Sarbanes-Oxley act and its influences on the relationship between board effectiveness and CEO compensation, and Firm performance

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PREFACE AND ACKNOWLEDGEMENTS

Before you, I proudly, present my master thesis in the field of Finance & Accounting. The master thesis is the most important step in completing the Master's program Accounting & Finance, and viewed by many as one of the toughest hurdles to overcome in obtaining the elusive Master's Degree.

During the seminars corporate finance: corporate governance and management accounting & control my interest grew on the topic Executive compensation. In my search of finding a interesting subject to investigate, I came across different studies on corporate finance, corporate governance and accounting research. From reviewing different papers, I believed that there must be some relationship between monitoring mechanism and bonding mechanisms – in an agency framework – in terms of aligning management's interest with that of the shareholders, and other key stakeholders. This was the starting point of my thesis and empirical research, and what followed after a intensive period is this document.

Writing this thesis would not have been possible if it was not for the help of certain people. First of all, I would like to thank my supervisor Dan Zhang, for her help during this intense period. By giving useful feedback, providing interesting papers and investing tremendous amounts of effort and time in me, I was able to finish this thesis in a period of only two months. Which is an accomplishment in itself. Furthermore, giving useful advice during the empirical phase, helped me to quickly overcome statistical hurdles and allowed me to try different approaches in finding what best suits this type of research.

Next to the indispensable help from Dan Zhang, I would like to thank my parents who gave me the possibility to study in the first place, both financially and mentally supporting me. Also, I would like to thank my 'annoying' brother for his critical view on my work and his continues questioning if I've put enough time and effort in my thesis, almost every day. Unconsciously, this focussed me on my thesis and resulted in a quick workpace, throughout this period.

As a concluding remark, I would like to add that during this intense period, I have really grown as a person, by facing numerous of challenges I doubted to overcome in the first place, developing skills both in finance and accounting, but also my statistical and research skills, and my ability of meeting tight deadlines. Therefore, I have to say that writing my thesis was a fruitful period, where I hopefully reap the benefits out of during my further career.

Raoul Baker

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ABSTRACT

The enactment of SOX has large implications for board structures, board composition, executive compensation and firm performance. SOX requires for publicly listed firms within the US to have greater participation of outside directors on the board and key committees, such as the audit committee and compensation committee. By imposing these requirements, SOX hopes to increase independence in the organization of firms, leading to stronger corporate governance and less corporate wrongdoing. Since the enactment of SOX is an influential event in the field op corporate governance, a substantial amount of research has, therefore been done on the impact of SOX on board structure, board composition, executive compensation and firm performance. However, no prior research has been conducted on how SOX affects the relationship between board effectiveness and executive compensation, in an agency framework. This study fill this gap, by studying on how SOX affects the relationship between board effectiveness and executive compensation, it will provide insights on how the enactment of SOX and its requirements for the board of directors are beneficial in aligning shareholder and manager interest and how this is reflected in CEO compensation. In addition, this study examines the impact of SOX on firm performance, and if there is a significant difference between weak governed firms and good governed firm on how they reap the benefits of SOX in comparison with the related costs to be compliant with SOX.

For a sample of 411 S&P 500 firms over a period of seven years (1999 – 2006), this study provides empirical evidence that the enactment of SOX increases board effectiveness, making board of directors more capable of monitoring the CEOs to act in the best interest of the shareholders and maximize shareholder value. As a result of this the compensation received by a CEO decreases after the enactment of SOX, consistent with the hypothesis, providing evidence that the relationship between board effectiveness and executive compensation is of an inverse nature and that monitoring mechanisms and bonding mechanism serve as substitutes for one another. By increasing one of the mechanisms, as SOX does in terms of monitoring capabilities, the other mechanism will decrease and be substituted, which is reflected in the executives compensation. In terms of Firm performance, this study provides evidence consistent with prior literature, that after the enactment of SOX, firm performance decreases. Furthermore, this study provides evidence that SOX is more beneficial for weak governed firms in the short term, but on the long run strong governed firms find SOX to be the most beneficial of the two.

JEL classification:

G18, G32, G34, G38, K22

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Sarbanes Oxley Act, Corporate Governance, Corporate Finance, Executive Compensation, Agency theory

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CHAPTER 1 Introduction

In July 2002, the Sarbanes Oxley Act (hereafter, SOX) was adopted by the Congress of the United States in response to a series of corporate and accounting scandals in late 2001 and early 2002, and profound concerns over the actions of auditors, accountants, directors and Self-Regulatory Organizations.

It attempts to bring in improved principles and accountability in the operations of companies in the U.S and it is seen by many as one of the most important legislation of its time in terms of internal control, corporate governance and financial reporting. The main goal of SOX is to reduce the risk of fraud and conflicts of interest and to increase the financial transparency and confidence in the markets to restore investor confidence in the U.S. (Pankaj and Zabihollah, 2006). To achieve this goal, SOX imposes requirements on auditors, accountants, directors and Self-Regulatory Organizations.

This study defines the following research question: how does the Sarbanes-Oxley act affect the relationship between board effectiveness and executive compensation, and firm performance? Since the enactment of SOX, a substantial amount of research has been conducted on the impact of SOX on board structure, board size, CEO compensation, corporate governance and firm performance. However, no prior research has been conducted on how SOX affects the relationship between board effectiveness and executive compensation, in an agency framework.

This study fill this gap, by studying on how SOX affects the relationship between board effectiveness and executive compensation, it will provide insights on how the enactment of SOX and its requirements for the board of directors are beneficial in aligning shareholder and manager interest and how this is reflected in CEO compensation.

It also provides evidence - through an agency perspective - how the monitoring expenditures (board revision) by the principal and the bonding expenditures (executive compensation) by the agent interact. Furthermore, it is possible to observe if legislation on corporate governance has a positive or a negative effect on the monitoring - bonding relationship. By increasing monitoring capacity or board effectiveness, it is predicted that less or different types of compensation is needed to align interest between shareholders and management.

