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An Empirical Analysis of the Board of Directors, Audit Committee and  
Compensation Committee

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# CEO COMPENSATION AND THE BOARD OF DIRECTORS

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AND COMPENSATION COMMITTEE

Diploma Thesis

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I would like to express my great thanks to my family - first and foremost to my parents, and to my friends for their love and support.

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## Abbreviations

2SLS	Two Stage Least Squares
AC	Audit Committee
busy_out	Busy Outsiders
CC	Compensation Committee
CC_stock	Percentage of Stock-Ownership by the Compensation Committee
CEO	Chief Executive Officer
CEO CC	Chief Executive Officer is Member of the Compensation Committee
CEO Chair	Chief Executive Officer Holds the Seat of Chairman of the Board
CEO Stock	Percentage of Stockownership by the Chief Executive Officer
EBIT	Earnings Before Interest and Taxes
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
Fem	Female
gray	Gray Directors
in	Insiders
ind_board	Independent Board
log_lt	=LOG(Long-Term Compensation)
log_rev	=LOG(Revenues)
log_salary	=LOG(Salary)
log_st	=LOG(Short-Term Compensation)
log_T_C	=LOG(Total Compensation)
NYSE	New York Stock Exchange
old_out	Old Outsiders
out	Outsiders
out ceo	CEO Appointed Outsiders
R&D expenses	Research and Development Expenses
ROA	Return on Assets (=Netincome/Assets)
SD	Standard Deviation
SOX 2002	Sarbannes Oxley Act of 2002
USD	United States Dollar
VIF	Variance Inflation Factor

# 1 Introduction

Over eight years Enron's stock showed a slightly better performance than most other big publicly listed companies in the U.S. represented in the S&P 500, however from 1999 to 2000 the stock value climbed up 150 percent whereas the index increased by only 10 percent only (Healy and Palepu, 2003).

Enron became extremely popular and one of the most admired U.S. corporations eternalized in a corresponding list (Gordon, 2002). But soon crisis broke out culminating in the company filing for bankruptcy (Gordon, 2002; Healy and Palepu, 2003). Investigations following Enron's breakdown showed that the actual performance did not reflect the picture presented in company reports but resulted from accounting fraud (Gordon, 2002).

Even though the company was navigating within the boundaries of regulations as all formal requirements concerning the audit committee and control mechanisms were in compliance with current legislation (Bratton, 2002). Managers were compensated with a compensation package that predominantly relied on stock-option plans (Healy and Palepu, 2003). As a result managers extracted tremendous sums by selling their stock whereas employees lost money they invested in the company believing it was secure (Gordon, 2002). Looking at the corporate scandal there are three economic actors responsible for the disaster created by Enron's management, first there is the management itself and most importantly the head-decision maker which is the CEO, then the board of directors and the audit committee as well as the compensation committee in charge of controlling and compensating executives and then the auditor (Bratton, 2002; Healy and Palepu, 2003).

Soon other corporations followed the dreadful path of Enron. WorldCom even out-played the former in earnings manipulation (Brickley, 2003). These two companies might be the most prominent examples of corporate scandals in the United States, but they are by far not the only ones. Shareholder activists, as well as institutional investors and legislative authorities were outraged by the fact CEOs were able to extract rents and increase their personal wealth even though they ruined their companies, exploited their employees and betrayed their shareholders. The sheer possibility of fraud on such a big scale even though both a board of directors and an audit committee were in office and in compliance with corporate governance regulations, is baffling.

In this study the theoretical and empirical relationship between the board of directors, audit committees, compensation committees and CEO compensation are assessed.

First the agency relationship will be explained as well as theories regarding CEO compensation which in turn stem from agency theoretic assumptions, then an overview of



alternative theories coping with executive compensation will be given, followed by a presentation of the CEO compensation package.

The next section analyzes the board of directors, after a summary describing the role of the board a more detailed literature review about board composition will be given. First the board of directors will be presented, followed by the audit and the compensation committee, as they are the most important committees regarding CEO compensation. This section encompasses the development of the hypotheses, later tested in the empirical part. The next part deals with possible complications and problems associated with the board of directors as a corporate governance mechanism. Here I pay close attention to the potentially endogenous nature of these relationships. The theoretical part will be supplemented with and tested in empirical models. Beginning with data and variable description and ending with the data analysis, the latter is composed of the descriptive analysis, the correlation analysis and finally the multiple regression models. Again all of the analyses will be conducted for the board of directors as well as for the audit and the compensation committee.

This study concludes with an overview of the findings as well as a presentation of the limitations and further research possibilities.

## 2 Executive Compensation

### 2.1 The Agency Relationship - Separation of Ownership and Control

Academic literature has long been concerned with the separation of ownership and control and implications thereof. According to Fama (1980) a shift from owner-managers to professional executive decision-makers in the governance of large corporations is observable, resulting in incentive problems and opportunistic behavior conflicting with the owner's interests. As a result many theories across a myriad of academic disciplines dealing with this issue evolved, one particularly worth mentioning is the Agency Theory.

The theoretical background of Agency Theory lies within the risk-sharing research of the 1960's and 1970's where the focus is set on individual risk-attitudes and efficient risk-allocation between cooperating parties. Additionally the agency theoretic research string includes the so called "agency problem" that occurs when cooperating parties are confronted with separation of ownership and control, different risk-attitudes as well as diverging goals (Eisenhardt, 1989).

In order to formulate an agency problem one has to consider two cooperating economic actors: the principal and the agent. The first figures as the owner of the firm (e.g. shareholder) and the latter as person (e.g. CEO) acting on behalf and in the best interest of the owner (Garen, 1994).

First of all one has to consider the individual risk preferences in this setting: The underlying assumption in classical agency models is that the principal is risk neutral. Shareholders who own the firm, usually consist of dispersed investors holding a diversified portfolio and hence fit the role of a risk-neutral principal (Shavell, 1979). Agents are assumed to be self-interested and risk averse, moreover they are considered rational actors with an aim to maximize their utility (Stroh, Brett, Baumann, and Reilly, 1996).

As mentioned before, the principal in general terms delegates a task to the agent and benefits from the outcome, shareholders are not the decision makers of a company, they invest their personal financial resources and in turn expect dividend payments that maximize their wealth.

There are two possible situations: First, the task is perfectly observable and monitoring is feasible, hence the principal exactly knows what action and effort level the agent chose while fulfilling the delegated task. In this case compensation is based on input and directly reflects the agent's behavior (Bloom and Milkovich, 1998). Second, too many actions and possible outcomes exist and the principal, due to high costs or complex tasks and environmental influences, cannot observe the agent's behavior directly (Baker et al., 1988). In this situation it is impossible to base the agent's compensation on input, the compensation

function is tied to output which is quantifiable. Since executive work is very difficult to define and to measure, it is the design of the compensation function which becomes the crucial task of the principal (Lewellen et al., 1987).

Agents are rewarded based on certain performance measures, which in an ideal economic world perfectly reflect the chosen input level. This first-best solution, which equals the solution when behavior is perfectly observable, can be obtained if, and only if a performance measure is congruent and noiseless. In practice, however, performance measures are incomplete and noisy and hence can never capture the agent's real effort. When performance measures include noise, risk is imposed on the agent and a higher risk-premium must be paid, resulting in higher compensation (Feltham and Xie, 1994).

Incentive systems can consist of financial performance measures (profits, cash-flows, ROA) and non-financial measures (employee satisfaction). Most companies over-emphasize financial measures because they are easy to explain, even though they are unable to incorporate long-term perspectives. The reason for gathering such financial measures is that they are needed for annual reports and external parties like shareholders turn their focus to them for evaluation. Ideally both dimensions should be integrated when evaluating performance (Epstein and Manzoni, 1998).

Furthermore the compensation function can be based on objective performance indices or subjective performance assessment (Baker et al., 1988; Gibbons and Murphy, 1989; Gibbons, 1998).

Baker et al. (1988) in their work *Compensation and Incentives: Practice vs. Theory* criticize objective performance measures as being sensitive to misspecification, thus distorting incentives and motivating employees to shirk.

Imagine a manager who is rewarded based on a compensation function requiring profits to increase each period ( $p_0 < p_1 < \dots < p_t$ ). According to the chosen depreciation method one can manipulate the system and simulate increasing profits. The manager in this case can extract bonus payments with constant or even decreasing performance by accounting manipulation.

Gibbons (1998) states that in practice many firms use a combination of both objective and subjective performance measures, which allows firms to benefit from the advantages of an integrated compensation scheme. A subjective component could be the CEO's human capital or his contribution to the sustainable value creation assessed by the board of directors. These values might not be quantifiable or directly measurable but without doubt are of essential interest to the company.

What all these different assessment criteria try to mitigate is a situation where CEOs get paid for company performance which in turn is a resultant of environmental influences rather than CEO's own performance. Bertrand and Mullainathan (2001) argue that shareholders would not reward lucky CEOs but hard-working executives, who maximize firm value by exerting high levels of effort to make the right decisions.

## 2.2 CEO Compensation

Executive compensation is one of the most prominent mechanisms to minimize the costs of the classic agency-relationship. The principal has to design a compensation-package providing incentives to the CEO so that s/he acts in the firm's best interest and at the same time balances the risk imposed, even though the latter might have diverging private interests and risk attitudes (Garen, 1994).

The rapid growth of CEO compensation in the last decades has raised public interest in executive compensation as reflected by countless discussions in newspaper articles, by shareholder activism and academic literature (Murphy, 1999; Bebchuk and Grinstein, 2005). Accounting scandals (Enron, WorldCom, and others) where managers' wealth grew and shareholders suffered enormous losses enraged shareholders, politicians as well as the public, fueled fierce debates over CEOs' paychecks and their justification.

Academic literature identified equity-based compensation components as the main source of growth in executive compensation, this phenomenon can be observed at the CEO-level as well as within the group of top-five-executives. Even the fixed base salary increased in the period of 1993 - 2003 (Bebchuk and Grinstein, 2005). Hall and Murphy (2003) highlight the explosion and recent cutback of rewarding executives as well as general workforce with stock option plans as a new trend in pay practices.

Gabaix and Landier (2008) argue that the rise in CEO compensation can be traced back to the differences in company size. The authors state that the massive increase of CEO pay of 600% is attributed to the analogous increase in market capitalization. Market capitalization is increasingly being used as a size proxy in academic literature, according to Murphy (1999).

Gabaix and Landier (2008) point out three approaches that attempt to identify the actual reason for the massive increase in executive pay and particularly in CEO compensation: perfect contracting, the skimming view and the idea that changes in the tasks result in changes in compensation.

Under the perfect contracting view it is the role of the board to design the CEOs compensation package in a manner that CEOs are motivated to act in line with shareholder interests (Bebchuk and Fried, 2003). This approach relies heavily on the incentives used and their effect on the CEOs behavior. Even very high CEO compensation might be justifiable and necessary depending on the risk imposed on the CEO, sometimes risk premiums are not high enough and hence fail to cover the CEOs risk resulting in the rejection of feasible and shareholder value maximizing projects. Bebchuk and Fried (2003) argue that optimal contracts are obtained under the principle of arm's length bargaining, otherwise market constraints can prevent the CEO or the board from deviating from the perfect contracting solution..

The skimming view tries to explain the change in executive pay that is not consistent with the perfect contracting view. Bertrand and Mullainathan (2001) state that the sep-

aration of ownership and control within this approach is believed to result in managerial entrenchment, allowing the CEO to manipulate the board of directors and influence the CEO pay-package. The authors argue that salary and bonuses as well as option plans are designed in a way that luck is incorporated in the compensation function, and CEOs receive excessive payments. This highlights the idea that boards might not always represent as effective shareholder protection as defined by corporate governance codices (Denis and McConnell, 2003). Bebchuk and Fried (2003) point out that individual directors are proposed by managers and shareholders vote within this slate. De facto in some cases boards are designed by the executives they are supposed to monitor (Shivdasani and Yermack, 1999). The pay-setting process is not always carried out on arms-length's bargaining, as a result CEOs actually design their own compensation package (Bertrand and Mullainathan, 2001). However there are constraints to managerial rent-extraction, as directors have to approve the CEO's pay package (Bebchuk and Fried, 2003). Gabaix and Landier (2008) state that the third possible reason for the rise in CEO pay is that the job has changed dramatically over the years, and that this change results in an analogous increase in compensation.

### 2.3 Alternative Theories of CEO Compensation

#### 2.3.1 The Economic Approach - Human Capital Theory

Human capital theory deals with the multitude of decisions a human being has to make (e.g. education, job opportunities) and defines them as investments which later in life generate returns (Ben-Porath, 1967). The creation of human capital depends on investments that result in new abilities and potential thus enabling the person to break new ground and improve career opportunities (Coleman, 1988). According to Ben-Porath (1967) it is the youth that invests in human capital in order to benefit from higher future earnings, one can assess that wages are relatively low in the beginning of the career and rising over time. Combs and Skill (2003) point out that more than half the amount of variation in managerial compensation is explained by a few variables e.g. company size and performance; whereas the other part remains unidentified. The authors argue that superior executive skills like excellent education and extensive expertise result in a competitive advantage and higher compensation. Harris and Helfat (1997) hypothesize and empirically support that, all other things equal, more skilled internally recruited CEOs receive higher compensation accounting for the superiority of their human capital. Given strong boards and thus effective corporate governance mechanisms premium CEO compensation reflects the board's valuation of the CEO's human capital as opposed to weak, insider dominated boards that pay market-driven remuneration and fail to retain strong talents (Combs and Skill, 2003).

### 2.3.2 The Sociological Approach - Social Comparison

Social comparison describes the process of comparing others to oneself with the intention of creating or updating one's self-concept (Zell and Alicke, 2009).

O'Reilly et al. (1988) propose two influential factors on compensation design conducted by committee members, first the comparison with themselves based on their experience and expertise and second market comparison, where other CEOs are compared with the firm's CEO. Gibbons and Murphy (1989) argue that there are good reasons why CEOs should be compensated on a relative basis, being risk-averse they should not be held responsible for market or industry shocks, the effect of shocks can be alleviated by comparison with other CEOs. Beside this approach it is common practice to achieve relative evaluation through internal comparison; however Gibbons and Murphy (1989) highlight the shortcomings e.g. CEOs choosing weak subordinates in order to seem more competent and assure one's position, as well as sabotage and collusion.

### 2.3.3 The Psychological Approach - Stewardship Theory

Davis et al. (1997) criticize the basic assumptions on which agency theory and the corresponding models are based. As explained earlier, the principal-agent theory considers two economic actors that cooperate as the agent acts on behalf of the principal. When an agency problem occurs diverging interests and different time and risk preferences play an important role. Both actors are rational human beings and utility maximizers. According to Davis et al. (1997) this is where the problem with the agency theoretic approach starts, as humans are seldom acting completely rational whereas most models assume homo economicus characteristics. As opposed to agency theory which dominated for many years economic literature, stewardship theory is a more recent line of research that emerged in the 1990's (Wasserman, 2006). Davis et al. (1997) state that agency theory and stewardship theory are not necessary rivaling theories, since the former is suited for situations where diverging preferences can be mitigated by corporate boards and sophisticated design of the compensation function whereas the later deals with different human actions depending on situational and psychological forces. Wasserman (2006) suggests stewardship theory is superior in organizations build on trust and encouraging identification rather than on monitoring mechanisms which induce control. Muth and Donaldson (1998) argue that transferring power to the CEO is beneficial for company success since it meets the CEO's need for achievement and recognition and increases non-financial motivation. Stewards are defined as economic actors with a collectivistic scope. Maximizing shareholders wealth simultaneously increases the steward's own utility since it is strongly tied to company success (Davis et al., 1997). Stewardship theory advocates different board structures than agency theoretic models where independent boards are favored. Here insider domination is not a sign of failing corporate governance but rather an efficient force since specialized insider knowledge, company based expertise and dedication to the company represent success

drivers (Muth and Donaldson, 1998). When setting CEO and top-executive compensation boards would design a steward's compensation function with a smaller fraction of base salary as well as performance based compensation compared to those of agents, since the former are motivated intrinsically driven by loyalty and identification with the company (Wasserman, 2006).

## 2.4 The Design of the CEO's Pay-Package

In practice one can observe considerable variation in pay-setting across companies. Compensation packages are generally structured along four essential components. The standard CEO pay-package contains a fixed salary, an annual bonus based on short-term targets, stock options, and long-term oriented compensation e.g. restricted options or pension plans (Murphy, 1999).

Since it is not conditioned on certain performance measures which have to be met by the CEO the base salary is regarded fixed to a certain amount and riskless when compared with variable compensation components. In a situation where the principal can easily observe the agent's actions (and thus information about the underlying effort-level is accurate), fixed salaries are to be used (Bloom and Milkovich, 1998). However the exact effort level of a CEO is hard to determine and hence fixed compensation will only constitute one part of the CEO's compensation function.

Although fixed, it does not imply that the salary-level is independent of the CEO's performance. According to Prendergast (1999) fixed salaries lack sufficient incentives due to the missing link of pay to performance. Future contracts however depend on current performance given that an individual can only renegotiate a contract in his favor, if certain targets were met in the past period (Prendergast, 1999). Usually salaries are determined at the beginning of the year and thus reflect last period's performance (Hall and Liebmann, 1998). A poorly performing CEO might weaken his bargaining position and hence lose a substantial part of his fixed income in the following period, as opposed to a well performing CEO who might be able to renegotiate his contract and raise his base salary to a higher level.

Baker, Jensen, and Murphy (1988) point out that base salaries, being cash compensation, lack incentives and the only way to create pay packages with incentive power is to emphasize variable pay particularly stock-related compensation.

