of three components: performance measures, performance standards, and the structure of the pay-performance relation. This is illustrated in figure 1.

Figure 1 Murphy (1999)



In general, companies use two or more performance measures and that can be a financial or non-financial performance measure. The most common non-financial performance measure used in

annual bonus plans is individual performance, which includes performance measured relative to pre-determined objectives as well as assessments of individual performance (Murphy, 1999).

There are multiple ways to determine the performance standard. The most used performance standards in general industries are based on the company's business plans or budget goals. The most common pay-performance structure is the "80/120" plan. A bonus plan has a performance threshold, which is in this case 80, and no bonus will be paid when this threshold is not achieved, i.e. performance does not exceed 80% of the performance standard (Murphy, 1999). When the performance of the firm is at performance threshold level, the minimum bonus will be distributed to its top executives, which is typically half of the target bonus (Holthausen, Larcker, & Sloan, 1995). Beyond the performance threshold, the bonus increases with performance until the cap is reached, which is in this case 120% of the performance standard (Murphy, 1999). At that point (and beyond that point), the maximum bonus will be distributed, which is typically twice as high as the target bonus (Holthausen, Larcker, & Sloan, 1995). Between the minimum and maximum bonus, there is a target bonus which corresponds with the performance standard and executives aim for at least this bonus. The range between the threshold and the cap is called the "incentive zone". In this range, an increase in performance results in an increase in the annual bonus so in this range, the executive is incentivized to improve performance as its leads to a higher bonus (Murphy, 1999). So, an annual bonus plan provides a good incentive to reduce the agency costs when the level of firm performance is in the "incentive zone". A disadvantage of this bonus is that when the cap is reached, it provides no longer an incentive because the maximum bonus is already achieved.

3.3.3 Stock Options

The growth in executives' compensation in U.S. firms during the last three decades can mainly be attributed to stock option awards (Yermack, 1995). Stock options are contracts which give the holder of the option the right to buy shares or stock at a pre-specified price ("exercise price") for a pre-specified term. When the actual share price is higher than the exercise price, the option becomes in-the-money and becomes attractive to exercise. Executive options, however, have a vesting period: this is the time that an executive must wait in order to be able to exercise the option and executives are therefore not able to exercise the option whenever they want. Executive options are non-tradable, and expire if the executive leaves the firm before vesting. In

practice, most options have a 10-year term and are granted with exercise prices equal to the share price on date of grant (Murphy, 1999).

At first sight, stock options provide a good incentive for the executives to act in the interest of the shareholders since the payout from exercising options increases as the stock price increases. However, stock options only reward stock-price appreciation and not total shareholder return since total shareholder return includes dividends. When dividends are paid out, the stock price decreases with the dividend payout amount. Therefore, executives that are holding options are incentivized to avoid dividends such that the stock price does not decrease. However, shareholders want dividends to be paid out as it is a return on their invested capital. There is a conflict of interest between the executive and shareholders and therefore stock options might not be the best incentive to align these interests. Furthermore, the value of options is positively related with stock price volatility and therefore executives that are holding options are more likely to engage in riskier investments. When the share price is far below exercise price, stock options provide no incentive to reduce agency costs at all because there is little chance the option becomes in-the-money, so the executive does not take into account this option value (Murphy, 1999).

3.3.4 Long-term Incentive Plan

Another component of executive remuneration is long-term incentive plan. Almost every company offers an annual bonus plan to its executives which is based on one single year performance. A disadvantage of such a plan is that it triggers executives to focus on short-term performance. In order to incentivize executives to focus on the long-term as well, most companies also offer long-term incentive plans (LTIPs), typically based on 3- or 5-year cumulative performance and often paid out in shares (Murphy, 1999). LTIPs are designed to increase the performance-pay sensitivity of executives and can be considered as good incentives to reduce agency problems. However, Buck et al. (2003) argue that the terms of LTIPs can be manipulated by the executives in their own favor. Rewards of LTIPs are often linked with EPS, total shareholder return, and relative performance of peers. Stock options for example are based on the firm's absolute share price and therefore harder to manipulate than LTIPs (Buck, Bruce, Main, & Udueni, 2003). So, LTIPs may not be an effective incentive, but it could support other objectives, for example retention. Furthermore, the structure of LTIP is the same as the structure of annual bonus plan which is elaborated in section 3.3.3.

3.3.5 Who sets the pay?

The board of directors determines the level and structure of the compensation of executives and their task is to monitor them as well (Hallock, 1997). However, one disagrees on the importance of the board of directors and the value of outside directors. An outside director defined as an individual that is not related to the firm, so not an employee or stakeholder in the company. Some people believe that boards are unnecessary because the market itself provides incentives to align the interests of managers and shareholders. Some other people suggest that outside directors are valuable for the board since they can monitor the management better due to their independency. However, it can be questioned how independent outside directors actually are since CEOs play a dominant role in choosing the outside directors (Rosenstein & Wyatt, 1990).

CEOs want to maximize their compensation and effective salary maximization requires that the CEO has a lot of power over the board. The role of the board is very important in the determination process of executive compensation (Boyd, 1994). In a research of Tosi and Gomez-Mejia (1989), it was found that monitoring is negatively related with the power of the CEO. When the board is better in monitoring, the influence of the CEO in the determination process of executive pay is reduced. CEO compensation is partially driven by firm size and firm performance but it also driven by the level of board control and the power of the CEO. For example, when the firm's CEO serves the position of chairman of the board as well, the CEO has more power over the board. This makes it easier to influence the determination process of the pay than when the chairman of the board is an independent board member who can objectively assess the performance of the executives and determine their pay (Boyd, 1994).

Another way for CEOs to gain power within the firm is to entrench themselves and this can done by multiple ways. For example, CEOs ensures themselves that they will not be replaced by making manager-specific investments. Manager-specific investments are investments that are most valuable under the current manager and therefore, these kind of investments reduces the probability of replacement as it is very costly to replace the manager. This enables CEOs to extract larger compensation (Shleifer & Vishny, 1989). Another way for CEOs to entrench themselves is by participating in a classified (or staggered) board. In a classified board, there is not an annual election for all directors but only for some of them. A classified board reduces the effectiveness of directors, thereby having a negative impact on firm value. Management itself, however, argues that staggered boards have better board stability and an effective long-term

strategic planning (Faleye, 2007). Nevertheless, Harford, Humphery-Jenner and Powell (2012) argue that entrenched managers are likely to overinvest and make value-destroying acquisitions.

Another measure that represents CEO power is the CEO Pay Slice (CPS). It is defined by Bebchuk, Cremers, and Peyer (2011) as: "the fraction of the aggregate compensation of the firm's top-five executive team captured by the CEO." When the level of CPS is high, the CEO has relatively more power within the firm than when the CPS level is low because the CEO was able to extract a larger proportion of the total compensation relative to the other top executives. CPS shows how the executive compensation is dispersed among the top five executives. It is difficult to compare companies' CPS levels because one need to look at the optimal CPS level and that level is different for each firm. It might depend on the CEO's relative ability and contribution. When the actual CPS level is higher than the optimal CPS level, there might be an agency problem because the CEO used his power to extract a larger proportion of the total executive compensation (Bebchuk, Cremers & Peyer, 2011). As elaborated earlier, executive compensation consist of several components but not all components are equally likely to explain the executive compensation dispersion among the top 5 executives. Base salary is relatively easy to influence by a powerful CEO because it is a fixed component of executive compensation, so not dependent of firm performance. Although the pay in the principal-agent model was set by shareholders, in practice the pay is set by board of directors. It is likely that a powerful CEO has some influence over the board and thereby can influence his own pay, in particular when the CEO and chairman of the board positions are held by the same person because duality raises the decision power of the CEO. A study of Ya'acob (2016) shows that duality has a positive effect on the CEO compensation. So, it can be assumed that base salaries could lead to executive compensation dispersion. A CEO could manipulate annual bonus plans via pay-performance structure. If the performance threshold is set lower, the bonus will be paid to the CEO while he performed less. He could also manipulate the maximum bonus and thereby making the "incentive zone" bigger. However, manipulating annual bonus plans is not likely to be the main component of executive pay that leads to dispersion. This is because at least 80% of the bonus is related to corporate financial performance and the remaining 20% is related to individual and non-financial objectives (Holthausen, Larcker, & Sloan, 1995). So, the largest part of bonus is dependent of corporate financial performance and this is for every executive the same and therefore, the bonus is not likely to cause the dispersion. Executive compensation dispersion

could increase if the CEO gets more stock options or if the CEO manipulates the exercise price. When the stock options are issued at a lower exercise price, there is a higher chance the option becomes in-the-money, resulting in a higher compensation. However, most of the time the stock options are issued with an exercise price equal to the share price of the issuance date so this is hard to manipulate. Furthermore, stock options are based on the firm's absolute share price which is hard to manipulate. A powerful CEO could require higher compensation in the form of stock options which would lead to a higher dispersion when the options become exercisable. LTIPs are easier to manipulate than stock options because this plan is based on EPS, total shareholder return or relative performance of peers. But the structure is the same as the structure of the annual bonus plans which means that the biggest part is depending on corporate performance and does not lead to executive compensation dispersion. However, the small part that is depending on individual performance could be manipulated and could lead to a higher CPS. In conclusion, there is not one particular component that causes a large executive compensation dispersion but all components together could lead to a higher CPS that is not optimal.

3.4 Risk Avoidance

It is assumed by many researchers that giving options to executives makes them more risk-seeking (Ross, 2004). Due to asymmetric payoffs of call options (i.e. call option cannot have a negative payoff but can have a positive payoff), it is attractive for executives to undertake risky projects (DeFusco, Johnson, & Zorn, 1990). However, this is incomplete. A convex (i.e. slope of the scheme increases in the output) compensation schedule makes an agent not more risk-seeking, nor does a concave (i.e. slope of the scheme decreases in the output) compensation schedules make an agent more risk-averse. The effect of compensation schedule on an agent's risk appetite does not only depend on the convexity of the compensation schedule but depends on other factors as well, e.g. utility function. To illustrate this, suppose that an option is offered to the executive as part of executive compensation that raises base salary. The agent assesses risk from the current point of his wealth and his attitude towards risk can be different at a higher level of wealth than at a lower level (Ross, 2004).

There is an incentive problem related with risk aversion which is called the risk-related incentive problem. This problem occurs when risk-averse managers pass up positive but risky net present value (NPV) projects. Stock options as part of the compensation package should mitigate this

problem since it should motivate managers to undertake more risky investments (Rajgopal & Shevlin, 2002). It is in the interest of shareholders to have a CEO that acts not too risk-averse as he might pass up positive NPV projects that could create shareholder value. There is empirical evidence of a relation between the structure of executive compensation and investment policy found in a study of Coles, Daniel and Naveen (2003). One characteristic of executive compensation structure is pay-for-performance sensitivity, which is the sensitivity of CEO wealth to stock volatility and is denoted by vega. In that study of Coles, Daniel and Naveen (2003), it was found that a higher vega in the compensation scheme gives executives the incentive to engage in riskier projects. Another characteristic of executive compensation structure is the sensitivity of CEO wealth to stock price and this is denoted by delta. Delta can be seen as the characteristic that aligns the incentives of executives with the interests of shareholders. A higher delta means that the CEO is more sensitive to stock prices as he shares gains and losses with shareholders. Coles, Daniel and Naveen (2003) argue that a higher delta not only results in an alignment of the interests of executives and shareholders but also results in a higher exposure of firm-specific risk.

There is a tradeoff between the expected firm value and the additional risk a CEO has to take. The effect of vega can be mitigated by high delta. A higher vega is associated with investments in riskier assets but this can be offset by a high delta because the CEO is exposed to a great amount of firm-specific risk. A measure of risk-taking incentives that captures this tradeoff is risk avoidance. This measure combines both vega and delta into one measure. Risk avoidance measure (ρ) can be seen as a hurdle rate: the CEO will implement a new project only if it increases firm value by ρ times the percentage increase in the firm risk. If $\rho = 0$, the CEO is indifferent to firm risk and will engage in all profitable projects irrespective of their riskiness. Consider a project that would increase the firm risk by one percentage point, e.g. from 25% to 26%, and assume that $\rho = 3$. Only profitable projects, i.e. positive NPV, that generate more than 3% increase in firm value for each percent of additional risk will be implemented. According to the agency theory, shareholders should be risk neutral which implies that a risk avoidance of zero is the best optimum and a positive risk avoidance is the second-best optimum. The optimal level of risk avoidance is for every firm different because it depends on the availability of positive NPV but risky projects. An increase in risk-taking incentives is particularly beneficial if the firm has a lot of those kind of projects (Dittmann, Yu, & Zhang, 2015). Shareholders are assumed to

be risk neutral because they can diversify their portfolio. Faccio, Marchica and Mura (2011) provided evidence that not all major shareholders are diversified enough and therefore are more risk. This finding shows that a risk avoidance of zero may not be the best optimum as shareholders are risk averse instead of risk neutral (Dittmann, Yu, & Zhang, 2015).