Since SOX requires that the majority of the board of directors must be composed of independent outside directors in order to be compliant, it is expected that this should lead to an increase in board effectiveness. Therefore, it should be interesting to see how SOX influences this relationship between board effectiveness and CEO compensation. Moreover, it is interesting to see how SOX impacts firm performance and if there is a difference between weak and strong governed firms. In addition, this study investigates the impact of SOX on firm performance.

Since a large amount of research has focussed on the impact of SOX on firm performance, this study differentiates itself by using different criterion for the sample selection. By doing so, it will provide complementing evidence on the relationship between the enactment of SOX and firm performance. Also, by using a sample based on the S&P 500, it can provide some insights on how SOX effects the larger firms in the U.S. and how these firms cope with the enactment of SOX. Furthermore, this study examines if there is a significant relationship between strong governed

and weak governed firms. Since different studies report that weak governed firms experience more benefits from the enactment of SOX, as the SOX requires them to implement the changes in the governance structure, in order for them to be complied.

In contrast, strong governed firms already have monitoring and bonding mechanisms in place that function accordingly, therefore the benefits of SOX do not outweigh the cost made to be compliant with SOX mandates. This difference in experiencing benefits from the enactment of SOX between strong and weak governed firms could therefore be represented in their operating performance((Ahmed, 2010) Wintoki, 2008) Chhaochharia, 2007) Grinstein, 2007)), where research on this matter is mixed in favour of both the strong or weak governed firms.

This study defines several hypothesis to find evidence for answering the main research question. The hypothesis consist of three main hypothesis, which are: after the enactment of SOX, board effectiveness is negatively related to CEO compensation; after the enactment of SOX, firm performance is negative; and after the enactment of SOX weak governed firms experience negative changes in firm performance.

To validate the hypothesis, a Tobit regression model is used, incorporating variables that the literature review has revealed, are likely to influence executive compensation, firm performance and corporate governance. A Tobit regression model makes it possible (to some extend) to examine the effects of the moderator variable (SOX) on the relationship between the independent variable (executive compensation) and dependent variable (board effectiveness). The Tobit regression model measures both the individual clarifying value of the variables, as well as the combined value of the variables. In addition, interaction terms between the moderator and the dependent variable are introduced, to measure how SOX influences the cause-effect relationship between the board effectiveness and the executive compensation.

As a robustness check for board effectiveness, the analysis of the impact of SOX on the relationship between board effectiveness and executive compensation is repeated, by replacing the independent variable with a different board effectiveness index. For a sample of 411 S&P 500 firms over a period of seven years (1999 – 2006), this study finds that board effectiveness is positively related to SOX at the 1% level, suggesting that the enactment of SOX increases board effectiveness by mandating governance provisions.

Therefore, board effectiveness improves after the enactment of SOX, suggesting that the boards of the sample firms are more capable in monitoring there respective CEOs and aligning interest between management and owners. In addition, evidence shows a significant inverse relationship between CEO compensation and the interaction term SOX times board effectiveness, suggesting that after SOX was implemented board effectiveness increased, therefore substituting the need for compensating CEOs more to align their interest with shareholders.

This provides evidence that monitoring mechanisms are substitutes for bonding mechanisms. Also, SOX makes boards more effective in monitoring CEOs and reduces the risk that CEOs make use of their private benefits of control or show managerial opportunism at the cost of the owners. Consistent with prior research on the relationship between SOX and firm performance, findings suggest a negative relationship between the enactment of SOX and firm

performance. These findings provide some evidence that SOX is unbeneficial for firm performance.

Findings on the impact of SOX on weak and strong governed firms suggest that weak governed firms greatly improve their governance mechanisms post-SOX, maximizing shareholder-value and showing that improving corporate governance is a value enhancing decision, as viewed by the market. In terms of firm profitability (ROA), SOX seems to be more beneficial for strong governed firms.

Since strong governed have less implementation costs to be compliant with SOX. In addition, SOX proves to be more beneficial for weak governed firms in maximizing shareholder-value. Strong governed firms already reached a sub-optimal level of governance within the organization, therefore SOX does not prove to be beneficial for strong governed firms in maximizing shareholder value, in comparison with weak governed firms.

The remainder of this study is organized as follows. Chapter 2 discusses the research question of this study and provides a comprehensive overview of SOX. Chapter 3 discusses the theoretical perspectives used in this study. Chapter 4 provides a literary review of relevant literature and discusses the hypothesis development. Chapter 5 introduces the model specification, the methodology and the data sources and sample criterion. Chapter 6 presents the findings on the impact of SOX on the relationship between board effectiveness and CEO compensation, firm performance, and between strong and weak governed firms. The last chapter summarizes and concludes the empirical results.

CHAPTER 2 Literature Review

The focus of this study, is on the Sarbanes Oxley act, as well as on the relationship between board effectiveness (monitoring) and executive compensation (bonding). Therefore, this study will contain an extensive literature review of the most important studies on SOX, board characteristics and composition, executive compensation, and the monitoring - bonding relationship. In addition, the empirical findings of relevant studies will be discussed.

2.1 An overview of SOX

The enactment of SOX was a reaction by congress to the major corporate scandals that led to the downfall of Worlcom and Enron, preventing that such scenarios will not arise within the future. To realize this goal, SOX aims to strengthen the independence of auditing firms, to improve the quality and transparency of financial statements and corporate disclosure, to enhance corporate governance, to improve the objectivity of research, and to strengthen the enforcement of the federal securities laws[1].

To enhance corporate governance within firms, SOX mandates governance provision, which focuses on board structures and board composition. For instance, Firms listed on the NYSE or NASDAQ, are mandated to have a board of directors composed of a majority of independent outside directors and the directors, who are presumably independent must meet criteria of independence.

Furthermore, firms compensation committees and other key governance committees are required to be entirely composed of independent outside directors, and the audit committee is required to have at least three members and is entirely composed of independent outside directors, where every member must have sufficient financial knowledge to be able to carry out their responsibilities, accordingly.