The variable part of a compensation package can consist of various incentive instruments; each with its respective objectives and merits. Lewellen et al. (1987) argue that the aim of this multitude of pay components is to mitigate existing conflicts between shareholders and executives. According to the authors the problems of diverging temporal horizons and differing risk attitudes can be solved with the help of corresponding current incentives as opposed to deferred compensation and cash versus equity based compensation. Incentive

mechanisms tend to be of either long-term or short-term nature.

The bonus part of the compensation package is usually based on annual performance measures and hence is short-term oriented. The cash amount is calculated at the end of the year, according to its weight in the compensation function, and is usually paid out annually rewarding the CEO's performance during the last fiscal period (Hall and Liebmann, 1998).

As bonus payments are not tied to future performance their incentive power is limited to a relative short span of time, shareholders in contrast depend on sustainable growth and value creation.

Academic literature has emphasized the importance of tying executive pay to performance. Baker, Jensen, and Murphy (1988) argue that empirical research shows only a weak but statistically significant correlation between executive compensation and company stock price development. The authors state that CEO's own a far too small proportion of company stock and hence lack incentive also shareholders' wealth is barely tied to CEO compensation. According to the authors an increase of stock value of 1000\$ augments CEO short-term compensation by 0.00002% (of 1000\$). Political constraints in reaction to public outrage about vast CEO compensation are one of the possible explanations why certain contracts are not enforced. Another rather unlikely possibility is that the board of directors can observe the CEOs actions in detail and hence a smaller proportion of incentive pay is needed since monitoring accounts for most of the incentives (Jensen and Murphy, 1990). In contrast Hall and Liebmann (1998) argue that pay-for-performance sensitivity is much larger than stated by previous academic literature. Furthermore the authors point out that this connection can easily be obtained with the use of equity based forms of compensation e.g. CEO stock-holdings and granting stock options.

Since compensation in this case is a direct function of firm performance, CEOs will only be rewarded if they meet certain stock price performance targets which are in line with shareholders' interest and at the same time increase the CEO's wealth. Stock options thus seem to be an effective way of tying CEO wealth directly to company performance and thereby mitigating the existing agency problems between owners and managers (Hall and Murphy, 2003). Compared to salaries equity based compensation components are considered variable and are a rather risky form of compensation having a long-term and future-oriented temporal focus.



### 3 Board of Directors and CEO Compensation

The substantial rise in CEO compensation has attracted the attention of academics as well as politicians, shareholders and the public in general. After the well-known accounting scandals involving big U.S. companies the board of directors is of special interest, as they are partly to blame for the disasters. Denis and McConnell (2003) differentiate between external and internal corporate government structures, the board of directors being part of the internal corporate governance.

This internal control mechanism clearly failed considering the multiple cases of accounting fraud and earnings management, failures which shareholders had to pay for (Laux and Laux, 2008). Nearly every corporation today is and shall be managed by a board of directors as dictated by state law. Hermalin and Weisbach (2003) emphasize that corporations as well as non-incorporated organizations like universities and hospitals are usually controlled by boards, incorporation being legally impossible without the control mechanism of boards. The board of directors is the most important control authority regarding organizational decision-making (Fama, 1980; Fama and Jensen, 1983).

Academic literature suggests that the main function of the board is mitigating agency conflicts caused by separation of ownership and control (Hermalin and Weisbach, 2003). The board's key tasks include hiring, firing and monitoring executives as well as setting their compensation function (Shivdasani and Yermack, 1999; Denis and McConnell, 2003) in a manner that adequate incentives are induced as the role of the board also requires directors to act on behalf of the shareholders who elect the individual representatives to the board. Daily, Johnson, Ellstrand, and Dalton (1998) define the board of directors as the most important protection system shareholders have against entrenched CEOs. The authors identify excessive compensation as one of the possible problems shareholders face and suggest that according to agency theoretic insights the board of directors should be responsible for dealing with diverging interests of CEOs as well as mitigating these differences with appropriate compensation functions.

Coles, Naveen, and Naveen (2006) argue that the two critical tasks of the board of directors are monitoring and at the same time advising top executives in their daily business decisions. Adams (2003) also emphasizes the board's role as advisors and monitors and additionally points out the importance of all stakeholders of the company, the third function being acting in the best interest of those stakeholders. Laux and Laux (2008) on the other hand identify designing the CEO's compensation scheme and overseeing financial reporting as the board's most important functions.

Daily et al. (1998) argue that executives, especially CEOs have an influence over the board and thus board members are not really objective but align themselves with the CEO in-

stead of acting in the best interest of shareholders. Hermalin and Weisbach (1998) state that the major role of the board is to provide management with information and advice, furthermore future CEOs should be part of the board since this is where they can train their future role and at the same time be assessed by experienced decision makers.

In practice one can differentiate a myriad of possible board structures, there are small vs. big boards, boards with different subcommittees, boards can consist of outsiders, insiders or affiliated directors, individual directors can sit on one or more boards at a time. All these structural variables have an impact on the company, on firm performance and also on the way how executives are monitored, advised and compensated. As mentioned before, one of the boards' most important tasks is setting the CEO's compensation function. The different variables represent proxies for corporate governance and hence the monitoring ability of the board. This section looks at all the different possibilities of board composition, the relevant literature is reviewed as well as hypothesis concerning the influence of board structure on CEO pay are developed.

### 3.1 Board structure

In this section all the relevant variables regarding the board of directors are presented, following the respective blocks of literature review the hypothesis are stated.

#### 3.1.1 Board Size

Board size is the number of individuals voted by shareholders to be a director on a company's board.

Board size is measured by the number of directors. Some boards consist of relatively few directors, whereas other boards are composed of many directors. Empirical evidence about board size is mixed, resulting in inconsistent guidelines for the optimal size.

Callahan, Millar, and Schulman (2003) come to the conclusion that large boards have a negative impact on firm performance. Hermalin and Weisbach (2003) come to the same conclusion and argue that smaller boards are better decision-makers in general and most important concerning executive compensation. Jiraporn, Singh, and Chun (2009) also find a negative and significant effect of size on firm performance, based on EBIT. Ryan and Wiggins (2004) argue that boards lose their independence the larger they are. A more detailed analysis of Conyon and Peck (1998) reveals that there is a relationship between the number of executive directors and CEO compensation. Core, Holthausen, and Larcker (1999) conclude that large boards are inefficient and weak monitors. The authors state that CEOs in companies with large boards receive higher compensation than those evaluated by smaller boards. Petra and Dorata (2008) find that CEOs receive lower fractions

of performance based incentives when boards are small. Core et al. (1999) emphasize and provide empirical evidence, that larger boards result in higher CEO compensation. Yermack (1996) points out, that there is an inverse relationship between board size and company value. Pathan (2010) tests the influence of board size on bank risk, and finds a negative coefficient. Klein (2002) argues that larger boards result in a greater degree of audit committee independence, which is an indicator for better monitoring. The author states that if the board size is limited there are fewer directors who can serve on various committees, in turn the degree of independence can decrease as there are not enough outsiders available to sit on the committees. There seem to be different optimal sizes for different firms; simple firms benefit from small boards, whereas complex firms with special advising needs benefit from large boards with considerable outsider representation (Coles et al., 2006). The authors hypothesize that small boards are better monitors compared to large boards, however large boards represent better advisors to company management since a broader knowledge-base is created at board level.

The negative effects of large boards can be mitigated and even completely off-set by the use of subcommittees by alleviating the size-induced costs (Reeb and Upadhyay, 2010). A large body of the academic literature seems to consider small boards more effective as opposed to large boards, however companies have to cope with different environments and in some cases quite the opposite is optimal. It seems that board size has decreased recently as a reaction to SOX - Sarbanes-Oxley Act 2002 (Coles et al., 2006). Based on theoretical findings board size is expected to have a negative impact on corporate governance mechanisms and hence the coefficients regarding CEO compensation are expected to be positive (Core et al., 1999).

**H1:** There is a positive relationship between board size and CEO compensation

### 3.1.2 Board Composition

Each individual director can be categorized, according to his relationship to the company, into one of the following groups: insiders, outsiders or gray directors. According to academic literature, this is one of the most common approaches in categorizing directors (Core et al., 1999; Anderson and Bizjak; Klein, 2006). Each of these groups has a special role within the board and thus has a different influence on the company as a whole and on CEO compensation.

Anderson and Bizjak differentiate between insiders, affiliated directors and independent directors. Sometimes gray directors are referred to as being affiliated, but basically the same independence status is meant. By “independent” the authors define a group usually named as outsiders. However the term independent is not necessarily equivalent to this of an outsider, under the corporate governance rules of the NYSE former employees and their family members become independent three years after they end their employment within the company.

### Insiders

Insiders are executives, retired executives or family members of the former two (Core et al., 1999; Anderson and Bizjak). Hermalin and Weisbach (1998) argue that insider dominated boards are less effective. Insider representation on company boards is not per se a bad solution, it depends why insiders are appointed to their seats if the appointment is based on shareholder interests it can even be optimal (Rosenstein and Wyatt, 1997). In their empirical work concerning stock-price reactions and insider appointments Rosenstein and Wyatt (1997) distinguish two groups: insiders owning less than 5% stock and insiders that own between 5% and 25%, in the first case the stock price reaction is significantly negative, whereas in the second case the significant relation is positive. Klein (1998) is not able to identify a significant linkage between company performance and the percentage of insider representation on the board of directors. Yet this study reveals a positive relationship between insider representation on finance- and investment committees and firm performance, which leads to a conclusion that insiders are of great value to the company when put on these committees due to their in-depth company knowledge and professional expertise. Duchin, Matsusaka, and Ozbas (2010) highlight the importance of insiders and their information status compared to outsiders who suffer from a lack of company based knowledge and hence have to obtain this information in order to improve their decision-making. Callahan et al. (2003) argue, that directors are supposed to work in the shareholders' best interest by advising and counseling executives and thus helping them making strategic decisions. The authors point out that in this situation executive directors have a significant advantage over outsiders. Baysinger and Hoskisson (1990) in their work argue in favor of inside directors as they are part of the internal decision-making team and hence have better information about the CEO's and other executives' performance and effort levels. Core (Core et al., 1999) et al. (1999) find that the CEO compensation is decreasing as the percentage of insiders appointed to the board is growing. Anderson and Bizjak find that a greater fraction of insiders is positively associated with CEO stock-ownership, hence tying CEO wealth closely to shareholder interests.

**H2:** CEO compensation is negatively related to insider representation on the board board rises.

### Gray Directors

Retired executives and relatives of former or current management as well as persons with disclosed conflicting interests and interlocked directors all fall within the category of gray directors (Shivdasani and Yermack, 1999). Gray directors are not truly independent since they have further relationships to the company beside their directorship. Daily et al. (1998) argue that executives are more likely to exert influence over gray directors than on outsiders and that they might design less risky CEO compensation functions in favor for the CEO. Core et al. (1999) find that CEO compensation increases as the number of gray

members on the board increases and argue that they are less effective monitors and under the influence of management.

**H3:** CEO compensation is a positive function of gray directors' representation on the company board.

### Outsiders

A director is an outsider if sitting on the firm's board is his only relationship to the company; there exist no further blood or business relations between the director and the company. A director who at the same time consults the company or works for a subsidiary cannot be considered an outsider since his relationship with the firm exceeds pure directorship. Generally academic literature identified outside directors as a defense mechanism for shareholders, as they are believed to be independent from management and hence more willing to combat an entrenched CEO who is maximizing his own wealth at the expense of shareholders. In order to define the role and effects of outsider representation on company boards different academic views will be presented.

Conyon and Peck (1998) examined an increase in non-executive directors in the period of 1991-1994, which can be traced back to the recommendations of the Cadbury and Greenbury Committees.

However the authors' findings imply that the fraction of non-employee directors has no effect on executive compensation, the positive influence on company performance was stronger and significant. Coles et al. (2006) argue that in complex firms a higher representation of outsiders has a positive effect on performance by ameliorating the advice capacity of the board. Opposed to the view that boards composed of a big majority of outsiders are costly Reeb and Upadhyay (2010) argue that operating with subcommittees off-sets this negative effect. More independent boards fearing a law-suit and being closely monitored are believed to act conservative concerning bank-risk (Pathan, 2010). In their empirical study Jiraporn et al. (2009) find that the group of busy directors is comprised by 78% of outsiders, whereas the non-busy group shows a 17% lower contribution (61%) of outsiders. The authors conclude that there is a higher demand for outsiders on the board, than there is for insiders, they trace this development back to the outsiders' role as crucial objective advisors. Moreover non-busy outsiders are believed to perform as better monitors and are more likely to fire the CEO after an unsuccessful period (Fich and Shivdasani, 2006). Duchin et al. (2010) cannot find any relation between adding more outsiders to a board and firm performance on average, however they find that outsiders ameliorate performance when obtaining information is cheap and decrease company performance when information is costly. Moreover the authors argue that the optimal number of outsiders is different for every company, they hypothesize that some companies have fewer outsiders for optimality reasons and exogenously rising the number of outsiders hurts their performance, whereas other firms seem to keep outsider representation low in order to facilitate managerial entrenchment (Duchin et al., 2010). Ryan and Wiggins (2004) argue in favor of

independent boards and emphasize the importance of outsiders as shareholder protection; they find that shareholders' interests are best managed by an outsider dominated board whose compensation package is closely tied to shareholder wealth.

As mentioned before the design of a compensation function is crucial in setting the right incentives and avoiding agency conflicts, which of course can occur between directors and shareholders.

Peasnell, Pope, and Young (1998) find support for the use of outsiders on a company's board. The authors conclude that outsiders prevent executives from maximizing their compensation by choosing the right accounting methods. Furthermore Peasnell et al. (1998) argue that outsiders restrict management's possibilities for all kind of earnings management. Baysinger and Hoskisson (1990) argue that outsiders are not an active part of the daily decision-making process management has to face and hence have limited information not just about what is best for the firm but also lack information about decision quality and exerted effort of CEOs. The authors conclude that outsiders are not able to assess executive performance due to these informational short-comings. Core et al. (1999) find no evidence that the number of outsiders appointed to the board has any influence on CEO compensation argue in disfavor of forced use of outsiders, even though some guidelines and shareholder activists ask for it. Boards tend to be more rigorous while fulfilling their monitoring duties and optimal pay-performance-sensitivities are higher, when they are more independent of CEOs (Ozerturk, 2005).

Outsiders are believed to be shareholder's protection against opportunistic CEOs (Ryan and Wiggins, 2004), moreover fulfilling their monitoring function they prevent executives from maximizing their compensation (Peasnell et al., 1998). However Baysinger and Hoskisson (1990) argue that outsiders are not as well informed as insiders resulting in suboptimal decisions. Literature as well as empirical results concerning outsiders is ambiguous, many studies find no relationship between outsiders and CEO compensation.

**H4:** There is no relationship between outsiders and CEO compensation.

**Old Outsiders** Core et al. (1999) define directors to be old when they pass the age of 69, this is a definition commonly adopted and used by acThe authors hypothesize and provide empirical evidence that old directors are less effective and that their appointment to company boards results in higher CEO compensation. Petra and Dorata (2008) analyze the effect of director age on their performance when placed onto the compensation committee, the authors hypothesize that "old" directors might be captivated in old-fashioned views and as a result the committee might become inflexible. However they were not able to identify any effect of senior directors serving on the compensation committee on corporate governance (Petra and Dorata, 2008). Core et al. (1999) find support for a positive relationship between CEO compensation and old directors..

**H5:** Old directors have a positive influence on CEO compensation.

**Busy Outsiders** The public in general as well as private and institutional shareholders are worried that busy directors lack time for effective and well-considered decision-making, multiple directorship is regarded as an obstacle to successful monitoring and hence might weaken a company's corporate governance. Academic literature is ambivalent concerning director busyness. Whereas some researchers argue that busy directors have a negative effect on the quality of corporate governance (e.g. Fich and Shivdasani, 2006) others find positive effects of busyness (Jiraporn et al., 2009).

Fama and Jensen (1983) state that the value of a director's human capital is a function of her/his directorships, as it depends on the quality of the decisions they make in various organizations. The authors argue that directors are keen to build a reputation as decision-making experts; hence they use their directorships for signaling their abilities and expertise. The number of board seats an executive occupies can be interpreted as a classification figure of their expertise and their quality as decision-makers. Fich and Shivdasani (2006) empirically support that outsiders connected to successful companies tend to occupy more board seats as they are highly sought after in the directorship market.

Jiraporn et al. (2009) find that outside directors are busier than insiders, they attribute this pattern to the fact that there is more demand for independent directors. The higher demand for independent directors might be a result of the regulations imposed on public corporations, since certain committees have to be composed by outsiders only e.g. the audit committee more outsiders are needed to fill those committees. The authors also argue that directors serving on boards of bigger firms are busier than their colleagues serving on boards of small corporations since they seem to have more profound expertise and are in high demand on the director market. Busy directors serve on bigger and at the same time more independent boards than non-busy directors and also they tend to serve on more committees (Jiraporn et al., 2009). The authors conclude that the reputation hypotheses is significant and that expertise is signaled through the number of board seats held, they empirically prove their prediction with the observation that directors holding more than two board seats serve on more committees than the non-busy fraction of directors.

Core et al. (1999) define an employed outsider being busy, when serving on three or more corporate boards and a retired outsider is considered busy when being on six or more boards. The authors argue that busy directors have limited monitoring abilities and find a positive relationship between director busyness and CEO compensation. Fich and Shivdasani (2006) decide to use another approach than individual busyness in this context, they examine the board as a whole and define a busy board to consist of a majority (50% or more) of the outsiders that occupy three or more board seats. The authors show that companies with busy boards perform inferior compared to non-busy boards, as well as CEO turnover following poor performance is less likely, stock price reactions to busyness are mostly negative whereas restructuring of the board resulting in non-busyness is followed by positive reactions. Their study suggests that busy directors become preoccupied and as a result cannot fulfill their monitoring duties as good as non busy directors hence lowering the effectiveness of corporate governance. As a result some companies could ben-

efit from a lower fraction of outsiders, if they are considered busy (Fich and Shivdasani, 2006). In contrast Ferris et al. (2003) find no evidence that multiple board seats held by a director harm company performance, hence the busyness hypothesis has to be rejected. Interestingly the authors were able to identify a positive link between company and board size and the number of board appointments, this result is consistent with later findings of (Jiraporn et al., 2009). The reputation hypothesis seems to hold for the sample as a positive relation between firm performance and following appointments observed (Ferris et al., 2003). Petra and Dorata (2008) show that performance based incentives are lower when companies restrict their directors from serving on more than four boards. However the authors argue that the connection between pay and performance is not strong enough and are critical concerning incentive pay, e.g. stock-options.