4. Data and Methodology

In this section, I explain what sample this research uses and how the data is collected and merged. I elaborate on the variable definitions and discuss the summary statistics. In the methodology part, I explain what methodologies I use for the different hypotheses. If I refer to equations, these can be found in Appendix II. Specifications, e.g. firm fixed effects, are not shown in equations.

4.1 Sample Selection

The time range used for this research is 1997 – 2012. I chose this time range as year 1997 is the first year for which all data was available in the databases and year 2012 is the latest year for which all required data was available. This time range includes the period of the financial crisis and allows me to examine whether the crisis had an impact on CPS or risk avoidance. There was a peak in the credit boom in 2007 and this collapsed in the fall of 2008 by the meltdown of subprime mortgages and other types of securitized products (Ivashina & Scharfstein, 2010). Therefore, I consider year 2008 as start year of financial crisis. I consider year 2010 as end year of financial crisis as in the time period 2008 – 2010, the crisis had its greatest impact. For this research, I used a sample of U.S. listed firms.

4.2 Data Collection

The first database is the Compustat database and is used as my main database, i.e. I merged everything with this database. This database contains firm performance data and I used variables from Compustat to create my own variables because they were not available in the database. An example of such a variable is Tobin's Q which is a measure of firm performance. It is defined as the capital market value of the company divided by the book value of its assets (Wernerfelt & Montgomery, 1988). A rough calculation of Tobin's Q is the market value of shares, i.e. number of shares outstanding times share price, plus the total debt, all divided by the book value of total assets. A Tobin's Q between zero and one implies that the stock is undervalued: book value of the firm's assets are greater than value of the stock. A Tobin's Q higher than one implies that the

stock is overvalued. Firms with a Tobin's Q higher than 10 are deleted from the database because this is not realistic as it would imply that the firm's stock is ten times or more overvalued. Another performance measure is Return on Assets (ROA) and is calculated by net income divided by book value of total assets. ROAs vary across different industries as capital-intensive business typically have a lower ROA than non-capital-intensive businesses because they have more assets. I dropped one observation which had a ROA of 11 because this was significantly higher than other observations. Investment opportunities, or growth opportunities, are calculated by capital expenditures (capex) divided by book value of total assets. Negative values are dropped form the database since that would imply a negative capex or negative total assets and this is not very common. The variable leverage is the ratio between debt and firm value and is calculated by total debt divided by book value of total assets. Firms with a leverage ratio of three or higher are deleted from the sample because this is very high. A leverage ratio above 1 implies that the firm is in a very risky position where it has more debt than total assets. Lastly, firm size is defined as the natural logarithm of total assets. The natural logarithm is used to get a more appropriate distribution of the variable. A unit increase in a big firm may have less effect than a unit increase in a small firm and this effect is mitigated by taking the natural logarithm of total assets.

Before merging with the Compustat database, I merged the ISS director database with Execucomp data using the following identifiers: cusip, year, first name and last name. I only used CEOs who are the entire year with the company, and other executives and CEOs who left before the end of the year are removed. They are removed because executive compensation is based on the entire year so I only want CEOs who do not leave early in my sample. It avoids observations with a biased CPS because a CEO that does leave early has a lower CPS due to the fact that he has only received compensation for part of the year. ISS database mainly contains information about the firm's board of directors. The variable board size was created by counting the executives on the board. In the regression analyses, I use the natural logarithm of board size for the same reason as with firm size. For example, one extra member on a board of four people can have a different impact than an extra member on a board of 30 people and by taking the natural logarithm, this effect is attenuated. After that, the independency ratio can be calculated by dividing the number of independent board members by absolute board size. I created a CEO outsider dummy variable which equals one if the CEO is an outsider and zero otherwise. The

CEO is considered as an outsider when the date he became CEO is within one year since he joined the company (Bebchuk, Cremers & Peyer (2011). CEO duality exists when a firm's CEO also serves as chairman of the board of directors (Boyd, 1995) which allows him to bargain a lot of power and this is denoted by the dummy variable CEO duality. The dummy variable equals one if the CEO is also the chairman and equals zero otherwise. The last variable from the ISS database is CEO ownership which is calculated by the shares held by the CEO divided by total common shares outstanding. I dropped one observation which had a ratio above 1. This is not possible as it would suggest that the CEO owns more shares than the total shares outstanding.

The Execucomp database includes data with some other CEO characteristics and data about the compensation. For this research, total compensation (TDC1) is used which consists of the following components: salary, bonus, all other compensation, all other annual compensation, restricted stock granted, option granted Black Scholes value and long-term incentive plan payouts. CPS is a measure of compensation dispersion and is calculated by taking total compensation of the CEO as a fraction of the total compensation of the top 5 executives. 37 observations with a CPS level of zero are deleted from the database because this would imply that the CEO received no compensation at all in that given year and that is very unrealistic. Furthermore, I included CEO tenure and it is the different between the current year and the year he became CEO. This variable is divided in three dummy variables. The first CEO tenure variable consists of CEOs with a tenure of 1-2 years, the second CEO tenure variable contains CEOs with a tenure of 3-4 years and the third CEO tenure variable includes CEOs with a tenure of 5 years or higher. I included a dummy variable about gender as well which equals one if the CEO is a female and equals zero if the CEO is a male. Lastly from this database, I included CEO founder as a dummy variable and this variable equals one if the CEO is the founder and equals zero otherwise. I assume that the CEO is a founder when the CEO's tenure started prior to the firm's first listing in CRSP database. The first year that is reported in this database is assumed to be the IPO year of the firm (Bebchuk, Cremers & Peyer, 2011). The CRSP database is merged with Execucomp and ISS using cusip as identifier. After that, the merged database of Execucomp and ISS directors is merged with Compustat database using the following identifiers: Gvkey and Year.

In order to get information about the entrenchment of executives, I use the ISS Governance database. The measure of entrenchment is E-index and consists of six provisions. E-index has a minimum of 0 and a maximum of 6. The six provisions are: classified board, limits to shareholder bylaw amendments, golden parachutes, poison pills and supermajority requirements for mergers and charter amendments (Bebchuk, Cohen & Ferrell, 2009). I also included the data that is used in the research of Bebchuk, Cohen and Ferrell (2009) which was available on the website of Harvard and merged this data with Compustat using Cusip and Year.

The data of risk avoidance measure (ρ) is provided by Mr. Dittmann and is in the research Dittmann, Yu and Zhang (2015). There are risk avoidances for $\gamma = 0.5, 1, 2, 3, 4$ and 6 where γ is the level of risk aversion (Dittmann, Yu, & Zhang, 2015). This research uses a risk aversion level $\gamma = 3$ because it is the most standard risk aversion level used.

An overview of the variables and their definitions can be found in Appendix I, Table 1.

4.3 Summary Statistics

In Table 1, the summary statistics of the variables are provided and this table can be found at the end of this paragraph. The statistics are computed based on a panel data set of 16,630 firm-year observations that represent 4,377 different CEOs and 2,843 firms between 1997 and 2012. The average CEO has a CPS of 0.3820 which means that the CEO's compensation is 38.2% of the total compensation of the top 5 executives. If compensation would be equally divided between the top 5 executives, CEO would have a CPS of 0.2. However, a CEO generally earns more than other executives so an average CPS of 0.3820 is not significantly high. The risk avoidance measure for $\gamma = 3$ has a mean of 2.1621. The average CEO would only implement projects that generate more than 2.1621% increase in firm value for each percent of additional risk. The firm performance measure Tobin's Q has a mean of 1.5707 which means that the average firm's stock is overvalued. The average ROA is 0.0364 so the total net income is 3.64% of total assets. This is quite low as ROA above 5% is considered as "good". Duality has a value for approximately half of the observations with a mean of 0.6360. This means that 63.6% of the CEOs that have a value for the variable duality are both CEO and chairman of the board of directors. Note that the sample contains identical CEOs for multiple years, so this percentage does not indicate that 63.6% of all unique CEOs are both CEO and chairman. It only states that 63.6% of the observations are both CEO and chairman. This note applies to all dummy variables. Furthermore,

the independency ratio of the board of directors is 0.7148 which means that 71.48% of the members of the board are outsiders. The average ownership by a CEO is 0.0276, which means that a CEO owns on average 2.76% of the firm's stock and the median is even lower, namely 1.05%. This percentage indicates that the average CEO is not a block holder. Block holder is defined as any entity that owns 5% or more of the firm's equity (Denis & McConnell, 2003). E-index has only 5,269 observations which is the lowest number of observations of all variables and has a mean of 2.8941. An E-index of zero means that the CEO is not entrenched at all and an E-index of 6 implies a highly entrenched CEO. A mean of 2.8941 indicates that the average CEO is entrenched but not highly entrenched. Lastly, female has a mean of 0.0161. This means that 1.61% of the CEOs who have a value for this variable is female. In general, CEO positions are served by a male, however, this percentage of female CEOs is surprisingly low.

Table 1 - Descriptive Statistics

This table provides summary statistics of all variables that are used for this study. An overview of the variables can be found in Appendix I, Table 1. The variables firm size and board size are both a natural logarithm of their absolute value.

Variable	Number of Observations	Mean	Median	Standard Deviation	Minimum	Maximum
CPS	16,630	0.3820	0.3842	0.1153	$3.31 \cdot 10^{-8}$	0.9512
Risk avoidance for $\gamma = 3$	9,497	2.1621	1.8669	1.5822	-3.5598	10.8571
Tobin's Q	16,430	1.5707	1.1870	1.3012	0.0065	9.9636
ROA	16,618	0.0364	0.0439	0.1458	-5.7785	1.3278
Investment Opportunities	16,104	0.0494	0.0342	0.0556	0	0.8153
Leverage	16,562	0.2290	0.2053	0.2016	0	2.6008
Firm size	16,620	7.6652	7.5315	1.7324	1.8129	14.6738
CEO Duality	8,426	0.6360	1	0.4812	0	1
Independency of board	8,426	0.7148	0.7500	0.1607	0	0.9412
CEO Outsider	7,662	0.5243	1	0.4994	0	1
CEO Ownership	7,925	0.0276	0.0105	0.0580	0	0.7043
CEO Founder	15,831	0.2300	0	0.4208	0	1
Board size	8,426	2.2169	2.1972	0.2662	1.0986	3.5264
CEO Tenure	16,630	8.4083	6.0658	7.2767	1	61.0384
E-index	5,269	2.8941	3	1.4641	0	6
Female	8,426	0.0161	0	0.1260	0	1
Crisis	16,630	0.1977	0	0.3983	0	1

4.4 Methodology

For hypothesis 1, I want to test differences between the non-crisis period and the crisis period in CPS, so I create two groups, the "non-crisis" group which contains the years 1997-2007 and the "crisis" group which contains the years 2008-2010. I first plot CPS against years to see if there is a decrease in CPS during the crisis. In order to test the differences in CPS before and during the crisis statistically, I test a few assumptions to check what test is appropriate to use. The first assumption is that the dependent variable, i.e. CPS, should be continuous. CPS is a variable that is measured at ratio level with a range of 0 to 1 and is therefore continuous. The second assumption is that there are no significant outliers. Since CPS is a ratio between 0 and 1 and values that did not fall within that rage already have been removed, there are no significant outliers in values of CPS. Furthermore, I have to check whether CPS is normally distributed and the histogram can be found in Appendix I, Figure 1. The histogram shows that the distribution of CPS is right-skewed. I also tested for normality and used the Skewness and Kurtosis test for normality as it allows for larger samples than for example Shapiro-Wilk test. However, I also used the latter to see if it would give the same results as the Skewness and Kurtosis test. Both tests indicate that CPS is not normally distributed and the results can be found in Appendix I, Table 2. So, the assumption that the variable has a normal distribution is violated. A reason for non-normality is that the dataset contains too many extreme values and this will result in a skewed distribution. It can be questioned whether the extreme values in this case are outliers and therefore whether they should be removed from the dataset. For example, a CPS of 0.9 is tremendously high, but it is not impossible. However, it is far above the mean of CPS which is slightly less than 0.4. It might bias my dataset if I would remove these observations and that is why I chose to include these observations. With the information above in mind, I chose to use the Mann-Whitney U (Wilcoxon rank-sum) test. This test does not require the data to be normally distributed. Mann-Whitney U test can be used when the groups are not the same size, however, the statistical power will decrease as the group sizes become more unequal. The non-crisis group is significantly larger than the crisis group which diminishes its statistical power. Therefore, I perform another Mann-Whitney U test with equal group sizes. The non-crisis group contains observations of year 2005 and the crisis group contains observations of year 2009. I only included firms that have a value for CPS in both year 2005 and 2009 which results automatically in two groups of the same size. It shows better whether the CPS of companies

actually differs before and during the crisis. I perform four regressions as well to test what variables have an effect on CPS before and during crisis. The first two models have CPS before crisis as dependent variable and are shown in equation (1) and equation (2), respectively. Both models have year dummy variables and firm fixed effects. The first model contains CEO characteristics and board structure characteristics as independent variables and the second model has in addition a one-year lagged CPS as independent variable. Models 3 and 4 are similar to the first two models but have CPS during crisis as independent variable and the models are shown in equation (3) and (4), respectively.