Within the audit committee, it is required that one of the members is a financial expert, and if the firms does not have a financial expert on the audit committee it is required to disclose the reason for this.

1 The Practitioner's Guide to the Sarbanes-Oxley Act, Volume 1, The American Bar Association, 2004.

2.2 The effects of SOX on the board of directors

The enactment of SOX has large implications for board structures. For instance, SOX requires for publicly listed firms within the US to have greater participation of outside directors on the board and key committees, such as the audit committee and compensation committee. By imposing these requirements, SOX hopes to increase independence in the organization of firms, leading to stronger corporate governance and less corporate wrongdoing.

By extensively reviewing the literature on the effects SOX has on the board of directors, both empirical and literary evidence shows that SOX has different effects on board composition, board size and the attraction on outside independent directors. Prior research on the relationship between firm performance and the participation of outside directors in the firm are mixed, where research is based on the views of agency theory or managerial 'hegemony' theory. More specifically, managerial hegemony assumes – like agency theory – that although owners and managers have different interest, managers control main levers of powers (Lorsch & MacIver, 1989; Mace,1989; Vance,1983).

Managerial hegemony theory suggest that board of directors are dominated by management, therefore not serving the best interest of shareholders. The initial idea behind the implementation of a board of directors is, to advise and monitor management on behalf of the shareholders and other key stakeholders. In order for board of directors to be effective in monitoring management, the board of directors must not be influenced by management in their decision-making responsibilities.

The initial idea behind the implementation of a board of directors is, to advise and monitor management on behalf of the shareholders and other key stakeholders. In order for board of directors to be effective in monitoring management, the board of directors must not be influenced by management in their decision-making responsibilities. Therefore, independence of the directors is necessary to function, accordingly.

As stated ealier, research on the relationship between board independence is mixed. For instance, Hermalin and Weisbach (1991) argues that there is no significant association with board composition and firm performance (reflected by Tobin's Q). However, Agrawal and Knoeber (1996) report findings that show a negative relationship between board independence and firm performance (reflected by Tobin's Q), by using seven different corporate governance mechanisms in a simultaneous equations context. Also, Bhagat and Black (2002) provide evidence that firms with increased board independence is not positively related to firm performance, wile using a variety of performance measures.

Bhagat and Black (2002) state that firms with more independent boards do not outperform firms with less independent boards. Furthermore, the authors find firms who show weak firm performance are more likely to increase the participation of independent outside directors on the board, although not leading to increased firm performance. Another study by Bhagat and Bolton (2008), find similar results with prior research, that board independence and operating performance are negatively related.

However, positive association between firm performance and board independence is also reported by a large number of studies. As such, numerous studies find evidence that independent outside directors are more capable in monitoring management and protecting shareholder wealth, compared to inside directors ((Brickley & James (1987); Byrd & Hickman (1992); Peasnell et al. (2000); Solomon & Solomon (2004); McCabe & Nowark (1992); Fernandes & Fransisco (2008); Mura (2007); Chin-Jung & Ming-Je (2007); Schellenger et al. (1989); Elloumi &Gueyie (2001); OSullivan & Wong (1999)). According to Beasley (1996), outside independent directors reduce the likelihood of financial statement fraud, and Scherrer (2003) suggest that outside independent directors prove invaluable to corporations, providing access to resources and information. Scherrer (2003) suggest, that outside independent directors are not concerned with career opportunities presented within the firm, making independent outside directors more capable in protecting shareholders' interest.

Previous mentioned studies, find evidence that outside independent directors are more effective monitors, in comparison with their inside counterparts. Nevertheless, managerial hegemony theory argues the board of directors to be incapable of fulfilling its supervisory role and protecting shareholders' wealth.

As shown by prior studies in corporate governance, prior literature finds conflicting evidence on the relationship between high participation of independent directors on the board and firm performance. The resemblance these studies have, is that they all originated before 2002, before the enactment of SOX, a significant change in the corporate governance landscape. Therefore, it would be interesting to how SOX changes the perception of increased board independence, as SOX mandates a majority of independent directors on firms board of directors.

According to earlier studies outside director monitoring has a beneficial effect on the independence of the board and monitoring capabilities. Another phenomena that is reflected in the literature is the tendency of larger firms to increase their board size Post-SOX. By attracting additional outside directors, board size increases and firms become compliant with SOX legislation. However, these firms do not terminate inside directors to create smaller boards, and thus more effective boards.

Prior studies, such as Yermack (1996) have criticized the effectiveness and performance of large boards, suggesting that the enactment of SOX could have some negative effects on board effectiveness if large firms simply increase their board size to be compliant, in stead of revising their board. Yermack (1996) finds empirical evidence that increased board size is negatively related tofirm value. Prior literature, such as Brickley et al. (1997) suggest that larger boards (beyond seven or eight) can be less effective than smaller boards.

According to Lipton & Lorsch (2005), the behavioral standards within most boardrooms are dysfunctional because directors rarely criticize the policies of the top managers. They suggest to limit the board of directors to ten, with a preference to a size of eight or nine. Even if the monitoring capabilities increase with the size of the board, board effectiveness is declined due to slower decision-making, less candid discussions of managerial performance, and biases against risk-taking. The insight behind this is, when board size increases, the effect to tackle agency

problems within the firm are reduced, making the boardroom more symbolic and less a part of the management process (Lipton & Lorsch, 2005; Eisenberg et al., 1998).

Under SOX, the independence of the board is increased, but the size as well, leading to less effective boards and more opportunities for the CEO to entrench himself.

2.3 The effects of SOX on executive compensation

In addition to the fact that SOX has some significant impact on board structures, research has also found evidence, that SOX influences executive compensation. Carter et al. (2009) investigate whether the enactment of SOX influences the relationship between earnings and bonuses. In stead of focussing on the governance reforms SOX implies, Carter et al. (2009) focus on the changes in the financial reporting system and how it reduces discretion allowed by managers.