One must keep in mind that higher incentive pay results in higher overall compensation, but if shareholders' interests and the CEO's interests are aligned by the chosen compensation functions and CEO compensation is strongly tied to company performance, high incentive pay is beneficial for the company and helps alleviating agency conflicts. Song and Windram (2004) highlight that director busyness contributes to a diligent audit committee and consequently to improved audit committee efficiency.

In accordance with prior literature (Core et al., 1999; Fich and Shivdasani, 2006) as well as corporate governance guidelines busy directors are expected to have a positive influence on CEO compensation.

**H6:** CEO compensation is a positive function of the fraction of busy outsiders serving on the board of directors.

**CEO appointed Outsiders** Outside directors appointed by the CEO are considered inefficient since they are influenced by the CEO and result in higher CEO compensation (Core et al., 1999). Shivdasani and Yermack (1999) find that CEO's are more likely to appoint gray directors instead of independent outsiders. Furthermore the authors point out that market reactions to outsider appointment to the boards show a negative coefficient, when the CEO is involved in the nomination process. Additionally CEO's tend to appoint busy directors to the board. Callahan et al. (2003) find that CEO involvement in the director nomination process and long-term company performance show a significant and positive coefficient. Daily et al. (1998) argue that directors nominated by the CEO might feel loyalty to the CEO and hence would be less ready to challenge management decisions.

**H7:** Directors appointed by the CEO have a positive influence on CEO compensation.



## 3.2 CEO Characteristics

### 3.2.1 Duality

There are different views in academic literature concerning the leadership structure in companies. Shareholder activists favor a separation of the two titles emphasizing the control exerted over the board of directors by a CEO-chairman. However some companies argue that a combination of titles is beneficial.

The role of the chairman of the board is to organize board meetings and to be the leader when it comes to decision-making within the board (Conyon and Peck, 1998).

Core et al. (1999) find that CEO compensation is higher when the CEO holds the seat of chairman of the board; the authors argue that a company can ameliorate corporate governance by separating those two titles. Brickley, Coles, and Jarrell (1997) also report that CEO compensation is higher when the functions of CEO and chairman are combined, but opposed to Core et al. (1999) they draw it back to factors as firm size, work experience and firm performance and find no evidence that manipulative behavior is the reason of increased CEO pay. The authors argue that companies remunerate their CEOs for superior performance by granting them the title chairman of the board, but they could not identify managerial entrenchment. It may as well be the size of the firm that requires different leadership structures, small companies benefit from a combined leadership structure, where the CEO holds the title of the chairman of the board and hence can make clear directions and ameliorate communication between management and the board, whereas large companies benefit from separated titles that alleviate agency conflicts (Palmon and Wald, 2002). Conyon and Peck (1998) argue that CEOs who occupy both roles might suffer from a conflict of interests. A CEO-chairman might face this conflict of personal and professional interests due to his self-interest as opposed to the shareholders' interest. Contrary to their theoretical assumptions Conyon and Peck (1998) were not able to identify a significant relationship between the combination of titles and executive compensation. Conyon and Murphy (2000) find a positive relationship between pay-performance sensitivities and the combined title of CEO-chairman. Petra and Dorata (2008) show that CEOs who chair the company's board tend to receive higher levels of incentive pay and therefore obtain higher levels of pay-for-performance sensitivities. There is another stem of academic literature which takes psychological and social factors into account when analyzing CEO behavior and the role of a CEO-chairman, namely stewardship-theory. In contrast to agency theory this view assumes that the CEO realizes personal benefits by maximizing firm value and acting in the best interest of shareholders, since intrinsic motivation is the driving force such a CEO would need high decision-making authority and power, as opposed to a CEO-agent (Davis et al., 1997). The authors argue that a CEO-steward would be motivated by combined titles and work in the shareholder's best interest.

Literature discussing combined titles is mixed as whether to favor CEO duality or not,

however CEO duality seems to induce higher levels of CEO compensation. While some authors argue in favor of separation of titles (Core et al., 1999) in order to reduce CEO influence and strengthen corporate governance (thus avoiding the possibility that CEOs extract higher compensation due to influencing the board of directors) others argue in favor of a combination of positions since CEO chairmen seem to receive compensation with higher pay-performance sensitivities (e.g. Conyon and Murphy, 2000).

**H8:** There is a positive relationship between combined titles and CEO compensation.

### 3.2.2 Tenure

Hill and Phan (1991) argue that CEOs get more entrenched the longer their tenure, and hence significantly influence the board of directors and as a result their own pay-package. The authors highlight that the effect of firm size on CEO compensation becomes more important, as well as company risk and pay whereas the relationship between CEO compensation and stock returns diminishes. Bertrand and Mullainathan (2001) hypothesize that corporate governance should be the strongest in the beginning of a CEO's career and weaken over time as the CEO gains power. Their empirical results clearly show that there is no connection between tenure and incentive pay which is tied to performance however pay for luck is strongly tied to tenure. Anderson and Bizjak were not able to identify a link between CEO tenure and compensation committee structure, stating that there exists no strong evidence that CEO's with longer tenure are able to manipulate committees and hence ameliorate their own pay package through rent extraction. Hermalin and Weisbach (2003) also state that tenure weakens corporate governance and has a negative correlation with independent boards. The lack of independence might lead to higher CEO compensation, since the CEO might influence the board or the board might act in favor of their CEO out of loyalty.

**H9:** Tenure has a positive connection with CEO pay

### 3.2.3 Stock Ownership

Laux and Laux (2008) argue that stock ownership even though it has high incentive power, can induce wrong incentives, resulting in CEOs manipulating stock prices in order to maximize their wealth at the expense of shareholders. Also Core, Guay, and Verrecchia (2003) report suboptimal incentives induced by voluntary stock ownership of the CEO that exceeds the optimal amount preferred by the firm. Adams et al. (2010) report that CEO shareholdings have a negative connection with board independence. Klein (2006) finds that CEO stock ownership and earnings-manipulation show a negative coefficient. CEOs engage in earnings manipulations in order to maximize their own wealth and ameliorate their compensation. If stock-ownership is negatively correlated to earnings manipulations it is possible that there is a negative relationship with CEO compensation as well. Core

et al. (1999) in accordance with their theoretical predictions find that CEO compensation decreases with the CEO's ownership stake.

**H10:** CEO compensation decreases with CEO stock ownership.

### **3.3 Company Characteristics**

#### **3.3.1 Company Size and Company Performance**

There is a positive and significant relation between firm size and the absolute level of CEO remuneration as well as to the percentage of incentive pay in terms of total compensation (Daily et al., 1998). Wasserman (2006) reports that executive compensation increases with company size, no matter if agents or stewards are considered. Company size as well as company performance are important control variables in corporate governance research and should be accounted for in empirical analysis.

## 4 Board Committees - The Role of Subordinate Board Structures

Shareholders appoint executive and non-executive directors to the board in order to act in their best interest and as a defense mechanism against self-interested and entrenched executives and CEOs. Boards can conduct their work as a whole or delegate specific tasks to sub-committees, essentially every listed company has different committees e.g. audit committee, compensation committee, nominating committee, corporate governance committee, executive committee, finance committee, and many more.

In this section two particularly important committees are analyzed: the audit committee and the compensation committee. According to Klein (1998) board committees are composed of a fraction of the boards' directors which have their own predefined and explicit roles and tasks and have meeting schedules and meeting frequencies independent of the board as a whole.

Reeb and Upadhyay (2010) argue that subcommittees ameliorate communication conflicts as well as free-rider problems within large boards and outsider dominated boards. However they also argue that these positive effects are absent in small or insider dominated boards since costs in this case exceed benefits. Arranging subcommittees within the board of directors is costly due to the separation of the specialized directors into committees resulting in less communication and hence information asymmetries besides directors' preoccupation with their own responsibilities (Reeb and Upadhyay, 2010). Jiraporn et al. (2009) argue that the work at some committees might be more expertise demanding and time consuming (e.g. audit committee, compensation committee and corporate governance committee). The implication of this argument might be that these committees are more important than other committees. Regulations concerning the audit and the compensation committee are more accurate and stringent than for other committees, e.g. internal committees can be composed of insiders entirely which is impossible for the two committees of interest in this section. The two board committees that are especially designed for monitoring purposes are the audit and the compensation committee (Klein, 1998). The author argues that they mitigate agency problems between management and shareholders as the audit committee ensures correct accounting information and hence balances information asymmetries and the compensation committee designs and enforces incentive compensation contracts in order to bring executives' interests and shareholder interests in line.

### 4.1 Audit Committee

The following paragraph describes certain requirements each audit committee of a publicly listed company has to fulfill as stated by the Sarbanes-Oxley Act of 2002 (SOX 2002). An audit committee is a committee consisting of three or more directors, which are chosen from the general board of directors. The committee has to be composed of independent directors whose only relation to the company is their directorship. This definition excludes i.e. lawyer, consultants and other persons receiving compensation other than director fees and also excludes directors considered gray from serving on a company's audit committee. At least one of the directors serving on the committee has to be a financial expert; a person fits this definition if education or experience leads to a profound financial and accounting expertise. The audit committee's role is to oversee financial and accounting reporting. All services received by an auditor have to be revised and approved by the audit committee first. Furthermore it is obliged to appoint, compensate and monitor the company's auditor which has to be chosen from registered public accounting companies. Even though the audit committee has to be composed of independent directors, there are exceptions to this rule, as the board can approve affiliated or executive directors if it is not considered harmful to the company.

Example: *North American Galvanizing & Coatings Inc.*, Def 14a, 2007-03-30, page 6. As a practical example North American Galvanizing & Coatings Inc.'s audit committee will be analyzed and its compliance with regulations of the Sarbanes-Oxley Act of 2002 will be examined. During the fiscal year of interest (2006) the audit committee met six times in order to fulfill its duties. The primary functions of the company's audit committee are to select independent auditors, maintain communication between the board, the financial executive team and to monitor external auditing and the company's financial management as well as analyzing the environment and informing the shareholders. The audit committee consists of four directors, each of which is considered financial experienced and one of them being a financial expert. This company's audit committee complies with SOX regulations as well as NYSE requirements. The two most important tasks of the committee, monitoring audit and financial reporting, are executed by regular meetings during which important matters are discussed and decisions are made.

Krishnan (2005) states that internal control is one of the most important defense mechanisms. Since audit committees ensure effective control they are of particular interest for researchers as well as for practitioners (Krishnan, 2005). The author argues that the quality of a company's control depends on the board of directors on the one hand and more important on the effectiveness of the audit committee. Klein (2002) argues that in compliance with the NYSE and the NASDAQ, all publicly listed companies must obtain audit committees composed of at least three independent directors; hence insiders, interlocks and gray directors are banned from serving at these committees. However there are exceptions to this rule, since according to Klein (2002) business relationships between the company and the director are allowed if the audit committee benefits from the nomination

of this particular person. Klein (1998) explains that the observed audit, compensation and nomination committees are primarily composed of non-insiders. However according to the author many of the directors are chosen from the fraction of gray directors, in contrast to existing regulations which advocate complete independence from executives.

Karamanou and Vafeas (2005), similarly to the arguments presented in the section concerning the full board, argue in favor of small audit committees and find a negative correlation with market reactions to management forecasts. Krishnan (2005) states that internal control is stronger when there are more financially literate members on the audit committee. Klein (2006) finds that boards and audit committees in particular are most efficient in regard of their overseeing and monitoring duties when they are independent of management. In the study "Economic Determinants of Audit Committee Independence" conducted in 2002; Klein theoretically and empirically examines the various factors influencing the independence between audit committees and management. The author hypothesizes that audit committee independence is a function of board size and board independence, and that independence due to board expanding is costly for firms. Audit committee independence is lower when the firm faces growth possibilities and two consecutive losses, Klein (2002) argues that this is due to the complexity of decisions and hence the demand for insiders with firm specific knowledge. Krishnan (2005) highlights independence as an internal control vehicle and finds a negative association between audit committee independence and the occurrence of internal control failures. Klein (2006) examines the relation between earnings management and audit committee independence and finds that boards with a majority of independent directors and earnings management show a negative association. Klein (1998) also shows that firms with powerful CEOs who exert influence over the board, have lower percentages of outsiders on the two committees compared to boards that are relatively independent from the CEO. Song and Windram (2004) find evidence that independent audit committee outperform less independent committees in regard of financial reporting.

**H1-AC:** CEO compensation is a positive function of audit committee size.

**H2-AC:** CEO compensation is a positive function of insider representation.

**H3-AC:** CEO compensation is a positive function of the percentage of gray directors.

**H4-AC:** CEO compensation is a negative function of outsider representation

## 4.2 Compensation Committee

According to the NYSE Corporate Governance Rules each listed company must have a compensation committee, the appointed committee members have to be independent from the company. The NYSE Corporate Governance Rules highlight that the role of the compensation committee is to assess the CEOs performance, review and approve CEO compensation based on their assessment, recommend non-CEO compensation and finally

compose a compensation committee report concerning executive remuneration.

Practical Example: *North American Galvanizing & Coatings Inc.*, Def 14a, 2007-03-30, page 6: The company's compensation committee composed of three directors met four times in the fiscal year of 2006. The role of the compensation committee is to formulate and recommend to the full board remuneration of the CEO, top executives and Directors. This function also includes decisions over incentive pay as well as stock-based compensation components. The directors of the committee are obliged to analyze and discuss compensation and report to the shareholders in the proxy statement.

Vafeas (2003) highlights that the existing regulatory landscape defines the compensation committee as the most essential monitor as well as decision-maker regarding CEO compensation. The author argues that regulations concerning committee membership are strictly driven by concerns that insiders are inefficient monitors and act in favor of the CEO by boosting CEO compensation or alternatively decreasing pay-for-performance sensitivities. Conyon and Peck (1998) highlight the importance of remuneration committees, the authors state that if such committees were not established executives and above all CEOs would set their own compensation function and reward themselves as they please. This clearly is not in the best interest of shareholders, who want to reward CEOs for superior performance. Moreover boards and committees tend to be less effective when the CEO of the company occupies a director's seat on the nominating or the compensation committee, since he can exert more influence on the board and manipulate earnings in order to maximize compensation (Klein, 2006). However Anderson and Bizjak find no relation between committee independence and executive compensation. Furthermore the authors find that pay-performance-sensitivities are much higher when the CEO sits on the compensation committee, concluding that these CEOs do not engage in manipulative behavior. Daily et al. (1998) analyze single independence variables of the compensation committee and find that the fraction of gray directors serving on the committee has no positive effect on neither contingent nor non-contingent CEO compensation. Again testing for compensation committee independence the authors found no support for the assumption that less independent boards lead to higher CEO remuneration. Vafeas (2003) does not find any support for the assumption that insiders act in favor of the CEO, since there was no relationship between insider representation and the level or structure of CEO compensation. Conyon and Peck (1998) find evidence that companies with compensation committees or with a large proportion of outside directors on the compensation committee show higher top-executive compensation functions, but more importantly there is a stronger relation between pay and performance in these companies. Another interesting relationship is that of CEO compensation and the stock-ownership of the members of the compensation committee - in their research Cyert, Kang, and Kumar (2002) find that CEO compensation is negatively related to director ownership on the compensation committee.

One has to note that empirical findings regarding the compensation committee are far more conclusive than findings concerning the board of directors or the audit committee. CEO on Compensation Committee. Klein (2006) proves that there is a significant and

positive connection between earnings management and the fact that CEOs occupy a seat on their own compensation committee. The author claims that this can be due to sympathetic relationships between board and CEOs or that the CEO games the system and hence maximizes the compensation package.

### 4.3 Overlap of Directors

Laux and Laux (2008) argue in favor of task separation, tasks on the board should be clearly assigned to specialized committees resulting in clear and enhanced decisions. The authors state that this requires committee formation and more important depends on the overlap between these committees. In their model Laux and Laux (2008) assign the task of setting CEO pay to the compensation committee whereas monitoring is carried out by the audit committee, which per definition is a “monitoring-committee”. The authors argue that a higher task separation will result in powerful incentive compensation, since the compensation committee only designs the pay package and has no monitoring functions which induce more work on the individual directors. The audit committee will exert effort and concentrate on its monitoring functions, triggered by incentives to ameliorate monitoring (higher pay-performance sensitivities, increased possibility for earnings manipulation). Hoitash and Hoitash (2009) empirically analyze whether directors serving on both committees (leading to director overlap between the audit committee and the compensation committee) tend to modify CEO compensation in a manner that will allow them to reduce their monitoring intensity serving on the audit committee. The authors identify several structural variables with a negative relationship with committee overlap like board size and number of outsiders while at the same time there is a positive relation between committee size and dual membership. Most importantly the CEOs’ compensation package consists of less incentive pay as the fraction of overlapping directors grows (Hoitash and Hoitash, 2009). Contrary to the theoretic assumptions of Laux and Laux (2008) and the empirical findings of Hoitash and Hoitash (2009) other authors identified the overlapping variable as an ameliorator of financial reporting quality (Chandar, Chang, and Zheng, 2008). However the authors found evidence for a non-linear relationship in form of a parabola, indicating that overlapping is positive to some extent but if a certain degree of committee overlapping is exceeded it becomes unfavorable and costly. The authors argue that the positive effect of director overlapping is a result of increased communication and information exchange between the two committees (Chandar et al., 2008).