For hypothesis 2, I first test the correlation between the different gamma levels of risk avoidance measure ρ and CPS. After that, I perform some regressions and I use six different models. Hypothesis two examines the relation between risk avoidance and CPS and control variables are included to test the robustness. The control variables are mainly CEO characteristics or characteristics of the board of directors. The second model includes year dummies to capture any influence of aggregate trends that may have an effect on the results. Not controlling for years might lead to the omitted variables bias. The third model includes firm fixed effects as well. By using firm fixed effects, we look at the effect of the variables within each firm and this mitigates the effect of the omitted variable bias. The first three models and model 5 are illustrated by equation (5). The fourth model has the same specifications as model 3 but has a one-year lagged CPS instead of a non-lagged CPS. The fifth model has the following specifications: year dummies, firm fixed effects and firm clustering. The sixth model has the same specifications as model 5 but has a one-year lagged CPS instead of a non-lagged CPS. The fourth and sixth models are shown in equation (6).

Hypothesis 3 examines the relationship between firm performance and CPS. For this hypothesis, I use four different regression models. The first and third model has as only specification year dummies and the second and fourth model has in addition firm fixed effects as specification. All models include the same variables and only differ in specifications or dependent variable. The first two models have performance measure Tobin's Q as dependent variable and the other two models have ROA as dependent variable. I use two different firm performance measures to check how robust my findings are. The regressions of the models with Tobin's Q and ROA are

shown in equation (7) and (8), respectively. The regressions include the same control variables as hypothesis 2 but include firm characteristics as control variables as well.

Hypothesis 4 examines the relation between firm performance and CPS and risk avoidance. For this hypothesis, I use the same firm performance measures as in hypothesis 3 (Tobin's Q and ROA). The two main differences between hypothesis 3 and 4 is the inclusion of risk avoidance in the regression and hypothesis 4 has more models. Models 1A-6A have Tobin's Q as dependent variable. CPS and risk avoidance are independent variables and other variables, such as CEO characteristics, board structure characteristics and firm characteristics are included in the regression as well. Models 1A, 2A, 3A and 5A are illustrated in equation (9). Models 4A and 6A have a one-year lagged CPS instead of a non-lagged CPS and both models are shown in equation (10). Models 1B-6B is basically the same as 1A-6A but includes a one-year lagged Tobin's Q as independent variable as well. I included this lagged Tobin's Q separately because it decreases the number of observations of the models. Models 1B, 2B, 3B and 5B are shown in equation (11) and models 4B and 6B in equation (12). Models 1C-6C have ROA as dependent variable and the regression of model 1C, 2C, 3C and 5C is shown in equation (13) and models 4C and 6C are show in equation (14). Models 1D-6C is basically the same as models 1C-6C but has a one-year lagged ROA in addition. Equation (15) illustrates the regression models 1D, 2D, 3D and 5D and equations (16) shows models 4D and 6D. The specifications of the six models are the same as of the six models in hypothesis 2. The specifications are not shown in the equations but are shown in the tables with the results that will be discussed in the next section.

5. Results

In this section, the obtained results are discussed. Each hypothesis is discussed in a separate subsection.

5.1 Difference in CPS before and during crisis

The first hypothesis is: The CPS during the crisis is lower than the CPS before the crisis. I plotted CPS against years to see if there is a significant difference in CPS during the crisis. The scatterplot can be found in Appendix I, Figure 2. There is a decrease during the crisis but after 2010, CPS levels rose significantly again. The scatterplot suggests that CPS during the crisis is lower than before crisis and to test this statistically, I perform the Mann-Whitney U test. In total, I have 14,367 observations whereof 11,079 observations are in the non-crisis group (years 1997

– 2007) and 3,288 observations in the crisis group (years 2008 – 2010). The null hypothesis of this test is that the median of CPS in the non-crisis group is equal to the median of CPS in the crisis group. The alternative hypothesis is that the medians of both groups are not equal. The P-value of the Mann-Whitney U test is 0.0188 and this is presented in Table 2. As this is lower than 0.05, we should reject the null hypothesis and accept the alternative hypothesis. This means that the medians of CPS of the non-crisis group and the crisis group are not equal.

Table 2 - Mann-Whitney U test 1997 - 2010

This table shows the results of Mann-Whitney U test using the years 1997 - 2010. The non-crisis group contains the years 1997 – 2007. The crisis group consists of the years 2008 – 2010. The null hypothesis of this test is: the median of CPS before crisis is equal to the median of CPS during crisis.

Group Variable	*Number of Observations*
Non-Crisis	11,079
Crisis	3,288
Combined	14,367
Z = -2.350	P > |z| = 0.0188

In order to check the robustness of this result, I perform another Mann-Whitney U test with other groups. The first group is considered as the group before the crisis and consists of firms from year 2005. The second group is considered as the group during the crisis and consists of firms from year 2009. Both groups only contains firms that have a value for CPS in both year 2005 and 2009. This will give a clearer view whether CPS of firms actually decreased. The null and alternative hypothesis are the same as the hypotheses of the first Mann-Whitney U test. Table 3 presents the obtained results of the Mann-Whitney U test and the P-value of the Mann-Whitney U test is 0.0764 which means that we only can reject the null hypothesis at 10%. So, at a 10% significance level, this test provides evidence for inequality of the medians of CPS before and during the crisis. However, since it is only significant at 10%, this result decreases the robustness of the inequality of the medians of CPS before and during the crisis I found earlier. Table 4 provides summary statistics of CPS in 2005 and 2009. In 2005, the mean of CPS is 0.4023 and in 2009, the mean of CPS is 0.3890. In 2005, CPS has a median of 0.4033 and in 2009, the median of CPS was 0.3922. This shows that CPS during the crisis is lower than before the crisis.

Table 3 - Mann-Whitney U test 2005 & 2009

This table shows the results of Mann-Whitney U test using the years 2005 and 2009. The non-crisis group consists of year 2005 and crisis group consists of year 2009. The null hypothesis of this test is: the median of CPS before crisis is equal to the median of CPS during crisis.

Group Variable	*Number of Observations*
Non-Crisis	510
Crisis	510
Combined	1,020
Z = 1.772	P > |z| = 0.0764

Table 4 - Summary Statistics CPS

This table shows the mean and median of CPS before the crisis (year 2005) and CPS during the crisis (year 2009).

Variable	*Mean*	*Median*
CPS before crisis (2005)	0.4023	0.4033
CPs during crisis (2009)	0.3980	0.3922

The Mann-Whitney U test does not provide information about what could have an influence on the CPS levels before and during the crisis. Therefore, I conduct four regressions analyses. The obtained results are provided in Table 5 and can be found at the end of this section.

In the first model, there is a negative relation between CEO tenure 1 and CPS before crisis. When a CEO has a tenure of 1 or 2 years, this is negatively associated with their CPS. A CEO with such a small tenure may have not enough power or influence to require a higher CPS. Independency of the board is positively related with CPS before crisis. This positive relation, however, is counter intuitive as one would expect that a board with more outside board members is associated with a lower CPS level since the CEO is better monitored and has less influence. Rosenstein and Wyatt (1990) argue that CEOs play a dominant role in choosing the outside directors and are therefore still able to influence their compensation which is likely to results in a higher CPS.

In model 2, the one-year lagged CPS before crisis is positively related with non-lagged CPS before crisis. This implies that the level of CPS of last year has a positive effect on CPS of this year. CEO duality is negatively related with CPS before crisis which means that a person that serves both CEO and chairman positions is associated with a lower CPS. This is not in line with agency theory because according to that theory, duality increases CEO power and a powerful CEO has more power to set his own pay, resulting in a higher CPS. The costs of duality (i.e. agency costs) could be mitigated by other executives because executives not only corporate with, but also compete with and monitor, each other (Tang, 2016). It could be that a CEO that is also the chairman of the board is better monitored by other executives whereby CEO is less able to use his power to set his own pay, resulting in a lower CPS. Independency of the board is in this model positively related with CPS before crisis as well.

In model 3, independency of the board is negatively related with CPS during the crisis and this is in contrast with the positive relation found in model 1 and 2. As explained earlier, a negative relation between independency and CPS is more intuitive as the CEO is better monitored by the board and this negatively affects his CPS. The difference in sign of relation between both variables before and during crisis could be due to that in times of crisis the CEO has less influence in choosing outside directors. This results in truly outside directors which has a negative effect on CPS level.

In model 4, CEO tenure 1 is positively related with CPS during crisis. This is in contradiction with the negative relation between CEO tenure 1 and CPS before crisis found in model 1. In times of economic downturn, firms can choose to appoint a new CEO to make sure their company will survive the crisis. It is likely that a new CEO is an outsider and is appointed based on his unique skills and experience. In order to attract these CEOs, firms are willing to give a high compensation to that CEO. This results in a CEO with a low tenure but with a high CPS. Lastly, independency of the board is negatively related with CPS during crisis which is in line with model 3.

In conclusion, the median of CPS before crisis is higher than the median of CPS during crisis. However, when it is tested while using only year 2005 and 2009 as before and during crisis, it is only significant at 10% which decreases the robustness of the results. CEO tenure 1 has a negative effect on CPS before crisis but has a positive effect on CPS during crisis and this could

be due to appointment of a new CEO. Furthermore, independency of the board is before crisis positively related with CPS and negatively related with CPS during crisis. This could be due to that outside directors during crisis are genuinely independent of the firm whereby the CEO has less influence on his own pay.

Table 5 - Regressions CPS before and during crisis

This table shows four different regressions of CPS on several variables, such as other CEO characteristics and board structure characteristics for the years 1997 - 2010. The first two models have as dependent variable CPS before crisis and the latest two models have CPS during crisis as dependent variable. The crisis period is defined as the years 2008 – 2010. An overview of the variables can be found in Appendix I, Table 1. *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

Dependent variable:	*CPS before crisis*		*CPS during crisis*	
Model	1	2	3	4
Independent Variables:				
CPS before crisis, T-1		0.1255***		
CPS during crisis, T-1				0.1115
CEO Tenure 1	-0.0131*	-0.0193	-0.0296	0.0220**
CEO Tenure 2	0.0009	0.0034	-0.0063	-0.0317
CEO Tenure 3	(Omitted)	(Omitted)	0.0030	-0.0346
CEO Founder	-0.0312	-0.0002	(Omitted)	(Omitted)
CEO Duality	0.0116	-0.0218*	-0.0054	(Omitted)
Independency of board	0.0529*	0.1079***	-.3981***	-0.6114**
CEO Outsider	-0.0159	0.0079	-0.0484	-0.0193
Female	0.0434	-0.0176	(Omitted)	(Omitted)
CEO Ownership	0.0812	-0.3304	-1.6534	-0.4876
E-index	0.0000	0.0000	0.0063	-0.0242
Board size	-0.0301	-0.0154	0.0062	0.0967
Constant	0.4505***	0.3243***	1.0301***	0.5639*
Number of Observations	2,272	1,552	392	183
R-squared	0.6966	0.7715	0.8435	0.9359
Adjusted R-squared	0.4205	0.4726	0.5975	0.7407
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes

5.2 Relation between Risk avoidance and CPS

The second hypothesis is: Risk avoidance is positively related with executive compensation dispersion. In order to test this hypothesis, I first look at the correlation between the risk avoidance measure and CPS and the obtained results can be found in Table 6. For each level of γ, there is a negative correlation between CPS and risk avoidance with all correlations highly significant. For example, the risk avoidance measure for γ =2 and CPS have a correlation coefficient of -0.1370. This indicates a negative weak correlation between the variables and this negative weak correlation applies to all the different levels of γ. When CPS increases, risk avoidance decreases. This is also true the other way around because correlation is not causation. However, correlation does not explain that much because you only look at those two variables and how they interact with each other. Therefore, I perform a few regressions and include control variables. The obtained results of these regressions are presented in Table 7 and this table can be found at the end of this paragraph.

Table 6 - Correlation between CEO Pay Slice (CPS) and Risk avoidance

This table shows the correlation between CPS and Risk avoidance for six different levels of γ and for the years 1997 - 2012. For each correlation, the P-value is given below the correlation coefficient.