Theory predicts that when discretion is reduced, firms will put more weight on earnings in compensation contracts to encourage effort, rather then bonuses. However, the authors state that the increased risk that SOX imposes on executives may cause firms to temper this contracting outcome. The authors find evidence that the implementation of SOX led to a decrease in earnings management and that firms placed more weight on earnings in bonus contracts Post-SOX. In addition, the authors did not find evidence that the changes in compensation contracts were the result of assuming more risk by executives.

In a way this research documented a change in executive compensation Post-SOX, however a thorough explanation is still missing. This could implicate that board effectiveness plays an important role in establishing executive compensation. Cohen et al. (2007) examine whether SOX has an effect on the compensation structure and the risk-taking incentives of CEOs as revealed by their research and development expenses and capital expenditures. The authors hypothesize that firms will react to additional liability imposed by SOX on corporate executives by altering the mix of incentive compensation to fixed salary awarded to them in order to provide insurance. The authors find evidence that there was a significant decline in the ratio of incentive compensation to salary after the passage of SOX.

They also find evidence that the research and development expenses and capital expenditures made by CEOs experienced a significant decline after the enactment of SOX. Cohen et al. (2007) provide us a better understanding in how SOX affects CEO compensation in relation to risk appetite, then Carter et al. (2009). However, the relationship with board effectiveness is still missing.

2.4 SOX and firm performance

Research has also examined the effects SOX has on firm performance. For instance, Bhagat and Bolton (2009) examines how the enactment of SOX influences the relationship between corporate governance and firm performance. The Authors find a negative and statistically significant association between board independence and operating performance in the period before (pre-2002) the passing of SOX, and a positive and statistically significant association in the period after (post- 2002) the passing of SOX. In their sample, stock ownership of directors related to firm

performance proved to be positive and statistically significant, throughout both periods. As for the other variables, such as the governance indices introduced by Gompers, Ishii and Metrick (2003) and Bebchuk, Cohen and Ferrell (2009) provide inconsistent results. The authors, therefore suggest that director stock ownership is the most reliable measure of governance to be considered in corporate governance studies.

To asses how the enactment of SOX influences the relationship between corporate governance and firm performance, the authors examine how CEOs are disciplined following poor firm performance. According to Bhagat and Bolton, board independence and director stock ownerships seem to be effective corporate governance mechanisms for replacing the CEO following poor performance. Furthermore, the two corporate governance indices, being the G-Index of Gompers, Ishii and Metrick (Gomper, Ishii and Metrick, 2003) and the E-Index of Bebchuk, Cohen and Ferrell (BCF, 2009), show during the pre-SOX period an positive and statistically significant relationship between corporate governance and firm performance.

However, during the post-SOX period, the G-Index shows a *negative* and significant association between corporate governance and firm performance. Also, during the post-SOX period, the E-Index reveals an inconsistent relation between corporate governance and firm performance. (Sarbanes-Oxley, Governance and Performance, Bhagat & Bolton).

Another study by Ahmed et al (2010), provide evidence on the increased net-cost of the enactment of SOX. Their results find empirical evidence that after SOX, firms experience declines in cash-flow profit (excluding audit fees) of 1.3% of assets and 1.8% of revenue after controlling for firm-specific characteristics, macro-economic conditions, and other factors that explain operating cash flows. Collectively, these cash-flow declines suggest SOX-related net costs of about $19 billion per year or $75 billion over the four-year post-SOX period. Furthermore, the authors find evidence that the enactment of SOX is more costly for small firms than for larger firms, providing some evidence on the disproportionate impact of SOX.

A study by Kang et al. (2010) find empirical evidence that the discount rates in the U.S. rise significantly after SOX, in comparison with the discount rates in the U.K., which show no change at all. The authors, therefore, believe that this provide some evidence that the enactment of SOX negatively influences corporate investments in the U.S.

2.5 The relationship between monitoring and compensation

According to Jensen and Meckling (1976) the problem which arises with the “separation of ownership and control” is in essence an agency problem, where shareholders and managers have a conflict of interest. To address this agency problem, the principal (shareholders) and the agent (managers) will incur monitoring and bonding expenditures to improve the alignment of interest, where monitoring expenditures are means to control agent behavior and bonding expenditures means to motivate and direct behavior in line with shareholder goals.

Agency theorists, therefore believed that a relationship between monitoring and bonding mechanisms existed, resulting in significant amount of research on this phenomena in both organizational and finance literature which suggests that there is a substitution effect between

monitoring and bonding. For instance, Westphal and Zajac (1994) observed an inverse relationships between incentive compensation and monitoring. The authors interpret their results in a way that increased board monitoring puts pressure on the CEO in making the decisions that is beneficial for the shareholders, thus less compensation is needed to achieve the same effect through pay-for-performance. Furthermore, Beatty and Zajac (1994) also finds evidence that the levels of monitoring observed are inversely related to the levels of managerial incentives used to align shareholder interest with CEO interest. There empirical findings are obtained with multiple measures of monitoring and considering managerial incentives both in terms of compensation and stock ownership.

More generally, the observed trade-off between monitoring and bonding suggests that there are costs to monitoring and bonding management, and that the level of monitoring will therefore differ across firms, and that considering firm-specific contingencies such as the use of incentives can contribute to inverse relationship between monitoring and bonding. In addition, Lipert and Moore (1995) also find empirical evidence of a trade-off between monitoring and bonding. According to Lipert and Moore, firms with well developed internal monitoring systems have CEO contracts which are weaker align with shareholder interest. Also, firms with boards of directors that are not independent make use of higher compensation contracts to increase alignment.

Therefore, the authors believe that internal monitoring decisions are used as substitutes for bonding CEO compensation and shareholder welfare. In addition, firms which have secluded themselves from the market for corporate control (e.g., through poison pills and/or staggered board elections) have higher CEO alignment, thus external monitoring is viewed as a substitute for bonding. The authors state that there findings are consistent with rational shareholders acting on the inevitable owner-manager conflict by insisting on high levels of bonding in cases where monitoring is weak. More important, the results indicate that low levels of pay-performance sensitivity per se do not imply a breakdown in control of the owner manager conflict.