Similar to the arguments presented in the preceding sections compensation committee size is expected to have a positive association with CEO compensation.

**H-CC1:** CEO compensation is a positive function of compensation committee size.

**H-CC2:** CEO compensation is a positive function of insider representation.

**H-CC3:** CEO compensation is a positive function of the percentage of gray directors.



**H-CC4:** CEO compensation is a negative function of outsider representation.

**H-CC5:** There is a negative relationship between CEO compensation and the fraction of overlapping directors between the compensation committee and the audit committee.

**H-CC6:** CEO compensation is a negative function of compensation committee stock-ownership.

## 5 Endogeneity

After reading a myriad of theoretical and even more important empirical academic articles about the board of directors, their role and their influence on certain other variables, it becomes apparent that empirical research concerning boards of directors suffers from a multitude of obstacles, first of all the work and behavior of directors cannot be observed directly, since directors work behind closed doors hidden from the public eye. According to Adams et al. (2010) the explanatory variable "board of directors" cannot be analyzed econometrically since listed corporations are by law required to have a board of directors. The authors derive this as the reason why empirical research often focuses on structural differences across the boards e.g. board size, percentage of insiders as opposed to gray or outside directors, board independence, director busyness, that are used as proxies for behavior. Hermalin and Weisbach (2003) state that board behavior is connected to the decisions (e.g. CEO pay, hiring and firing a CEO) the board of directors makes. These structure variables are set in relation with other economic factors like CEO pay (e.g. Core et al., 1999; Petra and Dorata, 2008, firm performance (e.g. Yermack, 1996; Callahan et al., 2003, accounting fraud (e.g. Klein, 2002) and conclusions are made based on empirically tested assumptions. Adams et al. (2010) argue that the difficulty with this approach is the often cited endogeneity problem, since board structure is not likely to be exogenously determined. Hermalin and Weisbach (2003) highlight that variables like company performance or CEO turnover are the result of the directors' decision-making process and at the same time might change the board structure over time since demand for specific directors changed (e.g. low performance required more monitoring, since outsiders are believed to be better monitors, the firm might consider to replace insiders with outsiders). Adams et al. (2010) accentuate that endogeneity does not only affect empirical analysis, but also the interpretation of empirical results. The authors argue that certain variable (e.g. high proportion of insiders, large boards) must not a priori be interpreted as weak corporate governance. As already pointed out different companies seem to require different boards, there is no solution that fits all and there is a reason for it, which is not a sign of failure in corporate governance practice. Some authors (e.g. Klein, 2002; Coles et al., 2006) have also picked up this idea and interpret their results, which might differ from previous work on board of directors, in a more detailed analysis instead of blaming bad corporate governance. Coles et al. (2006) argue that board size differs with firm requirements, concluding that small and simple companies require small boards whereas for big and complex firms the opposite is true. Even suboptimal solutions are not a priori bad decisions, since every firm faces different decisions and has its constraints and can in fact be an optimal solution for this particular company at this specific moment (Adams et al., 2010). Furthermore

the authors point out what role heterogeneity plays a role in a company's optimization problem - since models are influenced by exogenous factors, a variation in those factors leads to different solutions. Hermalin and Weisbach (2003) highlight yet another problem of empirical research concerning corporate governance and board of directors variables, they differentiate two approaches of interpreting results prevailing in academic literature. According to their work (2003) there is a possibility to interpret a result as the equilibrium solution and on the other hand one can interpret a result out-of-equilibrium.

Consider this example in the spirit of Hermalin and Weisbach (2003): One finds a negative and statistically significant coefficient between the percentage of insiders on the board of directors and the pay-for-performance sensitivity of CEO compensation. One could argue the higher the percentage of insiders, the lower are pay-performance sensitivities, and hence insiders should be banned from the board. This interpretation suffers from several weaknesses first, it does not account for any other factors than insiders as an influential force, secondly it is proven that insiders occupy an important role as advisors and decision-makers within the board (Baysinger and Hoskisson, 1990; Duchin et al., 2010). The second possibility of interpreting this result would be that there are other variables that influence the presence of insiders on the board as well as CEO compensation, e.g. company performance, CEO performance in the last fiscal year.

There are several approaches that mitigate the problems arising with endogeneity. First one can use fixed effects models based on panel data. Conyon and Peck (1998) analyzed a sample of 94 companies over four periods accounting for misspecified variables or unobserved variables by using a fixed effects model. Also one could try to account for endogeneity like Jiraporn et al. (2009), first the authors conducted the Hausmann Test for endogeneity checks and then used a 2SLS approach in order to correct occurring obstacles.

## 6 Data and Empirical Approach

### 6.1 Data Description

The final sample is based on a data set which in the beginning consisted of 400 cases (companies). From this sample only those cases that met following requirements were chosen:

1. Board of directors variables are available in the proxy statement (DEF 14A) of 2007, showing the structure variables from the fiscal year 2006.
2. Board of director variables, particularly the relationship to the company (e.g. insider, outsider and gray directors) are verifiable by means of external sources.
3. CEO Compensation Data, lagged for one year, is available and shown in the proxy statement of 2008.
4. Company Data (e.g. sales, net income) are available in the proxy statement of 2007.
5. The CEO in the fiscal year 2006 was the same in 2007, in order to see how the compensation changed, which would not be possible if the CEO retired in the meanwhile.

In the end a dataset of 106 valid cases was created and analyzed. The sample is made up of firms of different sizes and industries. The median company represented in the dataset has total revenues of 539 903 000 in 2006 USD. Data was gathered from proxy statements (2007) published by the SEC (Securities and Exchange Commission) with the aid of EDGAR (Electronic Data Gathering, Analyzing, and Retrieving), a database that began collecting relevant data for investors in 1984. Board of directors variables were collected from proxy statements of 2007, the period of interest was 2006. These findings were compared with two external sources (Bloomberg Businessweek and Forbes) in order to correctly classify companies whose directors were former employees, which are classified as outsiders in proxy statements if their employment status ended three years before. A case was found where the former CEO with tenure of 20 years was classified as an outsider, cases like this cannot be regarded as independent and hence this director has to be classified as an insider instead.

### 6.2 Variables

In this section all relevant variables will be presented, beginning with variables concerning the CEO, then firm size will be considered as a control variable whereas in the final step

the board of director variables as well as subcommittee variables will be described. Each of the variables will be used in the descriptive analysis following in the next section as well as in the correlation analysis, where decisions about variables important for the final model will be made, leading subsequently to the exclusion of some of the following variables.

### **CEO Variables**

**CEO CC** This dual variable takes the value of 1 if the CEO occupies a seat on the company's compensation committee, and equals 0 if this is not the case.

**CEO Chair** The variable CEO chair takes the value 1 if the CEO is the chairman of the board, otherwise the value is 0.

**CEO Stock** This variable represents the percentage of the CEO's ownership of the company's stock.

**CEO Age** CEO Age is a traditional human capital variable (Conyon and Murphy, 2000) and measures the CEOs age in years.

**Tenure** Tenure is often used as a proxy for the CEO's influence over the board of directors (e.g. Hill and Phan, 1991). This variable represents the amount of years a person serves as CEO.

**Compensation** There are several measures of CEO compensation that are relevant for analysis, like salary and bonus which together represent the short term compensation and on the other hand there is the fraction of long term compensation. Short term compensation and long term compensation are added up and indicate the level of total CEO compensation. Compensation data are lagged one year in order to analyze the effect of board variables on CEO compensation; this is standard procedure in academic research (Daily et al., 1998). Moreover a log transformation will be performed on each of the compensation variables, since skewed distributions distort statistical results by inducing heteroskedasticity (Daily et al., 1998).

**Gender** This variable indicates if the CEO is male (0) or female (1).

**Education** A CEO's education status is measured as whether (1) or not (0) a person has a bachelors, masters, MBA, PHD, or another degree. Education is an important variable as it represents the CEOs human capital. Belliveau, O'Reilly, and Wade (1996) hypothesize that as human capital education also reflects social capital which has an influence on CEO compensation.

**Company Variables** The following variables will be included in order to control for company size and company performance.

**Company Size** The following variables will be included in order to control for company size and company performance.

**Company Size (0,1)** This nominal variable is based on total revenues, it will take the value one if the company has over median revenues and zero if total revenues is below median.

**Company Performance** As a measure of company performance the return on assets will be included in the analysis defined as the ratio of net income and total assets will serve as a company performance measure.

**Board of Directors Variables** There is a multitude of board of directors variables that is used as a proxy for corporate governance and hence represents the monitoring power of a board and influence CEO compensation.

**Board** Board size indicates the amount of directors serving on the board in absolute terms.

**Insiders, Gray Directors and Outsiders** For robustness checks two slightly different definitions (Core et al., 1999; Bertrand and Mullainathan, 2001) are used to categorize directors into the three categories: insiders, gray directors, and outsiders.

1. Core, Holthausen, and Larcker (1999):
  - a) A director is considered to be an insider if he is or in the past was employed as an officer by the company.
  - b) In contrast, a gray director is a relative of an officer or someone who has a substantial business relationship with the firm other than regular business.
2. Bertrand and Mullainathan (2001):
  - a) Insiders are executives, former executives and family members of present or past executives.
  - b) A director is considered to be gray if he or his employer received payments other than director fees e.g. lawyers, consultants.

**Insiders** Insiders are measured as the percentage of insiders serving on the board of directors.

**Gray Directors** The variable gray directors measures the percentage of gray directors on the company board.

**Outsiders** Outsiders are measured as the fraction of directors which are neither gray nor insiders and, hence can be classified as independent company outsiders.

**Independent Board** The variable independent board is a nominal variable taking the value of 1 if the board consists of more than 50% outsiders and 0 otherwise. This variable was used by Shivdasani and Yermack (1999), the authors argue that their indicator variable will lead to significant results rather than the original variable measuring the percentage of outsiders.

**Old Outsiders** Following general academic practice (e.g. Core et al., 1999) outsiders serving on the board of directors are defined to be old, when they are older than 69.

**Busy Outsiders** In the spirit of Core et al. (1999) a director will be classified as busy if he or she serves on three or more boards. When considering retired directors - if six or more board seats are held accordingly.

**Busy Board** Following the approach of Fich and Shivdasani (2006) this variable examines the board as a whole and takes the value of 1 if the board consists of a majority of busy outsiders, otherwise the value is 0.

**Outsiders Appointed by CEO** Another variable is the percentage of outsiders appointed by the company's CEO, which is defined as the percentage of outsiders appointed after the CEO stepped in office.

**Audit Committee Size** This variable represents the number of directors serving on the audit committee.

**AC Insiders** Insiders serving on the audit committee are defined as the percentage of directors serving on the audit committee who are considered insiders.

**AC Gray** Gray directors serving on the audit committee are defined as the percentage of directors serving on the audit committee who are considered gray.

**AC Outsiders** Outsiders serving on the audit committee are defined as the percentage of directors serving on the audit committee who are considered outsiders.

**Compensation Committee Size** This variable is measured as the number of directors serving on the compensation committee.

**CC Insiders** Insiders serving on the compensation committee are measured as the fraction of directors serving on the audit committee who are considered insiders.

**CC Gray Directors** Gray directors serving on the compensation committee are measured as the fraction of directors serving on the audit committee who are considered affiliated.

**CC Outsiders** Outsiders, directors serving on the compensation committee are measured as the fraction of directors serving on the audit committee who are considered outsiders.

**CC Stock** The variable CC stock represents the total percentage of stock ownership of company stock held by directors serving on the compensation committee as a group.

**Overlapping Variable AC - CC** The overlapping of directors serving on the audit and compensation committee is believed to decrease monitoring and pay-setting efficiency (Laux and Laux, 2008). This variable measures the amount of directors who serve on both the audit and the compensation committee.

<i>In 1000 USD 2006</i>	Minimum	Maximum	Average	Median	SD
Total Assets	7560	48368000	4498886.12	997034	9149349.77
Total Revenues	0	39620000	2871277.9	539903	6292061.45
R&D Expenses (36 companies)	64	5873000	407246.56	34960	1094338.93
EBIT	-2949000	23381000	505804.4	66215	2400243.92
EBITDA	-2419000	24233000	656186.41	97410	2639336.6
Net Income	-3577000	22866000	411725	49191	2323372.14
Number of Employees	8	140000	8433	1550	18923.967

Table 6.1: Company Characteristics

**Fraction of CC in AC** This variable represents the fraction of directors who serve at the company's compensation committee and audit committee in terms of audit committee members (Laux and Laux, 2008).

### 6.3 Data Analysis and Results

In this paragraph analysis of the gathered data is conducted which is then followed by description and interpretation of the results. The first section covers descriptive statistics about the company as whole, CEO characteristics concerning gender and education, then CEO age, tenure as well as compensation figures are presented. The following subsection deals with descriptive analysis of the board of directors and its subcommittees. Within the section on correlation analysis and variable selection correlation analysis about the CEO and certain company variables will be conducted first, followed by an analysis of the board of directors as well as the audit and compensation committee. At last the multiple regression analysis is presented. After introducing the final model concerning the board of directors the two corresponding models covering the audit and the compensation committee are illustrated.

All of the empirical analyses were conducted for insider, outsider and gray directors both in accordance with previously mentioned definitions as well as following the notion and definitions used in the research work of Core et al. (1999) - for which results are presented herein. The results according to the definition of Bertrand and Mullainathan (2001) are very similar and are presented in the Appendix (7).

#### 6.3.1 Descriptive Statistics

##### Distributions - Minimums, Maximums, Means and Medians

**Company Characteristics** The average (median) Company generated total revenues of 2871277900 \$ (539903000\$) in the year 2006. The average (median) EBIT represents



505804400\$ (66215000\$) and the net income 411725000 \$ (49191000\$). The average (median) company owns total assets worth 4498886120 (997034000\$) and employs 8433 (1550) employees in 2006. 49.5% of the company have less than median total assets and will be classified small companies, whereas 50.5% of the sample consists of large companies. (Table 6.1).

**CEO Characteristics** Nearly all CEOs in the sample are male, representing 96% of CEOs. The youngest CEO in the sample is 35 years old, the oldest is 84 with an average (median) equal to 54.59 (54) years. The time span of being in office reaches from 0 years to 27 years, however the average (median) CEO is in office for 7.55 (7) years. These results are comparable to the sample of Shivdasani and Yermack (1999) where the average CEO serves for more than eight years. The following percentages describe the educational status of the CEOs; only those where information was available are considered in the calculations above (table 6.2). The bachelors degree seems to be the most desired one with 78.9% of the CEOs having succeeded obtaining one, 24.6% decided for a masters, whereas 32.4% preferred a MBA and only 17.6% finished a PhD program. Only 0.9% of the CEOs occupy a seat on their board's compensation committee, whereas 47.7% are chairmen of the board. In the study of Shivdasani and Yermack (1999) a much bigger proportion of CEOs held the title of chairman of the board (84%). The declining number of combined titles could result from stricter corporate governance guidelines as well as from pressure by shareholder activists and institutional investors. However this represents a very large fraction of combined titles, generally corporate governance guidelines are in favor of separated titles. These regulations obviously seem to have little impact in the real business world. The observed situation is conflicting with recommendations from academic literature since most of the authors argue for separating the roles of chairman of the board and CEO for different reasons e.g. ameliorating corporate governance (Core et al., 1999), alleviation of agency conflicts (Palmon and Wald, 2002) and solving personal and professional conflicts of interest (Conyon and Peck, 1998). A decision in favor of combined titles would only be feasible if representing an intrinsic motivator (Davis et al., 1997) and if higher pay-for-performance sensitivities are achieved (Petra and Dorata, 2008). In contrast it seems exceptional that a CEO is member of his own compensation committee, guidelines regarding this situation are strict and only one of the CEOs in the sample occupies a seat on the compensation committee.

**CEO Compensation** The CEO compensation function consists of various compensation elements, like salary and bonus and other short-term compensation which together constitute the fraction of the short-term oriented part of the CEOs' compensation. The rest of the compensation package represents long-term oriented remuneration. Total compensation is defined as the sum of short-term and long term compensation. There are many possible ways of designing CEO compensation as observable in table 6.3. The lowest salary

	Male, no	Female, yes
Gender	96%	4%
Bachelors	21.1%	78.9%
Masters	75.4%	24.6%
MBA	67.6%	32.4%
PhD	82.4%	17.6%
Others	92.6%	7.4%
CEO_CC	99.1%	0.9%
CEO_Chair	52.3%	47.7%

Table 6.2: CEO characteristics

	Minimum	Maximum	Average	Median	SD
Age	35	84	54.59	54	8.467
Tenure (2007)	0	27	7.55	7	5.844
Salary	1	5323367	649413.96	520385	541695.838
Bonus	1000	18500000	895220.61	250219	2895363.31
Other Short-Term Compensation	88953	1069641	623153.67	710867	496192.966
Total_Short-Term Compensation	1899	23800000	1009695.64	667000	2313387.95
Long-Term Compensation	0	25372500	3144802.84	1260101	4535176.98
Total Compensation	154616	36800000	4154498.48	2077405	5783799.49
CEO Stock	0	0.797	0.069575	0.023	0.1292582

Table 6.3: CEO compensation

is 1\$ paid by Google, the maximum is as much as 5323367\$ for CBS' CEO Leslie Moonves, the average (median) however is 649414 \$ (520385 \$). The distribution of bonus payments usually paid at the end of a fiscal year as a reward for special achievements within the covered period is more skewed with an average of 895221 \$ compared to a median of 250219 \$. The average (median) CEO earns 1009696 \$ (667000 \$) in short-term compensation. Concerning long-term incentive payments there even is one CEO that doesn't receive any long-term payments whatsoever, a very uncommon situation. The average (median) CEO receives 3144803 \$ (1260101 \$) of his compensation in form of long-term incentive payments. Total compensation reaches from 154616\$ (minimum) to 36800000 \$ (maximum) with the average at 4154498 \$ and the median is 2077405 \$ (Table 6.3).