CPS	γ = 0.5	γ = 1	γ = 2	γ = 3	γ = 4	γ = 6
	-0.1362	-0.1363	-0.1370	-0.1358	-0.1338	-0.1293
P-Value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

The first model shows a negative relationship between CPS and risk avoidance for γ = 3. This means that a CEO with a higher CPS has a lower risk avoidance. Note that with this model and the other models, causality cannot be proved and therefore it cannot be stated that a higher CPS leads to a lower risk avoidance. CEO duality is in this model positively related with risk avoidance which implies that a CEO who also serves the position of chairman of the board of directors has a higher risk avoidance than a CEO who does not serve the position of chairman. When there is CEO duality, the CEO is able to make decisions that do align his own interests and since a CEO is assumed to be more risk averse than shareholders, the higher risk avoidance could be explained by that the CEO does not want to invest in risky projects to protect himself

against risk. CEO ownership is positively related with risk avoidance which implies that a higher ownership of shares by CEO is associated with a higher risk avoidance. When a CEO owns more shares of the firm, he faces more firm-specific risk. Therefore, he might be more reluctant to take on positive NPV but risky projects as he wants to protect the value of his shares. A CEO that is also the founder of the firm is related with a higher risk avoidance than non-founder CEOs. A founder CEO is likely to be more committed to the firm. He may not want to bring his firm in jeopardy by making risky investments and therefore only invests in projects that exceed a higher 'hurdle rate', i.e. risk avoidance, than non-founder CEOs would invest in. CEO outsider is negatively related with risk avoidance which means that outsider CEOs have a lower risk avoidance than insiders. An outsider CEO may take more risk than an insider CEO because he is less committed to the firm, which is associated with a lower risk avoidance. Furthermore, the independency ratio of the board has a negative relation with risk avoidance. More independent members on the board of directors is associated with a lower risk avoidance of the CEO. A board is best able to perform their monitoring role optimally when board members are sufficiently independent. Because of better monitoring, the CEO has not the opportunity to pass up risky projects and should adapt the risk appetite of shareholders. As the CEO is assumed to be more risk averse than shareholders, it will result in a lower risk avoidance when independency ratio of board of directors is larger.

Model 2 shows a negative relationship between CPS and risk avoidance as well. CEO duality is no longer significantly related with risk avoidance in this model and in the following models. Therefore, it can be assumed that CEO duality has no impact on the risk avoidance of the CEO. This model shows a similar positive relation between CEO ownership and risk avoidance as model 1. A founder CEO is also in this model associated with a higher risk avoidance. CEO outsider is not significantly related with risk avoidance in this model, suggesting that risk avoidance is independent of whether the CEO is an outsider. Independency of the board is still negatively related with risk avoidance, but the coefficient (-1.1728) halved when comparing with coefficient of model 1 (-2.5250). This implies that the independency ratio of the board has a less negative effect on risk avoidance than in the previous model. This model shows a negative relation between board size and risk avoidance. This relation is surprising as one may expect a positive relation between board size and risk avoidance. A larger board is more difficult to coordinate and may have more communication problems than smaller boards. McNulty,

Florackis, and Omrid (2013) argue that larger boards are likely to perform their risk-management function in a less efficient way than smaller boards because the CEO cannot be monitored optimally. Due to bad monitoring, CEO can act in his own interest which results in a higher risk avoidance. It could be that an increase in a certain board size has a negative effect on risk avoidance because a bigger board has more people to monitor the CEO and it is likely to have more knowledge and experience than a smaller board because of the extra members. However, this negative effect is eventually vanished because of the related problems of large boards.

In model 3, CPS is negatively related with risk avoidance. CEO ownership is positively related with risk avoidance and the coefficient of CEO ownership has more than doubled compared to the coefficient of model 2, namely from 6.1920 to 14.4075. This indicates that CEO ownership has a great influence on risk avoidance. CEO founder is in this model and in the next models not significantly related with risk avoidance which implies that risk avoidance is irrespective of whether the CEO has also founded the firm. In this model, CEO outsider is positively related with risk avoidance which means that outsider CEOs are associated with a higher risk avoidance. This result is interesting as CEO outsider was negatively related with risk avoidance in model 1. One reason to explain the switch of the sign is that outsider CEOs are considered as CEOs with a lot of experience and knowledge. They "know" how much risk is appropriate to take and are therefore associated with a higher risk avoidance. There is no longer a significant relation between independency of the board and risk avoidance. This model shows a negative relation between board size and risk avoidance which is in line with model 2. Furthermore, dummy variable Female is negatively related with risk avoidance. This result indicates that female CEOs have a lower risk avoidance than male CEOs.

In model 4, a one-year lagged CPS is used instead of a non-lagged CPS to see whether the CPS of the previous year has an effect on the risk avoidance of the current year. The lagged CPS is negatively correlated with risk avoidance which means that the CPS of the previous year has a negative effect on the risk avoidance of this year. This model shows a similar positive relation between CEO ownership and risk avoidance as the previous model. CEO outsider is positively related with risk avoidance and this relation is now significant at 5% instead of 10% as in model 3. Board size is not significantly related with risk avoidance anymore and in the following models, there is no significant relationship between those variables found. In addition, this model

shows an insignificant relation between female and risk avoidance. Also in the following models, there is no significant relation found between female and risk avoidance and this result indicates that it does not have an effect on risk avoidance whether the CEO is a female or male. There is a positive relation found between crisis and risk avoidance which indicates that a CEO in the crisis is associated with a higher risk avoidance. This result is intuitive as the financial crisis is a risky time period and one needs to be careful with their investments. All the other variables are insignificant and seem to have no effect on risk avoidance in this model.

Model 5 has the same specifications as model 3 but includes also firm clustering and is together with model 6 the most important model as these models include the most specifications and give the most valid results. This model has the same coefficients as model 3 but differs in significance. The significance of the negative relationship between CPS and risk avoidance changed from 1% to 5%. There is no change in the significance of the positive relationship between risk avoidance and CEO ownership. Board size was significantly negatively related with risk avoidance in model 3 but has become insignificant in this model. This model suggests that there is no relationship between board size and risk avoidance.

Model 6 includes the same specifications as model 4 but has in addition firm clustering as specification. Coefficients of this model are the same as the coefficients of model 4 but can differ in significance. In this model, the lagged CPS is no longer significantly related with risk avoidance. The positive relationship between CEO ownership and risk avoidance is also in this model still highly significant. Furthermore, dummy variable crisis has not changed in significance which means that it is still positively related with risk avoidance with a significance level of 10%.

In 5 of the 6 models, CPS (or lagged CPS) is negatively related with risk avoidance. It was hypothesized that when a CEO has more power within the firm, i.e. a higher CPS, he would have a higher risk avoidance. However, the results show that a higher CPS is related with a lower risk avoidance and therefore, hypothesis two is rejected. According to these results, a powerful CEO is expected to behave in a more risky manner than a CEO with less power. It first was expected that power reduces risky behavior which is consistent with prospect theory of Kahneman and Tversky (1979). Prospect theory, however, does not take into account optimism. Possessing power increases optimism because individuals will pay more attention to the potential payoffs of

their risky behavior rather than pay attention to potential dangers (Anderson & Galinsky, 2006). Therefore, a higher CPS should be related with a lower risk avoidance. Another explanation for the negative relation between CPS and risk avoidance could be that CEOs with a lower risk avoidance are favored by shareholders and therefore can require a higher compensation which leads to a higher CPS. They are favored by shareholders because CEOs are more risk averse than shareholders and when the risk appetite of the CEO is more in line with the risk appetite of the shareholders, this decreases potential agency problems. A high stock ownership by the CEO has a great positive effect on risk avoidance because a higher ownership is associated with higher firm-specific risk that the CEO faces. Lastly, in 4 of the 6 models, there was a significant relationship found between CEO outsider and risk avoidance. The coefficient was negative in the first model, however, in model 3, 4, and 6 there was a positive relation found between CEO outsider and risk avoidance. Therefore, it can be assumed that outsider CEOs have a higher risk avoidance and this is likely due to their experience as they know how much risk is appropriate to take. The dummy variable crisis is positively related with risk avoidance which means that the financial crisis had a positive effect on risk avoidance. In times of economic downturn, CEOs are more careful with their investments.

Table 7 - Regressions of Risk avoidance on CPS

This table shows the regressions of risk avoidance for $\gamma = 3$ on CPS and other CEO characteristics and board structure characteristics for the years 1997 – 2012. Models 4 and 6 include a one-year lagged CPS instead of a non-lagged CPS as in models 1, 2, 3 and 5. The variable board size is a natural logarithm. An overview of the definitions of the variables can be found in Appendix I, Table 1. Models 2 – 6 include year dummy variables (not shown). *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

	Dependent Variable: Risk avoidance for $\gamma = 3$					
Model	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variables:						
CPS	-1.1468***	-1.1611***	-1.0487***		-1.0487**	
CPS t-1				-0.8610*		-0.8610
CEO Duality	0.3121***	0.0730	0.0496	-0.1618	0.0496	-0.1618
CEO Ownership	5.5762***	6.1920***	14.4075***	14.3520***	14.4075***	14.3520***
CEO Founder	0.3932***	0.3386***	0.3396	0.4515	0.3396	0.4515
CEO Outsider	-0.2269***	-0.0953	0.2341*	0.3250**	0.2341	0.3250
CEO Tenure 1	-0.0374	-0.1069	-0.0367	0.1574	-0.0367	0.1574
CEO Tenure 2	(Omitted)	(Omitted)	0.1034	0.1574	0.1034	0.1574
CEO Tenure 3	-0.0797	0.0611	(Omitted)	(Omitted)	(Omitted)	(Omitted)
Independency of the Board	-2.5250***	-1.1728***	0.1265	0.0135	0.1265	0.0135
Board size	-0.1669	-0.2305*	-0.4565*	-0.1841	-0.4565	-0.1841
E-index	-0.0329	0.0068	-0.0037	0.0045	-0.0037	0.0045
Female	-0.2171	0.1924	-1.3456**	-0.2872	-1.3456	-0.2872
Crisis	-0.0700	-0.1901	0.1570	0.3196*	0.1570	0.3196*
Constant	4.7290***	3.7836***	1.8265***	1.1752	1.8265*	1.1752
Number of Observations	2,276	2,276	2,276	1,657	2,276	1,657
R-squared	0.1706	0.2873	0.7636	0.8011	0.7636	0.8011
Adjusted R-squared	0.1662	0.2806	0.5712	0.5974	0.5712	0.5974
Firm Fixed Effects	No	No	Yes	Yes	Yes	Yes
Firm Clustering	No	No	No	No	Yes	Yes
Year Dummies	No	Yes	Yes	Yes	Yes	Yes

5.3 Relation between CPS and Firm performance

The third hypothesis is: CPS is negatively related with firm performance. For this hypothesis, I try to replicate the research of Bebchuk, Cremers and Peyer (2011). I first discuss my own results and after that, I compare my results with the results of Bebchuk et al. (2011). As explained

earlier in the methodology part, I use four different models and two different firm performance measures, i.e. Tobin's Q and ROA. The first two models use Tobin's Q as firm performance measure and models 3 and 4 use ROA as firm performance measure. The obtained results are presented in Table 8 at the end of this paragraph.

In model 1, ROA is positively related with Tobin's Q. This is intuitive as when firm performance increases, i.e. in this case ROA increases, Tobin's Q should increase as well since ROA and Tobin's Q are both firm performance measures. The one-year lagged Tobin's Q has also a positive relation with Tobin's Q. This means that when the firm performed well last year, it has a positive effect on the results of the company of this year. Furthermore, this model shows a negative relation between firm size and Tobin's Q. This implies that larger firms perform worse than smaller firms and this could be explained by diversification. Some argue that firm size can be seen as an indicator of diversification of the firm. Hansen and Wernerfelt (1989) argue that diversification negatively affects performance because the company is not focused on one particular industry. This lack of focus could be the cause of worse performance of bigger firms. Lastly, this model shows that E-index is negatively related with Tobin's Q. Managerial entrenchment negatively affects Tobin's Q because an entrenched CEO is difficult to replace due to for example a high stock ownership by the CEO. If the CEO does not act on behalf of shareholders and the firm wants to replace him for another CEO, this is very costly.

In model 2, we see a negative relation between leverage and Tobin's Q. Firms with a higher leverage are associated with a lower firm performance as a high leverage can put the company in a risk position where it is hard to satisfy its debt obligations. There is a negative relation between firm size and Tobin's Q but the coefficient is more than ten times higher as in model 1. This indicates that firm size has a stronger negative effect on Tobin's Q in this model than in the first model. CEO founder is positively related with Tobin's Q which implies that having the founder as CEO has a positive effect on firm performance. This could be due to that founder CEOs are really committed to the company and have more firm-specific knowledge. In this model, E-index is positively related with Tobin's Q and this is different than in the first model as there was a negative relation found between those variables. Anderson and Reeb (2003) argue that the positive effect of managerial entrenchment on Tobin's Q is especially pronounced in firms

owned by families. In family firms, entrenchment is usually very high and they show that family firms perform better than nonfamily firms.