CHAPTER 3 Theoretical perspectives

3.1 Agency theory

Agency theory seeks to describe the differences in behavior or decisions among members of a group. More specifically, it describes the relationship between two entities called the principal and the agent, where the principal delegates certain predetermined responsibilities to the agent against payment. In this relationship, agency theory explains differences in behavior or decisions between the principal and the agent, assuming that both parties pursue different goals and may have different attitudes toward risk, possibly leading to a conflict of interest between the principal and the agent.

The initial concept of Agency theory was originally presented in 1932 by Adolf Augustus Berle and Gardiner Coit Means (Berle & Means, 1932). Berle and Means were the first to discus the separation of ownership and control in modern corporations, and the related problems arising from this separation within organizations. By exploring the concepts of agency theory and its application toward the development of large corporations, Berle and Means predicted that when management hold small amounts of equity in the firm and shareholders are too dispersed to enforce value maximization, management could be tempted to use corporate resources for their own benefit, rather than in the best interest of the shareholders. According to Berle and Means, eventually, corporate executives will obtain full discretion in making decisions and managing the firm, which could lead to the extraction of value at the expense of the shareholders.

In 1976 Jensen and Meckling (1976) introduced the concept of agency costs. Jensen and Meckling define an agency relationship as a contract between a principal and an agent, in which the agent performs actions on behalf of the principal by making use of the decision making authority delegated by the principal. Assuming that both entities to the relationship are utility maximizer, there is reason to believe that conflicts of interest between the principal and the agent can arise, as the interest of the agent can differ from that of the principal.

To overcome (to some extend) this ‘agency conflict’, principals need to create mutual interest with the agent, by appropriately incentivizing the agent and by incurring monitoring costs designed to limit the diverge activities, of the agent. In addition, the principal will compensate the agent by expending resources (bonding costs) to reduce the risk that the agent will make decisions, which are harmful to the principals wealth. However, it is assumed that at a zero cost level is impossible for both the principal or the agent, to ensure that the agent’s interest are aligned with the principals interests.

Generally, the principal and the agent will incur monitoring and bonding costs to align interest as much as possible, however divergence between the agent's decisions and those decisions which would maximize the welfare of the principal will still occur. In terms of costs this could best be described as the "residual loss". Jensen and Meckling (1976) define all these costs as agency costs. Where the sum of agency costs is:

1. the monitoring expenditures by the principal,'
2. the bonding expenditures by the agent,
3. the residual loss.

According to Jensen and Meckling, the relationship between the shareholders and management in a firm is the definition of a pure agency relationship. The problem which arises with the separation of ownership and control in the modern diffuse ownership corporation are strongly related with the general problem of agency.

Further research on the concept of agency theory, can be generally classified into two streams. The first streams deals with the general problem of agency in a principal-agent relationship. Research in this field seeks to find a solution to the problem inherent to a agency relationship, by investigating the optimal design of a contract in an agency relationship in different situations. Optimal contracts are either behavior-based (easy or cheap monitoring) or outcome-based (difficult and costly monitoring), depending on the extent to which the principal is capable to monitor the agent's behavior. Regarding outcome-based contracts, the optimal design of a contract is an equilibrium between incentivizing the agent and risk-sharing between the principal and the agent, depending on several factors as outcome uncertainty and risk aversion (Eisenhardt, 1989).

However, there are limitations, concerning the use of contracts in resolving agency conflicts. For one thing, while the general agency relationship assumes that designing a contract is costless, transaction costs theory argues this assumption, suggesting that when designing a contract various costs (e.g. negotiations, legal fees) are incurred. Furthermore, according to Shleifer and Visny (1997), it is technologically impossible to design optimal contracts, capturing all possible future eventualities. Therefore, these constraints shaped the need for corporate governance (Hart, 1995). The second stream of agency theory, also known as positivist agency theory (Eisenhardt, 1989), tries to overcome these constraints by investigating governance mechanisms as alternative or complementing solutions to the agency problem. In that sense, this second stream can be seen as an extension of the first stream.

Governance structures are useful in situations when decisions need to be made that are not described in the initial contract. Therefore, corporate governance can be seen as set of mechanism implemented by outside investors (principals) to protect them against expropriation by management (agents) (La Porta et al., 2000). Such mechanism are, for instance, the use of contracts similar to the first stream of agency theory, and the implementation of information systems designed to lower opportunistic behavior by management, where the first system is the

board of directors, serving the purpose to monitor and advise management in making decision that are creating shareholder value.

In addition, the board of directors is responsible for setting the level of compensation received by management. For this task, the board constitutes a remuneration committee, which makes studies concerning the level and the design of executive compensation. The second system concerns the managerial labour market, which disciplines management both internally and externally. The third information system is an efficient capital market (Manne, 1965). Bad managerial performance leads to depressed stock price results, attracting other firms or investors, possibly causing dismissal of management.

Regardless of using contracts and information systems, monitoring of management is improved through concentrated ownership. According to Shleifer and Visny, majority shareholders are capable of being sufficient monitors and implementing corporate governance mechanism, due to their power within the firm, where minority shareholders are too dispersed in acting upon bad management (Shleifer & Visny,1997).

Additionally, shareholder-rights are improved by legal protection, enforcing through legislations and standards a stronger position of shareholders versus management (e.g. protection of shareholders' voting rights, board member election, and protection against expropriation by management. Finally, disciplining management through debt can serve as a monitoring mechanism, penalizing management when does not meet is obligation to pay back debts. Furthermore, creditors can serve as efficient monitors.