**Board Characteristics** The average board consists of 8.64 board members with the smallest board in the sample consisting of 4 directors and the largest of 15. 28.08% of these members are considered insiders, 4.57% are gray directors and 62.47% represent the fraction of outsiders and hence considered independent directors serving on the average board. These results seem consistent with the findings of Core et al. (1999) who report 33% insiders, 7% gray and 3% interlocked and 60% independent directors; and Fich and Shivdasani (2006) (approximately 45% insiders and gray, 55% outsiders). Corporate governance developments seem to have an impact since the fraction of insiders decreased

	Minimum	Maximum	Average	Median	SD
Board size	4	15	8.64	8	2.2995
Percentage of Insiders	7.69	71.43	28.08	28.57	0.1369
Percentage of Gray directors	0	54.54	4.57	0	0.0976
Percentage of Outsiders	9.09	92.31	62.47	63.64	0.1632
Percentage of Busy outsiders	0	92.31	37.69	40	0.2115
Percentage of Old outsiders	0	42.86	7.92	0	0.09797
Percentage of Outsiders CEO appointed	0	92.31	44.85	44.44	0.234

Table 6.4: Board Characteristics

compared to earlier results. As already discussed outsiders could fall in one of the following categories: old outsiders (7.92%), busy outsiders (37.69%) and outsiders appointed by the CEO (44.85%). A majority (76%) of the boards can be classified as independent, according to Shivdasani and Yermack (1999) a board is independent when more than 50% of the directors are outsiders. It is quite the opposite when looking at board busyness, only 23% of the boards in the sample are busy meaning that more than 50% of the outsiders serving on the board are classified as busy - Fich and Shivdasani (2006) use this approach and refer to this variable as “the busy board indicator” and show a similar result of 21.42%. Although a large fraction of the samples outsiders are busy they seem to be well distributed within the various companies.

As discussed earlier (section 3.1.1) most of the authors (e.g. Core et al., 1999; Hermalin and Weisbach, 2003; Yermack, 1996) propose small boards due to their efficiency. One study that identifies the weaknesses of large boards, but when possible recommend the usage of subcommittees to set-off negative effects (Reeb and Upadhyay, 2010). Only a small number of authors argues in favor of large boards resulting in better monitoring in form of the audit committee (Klein, 2002) or to satisfy advising needs of complex companies (Coles et al., 2006). As obvious from Table 6.4 there are some extremely large boards, but they are the exception; a median of 8 members represents a plausible number of directors for the size of the companies observed. The fraction of old outsiders is very small and since earlier studies failed to identify an effect on either performance or CEO compensation it is doubtful that they will have an effect regarding further analysis. However busyness might well become an issue since a considerable amount of directors is busy and even a quarter of all boards is classified as busy. While institutional and private investors are worried about busy directors serving on their company’s board academic literature is ambivalent concerning that question. On the one side busyness is seen as a quality attribute (e.g. Fama and Jensen, 1983; Jiraporn et al., 2009) others interpret it as a weakness (e.g. Core et al., 1999). Nearly half of the outsiders are CEO appointed which is generally criticized by academics (e.g. Core et al., 1999), arguing that the insiders are CEO appointed as well nearly the whole board is CEO appointed and might suffer from CEO entrenchment (Table 6.4).

	Minimum	Maximum	Average	Median	SD
Audit Committee Size	2	6	3.63	3	0.927
Percentage of Insiders	0	66.67	5.14	0	0.127
Percentage of Gray directors	0	50	3	0	0.0971
Percentage of Outsiders	16.67	100	87.09	100	0.1849

Table 6.5: Audit Committee Characteristics

**Committee Characteristics** The following section shows the results of the descriptive statistics concerning committees.

**Audit Committee Characteristics** There is much less variation in audit committee size than there is in general board size, the smallest committee is constituted by 2 directors while the biggest sub-board is made up by 6 directors, the median committee consists of 3 members. One can identify a very different pattern concerning the presence of insiders and gray directors on the audit committee as opposed to the board as a whole. Only 5.14% of these subcommittee directors are considered insiders and 3.00% are gray directors, adding up to 8.14% of directors fitting the classification of being dependent compared to the over 30% of insiders and gray directors on the whole board. The median is zero insiders and gray directors and 100% outsiders. Thus 87.09% of the audit committee's directors represent outsiders. Klein (2002) reports similar results with a proportion of 79.6% being outsiders, 1.4% being insiders and 19% being affiliated directors. The big difference between the affiliates in Klein's study and the present results concerning gray directors is explained by the different definitions chosen and hence the smaller fraction of insiders in Klein (2002)'s sample. However the total of dependent directors in Klein (2002) accounts for 20% of the directors - in contrast only 8.14% of the directors on average have ties to the company, which results from the rigorous changes in corporate governance regulation, namely the commencement of SOX 2002. As discussed earlier (section 4.1) the audit committee has to be composed of independent directors, which excludes insiders and gray directors. Exceptions to this rule are possible, surprisingly there are some boards where insiders represent 66.67% of the board - which clearly is not supportive of this rule. Overall most companies acknowledge the independence regulation since on average only 5.14% of the audit committee members are insiders and a slightly larger fraction is considered gray. Half of the sample shows no insiders or gray directors on the audit committee in accordance to general corporate governance regulations (Table 6.5).

**Compensation Committee Characteristics** The structure of the compensation committee leaves a similar impression to the one of the audit committee, the committee size reaching from 2 directors on the smallest committee up to 8 directors on the largest committee. However note that a compensation committee size of 8 directors is very big and unusual as the median committee has 3 appointed directors. On average 5.57% of the

	Minimum	Maximum	Average	Median	SD
Compensation Committee Size	2	8	3.56	3	1.074
Percentage of Insiders	0	66.67	5.57	0	0.1373
Percentage of Gray directors	0	66.67	5.14	0	0.1452
Percentage of Outsiders	0	100	85.53	100	21.44
Overlapping CC/AC	0	100	49.77	50	0.3199
CC Stock in Percent	0	25	1.82	0.3	0.0443

Table 6.6: Compensation Committee Characteristics

directors are insiders, 5.14% are gray and 85.53% are outsiders while the median structure shows no insiders and gray directors but 100% outsiders. On average there is a director overlap of almost 50% between the audit and the compensation committee. The members of the compensation committee on average (median) hold 1.82% (0.30%) of company stock. As for audit committees the regulations concerning insiders and affiliated directors on compensation committees is rather strict, they allow for non-independent directors exceptionally. The impression the data makes is much the same with the only difference of slightly fewer insiders on the committee but at the same time with a slightly higher proportion of gray directors. Here also half of the companies are in full compliance with regulated corporate governance standards. A massive director overlap between the audit committee and the compensation committee can be however identified - a fact unfavorable according to certain academics (Laux and Laux, 2008; Hoitash and Hoitash, 2009) (Table 6.6).

### Correlation and Variable Selection

In the following, correlation analysis is presented in order to provide an overview of the main variables and their interdependencies. The analysis is structured as follows, first the board of directors as a whole is discussed, then the two subcommittees namely the audit committee and the compensation committee are covered. Furthermore, the selection process of the variables included in the final model is described.

**Correlation Analysis - CEO Characteristics and Firm Variables** Surprisingly there are no significant results when analyzing the correlation of compensation variables and the occurrence of combined titles. The variable measuring CEO tenure correlates with age, combined titles and CEO stock. This is not surprising, since the longer a CEO's tenure, the older he is most probably. CEOs with longer tenure tend to occupy the position of chairman of the board more often than CEOs who are new to the company and in addition it seems that the longer a CEO serves, the more company stock is held. Tenure shows negative coefficients across all fractions of the CEO compensation package, long-term compensation ( $r = -0.261$ ,  $p < 0.01$ ) and total compensation ( $r = -0.305$ ,  $p < 0.01$ ) showing significant results. If tenure brings forward managerial entrenchment and hence

		CEO_chair	CEO_stock	Age	Tenure	Fem	Company Size	Company Size (0,1)	Company performance	log_salary	log_st	log_lt
CEO_stock	corr.	.301 **										
	sig.	0.002										
Age	corr.	0.084	-0.044									
	sig.	0.388	0.654									
Tenure	corr.	.260 **	.346 **	0.169								
	sig.	0.007	0	0.082								
Fem	corr.	-0.045	-0.07	-0.073	-0.045							
	sig.	0.659	0.488	0.47	0.658							
Company Size	corr.	-0.115	-.267 **	0.077	-0.18	-0.039						
	sig.	0.242	0.006	0.435	0.065	0.701						
Company Size (0,1)	corr.	0.01	-.249 **	0.098	-0.179	-0.176	.671 **					
	sig.	0.92	0.01	0.315	0.065	0.08	0					
Company performance	corr.	-.070	-.079	-0.017	.001	-.038	.501 **	.194				
	sig.	.474	0.420	0.865	0.993	.709	.000	.045				
log_salary	corr.	-0.089	-0.106	0.105	-0.059	0.021	0.127	0.098	.016			
	sig.	0.361	0.275	0.282	0.549	0.838	0.193	0.317	.873			
log_st	corr.	-0.106	-0.177	0.119	-0.13	-0.015	.330 **	.262 **	.049	.831 **		
	sig.	0.279	0.068	0.221	0.181	0.88	0.001	0.006	.614	0		
log_lt	corr.	-0.04	-.308 **	0.105	-.261 **	-0.018	.648 **	.499 **	.167	.335 **	.387 **	
	sig.	0.686	0.001	0.284	0.007	0.861	0	0	.088	0	0	
log_T_C	corr.	-0.053	-.335 **	0.095	-.305 **	-0.026	.684 **	.548 **	.154	.454 **	.629 **	.885 **
	sig.	0.591	0	0.332	0.001	0.798	0	0	.114	0	0	0

\*\*,\* Significant at the 0.01, 0.05, levels, respectively

Table 6.7: CEO characteristics and Company variables

weakens corporate governance one would expect CEO compensation to rise in salary and drop in performance based compensation measures. The negative coefficients of long-term compensation imply such a relationship, however the coefficients, although insignificant, are negative for the other compensation measures as well. CEO stock, which measures the percentage of CEO stockholding of company shares, shows negative coefficients over all compensation measures, whereas the relation with short-term ( $r = -0.177$ ,  $p < 0.1$ ) and long-term compensation ( $r = -0.308$ ,  $p < 0.01$ ) as well as with total compensation ( $r = -0.335$ ,  $p < 0.001$ ) are significant. CEO age correlates with tenure ( $r = -0.169$ ,  $p < 0.1$ ) but no other significant coefficients can be found. The variable indicating the CEOs gender cannot be interpreted because the amount of women in the sample is far too small to show significant and meaningful results. Like expected the variable total revenues shows positive, significant and very strong correlations with all the CEO compensation measures except for salary. The strongest effects are revealed when considering long-term compensation log\_lt ( $r = 0.648$ ,  $p < 0.1$ ) and total compensation ( $r = 0.684$ ,  $p < 0.01$ ), short-term compensation ( $r = 0.330$ ,  $p < 0.01$ ) is less interdependent. These results seem plausible since CEOs often are evaluated and remunerated based on firm performance. The variable company size (0,1), which is a nominal variable based on total revenues grouping the companies in two categories (small, large), shows very similar but not as strong results (Table 6.7).

**Correlation Analysis - Board of Directors** Like expected the variable board size correlates positively with all components of the CEO compensation package, the results for short-term ( $r = 0.331$ ,  $p < 0.01$ ), long-term ( $r = 0.545$ ,  $p < 0.01$ ) and total compensation ( $r = 0.605$ ,  $p < 0.01$ ) being significant. The strongest effects can be identified for long-

term and total compensation. This suggests that the influence on variable compensation is very strong, opposed to fixed compensation where there is no significance ( $r = 0.154$ ,  $p = 0.11$ ). The variable measuring the percentage of insiders on the company board indicates negative and significant correlations for all compensation elements; the results for long-term compensation ( $r = -0.443$ ,  $p < 0.01$ ) and total compensation ( $r = -0.383$ ,  $p < 0.01$ ) is stronger than for salary ( $r = -0.165$ ,  $p < 0.1$ ) and short-term compensation ( $r = -0.178$ ,  $p < 0.1$ ). The fraction of gray directors correlates positively and significantly with short-term compensation ( $r = 0.195$ ,  $p < 0.05$ ); the variable, however insignificant, shows positive coefficients across the other compensation variables. Outsiders show positive and significant coefficients with long-term compensation ( $r = 0.285$ ,  $p < 0.01$ ) as well as with total compensation ( $r = 0.274$ ,  $p < 0.01$ ) and, however the positive coefficient with salary and short-term compensation are insignificant.

These findings imply that outsiders are effective actors on a company board since they seem to have a positive effect on pay-for-performance which in turn might be due to their concern to tie company success to CEO wealth by increasing performance based compensation. Additionally the fraction of outsiders correlates strongly and positively with other dependent variables, all of which are outsider based measures like old outsiders, outsiders that are appointed by the CEO and busy outsiders. The variable independent board shows similar but weaker results than the percentage of outsiders. There is no significant relation between old outsiders and the CEO compensation package. The variable busy outsiders shows a positive and significant correlation with board size, it seems that the bigger a board gets, the more busy outsiders occupy a seat on the board. It seems to be hard for a board to find many outsiders that are not busy. The coefficient with insiders is very strong and negative, which indicates that insiders and busy outsiders might represent substitutes for each other. The more busy outsiders there are on a board the fewer insiders are represented on this board and vice versa.

Busy outsiders - the fraction of outsiders considered busy, correlate positively and significantly with all compensation measures. Again the results for long-term compensation ( $r = 0.422$ ,  $p < 0.01$ ) and total compensation ( $r = 0.404$ ,  $p < 0.01$ ) prove to be stronger than for salary ( $r = 0.172$ ,  $p < 0.1$ ) and short-term compensation ( $r = 0.187$ ,  $p < 0.1$ ). The variable busy board shows similar but less qualitative results than the variable busy board. Outsiders appointed by the CEO show no significant or meaningful relation to any of the compensation measures (Table 6.8).

		boardsize	in	gray	out	ind_board	old_out	busy_out	busy_board	out_ceo	log_salary	log_st	log_lt
in	corr.	-.231 *											
	sig.	0.017											
gray	corr.	0.029	-0.138										
	sig.	0.768	0.156										
out	corr.	0.155	-.676 **	-.436 **									
	sig.	0.111	0	0									
ind_board	corr.	0.036	-.418 **	-.444 **	.749 **								
	sig.	0.714	0	0	0								
old_out	corr.	0.072	0.053	-0.109	0.036	0.076							
	sig.	0.461	0.59	0.263	0.712	0.437							
busy_out	corr.	.318 **	-.521 **	-0.141	.581 **	.404 **	-.217 *						
	sig.	0.001	0	0.148	0	0	0.025						
busyboard	corr.	.259 **	-.345 **	-0.115	.456 **	.313 **	-0.094	.746 **					
	sig.	0.007	0	0.236	0	0.001	0.338	0					
out ceo	corr.	-0.137	-.5 **	-0.135	.418 **	.287 **	-0.011	0.149	0.147				
	sig.	0.159	0.002	0.167	0	0.003	0.911	0.125	0.13				
log_salary	corr.	0.154	-.165 *	0.03	0.101	-0.04	0.076	.172 *	0.151	-0.021			
	sig.	0.114	0.09	0.759	0.301	0.685	0.438	0.077	0.121	0.829			
log_st	corr.	.331 **	-0.178	.195 *	0.054	-0.068	0.014	.187 *	0.139	-0.037	.831 **		
	sig.	0.001	0.067	0.044	0.583	0.487	0.889	0.054	0.154	0.702	0		
log_lt	corr.	.545 **	-.443 **	0.103	.285 **	0.153	-0.041	.422 **	.274 **	-0.086	.335 **	.387 **	
	sig.	0	0	0.291	0.003	0.118	0.679	0	0.004	0.381	0	0	
log_T_C	corr.	.605 **	-.383 **	0.118	.274 **	0.113	-0.001	.404 **	.326 **	-0.1	.454 **	.629 **	.885 **
	sig.	0	0	0.226	0.004	0.246	0.992	0	0.001	0.308	0	0	0

\*\*,\* Significant at the 0.01, 0.05, levels, respectively

Table 6.8: Board analysis



		ac_size	in_ac	gray_ac	out_ac	log_salary	log_st	log_lt
in_ac	corr.	0.165						
	sig.	0.09						
gray_ac	corr.	-0.063	0.023					
	sig.	0.517	0.815					
out_ac	corr.	-0.049	-.593 **	-.423 **				
	sig.	0.613	0	0				
log_salary	corr.	.231 *	-.220 *	0.077	0.09			
	sig.	0.017	0.023	0.43	0.355			
log_st	corr.	.258 **	-0.121	.254 **	-0.036	.831 **		
	sig.	0.007	0.214	0.008	0.713	0		
log_lt	corr.	.505 **	0.021	0.048	-0.043	.335 **	.387 **	
	sig.	0	0.832	0.625	0.662	0	0	
log_T_C	corr.	.544 **	0.018	0.08	-0.024	.454 **	.629 **	.885 **
	sig.	0	0.854	0.414	0.803	0	0	0

\*\*,\* Significant at the 0.01, 0.05, levels, respectively

Table 6.9: Audit Committee Analysis

**Correlation Analysis - Committees** In this section the correlation analysis for the audit committee and the compensation committee will be presented.