In model 3, Tobin's Q is positively related with ROA which shows a similar relation as model 1 and 2 where the effect of ROA on Tobin's Q was tested. The one-year lagged ROA affects the non-lagged ROA positively. Similar as in the first two models, the lagged firm performance measure has a positive effect on the performance of this year. This model suggests that investment opportunities and ROA are negatively related. The sign of this relation is interesting since one may expect that when a firm has a lot of investment opportunities, this will have a positive effect on firm performance as it allows the company to grow. Since investment opportunities is only in this model significant and only at a 10% level, I assume that investment opportunities have no significant relation with firm performance. Furthermore, leverage is negatively related with ROA. Based on agency theory, one would expect that leverage can positively influence firm performance as it can be seen as a tool to discipline management. However, the negative relationship between leverage and firm performance can be explained by the fact that firms with high growth opportunities experience a negative effect of leverage since they need to do a lot of investments in order to grow. A high leverage makes it more difficult to attract more debt to finance those investments due to lower financial flexibility. Therefore, profitable projects might be passed up by management as the firm needs to make sure it can pay its debt obligations. Another possible reason why leverage has a negative effect on firm performance could be that it is sensitive to the time period that is used because during the financial crisis it is not favorable to have a high leverage (Ilyuhkin, 2015). CEO outsider is negatively related with ROA which indicates that having an outsider as CEO negatively affects ROA. This could be due to that an outsider CEO has less firm-specific knowledge than an insider CEO would have. Furthermore, E-index is positively related with ROA. As explained earlier in this section, this positive effect of managerial entrenchment is especially found in family firms. In family firms, the CEO is typically one with a higher stock ownership. Demsetz and Villalonga (2001) argue that a CEO with high stock ownership has entrenchment effects. However, it is not clear whether these entrenched CEOs act more like an outside shareholders or more like a manager with an entrenched position. When the CEO act more like an outside shareholder, this may have a positive effect on firm performance.

In model 4, leverage is negatively related with ROA which is consistent with the results of the previous two models. Firm size is not significantly related with ROA anymore in this model. CEO duality and ROA have a negative relation which means that a CEO who also serves the position of chairman of the board has a negative effect on ROA. When the CEO is also the chairman, he has more power and thus has more influence on the decisions of the board. This enables the CEO to act in his own interest instead of the shareholders which may negatively affect firm performance. In this model, I did not find a significant relation anymore between CEO outsider and ROA. CEO founder is negatively related with ROA in this model and this is in contradiction with the positive relation found between those variables in model 2. It was assumed that having an outsider as CEO has a negative impact on firm performance because he would have less firm-specific knowledge than an insider. A CEO founder is considered as an insider, but this model shows that having a CEO founder has a negative effect on firm performance as well. This could be due to that a founder CEO may not have the right skills or abilities to be on top of the firm and it may be better to appoint a new CEO with the right skills and abilities. Both CEO tenure 1 and 2 are negatively related with ROA. This indicates that having a CEO with 1-2 years or 3-4 years has a negative effect on firm performance. A CEO with such a low tenure may not be experienced enough to perform well. This can also be seen in the difference between the coefficient of CEO tenure 1 (1-2 years) and CEO tenure 2 (3-4 years). CEO tenure 1 has a stronger negative effect (-0.0170) on ROA than CEO tenure 2 (-0.0084). E-index is not significantly related with ROA anymore in this model.

In all models, I do not find a significant relation between the lagged CPS and the firm performance measure. Bebchuk et al. (2011) provided evidence for a negative relationship between CPS and firm performance, measured by both ROA and Tobin's Q. In this research, however, I did not find any evidence for this relation. An explanation for the difference in the results could be that this research had less observations than the original research. Models 1 and 2 had 2,223 observations and models 3 and 4 had 2,225 observations. In the research of Bebchuk et al. (2011), approximately 8,000 observations were used. Another explanation could be that the difference was caused by the performance measures. The original study adjusted the firm performance measures for industries while the firm performance measures in this research are not adjusted. In addition, this research used less variables than the original research and the absence of those missing variables could have an effect on the results. Lastly, it may be that the

results of Bebchuk et al. (2011) are not robust. I used the same database as the original study but different years. It could be that the relation between CPS and firm performance is only significant in the sample of the original study and that it is not robust for years

Table 8 - Regressions of Firm Performance on CPS

This table shows the regressions of firm performance on CPS and other variables, such as firm characteristics, CEO characteristics, and board structure characteristics for the years 1997 - 2012. Models 1 and 2 use Tobin's Q as firm performance measure and models 3 and 4 use ROA instead. An overview of the definitions of the variables can be found in Appendix I, Table 1. The variable firm size is a natural logarithm. Each regression includes year dummy variables (not shown). *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

Dependent Variable	*Tobin's Q*		*ROA*	
Model	(1)	(2)	(3)	(4)
Independent Variables:				
CPS, t-1	0.0128	-0.1862	-0.0005	-0.0081
ROA	2.4339***	1.8776***		
Tobin's Q			0.0230***	0.0305***
ROA t-1			0.4868***	0.2513***
Tobin's Q t-1	0.6552***	0.2708***		
Investment Opportunities	0.1363	-0.7208	-0.0462*	-0.0801
Leverage	-0.0157	-0.6658***	-0.0455***	-0.1373***
Firm size	-0.0416***	-0.4693***	0.0046***	0.0016
CEO Duality	0.0378	0.0070	-0.0016	-0.0127*
CEO Outsider	0.0367	0.0806	-0.0074**	0.0041
CEO Ownership	-0.1805	0.2928	0.0316	0.1364
CEO Founder	-0.0581	0.3049**	-0.0052	-0.0275*
CEO Tenure 1	-0.0460	-0.0051	(Omitted)	-0.0170**
CEO Tenure 2	(Omitted)	0.0341	0.0032	-0.0084*
CEO Tenure 3	-0.0318	(Omitted)	0.0065	(Omitted)
E-index	-0.0241**	0.0413*	0.0025**	0.0023
Constant	0.3871***	4.8330***	-0.0545***	0.0135
Number of Observations	2,223	2,223	2,225	2,225
R-Squared	0.7000	0.8957	0.4521	0.7904
Adjusted R-Squared	0.6968	0.7997	0.4464	0.5978
Firm Fixed Effects	No	Yes	No	Yes
Year Dummies	Yes	Yes	Yes	Yes

5.4 Relation between CPS, Risk avoidance and Firm performance

The fourth hypothesis is: Executive compensation dispersion and risk avoidance negatively affects performance. I first discuss the regression models that use Tobin's Q as performance measure (A and B) and the obtained results of these regressions can be found in Table 9 (models 1A-6A) and Table 10 (models 1B-6B). The latter table includes a one-year lagged Tobin's Q in each model. After that, I discuss the regression models that use ROA as performance measure (C and D) and an overview of the obtained results is provided in Table 11 (models 1C-6C) and Table 12 (models 1D-6D). Table 12 includes a lagged ROA. Lastly, a comparison between the results of both performance measures are made.

5.4.1 Tobin's Q

In model 1B, there is a positive relation between CPS and Tobin's Q. This is interesting as this relation was not found in model 1A and one would expect this relation to be negative because CPS explains the power of a CEO and his ability to make his own decisions that may not align shareholder interests. In model 1A, risk avoidance is positively related with Tobin's Q. A CEO with a higher risk avoidance has a positive effect on firm performance. This is likely to be true up to a certain level as a risk averse CEO does not take any unnecessary risks that could harm himself or shareholders, however, it is not in the shareholders' interests to have a CEO that is too risk averse as he might pass up positive NPV projects which is not favorable for firm performance. However, this relation between risk avoidance and Tobin's Q was not found in model 1B. Leverage is negatively related with Tobin's Q in model 1A. Firm size is in both models negatively related with Tobin's Q and in the results of hypothesis 3, I already explained this could be due to diversification. Another explanation for the negative effect of firm size on performance could be that large firms are controlled by managers with their own goals. Due to agency problems, the manager tries to maximize this own utility instead of maximizing the firm's profit (Pervan & Višić, 2012). In both models, there is a positive relation between CEO outsider and Tobin's Q. This indicates that having an outsider as CEO has a positive influence on performance and this is likely due to that an outsider as a CEO could be seen as someone with unique skills as the firm did hire this person instead of an insider (Bebchuk, Cremers & Peyer, 2011). In model 1A, CEO ownership is negatively related with Tobin's Q which indicates that a CEO who owns a lot of the company's shares is related with a lower firm performance. One would expect that this relation would be positive as in that case the CEO is more sensitive to the

market value of his shares and may perform better. Cui and Mak (2002) argue that the negative relation between CEO ownership and firm performance suggests that there are entrenchment effects with increasing ownership. Furthermore, board size is negatively related with Tobin's Q in model 1A. Larger boards may experience communication and organization problems which may negatively affect performance. In both models, I found a negative relation between E-index and Tobin's Q. It implies that entrenched CEOs have a negative effect on firm performance and this is because entrenched managers have more power within the firm and can maximize their own utility instead of maximizing firm value.

In models 2A and 2B, we see quite similar results when we compare it with models 1A and 1B. In model 2B, CPS and Tobin's Q are still positively related. Risk avoidance is positively related with Tobin's Q in model 2A which is similar to the results obtained in model 1A. Furthermore, there is a positive relation between investment opportunities and Tobin's Q in both models. Investment opportunities allow the company to grow and this has a positive effect on firm performance. Furthermore, there are no interesting results that are different from the previous models.

Models 3A and 3B both show not a significant relationship anymore between CPS and Tobin's Q. Model 3A still shows a positive relationship between risk avoidance and Tobin's Q but the coefficient is approximately twice as less as in model 2A, indicating that risk avoidance has a less positive effect on Tobin's Q. Investment opportunities is no longer significant related with Tobin's Q in both models. Furthermore, there is a negative relation found between leverage and Tobin's Q in both models. CEO outsider and CEO ownership appear no longer to be related with Tobin's Q in both models. In model 3A, E-index is positively related with Tobin's Q. This is surprising as the relation between those variables was negative in the previous models. We already saw this switch of sign in the relation of managerial entrenchment and firm performance in the results of hypothesis 3 and it can be explained by CEO ownership and associated entrenchment effects.

Models 4A and 4B both include a one-year lagged CPS instead of a non-lagged CPS. In both models, the lagged CPS is not significantly related with Tobin's Q. This means that the CPS of the previous year has no effect on Tobin's Q of this year. Furthermore, we see similar results as model 3A and 3B. Leverage and firm size are still negatively related with Tobin's Q in both

models. While CEO outsider was no longer significantly related with Tobin's Q in models 3A and 3B, it is in this model positively related with performance. This is in line with the results found earlier in models 1A, 2A, 1B and 2B. In model 4A, CEO ownership is negatively related with Tobin's Q and this is in contradiction with the results of previous models where the relation between CEO ownership and performance was positive. A CEO with high stock ownership can be considered as a block shareholder or as an entrenched manager. The effect of CEO ownership depends on whether the CEO acts more like a block shareholder or more like an entrenched manager. When the CEO acts more like an entrenched CEO, this has a negative effect on Tobin's Q as the CEO can act in his own interest. However, a positive effect of CEO ownership is more intuitive as a CEO with high stock ownership is more sensitive to the market value of his shares and thereby, maximizing firm value is also in the best interest of the CEO. Furthermore, E-index is no longer significantly related with Tobin's Q in both models.

The fifth models (A and B) have the same specifications as the third models but include also firm clustering. Model 3A and 5A, and model 3B and 5B have the same coefficients but differ in significance. In model 5A, risk avoidance is still positively related with Tobin's Q but only at 10% instead of 1% as in model 3A. The lagged Tobin's Q in model 5B is also still positively related with Tobin's Q but decreased in significance from 1% to 10%. In both models, leverage is not significantly related with Tobin's Q which indicates that the level of leverage has no effect on firm performance. Firm size has in both models still a significant relation with Tobin's Q but only at a 5% level instead of 1% level as in model 3A. The variable Female is in both models positively related with Tobin's Q which implies that when the CEO is a female, this positively affects firm performance. This is in accordance with other studies. For example, in the study of Smith, Smith, and Verner (2006), they provide evidence that the proportion of women in top management jobs, including CEO, has a positive effect on firm performance. A study of Dezsö and Ross (2012) has found similar results. They argue that a female serving a top executive job leads to better firm performance but only if innovation is an important part of its strategy.

Models 6A and 6B have the same specifications as model 4A and 4B, respectively, but include also firm clustering and therefore have the same coefficients as model 4A and 4B but differ in significance. There is still no significant relation between lagged CPS and Tobin's Q nor between risk avoidance and Tobin's Q. The positive relation between one-year lagged Tobin's Q

and Tobin's Q in model 6B decreased to significance level 10%. In both models, leverage is no longer significantly related with Tobin's Q. Lastly, variable Female is in both models positively related with Tobin's Q. The models provide evidence that a female CEO has a positive effect on firm performance and this is line with the obtained results of model 5A and 5B.