3.2 Optimal contracting theory

Executive compensation is viewed by many in economics as a possible solution in aligning management and shareholders in pursuing the same goals. On the basis of this idea lies optimal contracting theory. Optimal contracting theory assumes that the board of directors is responsible for designing optimal contracts for executives, providing incentives to maximize shareholder value. These contract are mostly defined as executive compensation packages, and are designed following an outcome-based contract, relating compensation to performance.

Executive compensation, therefore, is seen as a valuable mechanism to address agency problems, when monitoring is too difficult or costly. Executive compensation serves to align the interests of shareholders and management by relating wealth of management and shareholders to the same outcome, being strong firm performance.

The notion behind this assumption stems from Berle and Means (1932), suggesting that if management hold too small amounts of ownership within the firm, shareholder value maximization is not a goal in itself that they are interested in. Due to the utility-maximizing nature of the managers, outcome-based contracts will encourage managers to exert more effort to realize firm specific goals, as their level of remuneration is related to the delivered performance. Eventually, bringing shareholders objectives in line with the pay-for-performance contracts will lead to shared interest of shareholders and managers in increasing firm performance and maximizing shareholder value.

However, since perfect alignment is unobtainable, optimal contracts are a result of minimizing agency costs – including monitoring expenditures, bonding expenditures, and a residual loss related to the specific agency relationship (Bebchuk et al., 2002)

3.3 Managerial power theory

Proponents of the managerial power theory believe that agency theory and optimal contracting theory fail to describe the power imbalance between owners and managers (Tosi et al., 1999).

According to Grabke-Rundell and Gomez-Mejia (2002), agency theory and optimal contracting theory are flawed. They argue that Agency theory and optimal contracting theory acknowledge the fact that power plays an important role in the contracting process, agency and optimal contracting theory do not test a behavioral hypotheses. Bebchuck and Fried (2003) and Bebchuk, Fried and Walker (2002) argue that the contracting process in itself is an agency conflict and the outcome of the contracting process does not resolve the agency problems within firms. According to them, executive compensation is a part of the problem and therefore can not be the solution of the problem.

Managerial power theory differs from agency theory and optimal contracting theory, by focussing on the power inbalance between owners and manager, and how managers can entrench themselves through the use of power within the firm. According to Finkelstein (1992), managerial power can be divided in four types, being structural power, ownership power, expert power and prestige power.

Structural power is power derived from the position within the organization and increases when moving up the hierarchy. Finkelstein (1992) suggest that more structural power allows managers to influence colleagues more. Expert power is the managerial power derived from an inbalance in relevant knowledge for certain firm specific decisions. Ownership power is derived from the levels of ownership managers have within the firm. As this proportion of ownership increase, manager can use this power to entrench themselves. Prestige power is managerial power derived from reputation. When managers show strong performance there reputation increases. With this increase in reputation, managers derive more power to influence colleagues or others in making decisions best serving the respective manager.

Furthermore, agency theory and optimal contracting theory assumes that the members of the board of directors always act in the best interest of the shareholders. According to Bebchuk and Fried (2003, 2004, 2006), assuming that directors will always act in the best interest of the shareholders is based on no good reasons. Bebchuk and Fried (2003, 2004, 2006) argue that directors also act upon their self interest. Therefore, directors will side with the party that is best aligned with the interest of the director (Conyon and Ye, 2004).

CHAPTER 4 Hypothesis development

4.1 Research Question and Significance

Prior research suggests that SOX affects the board of directors in terms of size, structure and representation and that SOX influences the compensation received by the CEO and other executives. However, a small amount of evidence has been found on how SOX influences the relationship between board control or board effectiveness and the level of compensation received by the CEO.

This is important, since research has shown that board effectiveness is strongly related to executive compensation in a way that monitoring capacity of the board of directors and executive compensation are both manners to mitigate agency conflicts between ownership and management, and could therefore substitute one another. By increasing monitoring capacity or board effectiveness, it is predicted that less or different types of compensation is needed to align interest between shareholders and management.

Since SOX requires that the majority of the board of directors must be composed of independent outside directors in order to be compliant, it is expected that this should lead to an increase in board effectiveness. Therefore, it should be interesting to see how SOX influences this relationship between board effectiveness and CEO compensation. Moreover, it is interesting to see how SOX impacts firm performance and if there is a difference between weak and strong governed firms. In order to examine this phenomenon, the following research question is stated:

"How does the Sarbanes-Oxley act affect the relationship between board effectiveness and executive compensation, and firm performance?"

A substantial amount of research has been done on the impact of SOX on board structure, board size, CEO compensation, and outside directors. Also, there is some prior research on the relationship between monitoring and incentives or pay-for-performance. However, no prior research has been conducted on how SOX affects the relationship between board effectiveness and executive compensation, in an agency framework.

This study fill this gap, by studying on how SOX affects the relationship between board effectiveness and executive compensation, it will provide insights on how the enactment of SOX and its requirements for the board of directors are beneficial in aligning shareholder and manager interest and how this is reflected in CEO compensation. It also provides evidence - through an agency perspective - how the monitoring expenditures (board revision) by the principal and the bonding expenditures (executive compensation) by the agent interact. Furthermore, it is possible to observe if legislation on corporate governance has a positive or a negative effect on the monitoring - bonding relationship. In addition, this study investigates the impact of SOX on firm performance.

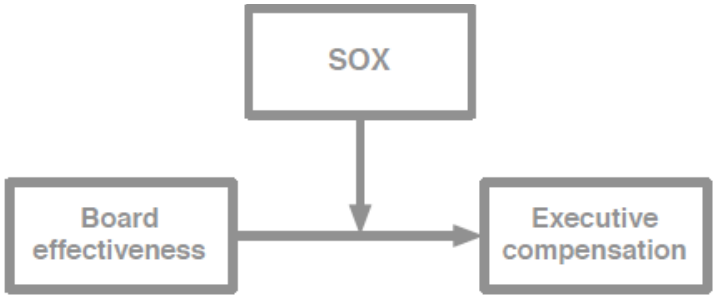
Since a large amount of research has focussed on the impact of SOX on firm performance, this study differentiates itself by using different criterion for the sample selection. By doing so, it will provide complementing evidence on the relationship between the enactment of SOX and firm performance. Additionally, by using a sample based on the S&P 500, it can provide some insights on how SOX effects the larger firms in the U.S. and how these firms cope with the enactment of SOX. Furthermore, this study examines if there is a significant relationship between strong governed and weak governed firms.