**Correlation Analysis - Audit Committee** The variable measuring audit committee size reveals significant, high and positive coefficients for salary ( $r = 0.231$ ,  $p < 0.05$ ), short-term compensation (bonus payments and other short-term compensation) ( $r = 0.258$ ,  $p < 0.01$ ) as well as with long-term compensation ( $r = 0.505$ ,  $p < 0.01$ ) and total compensation ( $r = 0.544$ ,  $p < 0.01$ ). The results are similar to the results from the board analysis (table 6.8), where size had a positive effect on CEO compensation. The fraction of insiders on the audit committee is negatively and significantly related to the fixed part of CEO compensation ( $r = 0.220$ ,  $p < 0.05$ ). Short-term compensation shows a negative but insignificant coefficient, long-term compensation and total compensation show a very weak and positive but not significant relation. The percentage of gray directors serving on the audit committee correlates positively with all compensation measures, though only short-term compensation ( $r = 0.254$ ,  $p < 0.01$ ) shows significant results. The variable outsiders shows a negative but insignificant correlation over all parts of the compensation package. The correlation analysis reveals that the independent variables are significantly correlated with each other (Table 6.9).

**Correlation Analysis - Compensation Committee** Similarly to the previous section concerning the audit committee, compensation committee size is positively correlated with all components of CEO compensation, whereas long-term compensation ( $r = 0.03$ ,  $p < 0.01$ ) and total compensation ( $r = 0.421$ ,  $p < 0.01$ ) show the strongest connection followed by short-term compensation ( $r = 0.240$ ,  $p < 0.05$ ) and salary ( $r = 0.169$ ,  $p < 0.1$ ).

		cc_size	in_cc	gray_cc	out_cc	overlapping	fraction cc/ac	CC_stock	log_salary	log_st	log_lt
in_cc	corr.	-0.014									
	sig.	0.885									
gray_cc	corr.	0.023	-0.017								
	sig.	0.813	0.86								
out_cc	corr.	0.006	-.597 **	-.446 **							
	sig.	0.953	0	0							
overlapping	corr.	.312 **	-0.047	0.054	0.012						
	sig.	0.001	0.628	0.582	0.902						
fraction cc/ac	corr.	-0.155	-0.066	0.012	0.025	.851**					
	sig.	0.112	0.5	0.905	0.795	0					
CC_stock	corr.	0.052	-0.031	.280 **	-0.146	.217 *	0.163				
	sig.	0.597	0.755	0.003	0.134	0.025	0.094				
log_salary	corr.	0.169	-0.011	0.06	-0.022	0.072	0.016	-0.107			
	sig.	0.083	0.912	0.536	0.825	0.46	0.87	0.273			
log_st	corr.	.240*	0.009	0.066	0.02	0.071	-0.025	-0.161	.831 **		
	sig.	0.013	0.926	0.499	0.841	0.468	0.8	0.098	0		
log_lt	corr.	.403**	0.05	0.07	-0.024	-0.183	-.420 **	-0.156	.335 *	.387 **	
	sig.	0	0.611	0.477	0.807	0.06	0	0.11	0	0	
log_T_C	corr.	.421 **	0.07	0.037	0.01	-0.13	-.334 **	-.218 *	.454 **	.629 **	.885 **
	sig.	0	0.476	0.702	0.916	0.181	0	0.024	0	0	0

\*\*,\* Significant at the 0.01, 0.05, levels, respectively

Table 6.10: Compensation Committee Analysis

The fraction of insiders shows positive coefficients except for the fixed part of remuneration, all of them lacking significance. Gray directors have a positive but insignificant association with all components of CEO compensation. The findings for the percentage of outsiders are inconclusive and not significant. The variable measuring the director overlap between audit committee and compensation committee shows one significant and negative coefficient with long-term compensation ( $r = -0.183$ ,  $p < 0.1$ ). The same is true for the variable measuring the overlap in terms of audit committee members ( $r = -0.420$ ,  $p < 0.01$ ); in addition this variable shows a negative and significant association with total CEO compensation ( $r = -0.334$ ,  $p < 0.01$ ). The percentage of stock held by compensation committee members shows a significant and negative correlation with short-term compensation ( $r = -0.161$ ,  $p < 0.1$ ) as well as with total compensation ( $r = -0.218$ ,  $p < 0.01$ ). As before the explanatory variables are correlated (Table 6.10).

**Variable Selection** Overall, the independent variables exhibit strong correlations among each other resulting in potential multicollinearity. Furthermore, some variables have a large number of missing values that would drastically reduce the sample size of the final models. For other variables, such as gender, the distribution does not allow to make reliable interpretation - this variable will be considered however in further analysis for completeness. In order to select the most appropriate variables, correlation, number of missings and their distribution were considered. Furthermore, regression analyses and multicollinearity measures (variance inflation factors) have been calculated in order to identify potentially problematic variables and to choose between conflicting variables.

The variable indicating if the CEO is a member of the compensation committee will not be considered in any of the following analysis and was left out of the correlation analysis as well since there is just one case where the CEO was part of the compensation committee and meaningful results are impossible to obtain.

Next variables of concern are educational are educational variables represented in the section discussing descriptive analysis (table 6.2) namely bachelors, Masters, MBA, PhD and others. These variables suffer from a large number of missing values which will minimize the sample for the final analysis dramatically, hence these variables will not be considered in the final regression model. The next few variables are considered potential threats for the final model since they are correlated highly with each other and might induce avoidable multicollinearity. The variable company size (0,1) is excluded from further analysis since the results equal those of the variable log revenues with slightly weaker correlations, further the two variables correlate highly ( $r = 0.671$ ,  $p < 0.01$ ) which might lead to unnecessary multicollinearity and distort the results of the final model.

The variable independent board shows similar but weaker results than the variable measuring the percentage of outsider on the board having a VIF (variance inflation factor) of about 2.5 over all regression analysis, especially regarding the association with compensation variables and is therefore not considered in further analysis. Again the two variables correlate highly ( $r = 0.749$ ,  $p < 0.01$ ). The decision regarding the variable busy board ( $VIF = 2.5$ ), that shows similar but weaker results than busy outsiders is analogous to the variables independent board and firm size, busy board will not be accounted for in following analysis due to high correlation ( $r = 0.746$ ,  $p < 0.01$ ) with and weaker results than the variable busy outsiders.

Due to the high correlation between the two variables overlapping and fraction cc/ac ( $r = 0.851$ ,  $p < 0.01$ ) and the similar findings, whereas the later shows stronger results and additionally correlates with total compensation, thus variable overlapping will not be considered in further analysis.

### 6.3.2 Results

In this section the multiple regression models are presented, beginning with the board of directors. Both the audit committee and the compensation committee are discussed and analyzed in different models due to the high correlations between the respective variables.

#### Regression Analysis - Board of Directors Structure and CEO Compensation

This paragraph discusses the effects of structure on several compensation measures. The dependent variables are salary, short term-compensation, long-term compensation and total compensation - all of which are log transformed. The independent variables are board

size, the percentage of insiders (%Insiders), the percentage of gray directors (%Gray Directors) and the percentage of outsiders (%Outsiders), the percentage of old outsiders (%Old outsiders), the percentage of outsiders appointed by the CEO (%Outsiders CEO appointed), a gender dummy (1) for female and (0) for male, the CEO's age (CEO Age), the CEO's tenure (Tenure), a variable indicating combined titles(CEO Chair Dummy) (1) combined and (0) separated CEO and chairman, the percentage of CEO stock-ownership (CEO stock) and a variable controlling for firm size (log total Revenues)and one controlling for company performance (ROA). This analysis was also conducted with robust regression.<sup>1</sup>

$$\begin{aligned}
 \text{Log\_Compensation} = & \\
 & \alpha + \beta_1 \text{Board Size} + \beta_2 \% \text{Insiders} + \beta_3 \% \text{Gray Directors} + \\
 & \beta_4 \% \text{Outsiders} + \beta_5 \% \text{Old Outsiders} + \beta_6 \% \text{Busy Outsiders} + \\
 & \beta_7 \% \text{Outsiders CEO appointed} + \beta_8 \text{Gender Dummy} + \beta_9 \text{CEO Age} + \\
 & \beta_{10} \text{Tenure} + \beta_{11} \text{CEO Chair Dummy} + \beta_{12} \text{CEO Stock} + \\
 & \beta_{13} \text{Company Size} + \beta_{14} \text{Company Performance}
 \end{aligned} \tag{6.1}$$

The multiple regression models differ in value, with adjusted  $R^2$  values of  $-0.062$  for salary, which implies that the model has no explanatory power. Moreover the F-Statistics show that the model is insignificant with a  $p$ -value far over 0.1. Each of the other three models is significant, again the results from long-term compensation ( $p < 0.01$ ) and total compensation ( $p < 0.01$ ) are superior in significance compared to short-term compensation ( $p < 0.1$ ). The short-term compensation model showing a adjusted  $R^2$  value of 0.081 is better than the one for salary since it explains about 10 percent of the variation. Contrary the models for long-term compensation (adjusted  $R^2 = 0.610$ ) and total compensation (adjusted  $R^2 = 0.57$ ) are very powerful. It seems that board structure variables in general represent good explanatory variables for long-term compensation and hence also for total compensation since the first makes up a significant part of total CEO compensation. The results concerning board size from the correlation analysis hold in the multiple regression model only for total compensation ( $\beta = 0.035, p < 0.1$ ), the coefficients is positive like expected. Board size however does not seem to have any influence on salary ( $\beta = 0.000, p > 0.1$ ), short-term compensation ( $\beta = 0.024, p > 0.1$ ) and long-term compensation ( $\beta = 0.024, p > 0.1$ ). In support of  $H1$  all coefficient are positive, though

<sup>1</sup>The robust regressions for the board of directors show following results (compared to table 6.11). For salary the coefficients of board size ( $\beta = 0.017, p < 0.05$ ), the percentage of insiders ( $\beta = -0.346, p < 0.1$ ) and company size ( $\beta = 0.159, p < 0.01$ ) are significant, whereas linear regression shows no significant coefficients. Short-term compensation shows significant coefficients for board size ( $\beta = 0.018, p < 0.1$ ), the percentage of gray directors ( $\beta = 0.606, p < 0.05$ ), company size ( $\beta = 0.125, p < 0.01$ ) and company performance ( $\beta = -0.190, p < 0.1$ ). No significant differences were observed for long-term compensation. For total compensation the results resemble those of the linear regression, additionally tenure ( $\beta = -0.011, p < 0.1$ ) is significant. Note that the models considered less powerful in the linear regression analysis (salary and short-term compensation) show more differences when compared to robust regression models than the two models with high explanatory power (long-term compensation and total compensation).

not all of them are significant. There is a negative relationship between all compensation measures and the percentage of insiders on the board. All coefficients are negative and the effect on long-term compensation ( $\beta = -2.512, p < 0.01$ ) and hence total compensation ( $\beta = -0.965, p < 0.05$ ) is stronger than on fixed compensation ( $\beta = -0.650, p < 0.01$ ) and short-term compensation ( $\beta = -0.088, p > 0.1$ ). The coefficients concerning gray directors<sup>2</sup> are insignificant over all compensation measures, hence H3 is not supported. The results from the correlation analysis do not hold for outsiders, all coefficients are negative and insignificant, most of them being close to zero, hence supporting H4 as there seems to be no relationship between the percentage of outsiders and CEO compensation. Like before, in the correlation analysis the variable measuring the fraction of old outsiders cannot be linked to any form of CEO compensation, hence no support for hypothesis H5 is found. The fraction of busy outsiders showed positive and significant results over all compensation measures in the correlation analysis; however this connection is not reinforced in the multiple regression analysis rejecting hypothesis H6. Like in the previous section concerning correlation analysis no association of directors appointed by the CEO on CEO compensation could be identified. Also the variable indicating that the CEO serves as chairman of the board shows no significant results, no evidence of H8 could be found in the data. This result is not surprising since other authors obtained the same results before (e.g. Conyon and Peck, 1998). Concerning CEO tenure the implication from the correlation analysis do not hold in the regression model, hence no support for H9 could be found in the data. Like predicted and implied by the results concerning correlations the coefficients measuring the influence of CEO stock ownership on CEO compensation are negative however lacking significance. Again the variable company size measured as the logarithm of total revenues shows positive and significant coefficients for long-term compensation ( $\beta = 0.516, p < 0.01$ ) and total compensation ( $\beta = 0.314, p < 0.01$ ) while the coefficients of salary and short-term compensation lack significance. This seems plausible since salary is the fixed part of compensation and hence independent of revenues and also short-term compensation might not be tied to revenues but to other operational results or subjective assessment. Company performance measured as the return of assets shows negative coefficients over all compensation measures, however only long-term compensation ( $\beta = -0.872, p < 0.05$ ) and total compensation ( $\beta = -0.607, p < 0.01$ ) show significant results.

### Regression Analysis - Committees

In the following paragraphs the models for the audit committee and the compensation committee will be introduced.

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<sup>2</sup>When excluding gray directors from the models in table 6.11 the results are very similar to those above, only the results concerning short-term compensation change as company size becomes significant ( $\beta = 0.113, p < 0.05$ ).

	coefficients and t-statistics			
	log_salary	log_st	log_lt	log_T.C
Intercept	5.321 (5.697) ***	4.917 (9.115) ***	4.231 (5.280) ***	4.786 (10.745) ***
Board Size	0.000 (0.007)	0.024 (1.084)	0.031 (0.987)	0.035 (1.938) *
%Insiders	-0.650 (-0.731)	-0.088 (-0.172)	-2.512 (-3.261) ***	-0.965 (-2.275) **
%Gray Directors	-0.039 (-0.037)	0.738 (1.198)	-0.761 (-0.835)	-0.030 (-0.059)
%Outsiders	-0.332 (-0.361)	-0.053 (-0.100)	-0.910 (-1.149)	-0.246 (-0.560)
%Old Outsiders	0.707 (1.020)	0.209 (0.521)	0.307 (0.526)	0.355 (1.074)
%Busy Outsiders	0.461 (1.119)	0.192 (0.808)	0.329 (0.948)	0.202 (1.030)
%Outsiders CEO appointed	-0.052 (-0.148)	0.055 (0.267)	-0.214 (-0.722)	-0.082 (-0.486)
Female	0.136 (0.404)	0.008 (0.041)	0.087 (0.306)	0.009 (0.054)
CEO Age	0.005 (0.590)	0.002 (0.451)	-0.001 (-0.181)	-0.002 (-0.491)
CEO Tenure	0.000 (0.031)	0.000 (0.032)	-0.012 (-1.074)	-0.009 (-1.314)
CEO Chair	-0.107 (-0.782)	-0.041 (-0.516)	0.076 (0.662)	0.059 (0.906)
CEO Stock	-0.075 (-0.132)	-0.237 (-0.720)	-0.263 (-0.548)	-0.287 (-1.060)
Company Size	0.061 (0.605)	0.094 (1.608)	0.516 (6.097) ***	0.314 (6.545) ***
Company Performance	-0.250 (-0.618)	-0.282 (-1.208)	-0.872 (-2.569) **	-0.607 (-3.149) ***
n	105	105	104	105
Adjusted $R^2$	-0.062	0.081	0.556	0.610

\*\*\*, \*\*, \* Significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 6.11: Board of Directors Structure and CEO Compensation.

### Regression Analysis - Audit Committee Structure and CEO Compensation

This subsection analyzes the effects of compensation committee structure on several compensation measures.

The dependent variables are salary, short term-compensation, long-term compensation and total compensation. Among the independent variables are audit committee size, the percentage of insiders (%Insiders), the percentage of gray directors (%Gray Directors) and the percentage of outsiders (%Outsiders) serving on the audit committee, company size and company performance. The following analysis was also calculated with the method robust regressions.<sup>3</sup>

$$\begin{aligned}
 \text{Log\_Compensation} = & \\
 & \alpha + \beta_1 \text{Audit Committee Size} + \beta_2 \% \text{Insiders} + \\
 & \beta_3 \% \text{Gray Directors} + \beta_4 \% \text{Outsiders} + \\
 & \beta_5 \text{Company Size} + \beta_6 \text{Company Performance}
 \end{aligned} \tag{6.2}$$

<sup>3</sup>The robust regressions regarding the audit committee characteristics show following results (compared to table 6.12). For salary the coefficients of audit committee size ( $\beta = 0.028, p < 0.1$ ), the percentage of insiders serving on the audit committee ( $\beta = -0.249, p < 0.1$ ), the percentage of outsiders serving on the audit committee ( $\beta = -0.171, p < 0.1$ ) and company size ( $\beta = 0.199, p < 0.01$ ) are significant. Short-term compensation shows significant coefficients for committee size ( $\beta = 0.048, p < 0.05$ ), company size ( $\beta = 0.156, p < 0.01$ ) and company performance ( $\beta = -0.218, p < 0.1$ ). The same is true for long-term compensation with significant coefficients for committee size ( $\beta = 0.203, p < 0.01$ ), company size ( $\beta = 0.468, p < 0.01$ ) and company performance ( $\beta = -0.843, p < 0.01$ ). Audit committee size ( $\beta = 0.154, p < 0.01$ ), company size ( $\beta = 0.366, p < 0.01$ ) and company performance ( $\beta = -0.690, p < 0.01$ ) are the significant coefficients for total compensation.

One has to note that overall the audit committee multiple regression models are better compared to the models analyzing the board as a whole regarding the explanation of salary (adjusted  $R^2 = 0.084$ ) and short-term compensation (adjusted  $R^2 = 0.192$ ). Again the models for long-term compensation (adjusted  $R^2 = 0.502$ ) and total compensation (adjusted  $R^2 = 0.585$ ) explain more of the variation in CEO compensation, however they are slightly less powerful than the equivalent models concerning the board structure. Each of the models is significant at the  $p < 0.01$  level as evident in the F-statistics, except for salary ( $p < 0.05$ ).