Models 5 and 6 are the most important models as they have the most specifications which makes the models more reliable. In conclusion, CPS and lagged CPS are both not significantly related with Tobin's Q which is consistent with the results obtained for hypothesis 3. This means that the inclusion of risk avoidance measure and other variables, e.g. board size, did not have an effect on the relation between CPS and Tobin's Q. In model 5A, risk avoidance is positively related with Tobin's Q which suggests that a higher risk avoidance positively affects firm performance. However, since this relation is only significant in model 5A and only at a 10% level, it is assumed that risk avoidance is not significantly related with Tobin's Q. Moreover, a negative relation between risk avoidance and firm performance would be more intuitive as a higher risk avoidance is associated with lower investments due to the higher "hurdle rate" before a project will be implemented. ROA and the lagged Tobin's Q are positively related with Tobin's Q. Furthermore, a bigger firm is associated with a lower Tobin's Q, possibly due to negative effects of diversification and the separation of ownership and control. Lastly, firms with a female serving the position of CEO are associated with a better performance than firms with a male as CEO.

Table 9 - Regressions of Tobin's Q on CPS and Risk Avoidance

This table shows 6 different regressions of Tobin's Q on CPS, risk avoidance and other control variables, such as CEO characteristics, board structure characteristics and firm characteristics for the years 1997 - 2012. An overview of definitions of variables can be found in Appendix I, Table 1. The variables firm size and board size are natural logarithms. Models 2A – 6A include year dummy variables (not shown). *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

	Dependent Variable: Tobin's Q					
Model	(1A)	(2A)	(3A)	(4A)	(5A)	(6A)
Independent Variables:						
CPS	0.2108	0.2207	0.0634		0.0634	
CPS t-1				-0.1401		-0.1401
Risk avoidance for $\gamma = 3$	0.0998***	0.1026***	0.0427***	0.0317	0.0427*	0.0317
ROA	4.9224***	4.8687***	2.7793***	2.5944***	2.7793***	2.5944***
Investment Opportunities	1.5091***	1.4798***	0.5830	0.1894	0.5830	0.1894
Leverage	-0.3553***	-0.3820***	-0.5585***	-0.7266***	-0.5585	-0.7266
Firm size	-0.1234***	-0.1209***	-0.2849***	-0.4187***	-0.2849**	-0.4187**
CEO Duality	-0.0265	-0.0345	-0.0907	-0.0471	-0.0907	-0.0471
Independency of the Board	-0.1091	-0.0448	-0.0951	-0.0880	-0.0951	-0.0880
CEO Outsider	0.0716*	0.0749*	0.0510	0.1687*	0.0510	0.1687
CEO Ownership	-1.5148***	-1.4534***	-0.7161	-0.9542***	-0.7161	-0.9542
CEO Founder	0.0249	0.0213	-0.0277	0.1226	-0.0277	0.1226
Board size	-0.2304**	-0.2388**	-0.1030	-0.1641	-0.1030	-0.1641
CEO Tenure 1	(Omitted)	(Omitted)	0.0060	0.0026	0.0060	0.0026
CEO Tenure 2	0.0464	0.0513	0.0493	0.0376	0.0493	0.0376
CEO Tenure 3	0.0022	0.0062	(Omitted)	(Omitted)	(Omitted)	(Omitted)
E-index	-0.1131***	-0.1102***	0.0502**	0.0406	0.0502	0.0406
Female	0.1612	0.1543	0.5041	0.9807	0.5041*	0.9807***
Constant	2.8352***	2.6016***	3.8007***	5.1389***	3.8007***	5.1389***
Number of Observations	2,218	2,218	2,218	1,610	2,218	1,610
R-Squared	0.3086	0.3141	0.8611	0.8805	0.8611	0.7551
Adjusted R-Squared	0.3036	0.3060	0.7455	0.7551	0.7455	0.5443
Firm Fixed Effects	No	No	Yes	Yes	Yes	Yes
Firm Clustering	No	No	No	No	Yes	Yes
Year Dummies	No	Yes	Yes	Yes	Yes	Yes

Table 10 - Regressions of Tobin's Q on CPS and Risk avoidance with in addition lagged Tobin's Q

This table shows 6 different regressions of Tobin's Q on CPS, risk avoidance, and other control variables such as CEO characteristics, board structure characteristics and firm characteristics for the years 1997 - 2012. The difference between this table and table X is the inclusion of a one-year Tobin's Q. An overview of definitions of variables can be found in Appendix I, Table 1. The variables firm size and board size are natural logarithms. Models 2B – 6B include year dummy variables (not shown). *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

	Dependent Variable: Tobin's Q					
Model	(1B)	(2B)	(3B)	(4B)	(5B)	(6B)
Independent Variables:						
CPS	0.2786*	0.3159**	-0.1235		-0.1235	
CPS t-1				-0.0944		-0.0944
Risk avoidance for $\gamma = 3$	0.0048	0.0169	0.0044	0.0043	0.0044	0.0043
ROA	2.0378***	1.8955***	2.1365***	2.1387***	2.1365***	2.1387***
Tobin's Q t-1	0.6698***	0.6813***	0.2282***	0.2278***	0.2282*	0.2278*
Investment Opportunities	0.4830*	0.3871	-0.4199	-0.4187	-0.4199	-0.4187
Leverage	-0.0928	-0.0523	-0.5313**	-0.5266**	-0.5313	-0.5266
Firm size	-0.0371***	-0.0365***	-0.4505***	-0.4538***	-0.4505**	-0.4538***
CEO Duality	0.0154	0.0173	-0.0496	-0.0460	-0.0496	-0.0460
Independency of the Board	-0.1548	-0.1267	-0.1055	-0.1111	-0.1055	-0.1111
CEO Outsider	0.0624*	0.0548*	0.1720*	0.1690*	0.1720	0.169
CEO Ownership	-0.3368	-0.3178	-0.1077	-0.0697	-0.1077	-0.0697
CEO Founder	-0.0963**	-0.1018**	0.2000	0.2009	0.2000	0.2009
Board size	0.0188	0.0064	-0.1834	-0.1756	-0.1834	-0.1756
CEO Tenure 1	-0.0288	-0.0287	-0.0186	-0.0178	-0.0186	-0.0178
CEO Tenure 2	(Omitted)	(Omitted)	0.0243	0.0247	0.0243	0.0247
CEO Tenure 3	0.0099	-0.0012	(Omitted)	(Omitted)	(Omitted)	(Omitted)
E-index	-0.0288***	-0.0292***	0.0387	0.0391	0.0387	0.0391
Female	0.2368	0.2106	0.7493	0.7223	0.7493**	0.7223**
Constant	0.6218***	0.1815	5.1640***	5.1638***	5.1640***	5.1638***
Number of Observations	1,608	1,608	1,608	1,608	1,608	1,608
R-Squared	0.6947	0.7077	0.8880	0.8880	0.8880	0.8880
Adjusted R-Squared	0.6914	0.7027	0.7698	0.7697	0.7698	0.7698
Firm Fixed Effects	No	No	Yes	Yes	Yes	Yes
Firm Clustering	No	No	No	No	Yes	Yes
Year Dummies	No	Yes	Yes	Yes	Yes	Yes

5.4.2 ROA

In both model 1C and 1D, I did not find a significant relation between CPS and ROA. This is not in accordance with earlier research of Bebchuk et al. (2011) who found a negative relation between CPS and ROA. Both models show a negative relation between risk avoidance and ROA. This is in accordance with theory because a CEO is assumed to be more risk averse than shareholders. A higher risk avoidance means a higher hurdle rate at which projects are accepted. The higher this rate, the less projects are implemented which has a negative impact on firm performance. In both models, firm size is positively related with ROA while there was a negative relation between firm size and Tobin's Q found in the previous section. This is in contradiction with each other as Tobin's Q and ROA are both firm performance measures. The positive influence of firm size on performance could be explained by economies of scale. For example, financial economies of scale occur because a large firm can get a better discount rate due to the large quantity it buys. One can also think about technical economies of scale because a big firm produces a large number of units and dividing the high fixed costs across this large number of units leads to a lower proportion of fixed costs per unit (Pervan & Višić, 2012). CEO founder is negatively related with ROA in both models, indicating that a founder as CEO has a negative effect on firm performance. As explained earlier, this could be explained by that a founder may not have the right skills and abilities to be a CEO. However, earlier research on this topic has been inconsistent. For example, this is in contradiction with the findings of Adams, Almeida and Ferreira (2009). They provide evidence for the existence of a positive causal effect of founder CEOs on firm performance. On the other hand, Jayaraman et al. (2000) provided evidence that founder CEOs can add market value to smaller and younger firms but have a negative effect on market value of larger and older firms. In model 1C, board size is positively related with ROA. This is surprising as model 1A and 2A provided evidence for a negative relation between board size and performance and a negative relation is more intuitive. However, a larger board could also be beneficial because it has more expertise, more capacity for monitoring and sharing the workload. This view is supported by Larmou and Vafeas (2010) as they provided evidence that larger board sizes are associated with better firm performance.

Models 2C and 2D show quite similar results as models 1C and 1D. In both models, there is no significant relation found between CPS and ROA. They both do show a significant negative relation between risk avoidance and ROA which is similar to model 1C and 1D. Investment

opportunities is in model 2C positively related with ROA which is in line with model 1C. We also see similar relations between leverage and ROA and firm size and ROA as in the previous 2 models. Further, the relation between CEO founder and ROA and the relation between board size and ROA are similar to the relations in model 1C and 1D.

In model 3C, there is no longer a significant relation between risk avoidance and ROA, however, in model 3D there is still a negative relation between those variables. Investment opportunities are not significantly related with ROA anymore which indicates that investment opportunities have no effect on performance. CEO duality is negatively related with ROA in model 3C. This implies that a CEO who also serves the position of chairman of the board is associated with lower firm performance. This could be explained by that in that case a CEO has more decision power and does not have to act in shareholders' interests. However, this is the only model that shows a significant relation between CEO duality and ROA, so I assume that CEO duality is not related with ROA. In model 3D, CEO tenure 1, i.e. 1-2 years, is negatively related with ROA. A CEO with such a low tenure may not be experienced enough to perform well and therefore may have a negative effect on firm performance. Furthermore, firm size, CEO ownership, CEO founder, board size, and E-index are not significantly related with ROA anymore in these two models.

Models 4C and 4D use a one-year lagged CPS instead of a non-lagged CPS to see if this lagged CPS has an effect on performance and whether this is different from non-lagged CPS. However, both models do not show a significant relation between lagged CPS and ROA which implies that the lagged CPS has no effect on performance. In both models, risk avoidance is negatively related with ROA. CEO tenure 1 is negatively related with ROA which is in accordance with model 3D.

Models 5C and 5D have the same specifications as model 3C and 3D, respectively, but include in addition firm clustering and therefore only differ in significance and not in coefficients. The relation between CPS and ROA is still not significant in both models. Risk avoidance and ROA were negatively related in model 3D but this relation became in both model 5C and 5D insignificant. Furthermore, the relation between leverage and ROA changed in significance from 1% to 5% in model 5C and changed to a significance level of 10% in model 5D. According to these models, there are only two more variables that have a significant relation with ROA.

Tobin's Q is positively related with ROA and the one-year lagged ROA is positively related with ROA as well.

Models 6C and 6D have the same coefficients as models 4C and 6D, respectively, but could differ in significance due to the extra specification firm clustering. In both models, there is still no significant relation between lagged CPS and ROA. In addition, risk avoidance is not significantly related with ROA. Both Tobin's Q and lagged ROA have not changed in significance and are positively related with ROA. Leverage decreased in significance but is still negatively related with ROA in both models. Both models do not show any other significant relations with ROA.

In order to answer the hypothesis, I look at models 5 and 6 as these are the most reliable. Both models 5 and 6 (C and D) do not provide evidence for a relation between CPS and ROA nor do they provide evidence for a relation between risk avoidance and ROA. As stated in results of section 5.4.1, there was a positive relation between risk avoidance and Tobin's Q found but since this relation was not found in model 5 or 6 when using ROA as performance measure, that positive relation is not robust and it is assumed that there is no significant relation between risk avoidance and firm performance. In all models, Tobin's Q and one-year lagged ROA are both positively related with ROA. In addition, leverage is negatively related with firm performance in all models. The models that use Tobin's Q as performance measure provide evidence that is in contradiction with the results of models that use ROA as performance measure. Firm size is negatively related with Tobin's Q which implies that larger firms perform worse than smaller firms. In addition, it has a positive effect on Tobin's Q when the CEO is a female. These relations are not found when using ROA as performance measure and therefore it can be questioned how robust these relations are.