As different studies report that weak governed firms experience more benefits from the enactment of SOX, as the SOX requires them to implement the changes in the governance structure, in order for them to be complied. In contrast, strong governed firms already have monitoring and bonding mechanisms in place that function accordingly, therefore the benefits of SOX do not outweigh the cost made to be compliant with SOX mandates. This difference in experiencing benefits from the enactment of SOX between strong and weak governed firms could therefore be represented in their operating performance ((Ahmed, 2010) Wintoki, 2008) Chhaochharia, 2007) Grinstein, 2007)), where research on this matter is mixed in favour of both the strong or weak governed firms.

4.2 Hypothesis development

As previously stated, the main research question of this proposed study is: “How does the Sarbanes-Oxley act affect the relationship between board effectiveness and executive compensation?”. Generally speaking, this question is related to whether a well-established cause-effect relationship between a dependent and independent variable is weaker or stronger depending on the value of the the moderator variable. Taking prior literature on board composition, SOX and the relationship between monitoring and executive compensation into account, the independent variables are defined as variables that determines board effectiveness in terms of monitoring capabilities, the dependent variable is the total executive compensation a CEO receives, and the moderator variable is the enactment of SOX, which are graphically depicted in figure 1.1.

Figure 1.1 Relationship between different variables in initial research design



Therefore, this study examines how the enactment of SOX affects the relationship between board effectiveness and executive compensation in an agency perspective, where board effectiveness reflects the effectiveness of the board of directors in monitoring the CEO on behalf of the shareholders, and executive compensation reflects the total compensation (annual salary, bonus, stock ownership, option grants) the CEO receives in order to make decisions that increase shareholder wealth.

Since SOX increases independence throughout the organization, such as board of directors and key committees, it is expected that this will increase board effectiveness. By increasing board effectiveness (monitoring expenditures) less compensation (bonding expenditures) is needed to align interest of executives with shareholders. To asses how the enactment of SOX affects the relationship of board effectiveness and executive compensation, the following hypothesis are developed:

Hypothesis 1a: After the enactment of SOX, board effectiveness is negative related to the total executive compensation.

Hypothesis 1b: After the enactment of SOX, board effectiveness is negative related to the proportion of non cash incentives (stocks and options) on executive compensation.

Hypothesis 1c: After the enactment of SOX, board effectiveness is negative related to the additional bonuses received by executives.

In addition to examine if SOX has an effect on the relationship between board effectiveness and executive compensation, it would also be interesting to see if SOX affects firm performance. As a large amount of research has focussed on the effects of SOX on firm performance on sample with sample different from the one used in this study, it could provide complementing evidence on the relationship between the enactment of SOX and firm performance. Also, by using a sample based on the S&P 500, it can provide some insights on how SOX effects the larger firms in the U.S. and how these firms cope with the enactment of SOX. Taking prior literature into account on the effects of the enactment of SOX on firm performance, the following hypothesis are developed:

Hypothesis 2a: After the enactment of SOX, firm performance is negative, reflected by ROA

Hypothesis 2b: After the enactment of SOX, firm performance is negative, reflected by Tobins'Q

Furthermore, this study examines if there is a significant relationship between strong governed and weak governed firms. Since different studies report that weak governed firms experience more benefits from the enactment of SOX, as the SOX requires them to implement the changes in the governance structure, in order for them to be complied.

In contrast, strong governed firms already have monitoring and bonding mechanisms in place that function accordingly, therefore the benefits of SOX do not outweigh the cost made to be compliant with SOX mandates. This difference in experiencing benefits from the enactment of SOX between strong and weak governed firms could therefore be represented in their operating performance ((Ahmed, 2010) Wintoki, 2008) Chhaochharia, 2007) Grinstein, 2007)), where research on this matter is mixed in favour of both the strong or weak governed firms.

This study will, therefore provide additional evidence on the matter, by using a sample based on S&P 500 firms only. Taking prior literature into account on the effects of SOX on weak and strong governed firms expressed in firm performance, the following hypothesis are developed:

Hypothesis 3a: After the enactment of SOX, weak governed firms experience positive changes in firm performance, reflected in ROA

Hypothesis 3b: After the enactment of SOX, weak governed firms experience positive changes in firm performance, reflected in Tobin's

CHAPTER 5 Data collection & Methodology

In the following sections, the data collection and methodology will be discussed in order to validate the hypothesis. In the section data collection, it will become clear how the starting sample is collected and which eliminations will be made to achieve a database that is useable to test the hypothesis. In the section methodology, the different variables will be discussed and the regression model, used to validate the hypothesis, will be presented.

The research method used for this study, is archival data analysis. In order to answer the main research question, public databases will be used to obtain relevant data, which will be fully explained in the section data collection. By extracting relevant data from different types of public databases, a database will be created in order to conduct the analysis. Furthermore, the type of data is cross-sectional, which is a result of a trade-off made between the advantages and disadvantages of both cross-sectional data and panel data.

By using dummy variables for indicating whether it is post-SOX or pre-SOX and using interaction terms with the different independent variables, it is believed that disadvantages inherent to cross-sectional data, are resolved. In the section methodology, the different variables and the statistical model will be explained in more detail.

5.1 Data collection

For this study, a sample will be constructed to validate the previously stated hypothesis and, thus the main research question. The sample will consist of S&P 500 firms, and Pre-SOX period will run from 1993 until 2001 and the Post-SOX period will run from 2002 until 2007. From this starting sample, firms will be eliminated that belong to the financial services and utility industries (Standard Industrial Classification codes 6000-6999 and 4900-4999) and limit this study to unregulated firms. Furthermore, firms showing negative earnings will also be eliminated from this starting sample, since the expected relationship between negative earnings and bonus compensation is unclear. Also, firms with new or exiting executives are eliminated, due to the fact that in those years the compensation received by these executives can be affected by hiring bonuses or retirement/ severance/ exit payments.