The variable measuring audit committee size shows strong positive coefficients across all compensation variables, the results are equivalent to the correlation analysis (table 6.9) in the section above. Again the results for long-term compensation ( $\beta = 0.236, p < 0.01$ ) and total compensation ( $\beta = 0.159, p < 0.01$ ), are much stronger than for salary ( $\beta = 0.167, p < 0.05$ ) or short-term compensation ( $\beta = 0.076, p < 0.1$ ). Compared to the regression analysis of the board of directors as a whole (table 6.11) the subcommittee analysis shows more significant results. H1-AC stating that the size of the audit committee has a positive impact on CEO compensation found full support in the data. The fraction of insiders serving on the audit committee seems to have a negative impact on salary ( $\beta = -1.426, p < 0.05$ ) short-term compensation ( $\beta = -0.716, p < 0.05$ ), long-term compensation ( $\beta = -1.098, p < 0.1$ ) and total compensation ( $\beta = -0.669, p < 0.05$ ). Overall the empirical results do not provide any evidence for H2-AC - quite the contrary - the percentage of insiders seems to have a negative impact on CEO compensation. Interestingly, the variable gray directors<sup>4</sup> serving on the audit committee shows one significant coefficient for short-term compensation ( $\beta = 0.849, p < 0.05$ ), equaling the results from the correlation analysis for both the board as a whole and the audit committee. H3-AC is supported by the multiple regression model, suggesting that the percentage of gray directors has a positive effect on CEO compensation. However the coefficient for all but short-term compensation are not significant. Again the fraction of outsiders serving on the audit committee does not show any significant coefficients, the results being equivalent to the analysis of the whole board. H4-AC was not supported by any significant coefficients, however the signs equal the predicted direction. The variable controlling for company size shows positive and significant coefficients for all compensation measures but salary ( $\beta = 0.057, p > 0.1$ ). The coefficients for short-term compensation ( $\beta = 0.135, p < 0.01$ ), long-term compensation ( $\beta = 0.556, p < 0.01$ ), and total compensation ( $\beta = 0.357, p < 0.01$ ) are much stronger. Again return on assets being a proxy for company performance seems to have a negative impact on CEO compensation, the coefficients being significant for long-term compensation ( $\beta = -0.892, p < 0.05$ ) and total compensation ( $\beta = -0.653, p < 0.05$ ).

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<sup>4</sup>Again the models from table 6.12 were calculated excluding gray directors, however no significant differences emerged.

	coefficients and t-statistics			
	log_salary	log_st	log_lt	log_T.C
Intercept	4.924 (8.830) ***	4.885 (15.020) ***	2.380 (4.313) ***	3.904 (13.211) ***
Audit Committee Size	0.167 (2.399) **	0.076 (1.872) *	0.236 (3.551) ***	0.159 (4.303) ***
%Insiders	-1.426 (-2.373) **	-0.716 (-2.044) **	-1.098 (-1.891) *	-0.669 (-2.100) **
%Gray Directors	0.486 (0.701)	0.849 (2.098) **	-0.216 (-0.323)	0.063 (0.170)
%Outsiders	-0.116 (-0.259)	-0.111 (-0.424)	-0.344 (-0.787)	-0.138 (-0.582)
Company Size	0.057 (0.721)	0.135 (2.957) ***	0.556 (7.355) ***	0.357 (8.599) ***
Company Performance	-0.175 (-0.633)	-0.296 (-1.388)	-0.892 (-2.548) **	-0.653 (-3.369) ***
n	105	105	104	105
Adjusted $R^2$	0.084	0.192	0.502	0.585

\*\*\*, \*\*, \* Significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 6.12: Audit Committee Structure and CEO Compensation

**Regression Analysis - Compensation Committee Structure and CEO Compensation** This subsection takes the effects of compensation committee structure on CEO compensation under scrutiny.

The dependent variables are salary, short term-compensation, long-term compensation and total compensation. This provides opportunities to investigate the impact of compensation committee structure on different forms of CEO compensation. The independent variables are compensation committee size, the percentage of stock held by compensation committee numbers (CC Stock), the percentage of insiders (%Insiders), the percentage of gray directors (%Gray Directors) and the percentage of outsiders (%Outsiders) serving on the compensation committee as well as the fraction of member overlapping between audit committee and compensation committee in terms of audit committee size (Fraction of CC in AC), company size and company performance. The following analysis was also calculated with the method robust regressions.<sup>5</sup>

$$\begin{aligned}
 \text{Log\_Compensation} = & \alpha + \beta_1 \text{Compensation Committee Size} + \\
 & \beta_2 \text{CC Stock} + \beta_3 \% \text{Insiders} + \beta_4 \% \text{Gray Directors} + \\
 & \beta_5 \% \text{Outsiders} + \beta_6 \text{Fraction of CC in AC} + \\
 & \beta_7 \text{Company Size} + \beta_8 \text{Company Performance}
 \end{aligned} \tag{6.3}$$

<sup>5</sup>The robust regressions regarding the compensation committee characteristics show following results (compared to table 6.13). For salary the coefficients of committee size ( $\beta = 0.023, p < 0.1$ ), the fraction of compensation committee members serving on the audit committee ( $\beta = -0.102, p < 0.05$ ), the percentage of stock held by the compensation committee members ( $\beta = -0.745, p < 0.05$ ) and company size ( $\beta = 0.154, p < 0.01$ ) are significant. Again the corresponding linear regression model shows no significant coefficients. Short-term compensation shows significant coefficients for committee size ( $\beta = 0.035, p < 0.1$ ) and company size ( $\beta = 0.140, p < 0.01$ ). Long-term compensation shows positive coefficients for the fraction of compensation committee members serving on the audit committee ( $\beta = -0.466, p < 0.01$ ), company size ( $\beta = 0.575, p < 0.01$ ) and company performance ( $\beta = 0.947, p < 0.01$ ). The results concerning total compensation are equivalent to the corresponding linear regression model.



Contrary to the audit committee analysis the models analyzing salary (adjusted  $R^2 = -0.019$ ) and short-term compensation (adjusted  $R^2 = 0.098$ ) explain little of the variation of the two parts of CEO compensation. Again the models for long-term compensation (adjusted  $R^2 = 0.478$ ) and total compensation (adjusted  $R^2 = 0.520$ ) explain more of the variation in CEO compensation; however they are less powerful than the equivalent models concerning the board structure (table 6.11). The fraction of insiders serving on the compensation committee like before in the correlation analysis (table 6.10) shows no significant coefficients. The percentage of insiders does not seem to have an influence on any of the compensation measures. The model analyzing salary is not significant at any conventional level, the short-term compensation model is significant at the  $p < 0.1$  level whereas the models for long-term compensation and total compensation are significant at the  $p < 0.01$  level. The variable measuring compensation committee size shows strong positive coefficients for long-term compensation ( $\beta = 0.116, p < 0.05$ ) and total compensation ( $\beta = 0.074, p < 0.05$ ) supporting H-CC1, whereas the results salary and short-term compensation lack significance. The variable measuring the percentage of insiders on the compensation committee shows no significant results, hence hypothesis H-CC2 is not supported. The same is true for both the percentage of gray directors<sup>6</sup> and the percentage of outsiders, no evidence for H-CC3 and H-CC4 was found in the data. The multiple regression analysis supports HCC-5 for one compensation measure, a negative coefficient was found for long-term compensation ( $\beta = -0.499, p < 0.05$ ). The percentage of the stock ownership of the compensation committee members like predicted shows negative coefficients, however all of them lack significance. Company size has a positive influence on all compensation measures, the coefficients for short-term compensation ( $\beta = 0.136, p < 0.01$ ), long-term compensation ( $\beta = 0.517, p < 0.01$ ), and total compensation ( $\beta = 0.349, p < 0.01$ ) are significant. Company performance seems to have a negative impact on long-term compensation ( $\beta = -0.703, p < 0.1$ ) and total compensation ( $\beta = -0.564, p < 0.05$ ).

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<sup>6</sup>Again the models from table 6.13 were calculated excluding gray directors, however no significant differences were found.

	coefficients and t-statistics			
	log_salary	log_st	log_lt	log_T_C
Intercept	5.083 (8.493) ***	4.747 (13.579) ***	3.202 (5.657) ***	4.225 (13.058) ***
Compensation Committee Size	0.091 (1.450)	0.051 (1.408)	0.116 (1.983) **	0.074 (2.200) **
%Insiders	-0.144 (-0.238)	0.033 (0.093)	-0.260 (-0.459)	0.023 (0.071)
%Gray	0.312 (0.587)	0.241 (0.775)	-0.037 (-0.075)	-0.010 (-0.034)
%Outsiders	-0.091 (-0.210)	0.063 (0.247)	-0.294 (-0.726)	-0.037 (-0.160)
Fraction of CC in AC	0.167 (0.821)	0.140 (1.181)	-0.499 (-2.574) **	-0.145 (-1.316)
CC Stock	-1.916 (-1.278)	-1.199 (-1.369)	-0.392 (-0.281)	-0.869 (-1.072)
Company Size	0.054 (0.606)	0.136 (2.618) ***	0.517 (6.135) ***	0.349 (7.239) ***
Company Performance	-0.155	-0.291 (-1.245)	-0.703 (-1.886) *	-0.564 (-2.610) **
n	105	105	104	105
Adjusted $R^2$	-0.019	0.098	0.478	0.520

\*\*\*, \*\*, \* Significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 6.13: Compensation Committee Structure and CEO Compensation

## 7 Conclusions

The Sarbanes-Oxley Act (SOX 2002) and other regulations concerning board and committee structure require companies to adapt their boards e.g. to increase the representation of outsiders, avoid insiders and affiliated directors and separate the role of CEO and chairman of the board. The objective of this study was to observe and explain the association between CEO compensation and board structure, audit committee composition and compensation committee characteristics respectively. The focus was set on publicly listed U.S. companies a randomly drawn sample eventually generated 106 valid observations.

Like predicted board size was found to have a positive impact on total CEO compensation, for the other compensation measures it shows positive but insignificant results. The results are in line with most of the recent corporate governance literature (e.g. Core et al., 1999; Petra and Dorata, 2008). Corporate governance guidelines and academic research (e.g. Hall and Murphy, 2003) often recommend the avoidance of placing insiders on a company board as they are said to be influenced by the CEO or considered weak monitors. However consistent with Core et al. (1999) a negative relationship between CEO compensation and insider representation on the board was found, hence there seems to be no reason to believe that insiders result in higher CEO compensation rather the opposite. Chhaochharia and Grinstein (2009) find that firms that do not comply with corporate governance regulations, decreased CEO compensation contrary to complying firms, this finding would imply that CEOs with boards consisting of a majority of insiders would receive lower compensation like the results of this study suggest. It is also possible that insiders know the task as well as the effort level of their CEO and hence avoid excessive pay. Hypothesis 3 predicted a positive relationship between gray directors and CEO compensation, however no evidence was found in support of this assumption.

Many authors argue that independent outsiders are vigilant and competent members of corporate boards resulting in higher efficiency compared to executive directors (e.g. Ryan and Wiggins, 2004; Fich and Shivdasani, 2006). In contrast to corporate governance guidelines and regulations (e.g. SOX) as well as the opinion of shareholder activists no support that outsiders constitute a more effective board and result in lower CEO compensation could be found. This result is consistent with prior work that was not able to identify any significant relation between non-executive directors and CEO pay (Conyon and Peck, 1998; Core et al., 1999). Similarly old outsiders are believed to be less effective and having a positive effect on CEO compensation (Core et al., 1999), contrary to hypothesis 5 no evidence was found that indicates that old directors are ineffective monitors.

Neither the correlation analysis nor the multiple regression models were able to identify a statistically significant relationship between the fraction of directors over 69 and CEO compensation. Corporate governance guidelines propagate the exclusion of busy directors, academic research finds negative effects on corporate performance (Fich and Shivdasani, 2006) and a positive effect on CEO compensation (Core et al., 1999). The correlation analysis reveals that all coefficients across each compensation measure are positive and significant. However the results do not hold in the multiple regression models, finding little support for hypothesis H6. Possible explanations are high correlations with other independent variables resulting in high variance inflation factors and tampering with statistical significance. Results for outsiders appointed by the CEO are similar. Even though some authors (e.g. Daily et al., 1998) argue that CEO appointed outside directors might be less independent than other outsiders no evidence of such a relationship is found. Hypothesis H8 predicted a positive effect of CEO duality on CEO compensation, however in accordance to the results of Conyon and Peck (1998) no evidence of relationship between the combination of titles (CEO = CoB) and executive compensation was found. CEO duality seems to have no impact on the amount or the structure of CEO compensation. Contrary to hypothesis H9 that stated a positive association between CEO compensation and CEO tenure there is no evidence found in the data, coefficients for tenure are negative and insignificant. Vafeas (2003) finds the same empirical association and argues that CEOs that rotate more often might be rewarded for their flexibility. Similarly Anderson and Bizjak were not able to find support that a CEO with long tenure was able to manipulate committees in order to extract advantages. In accordance to Adams, Hermalin and Weisbach (2003) correlation analysis revealed that tenure and the percentage of outsiders on the board correlate significantly negative. Hypothesis H10 predicted a negative relationship between CEO stock ownership and CEO compensation, found some support in the correlation analysis, where all components of CEO pay except for salary correlated negatively with CEO stock ownership. Again regression analysis could not find any significant association which could be due to multicollinearity. The results are in accordance with Vafeas (2003) and Core et al. (1999) who found an inverse association as well. Furthermore a positive association between company size and CEO compensation was predicted and also found in the correlation analysis for all compensation measures but salary, the results held in the regression models for long-term compensation and total compensation. It seems that firm size, measured as the log of total revenues, has an impact particularly on variable compensation variables and hence on total compensation but not on salary. This might be explained by the different performance measures used in a compensation function, variable compensation often depends on company performance. The results are similar to those of Daily et al. (1998) who found positive and significant coefficients for the ratio of contingent pay to total compensation and for total compensation. The results concerning the audit committee structure resemble the findings of the board as a whole. Like highlighted by Karamanou and Vafeas (2005) smaller audit committees tend to be preferred since in regard of CEO compensation control mechanisms seem to be

stronger when audit committees are not large. Concerning the representation of insiders no evidence could be found that as a result of higher insider representation corporate governance weakened or CEOs got entrenched since insiders seem to have a negative influence on all components of CEO compensation. One explanation based on the arguments of Chhaochharia and Grinstein (2009) might be that non-compliance to corporate governance regulations, e.g. insiders on the audit committee, reinforces vigilance and strengthens control mechanism since these companies might be rigorously observed by shareholders and regulators. The percentage of gray directors has a positive effect on CEO compensation, all coefficients were positive, although only the association with short-term compensation proved to be statistically significant. It might be easier for the CEO to exert influence over gray directors without attracting attention since they are not as obviously connected to the CEO as insiders. The percentage of outsiders shows the predicted signs, however none of the coefficients being significant.

Compensation committee size proved to be positively connected to CEO compensation, it might be that the board or committees eventually lose oversight and control and hence weakened corporate governance structures lead to higher CEO compensation. No evidence that insiders on the compensation committee behave opportunistically and favor their CEO could be found. This might be due to corporate governance regulations as well as concerns of being perceived as bad decision makers. The results equal those of Vafeas (2003) who failed to establish a connection between the magnitude or structure of CEO compensation and insider representation. However gray directors seem to have some positive impact on CEO compensation, again maybe this is resulting from their seemingly independence from the CEO that sometimes makes it hard to discover their relationship with the company. Outsiders on the compensation committee seem to have no influence on CEO compensation, being in accordance with prior literature (e.g. Anderson and Bizjak). Similarly the results of Cyert et al. (2002) show negative and significant coefficients. Also the director overlapping variable shows significant negative coefficients for long-term compensation. Also the director overlapping variable shows significant negative coefficients for long-term compensation and total compensation.

This study should not be however considered to be free of any limitations. First the sample consists of 106 companies - with a bigger sample statistically more reliable results would be possible. Secondly this study focuses on structure variables as measures for corporate governance mechanisms since they are visible and obtainable as opposed to behavioral explanations that would be hard to verify for one has no access to board rooms. Another problem is the earlier mentioned endogeneity which makes analysis and interpretation of results tough. Board and committee structures might have an influence on

CEO compensation, however the CEO might exert power over his board and subsequently design a board favoring the CEO, that in turn would grant the CEO higher compensation. Also it might be that influential factors are missing in the analysis because they are unobservable or did not seem important for this kind of research question. Like stated by Hermalin and Weisbach (2003) the equilibrium interpretation has a broader focus, there might be factors influencing the board measure as well as the CEO compensation measure at the same time resulting in a spurious correlation between the two measures of interest.

It would be interesting to conduct this study with a much larger sample with addition of a time series observation showing the evolution of CEO compensation as well as the board and committee structures over five to ten years.

Another problem is that structure variables are not optimal proxies for human behavior, here a study in the actual board room with interviews as the chosen research instrument would shed light on decision making as well as on internal control mechanisms more adequately.

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## Appendix

In the following tables the definition of insiders, gray directors and outsiders by Bertrand and Mullainathan (2001) are used in the calculations.