Table 11 - Regressions of ROA on CPS and Risk Avoidance

This table shows 6 different regressions of ROA on CPS, risk avoidance and other control variables, such as CEO characteristics, board structure characteristics and firm characteristics for the years 1997 - 2012. An overview of definitions of variables can be found in Appendix I, Table 1. The variables firm size and board size are natural logarithms. Models 2C – 6C include year dummy variables (not shown). *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

	Dependent Variable: ROA					
Model	(1C)	(2C)	(3C)	(4C)	(5C)	(6C)
Independent Variables:						
CPS	0.0196	0.0217	-0.0026		-0.0026	
CPS t-1				-0.0076		-0.0076
Risk avoidance for $\gamma = 3$	-0.0054***	-0.0036***	-0.0024	-0.0046**	-0.0024	-0.0046
Tobin's Q	0.0387***	0.0377***	0.0351***	0.0320***	0.0351***	0.0320**
Investment Opportunities	0.0857**	0.0766**	0.0816	0.1008	0.0816	0.1008
Leverage	-0.0800***	-0.0752***	-0.1123***	-0.1460***	-0.1123**	-0.1460**
Firm size	0.0051***	0.0047***	0.0054	-0.0020	0.0054	-0.0020
CEO Duality	-0.0023	-0.0010	-0.0124*	-0.0138	-0.0124	-0.0138
Independency of the Board	0.0086	0.0024	0.0003	-0.0093	0.0003	-0.0093
CEO Outsider	-0.0044	-0.0055	-0.0015	-0.0010	-0.0015	-0.0010
CEO Ownership	0.1237***	0.1123***	0.0578	0.1051	0.0578	0.1051
CEO Founder	-0.0156***	-0.0152***	-0.0269	-0.0142	-0.0269	-0.0142
Board size	0.0226***	0.0240***	0.0011	0.0068	0.0011	0.0068
CEO Tenure 1	(Omitted)	(Omitted)	-0.0105	-0.0236**	-0.0105	-0.0236
CEO Tenure 2	0.0081	0.0083	-0.0048	-0.0054	-0.0048	-0.0054
CEO Tenure 3	0.0093*	0.0074	(Omitted)	(Omitted)	(Omitted)	(Omitted)
E-index	0.0023*	0.0027**	-0.0036	0.0022	-0.0036	0.0022
Female	-0.0091	-0.0132	-0.0018	0.0075	-0.0018	0.0075
Constant	-0.0999***	-0.1077***	-0.0039	0.0510	-0.0039	0.0510
Number of Observations	2,218	2,218	2,218	1,610	2,218	1,610
R-Squared	0.2362	0.2533	0.7534	0.7498	0.7534	0.7498
Adjusted R-Squared	0.2306	0.2445	0.5482	0.4872	0.5482	0.4872
Firm Fixed Effects	No	No	Yes	Yes	Yes	Yes
Firm Clustering	No	No	No	No	Yes	Yes
Year Dummies	No	Yes	Yes	Yes	Yes	Yes

Table 12 - Regressions of ROA on CPS and Risk Avoidance with in addition lagged ROA

This table shows 6 different regressions of ROA on CPS, risk avoidance, and other control variables such as CEO characteristics, board structure characteristics and firm characteristics for the years 1997 - 2012. The difference between this table and table X is the inclusion of a one-year lagged ROA. An overview of definitions of variables can be found in Appendix I, Table 1. The variables firm size and board size are natural logarithms. Models 2D – 6D include year dummy variables (not shown). *, **, *** indicate significance at 10%, 5%, and 1%, respectively.

	Dependent Variable: ROA					
Model	(1D)	(2D)	(3D)	(4D)	(5D)	(6D)
Independent Variables:						
CPS	-0.0232	-0.0210	-0.0187		-0.0187	
CPS t-1				-0.0282		-0.0282
Risk avoidance for $\gamma = 3$	-0.0041***	-0.0032**	-0.0047**	-0.0048**	-0.0047	-0.0048
Tobin's Q	0.0245***	0.0238***	0.0337***	0.0336***	0.0337***	0.0336***
ROA t-1	0.4487***	0.4511***	0.4042***	0.4066***	0.4042***	0.4066***
Investment Opportunities	-0.0366	-0.0324	-0.0249	-0.0252	-0.0249	-0.0252
Leverage	-0.0507***	-0.0428***	-0.1145***	-0.1132***	-0.1145*	-0.1132*
Firm size	0.0028**	0.0026*	-0.0039	-0.0051	-0.0039	-0.0051
CEO Duality	-0.0001	0.0003	-0.0127	-0.0119	-0.0127	-0.0119
Independency of the Board	0.0090	0.0040	-0.0028	-0.0023	-0.0028	-0.0023
CEO Outsider	-0.0034	-0.0040	-0.0046	-0.0051	-0.0046	-0.0051
CEO Ownership	0.0706*	0.0613	0.1481	0.1524	0.1481	0.1524
CEO Founder	-0.0126**	-0.0118**	-0.0180	-0.0189	-0.0180	-0.0189
Board size	0.0136	0.0139	0.0013	0.0027	0.0013	0.0027
CEO Tenure 1	-0.0067	-0.0065	-0.0220**	-0.0222**	-0.0220	-0.0222
CEO Tenure 2	(Omitted)	(Omitted)	-0.0053	-0.0053	-0.0053	-0.0053
CEO Tenure 3	0.0012	0.0007	(Omitted)	(Omitted)	(Omitted)	(Omitted)
E-index	0.0022*	0.0022*	-0.0001	-0.0001	-0.0001	-0.0001
Female	-0.0185	-0.0228	0.0149	0.0062	0.0149	0.0062
Constant	-0.0427**	-0.0499**	0.0579	0.0680	0.0579	0.0680
Number of Observations	1,610	1,610	1,610	1,610	1,610	1,610
R-Squared	0.3810	0.3950	0.7747	0.7749	0.7747	0.7749
Adjusted R-Squared	0.3744	0.3846	0.5376	0.5380	0.5376	0.5380
Firm Fixed Effects	No	No	Yes	Yes	Yes	Yes
Firm Clustering	No	No	No	No	Yes	Yes
Year Dummies	No	Yes	Yes	Yes	Yes	Yes

6. Conclusion

In this research, several relations are examined. First, I examined the relation between crisis and CPS. It was hypothesized that the crisis has a negative effect on CPS and therefore CPS levels during the crisis would be lower than before the crisis. I found evidence for this negative relation between CPS and crisis. However, when CPS of year 2005 and year 2009 are compared, this decrease in CPS is only significant at 10% which decreases the robustness of this relation. CEO Tenure 1 is negatively related with CPS before the crisis but is positively related with CPS during the crisis. The change in this relation could be explained by that during the crisis a new but skilled CEO are wanted and therefore, companies are willing to offer a higher compensation to this CEO which increases CPS. Furthermore, independency of the board of directors has before the crisis a positive effect on CPS and has a negative effect during the crisis. During the crisis, outside directors may be genuinely independent of the firm whereby the CEO has less influence on his own pay and this may have a negative effect on his CPS.

Second, I examined the relation between risk avoidance and CPS. I found evidence for a negative relation between CPS and risk avoidance while it was hypothesized that this relation would be positive. This negative relation between CPS and risk avoidance is not in accordance with prospect theory of Kahneman and Tversky (1979) but can be explained by optimism. Possessing power, i.e. a high CPS, increases optimism because individuals pay more attention to the potential payoffs of their risky behavior rather than pay attention to potential dangers. Another explanation for the negative relation between CPS and risk avoidance could be that CEOs with a lower risk avoidance are favored by shareholders because in general, CEOs are more risk averse than shareholders would favor and when a CEO has a low risk avoidance, he can require a higher compensation which leads to a higher CPS. The crisis is positively related with risk avoidance. CEOs only invest in projects that are even more profitable than they would do in the non-crisis period as each percent increase in firm risk is even more risky in times of crisis.

Before extending the original study, I examined the relationship between CPS and firm performance which was my third hypothesis. I did not find a significant relationship between CPS and firm performance. This could be explained by that this study has less observations, less variables, non-adjusted firm performance measures, or different years.

In the fourth hypothesis, I examined the relationship between CPS and firm performance with risk avoidance taken into account and examined the relationship of risk avoidance and firm performance as well. When risk avoidance is taken into account, there is still no significant relationship between CPS and firm performance. When firm performance is measured by Tobin's Q, risk avoidance is positively related with firm performance which is surprising. It was expected that risk avoidance negatively affects firm performance because more profitable risky projects might be passed up. When firm performance is measured by ROA, there was no significant relationship found in the latest models between risk avoidance and firm performance, indicating that the positive relationship between risk avoidance and firm performance is not robust. So, it can be concluded that neither risk avoidance nor executive compensation dispersion has an effect on firm performance.

In order to minimize the agency costs, each firm should have an optimal level of CPS. This paper does not answer the question what this optimal CPS level is but it might differ among industries. It may be interesting to examine how the optimal levels of CPS differ among industries and which industry has for example the highest optimal CPS. In this study, only U.S listed firms are used and therefore, these results are not applicable to all firms. It may be interesting to replicate this research with firms that are listed in a different country because it may give different results due to for example different culture. Furthermore, it would be a recommendation to examine the relationship between CPS and firm performance using different years than this study or the study of Bebchuk et al. (2011) to check the robustness of the results obtained in both studies. The contribution of this paper is to examine the relationship between CPS and firm performance with risk avoidance taken into account and to examine the relationship between CPS and risk avoidance. It only uses the risk avoidance measure for $\gamma = 3$ and it may give different results when other levels of risk aversion are used. This paper attempted to give an overview of what component of executive compensation could possibly cause a CPS that is not optimal. However, this paper did not test this statistically and it is recommended to do so in further research. Lastly, the regressions are conducted with limited variables and there are more variables that have an effect on for example firm performance. An example of a variable that could be added to the models is R&D costs. Firms with high R&D costs are innovative and this is likely to have an effect on firm performance. The more variables that are added to the model, the more reliable the results will be. It is also recommended to include more observations, in particular to test

hypothesis 1. Regressions model 3 and 4 of hypothesis 1 have 392 and 183 observations, respectively. This is very low and might bias the results.

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Appendix I

Table 1 - Definitions of variables

This table provides an overview of all variables that are used in this research and their definitions

Variable	*Definition*
CPS (CEO Pay Slice)	Compensation of the CEO divided by the total compensation of the top five executives
Risk avoidance	Risk avoidance measure with gamma level of three
Tobin's Q	Capital market value of the company divided by the replacement value of its assets
ROA (Return on Assets)	Net Income divided by Total Assets
Investment Opportunities	Capex/Total Assets
Leverage	Total Debt divided by Total Assets
Firm size	Natural logarithm of Total Assets
CEO Duality	Dummy variable that equals one if the CEO and chairman of the board positions are held by the same person
Independency of the Board	Ratio of independent board members relative to total board size
CEO Ownership	Shares held by the CEO divided by Total Shares Outstanding
CEO Outsider	Dummy variable that equals one if the difference between the date he joined the company and the date he became CEO is less than one year and zero otherwise
CEO Founder	Dummy variable that equals one if the date he became CEO is prior to the IPO year of the company as registered by CRSP database
Board size	Natural logarithm of Board size
CEO Tenure	The number of years he is the CEO of the company. This variable is split in 3 variables: CEOs with a tenure of 1-2 years, CEOs with a tenure of 3-4 years and CEOs with a tenure of 5 years or higher
E-index	Measure of entrenchment and consists of six provisions: classified board, limits to shareholder bylaw amendments, golden parachutes, poison pills, and supermajority requirements for mergers and charter amendments
Female	Dummy variable that equals one if the CEO is a female and zero otherwise

Table 2 - Normality test CPS

This table provides the results of two normality tests of CPS, namely of the Shapiro-Wilk test and Skewness-Kurtosis test. The null hypothesis is that CPS is normally distributed and the alternative hypothesis is that CPS is not normally distributed.

Test	**Variable**	**Observations**	**P-Value**
Shapiro-Wilk	CPS	16,630	0,00000
Skewness-Kurtosis	CPS	16,630	0,0000

Figure 1 - Histogram of CPS

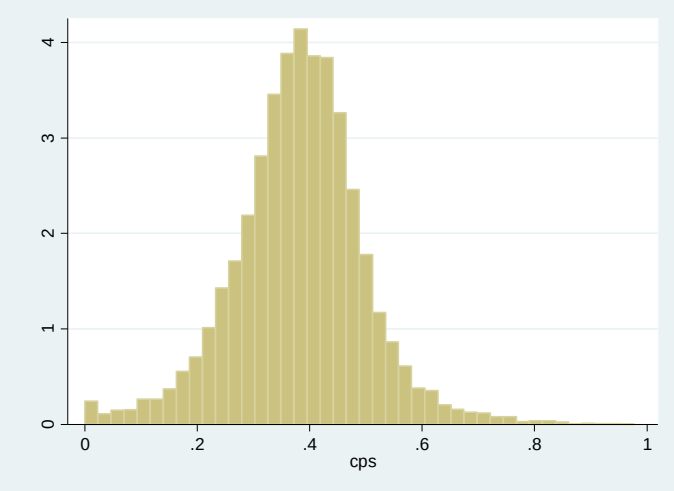
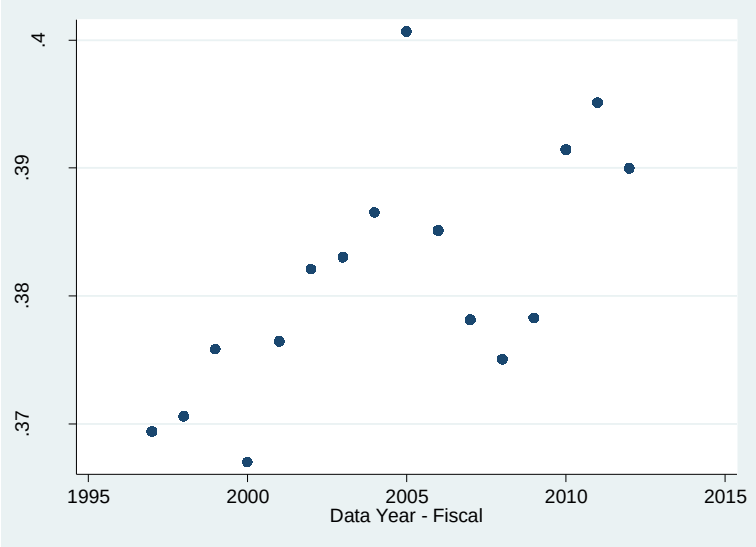


Figure 2 – Scatterplot CPS against years



Appendix II

Hypothesis 1:

$$CPS_{before} = \alpha + \beta_1 * CEO_{tenure_1} + \beta_2 * CEO_{tenure_2} + \beta_3 * CEO_{tenure_3} + \beta_4 * CEO_{founder} + \beta_5 * CEO_{duality} + \beta_6 * Independency_{board} + \beta_7 * CEO_{outsider} + \beta_8 * Female + \beta_9 * CEO_{ownership} + \beta_{10} * Eindex + \beta_{11} * Board\ size + \varepsilon \quad (1)$$

$$CPS_{before} = \alpha + + \beta_1 * CPS_{before_{t-1}} + \beta_2 * CEO_{tenure_1} + \beta_3 * CEO_{tenure_2} + \beta_4 * CEO_{tenure_3} + \beta_5 * CEO_{founder} + \beta_6 * CEO_{duality} + \beta_7 * Independency_{board} + \beta_8 * CEO_{outsider} + \beta_9 * Female + \beta_{10} * CEO_{ownership} + \beta_{11} * Eindex + \beta_{12} * Board\ size + \varepsilon \quad (2)$$

$$CPS_{during} = \alpha + \beta_1 * CEO_{tenure_1} + \beta_2 * CEO_{tenure_2} + \beta_3 * CEO_{tenure_3} + \beta_4 * CEO_{founder} + \beta_5 * CEO_{duality} + \beta_6 * Independency_{board} + \beta_7 * CEO_{outsider} + \beta_8 * Female + \beta_9 * CEO_{ownership} + \beta_{10} * Eindex + \beta_{11} * Board\ size + \varepsilon \quad (3)$$

$$CPS_{during} = \alpha + \beta_1 * CPS_{during_{t-1}} + \beta_2 * CEO_{tenure_1} + \beta_3 * CEO_{tenure_2} + \beta_4 * CEO_{tenure_3} + \beta_5 * CEO_{founder} + \beta_6 * CEO_{duality} + \beta_7 * Independency_{board} + \beta_8 * CEO_{outsider} + \beta_9 * Female + \beta_{10} * CEO_{ownership} + \beta_{11} * Eindex + \beta_{12} * Board\ size + \varepsilon \quad (4)$$

Hypothesis 2:

$$\rho\ (\gamma = 3) = \alpha + \beta_1 * CPS + \beta_2 * CEO_{duality} + \beta_3 * CEO_{ownership} + \beta_4 * CEO_{founder} + \beta_5 * CEO_{outsider} + \beta_6 * CEO_{tenure_1} + \beta_7 * CEO_{tenure_2} + \beta_8 * CEO_{tenure_3} + \beta_9 * Independency_{board} + \beta_{10} * Board\ size + \beta_{11} * Eindex + \beta_{12} * Female + \beta_{13} * Crisis + \varepsilon \quad (5)$$

$$\rho\,(\gamma = 3) = \alpha + \beta_1 * CPS_{t-1} + \beta_2 * CEO_{duality} + \beta_3 * CEO_{ownership} + \beta_4 * CEO_{founder} + \beta_5 * CEO_{outsider} + \beta_6 * CEO_{tenure_1} + \beta_7 * CEO_{tenure_2} + \beta_8 * CEO_{tenure_3} + \beta_9 * Independency_{board} + \beta_{10} * Board\ size + \beta_{11} * Eindex + \beta_{12} * Female + \beta_{13} * Crisis + \varepsilon \quad (6)$$

Hypothesis 3:

$$Tobin's\ Q = \alpha + \beta_1 * CPS_{t-1} + \beta_2 * ROA + \beta_3 * Tobin's\ Q_{t-1} + \beta_4 * Investment\ Opportunities + \beta_5 * Leverage + \beta_6 * Firm\ size + \beta_7 * CEO_{duality} + \beta_8 * CEO_{outsider} + \beta_9 * CEO_{ownership} + \beta_{10} * CEO_{founder} + \beta_{11} * CEO_{tenure_1} + \beta_{12} * CEO_{tenure_2} + \beta_{13} * CEO_{tenure_3} + \beta_{14} * CEO_{tenure_3} + \beta_{15} * Eindex + \varepsilon \quad (7)$$

$$ROA = \alpha + \beta_1 * CPS_{t-1} + \beta_2 * ROA_{t-1} + \beta_3 * Tobin's\ Q + \beta_4 * Investment\ Opportunities + \beta_5 * Leverage + \beta_6 * Firm\ size + \beta_7 * CEO_{duality} + \beta_8 * CEO_{outsider} + \beta_9 * CEO_{ownership} + \beta_{10} * CEO_{founder} + \beta_{11} * CEO_{tenure_1} + \beta_{12} * CEO_{tenure_2} + \beta_{13} * CEO_{tenure_3} + \beta_{14} * CEO_{tenure_3} + \beta_{15} * Eindex + \varepsilon \quad (8)$$

Hypothesis 4:

$$Tobin's\ Q = \alpha + \beta_1 * CPS + \beta_2 * Risk\ avoidance + \beta_3 * ROA + \beta_4 * Investment\ opportunities + \beta_5 * Leverage + \beta_6 * Firm\ size + \beta_7 * CEO_{duality} + \beta_8 * Independency_{board} + \beta_9 * CEO_{outsider} + \beta_{10} * CEO_{ownership} + \beta_{11} * CEO_{founder} + \beta_{12} * Board\ size + \beta_{13} * CEO_{tenure_1} + \beta_{14} * CEO_{tenure_2} + \beta_{15} * CEO_{tenure_3} + \beta_{16} * Eindex + \beta_{17} * Female + \varepsilon \quad (9)$$

$$Tobin's\ Q = \alpha + \beta_1 * CPS_{t-1} + \beta_2 * Risk\ avoidance + \beta_3 * ROA + \beta_4 * Investment\ opportunities + \beta_5 * Leverage + \beta_6 * Firm\ size + \beta_7 * CEO_{duality} + \beta_8 * Independency_{board} + \beta_9 * CEO_{outsider} + \beta_{10} * CEO_{ownership} + \beta_{11} * CEO_{founder} + \beta_{12} * Board\ size + \beta_{13} * CEO_{tenure_1} + \beta_{14} * CEO_{tenure_2} + \beta_{15} * CEO_{tenure_3} + \beta_{16} * Eindex + \beta_{17} * Female + \varepsilon \quad (10)$$

$$Tobin's\ Q = \alpha + \beta_1 * CPS + \beta_2 * Risk\ avoidance + \beta_3 * ROA + \beta_4 * Tobin's\ Q_{t-1} + \beta_5 * Investment\ opportunities + \beta_6 * Leverage + \beta_7 * Firm\ size + \beta_8 * CEO_{duality} + \beta_9 * Independency_{board} + \beta_{10} * CEO_{outsider} + \beta_{11} * CEO_{ownership} + \beta_{12} * CEO_{founder} + \beta_{13} * Board\ size + \beta_{14} * CEO_{tenure_1} + \beta_{15} * CEO_{tenure_2} + \beta_{16} * CEO_{tenure_3} + \beta_{17} * Eindex + \beta_{18} * Female + \varepsilon \quad (11)$$

$$Tobin's\ Q = \alpha + \beta_1 * CPS_{t-1} + \beta_2 * Risk\ avoidance + \beta_3 * ROA + \beta_4 \quad (12)$$
$$* Tobin's\ Q_{t-1} + \beta_5 * Investment\ opportunities + \beta_6$$
$$* Leverage + \beta_7 * Firm\ size + \beta_8 * CEO_{duality} + \beta_9$$
$$* Independency_{board} + \beta_{10} * CEO_{outsider} + \beta_{11}$$
$$* CEO_{ownership} + \beta_{12} * CEO_{founder} + \beta_{13} * Board\ size + \beta_{14}$$
$$* CEO_{tenure_1} + \beta_{15} * CEO_{tenure_2} + \beta_{16} * CEO_{tenure_3} + \beta_{17}$$
$$* Eindex + \beta_{18} * Female + \varepsilon$$

$$ROA = \alpha + \beta_1 * CPS + \beta_2 * Risk\ avoidance + \beta_3 * Tobin's\ Q + \beta_4 \quad (13)$$
$$* Investment\ opportunities + \beta_5 * Leverage + \beta_6$$
$$* Firm\ size + \beta_7 * CEO_{duality} + \beta_8 * Independency_{board} + \beta_9$$
$$* CEO_{outsider} + \beta_{10} * CEO_{ownership} + \beta_{11} * CEO_{founder} + \beta_{12}$$
$$* Board\ size + \beta_{13} * CEO_{tenure_1} + \beta_{14} * CEO_{tenure_2} + \beta_{15}$$
$$* CEO_{tenure_3} + \beta_{16} * Eindex + \beta_{17} * Female + \varepsilon$$

$$ROA = \alpha + \beta_1 * CPS_{t-1} + \beta_2 * Risk\ avoidance + \beta_3 * Tobin's\ Q + \beta_4 \quad (14)$$
$$* Investment\ opportunities + \beta_5 * Leverage + \beta_6$$
$$* Firm\ size + \beta_7 * CEO_{duality} + \beta_8 * Independency_{board} + \beta_9$$
$$* CEO_{outsider} + \beta_{10} * CEO_{ownership} + \beta_{11} * CEO_{founder} + \beta_{12}$$
$$* Board\ size + \beta_{13} * CEO_{tenure_1} + \beta_{14} * CEO_{tenure_2} + \beta_{15}$$
$$* CEO_{tenure_3} + \beta_{16} * Eindex + \beta_{17} * Female + \varepsilon$$

$$ROA = \alpha + \beta_1 * CPS + \beta_2 * Risk\ avoidance + \beta_3 * Tobin's\ Q + \beta_4 \quad (15)$$
$$* ROA_{t-1} + \beta_5 * Investment\ opportunities + \beta_6 * Leverage$$
$$+ \beta_7 * Firm\ size + \beta_8 * CEO_{duality} + \beta_9 * Independency_{board}$$
$$+ \beta_{10} * CEO_{outsider} + \beta_{11} * CEO_{ownership} + \beta_{12} * CEO_{founder}$$
$$+ \beta_{13} * Board\ size + \beta_{14} * CEO_{tenure_1} + \beta_{15} * CEO_{tenure_2}$$
$$+ \beta_{16} * CEO_{tenure_3} + \beta_{17} * Eindex + \beta_{18} * Female + \varepsilon$$

$$ROA = \alpha + \beta_1 * CPS_{t-1} + \beta_2 * Risk\ avoidance + \beta_3 * Tobin's\ Q + \beta_4 \quad (16)$$
$$* ROA_{t-1} + \beta_5 * Investment\ opportunities + \beta_6 * Leverage$$
$$+ \beta_7 * Firm\ size + \beta_8 * CEO_{duality} + \beta_9 * Independency_{board}$$
$$+ \beta_{10} * CEO_{outsider} + \beta_{11} * CEO_{ownership} + \beta_{12} * CEO_{founder}$$
$$+ \beta_{13} * Board\ size + \beta_{14} * CEO_{tenure_1} + \beta_{15} * CEO_{tenure_2}$$
$$+ \beta_{16} * CEO_{tenure_3} + \beta_{17} * Eindex + \beta_{18} * Female + \varepsilon$$