### 1 Descriptive Statistics

#### 1.1 Distributions - Minimums, Maximums, Means and Medians

##### Board Characteristics

	Minimum	Maximum	Average	Median	SD
Boardsize	4	15	8.64	8	0.2223
Percentage of Insiders	6.67	71.43	26.67	25	0.0132
Percentage of Gray Directors	0	54.55	5.87	0	0.0102
Percentage of Outsiders	9.09	92.31	62.47	63.64	0.0158
Percentage of old Outsiders	0	42.86	7.92	0	0.0095
Percentage of busy Outsiders	0	92.31	37.69	40	0.0204
Percentage of Outsiders CEO app.	0	92.31	44.85	44.44	0.0226

Table 1: Distributions - Minimums, Maximums, Means and Medians - Board Characteristics

##### Committee Characteristics

##### Audit Committee

	Minimum	Maximum	Average	Median	SD
AC Size	2	6	3.63	3	0.0896
Percentage of Insiders	0	66.67	5.14	0	0.0123
Percentage of Gray Directors	0	50	3.15	0	0.0095
Percentage of Outsiders	16.67	100	86.78	100	0.0179

Table 2: Committee Characteristics - Audit Committee

## Compensation Committee

	Minimum	Maximum	Average	Median	SD
@# directors_CC_BM	2	8	3.56	3	0.1039
insiders_CC_BM_P	0	66.67	5.34	0	0.0132
gray_CC_BM_P	0	66.67	5.23	0	0.0141
outsiders_CC_BM_P	0	100	85.53	100	0.0207
fraction_of_cc_in_ac	0	100	49.77	50	0.0309
CC_stock in Percent	0.02	25.12	1.82	0.3	0.0043

Table 3: Committee Characteristics - Compensation Committee

## 1.2 Correlations

## Correlation Analysis – Board of Directors

		boardsize	in	gray	out	ind_board	old_out	busy_out	busy_board	out_ceo	log_salary	log_st	log_lt
in	corr.	-.260 **											
	sig.	0.007											
gray	corr.	0.066	-.191 *										
	sig.	0.498	0.048										
out	corr.	0.155	-.651 **	-.437 **									
	sig.	0.111	0	0									
ind_board	corr.	0.036	-.406 **	-.433 **	.749 **								
	sig.	0.714	0	0	0								
old_out	corr.	0.072	0.071	-0.13	0.036	0.076							
	sig.	0.461	0.469	0.183	0.712	0.437							
busy_out	corr.	.318 **	-.503 **	-0.168	.581 **	.404 **	-.217 *						
	sig.	0.001	0	0.084	0	0	0.025						
busyboard	corr.	.259 **	-.309 **	-0.175	.456 **	.313 **	-0.094	.746 **					
	sig.	0.007	0.001	0.072	0	0.001	0.338	0					
out_ceo	corr.	-0.137	-.307 **	-0.117	.418 **	.287 **	-0.011	0.149	0.147				
	sig.	0.159	0.001	0.228	0	0.003	0.911	0.125	0.13				
log_salary	corr.	0.154	-0.16	0.021	0.101	-0.04	0.076	0.172	0.151	-0.021			
	sig.	0.114	0.1	0.834	0.301	0.685	0.438	0.077	0.121	0.829			
log_st	corr.	.331 **	-.209 *	.224 *	0.054	-0.068	0.014	0.187	0.139	-0.037	.831 **		
	sig.	0.001	0.031	0.02	0.583	0.487	0.889	0.054	0.154	0.702	0		
log_lt	corr.	.545 **	-.412 **	0.056	.285 **	0.153	-0.041	.422 **	.274 **	-0.086	.335 **	.387 **	
	sig.	0	0	0.566	0.003	0.118	0.679	0	0.004	0.381	0	0	
log_T_C	corr.	.605 **	-.362 **	0.085	.274 **	0.113	-0.001	.404 **	.326 **	-0.1	.454 **	.629 **	.885 **
	sig.	0	0	0.383	0.004	0.246	0.992	0	0.001	0.308	0	0	0

\*\*\*, \*\*, \* Significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 4: Correlation Analysis - Board of Directors analysis

## Correlation Analysis - Committees

## Correlation Analysis Audit Committee

		ac_size	in_ac	gray_ac	out_ac	log_salary	log_st	log_lt
in_ac	corr.	0.165						
	sig.	0.09						
gray_ac	corr.	-0.022	0.016					
	sig.	0.825	0.868					
out_ac	corr.	-0.038	-.584 **	-.474 **				
	sig.	0.699	0	0				
log_salary	corr.	.231 *	-.220 *	0.085	0.094			
	sig.	0.017	0.023	0.384	0.337			
log_st	corr.	.258 **	-0.121	.262 **	-0.024	.831 **		
	sig.	0.007	0.214	0.006	0.804	0		
log_lt	corr.	.505 **	0.021	0.071	-0.028	.335 **	.387 **	
	sig.	0	0.832	0.471	0.775	0	0	
log_T_C	corr.	.544 **	0.018	0.108	-0.004	.454 **	.629 **	.885 **
	sig.	0	0.854	0.27	0.969	0	0	0

\*\* , \* Significant at the 0.01, 0.05, respectively.

Table 5: Correlation Analysis - Audit Committee Analysis

## Correlation Analysis – Compensation Committee

		cc_size	in_cc	gray_cc	out_cc	overlapping	fraction cc/ac	CC_stock	log_salary	log_st	log_lt
in_cc	corr.	-0.021									
	sig.	0.828									
gray_cc	corr.	0.005	-0.013								
	sig.	0.958	0.892								
out_cc	corr.	0.006	-.594 **	-.450 **							
	sig.	0.953	0	0							
overlapping	corr.	.312 **	-0.052	0.045	0.012						
	sig.	0.001	0.595	0.643	0.902						
fraction cc/ac	corr.	-0.155	-0.067	0.012	0.025	.851 **					
	sig.	0.112	0.495	0.905	0.795	0					
CC_stock	corr.	0.052	-0.025	.276 **	-0.146	.217 *	0.163				
	sig.	0.597	0.798	0.004	0.134	0.025	0.094				
log_salary	corr.	0.169	0.024	0.022	-0.022	0.072	0.016	-0.107			
	sig.	0.083	0.803	0.826	0.825	0.46	0.87	0.273			
log_st	corr.	.240 *	0.01	0.058	0.02	0.071	-0.025	-0.161	.831 **		
	sig.	0.013	0.918	0.553	0.841	0.468	0.8	0.098	0		
log_lt	corr.	.403 **	0.078	0.028	-0.024	-0.183	-.420 **	-0.156	.335 **	.387 **	
	sig.	0	0.427	0.774	0.807	0.06	0	0.11	0	0	
log_T_C	corr.	.421 **	0.089	0.001	0.01	-0.13	-.334 **	-.218 *	.454 **	.629 **	.885 **
	sig.	0	0.364	0.992	0.916	0.181	0	0.024	0	0	0

\*\* , \* Significant at the 0.01, 0.05 levels, respectively.

Table 6: Correlation Analysis - Compensation Committee Analysis

## 2 Regression Analysis

### 2.1 Board of Directors Structure and CEO Compensation

$Log\_Compensation =$

$$\begin{aligned} & \alpha + \beta_1 Board\ Size + \beta_2 \%Insiders + \beta_3 \%Gray\ Directors + \\ & \beta_4 \%Outsiders + \beta_5 \%Old\ Outsiders + \beta_6 \%Busy\ Outsiders + \\ & \beta_7 \%Outsiders\ CEO\ appointed + \beta_8 Gender\ Dummy + \beta_9 CEO\ Age + \\ & \beta_{10} Tenure + \beta_{11} CEO\ Chair\ Dummy + \beta_{12} CEO\ Stock + \\ & \beta_{13} Company\ Size + \beta_{14} Company\ Performance \end{aligned}$$

	coefficients and t-statistics			
	log_salary	log_st	log_lt	log_T.C
Intercept	5.373 (5.660) ***	4.972 (9.117) ***	4.387 (5.272) ***	4.826 (10.461) ***
Board Size	-0.001 (-0.017)	0.022 (1.006)	0.029 (0.897)	0.034 (1.852) *
%Insiders	-0.656 (-0.709)	-0.106 (-0.200)	-2.523 (-3.081) ***	-0.914 (-2.033) **
%Gray Directors	-0.235 (-0.226)	0.734 (1.227)	-1.493 (-1.640)	-0.329 (-0.649)
%Outsiders	-0.406 (-0.441)	-0.072 (-0.137)	-1.173 (-1.449)	-0.333 (-0.744)
%Old Outsiders	0.703 (1.009)	0.246 (0.616)	0.263 (0.440)	0.342 (1.009)
% Busy Outsiders	0.476 (1.155)	0.217 (0.919)	0.366 (1.033)	0.231 (1.152)
%Outsiders CEO appointed	-0.038 (-0.108)	0.048 (0.239)	-0.156 (-0.517)	-0.056 (-0.326)
Female	0.121 (0.361)	-0.009 (-0.045)	0.043 (0.148)	-0.013 (-0.078)
CEO Age	0.005 (0.607)	0.,002 (0.438)	-0.001 (-0.095)	-0.002 (-0.415)
CEO Tenure	-0.002 (-0.116)	-0.002 (-0.200)	-0.019 (-1.627)	-0.012 (-1.777) *
CEO Chair	-0.098 (-0.704)	-0.016 (-0.204)	0.091 (0.767)	0.070 (1.042)
CEO Stock	-0.059 (-0.104)	-0.246 (-0.750)	-0.196 (-0.398)	-0.267 (-0.960)
Company Size	0.061 (0.597)	0.087 (1.495)	0.519 (5.969) ***	0.313 (6.358) ***
Company Performance	-0.237 (-0.586)	-0.264 (-1.136)	-0.836 (-2.411) **	-0.587 (-2.985) ***
n	105	105	104	105
Adjusted $R^2$	-0.065	0.088	0.536	0.594

\*\*\*, \*\*, \* Significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 7: Regression Analysis - Board of Directors Structure and CEO Compensation

### 2.2 Regression Analysis - Committees

#### Regression Analysis - Audit Committee Structure and CEO Compensation

$Log\_Compensation =$

$$\begin{aligned} & \alpha + \beta_1 Audit\ Committee\ Size + \beta_2 \%Insiders + \\ & \beta_3 \%Gray\ Directors + \beta_4 \%Outsiders + \\ & \beta_5 Company\ Size + \beta_6 Company\ Performance \end{aligned}$$



	coefficients and t-statistics			
	log_salary	log_st	log_lt	log_T_C
Intercept	4.910 (8.805) ***	4.834 (14.832) ***	2.348 (4.254) ***	3.845 (13.006) ***
Audit Committee Size	0.164 (2.369) **	0.072 (1.767) *	0.237 (3.577) ***	0.158 (4.306) ***
%Insiders	-1.401 (-2.285) **	-0.641 (-1.788) *	-1.078 (-1.819) *	-0.606 (-1.865) *
%Gray Directors	0.451 (0.622)	0.870 (2.053) **	-0.241 (-0.344)	0.121 (0.316)
%Outsiders	-0.094 (-0.200)	-0.035 (-0.128)	-0.322 (-0.703)	-0.068 (-0.273)
Company Size	0.057 (0.725)	0.134 (2.916) ***	0.557 (7.346) ***	0.356 (8.529) ***
Company Performance	-0.175 (-0.476)	-0.291 (-1.356)	-0.895 (-2.549) **	-0.649 (-3.337) ***
n	105	105	104	105
Adjusted $R^2$	0.083	0.187	0.501	0.584

\*\*\*, \*\*, \* Significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 8: Regression Analysis - Audit Committee Structure and CEO Compensation

### Regression Analysis - Compensation Committee Structure and CEO Compensation

$$\begin{aligned}
 \text{Log\_Compensation} = & \alpha + \beta_1 \text{Compensation Committee Size} + \\
 & \beta_2 \text{CC Stock} + \beta_3 \% \text{Insiders} + \beta_4 \% \text{Gray Directors} + \\
 & \beta_5 \% \text{Outsiders} + \beta_6 \text{Fraction of CC in AC} + \\
 & \beta_7 \text{Company Size} + \beta_8 \text{Company Performance}
 \end{aligned}$$

	coefficients and t-statistics			
	log_salary	log_st	log_lt	log_T_C
Intercept	5.030 (8.351) ***	4.739 (13.501) ***	3.155 (5.553) ***	4.208 (12.989) ***
Compensation Committee Size	0.091 (1.449)	0.052 (1.420)	0.115 (1.963) *	0.074 (2.184) **
%Insiders	0.064 (0.105)	0.052 (0.145)	-0.041 (-0.073)	0.116 (0.352)
%Gray	0.173 (0.327)	0.232 (0.751)	-0.219 (-0.447)	-0.112 (-0.394)
%Outsiders	-0.048 (-0.112)	0.068 (0.270)	-0.261 (-0.647)	-0.031 (-0.134)
Fraction of CC in AC	0.170 (0.834)	0.141 (1.185)	-0.496 (-2.556) **	-0.143 (-1.301)
CC Stock	-1.741 (-1.159)	-1.186 (-1.355)	-0.177 (-0.127)	-0.760 (-0.941)
Company Size	0.055 (0.618)	0.136 (2.621) ***	0.519 (6.173) ***	0.351 (7.307) ***
Company Performance	-0.145 (-0.362)	-0.289 (-1.237)	-0.696 (-1.867) *	-0.563 (-2.612) ***
n	105	105	104	105
Adjusted $R^2$	-0.024	0.097	0.477	0.522

\*\*\*, \*\*, \* Significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 9: Regression Analysis - Compensation Committee Structure and CEO Compensation

## **Eidesstattliche Erklärung**

Ich versichere, dass ich meine Diplomarbeit ohne Hilfe Dritter und ohne Benutzung anderer als der angegebenen Quellen und Hilfsmittel angefertigt und die den benutzten Quellen wörtlich oder inhaltlich entnommenen Stellen als solche kenntlich gemacht habe. Diese Arbeit hat in gleicher oder ähnlicher Form noch keiner Prüfungsbehörde vorgelegen.

Wien, October 11, 2011

Silvia Cindric

## Abstracts

Corporate scandals (e.g. Enron, WorldCom) have evoked outrage in the public as well as in shareholders and regulators. Managers with insider information extracted enormous amounts of money by betraying both their company and their shareholders. Three economic actors were to blame first the executives, second the auditor and third and most importantly the board of directors. In reaction to these corporate scandals new regulations concerning corporate governance emerged (e.g. SOX 2002, NYSE Corporate Governance Regulations). Shareholder activists as well as institutional investors demand their representatives within the corporation which are responsible for protecting shareholder interests namely the board of directors to be structured and act in compliance with corporate governance regulations. This issue similarly attracted the interest of academics as the growing amount of academic literature dealing with executive compensation, the board of directors or the various committees shows. Theoretical assumptions are mostly in accordance with corporate governance regulations however empirical findings are inconclusive. The aim of this work is to investigate the relationship between the board of directors and its subordinate audit and compensation committee with CEO compensation. First academic literature agency theoretic assumptions about CEO compensation are discussed, followed by alternative approaches (e.g. human capital theory, stewardship theory). In the next section the board of directors as well as the audit and the compensation committee are analyzed and hypotheses about the association with CEO compensation are developed and subsequently tested in the empirical part of this study. Positive coefficients were found for company size, board size, audit committee size, gray directors serving on the audit committee, and compensation committee size. Negative coefficients were found for percentage of insiders on the company board, company performance measured as ROA, the percentage of insiders serving on the audit committee and director overlap between compensation committee and audit committee.

*Key words:* Agency Theory, CEO compensation, board of directors, audit committee, compensation committee, managerial entrenchment, insiders, outsiders, gray directors, corporate governance, chairman of the board

Bilanzskandale (z.B. Enron, WorldCom) haben Empörung in der Öffentlichkeit als bei den Aktionären und den Regulierungsbehörden hervorgerufen. Manager mit Insiderinformationen extrahierten durch den Verrat ihres Unternehmens als auch ihrer Aktionäre enorme Reichtümer. Drei wirtschaftliche Akteure wurden als die Hauptschuldigen identifiziert: das Management, der Auditor und das Board of Directors (der Aufsichtsrat).

In Reaktion auf diese Skandale sind weltweit Unmengen an neuen Corporate Governance Regulierungen entstanden (zB SOX 2002, NYSE Corporate Governance Regulations). Shareholder als auch institutionelle Investoren fordern dass deren Vertreter innerhalb des Unternehmens, der Aufsichtsrat, welcher die Aufgabe hat die Aktionärsinteressen zu schützen, sowohl nach diesen Corporate Governance Vorschriften handelt als auch dementsprechend strukturiert ist. Auch das rege Interesse von Wissenschaftlern wurde geweckt, wie anhand der wachsende Menge an wissenschaftlichen Literatur über die Vergütung von Führungskräften, das Board of Directors oder die verschiedenen Subkommittees ersichtlich ist. Theoretische Annahmen sind größtenteils im Einklang mit Corporate Governance-Vorschriften, die empirischen Ergebnisse divergieren jedoch und erlauben kein einheitliches Bild. Das Ziel dieser Arbeit ist es, die Beziehung zwischen dem Board of Directors, seiner Subkommittees (Audit und Compensation Committee) und der CEO Vergütung zu untersuchen. Zuerst wird ein Überblick über theoretische Annahmen bezüglich Vorstandsgehälter gegeben, gefolgt von alternativen Ansätzen (z.B.: Human Capital Theorie, Stewardship Theorie). Im nächsten Abschnitt werden das Board of Directors als auch das Audit und Compensation Committee analysiert. In diesem Abschnitt werden auch Hypothesen über den Einfluss dieser Strukturvariablen auf CEO Vergütung entwickelt und anschließend in dem empirischen Teil der Studie getestet. Positive Koeffizienten wurden für Firmengröße, Aufsichtsratsgröße, Audit Committee Größe, den Anteil der verbundenen Direktoren (z.B. zugehörige Unternehmensberater) als Mitglieder des Audit Committees und Compensation Committee Größe gefunden. Negative Koeffizienten wurden für den Prozentsatz von Insidern im Aufsichtsrat, ROA, den Prozentsatz der Insiders im Audit Committee und für die Mitglieder Überschneidungen zwischen Audit Committee und Compensation Committee gefunden.



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## Education

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## Publications

Silvia Cindric. L'Oréal – Focus auf den Kunden. In Schwand Reisinger, editor, *Fallstudien aus der österreichischen Marketingpraxis 5 - Ein Arbeitsbuch zu den Grundzügen des Marketin*. Facultas, Wien, 2009.

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