To collect data on the board of directors and committees, the Risk Metrics database, formerly know as IRRC, is used to extract relevant information. Companies listed at a US stock exchange need to upload numerous forms in this database, containing information about board compensation and executive compensation, including salary, bonus, non-equity compensation, stock awards, options, and deferred compensation. In addition, data on executive compensation is collected from Execucomp, firm characteristics from Compustat and governance data is obtained from RiskMetrics, formerly known as IRRC.

5.2 Methodology

To validate the hypotheses as formulated in section hypothesis development, a Tobit regression model will be used, incorporating variables that the literature review has revealed, are likely to influence executive compensation. By using a Tobit regression model, it is possible (to some extend) to examine how the moderator variable (the enactment of SOX) influences the relationship between the independent variable (board effectiveness) and the dependent variable (executive compensation). The Tobit regression model measures both the individual clarifying value of the variables, as well as the combined value of the variables.

Moreover, by introducing interaction terms within the Tobit regression model, it is possible to measure how the moderator variable influences the cause-effect relationship between the independent and the dependent variable. However, there are limitations to a Tobit regression model. For instance, conclusiveness is limited since correlation is not automatically linked to causation. In addition, the (multiple) regression model assumes a linear relationship between the different variables and there is the problem of omitted variables, where potentially relevant factors are not included in multiple regression model. Furthermore, the trade-off between the advantages and disadvantages of using a multiple regression model, made it clear to make use of a Tobit regression model, where the hypotheses will correspond with the selected independent variables.

A Tobit regression model, also know as censored regression model, is used for data that is censored. The Tobit regression model estimates a linear relationship between variables when the dependent variable is either left or right censored. Censoring occurs when observations in the dependent variable are clustered around a predetermined threshold (often zero), where left censoring reflects a value equal or below the predetermined threshold and right censoring reflects a value equal or above the predetermined threshold.

In comparison wit an Ordinary least Square model, the most important difference wit a Tobit model is that the Tobit model computes the intercept and slope coefficient by maximum-likelihood estimation (MLE), where the Ordinary least square model uses a OLS estimator. The advantage of a Tobit regression model is that, by estimating coefficients through MLE, it allows a prediction of censored data that accounts for a clustered distribution.

Another advantage of using a Tobit regression, is that multiple reporting limits may easily be incorporated. However, to be able to use a Tobit regression, the data set must be normally distributed around the group mean (Tobit line), and the variances must be constant across the range of predicted values. For large amounts of censoring these restrictions are difficult to verify. Therefore, the amount of censoring must be sufficiently small that linearity, constant variance, and normality assumptions of the procedure can be checked. Moreover, outliers within the data set can have a strong influences on the group mean (Tobit line) and on significance tests, which is similar to the uncensored OLS model.

5.3 Variables: measuring board effectiveness

Board effectiveness shows the capabilities a board has as a monitoring mechanism, to the owners of the firm, in resolving the agency conflict between ownership and management and to reduce the playing field or influences of the CEO in extracting private benefits of control at the expense of the firm. In order to measure board effectiveness, an index is constructed based on board size, board independence, directorships held by independent directors, CEO duality, ratio of outside directors on the board with ownership in the firm. Each stand-alone variable receives a score based on quantiles between the one and four, where a high score means that a firm scores well on that particular measure.

The variables, where the board effectiveness is comprised of, are selected on the basis of their explanatory power in terms of monitoring capabilities or the playing field of a CEO to make use of its "managerial power" within the organization to influence outcomes in its own best interest, rather than the firm's interest. In the following subsections, the variables which are chosen to construct the board effectiveness index are explained more elaborately.

The sum of the stand-alone variable scores represents the measurement of board effectiveness (hereafter, board effectiveness index), where a high board effectiveness index reflects a firm's board as a more effective monitor to address the agency conflict between management and owners, and a low board effectiveness index reflects a firm's board as a less effective monitor. Additionally, to check for robustness, a board effectiveness index comprised of the same variables is used, where the scores are based on empirical evidence and prior literature concerning corporate governance.

5.3.1 Outside independent directors

Prior research on the relationship between firm performance and the participation of outside directors in the firm are mixed, where research is based on the views of agency theory or managerial 'hegemony' theory. More specifically, managerial hegemony assumes – like agency theory – that although owners and managers have different interest, managers control main levers of powers (Lorsch & MacIver,1989; Mace,1989; Vance,1983). Managerial hegemony theory suggest that board of directors are dominated by management, therefore not serving the best interest of shareholders.

The initial idea behind the implementation of a board of directors is, to advise and monitor management on behalf of the shareholders and other key stakeholders. In order for board of directors to be effective in monitoring management, the board of directors must not be influenced by management in their decision-making responsibilities. Therefore, independence of the directors is necessary to function, accordingly.

Different studies, find evidence that independent outside directors are more capable in monitoring management and protecting shareholder wealth, compared to inside directors ((Brickley & James (1987); Byrd & Hickman (1992); Peasnell et al. (2000); Solomon & Solomon (2004); McCabe & Nowark (1992); Fernandes & Fransisco (2008); Mura (2007); Chin-Jung & Ming-Je (2007); Schellenger et al. (1989); Elloumi &Gueyie (2001); OSullivan & Wong (1999)). According

to Beasley (1996), outside independent directors reduce the likelihood of financial statement fraud, and Scherrer (2003) suggest that outside independent directors prove invaluable to corporations, providing access to resources and information. Scherrer (2003) suggest, that outside independent directors are not concerned with career opportunities presented within the firm, making independent outside directors more capable in protecting shareholders' interest.

Previous mentioned studies, find evidence that outside independent directors are more effective monitors, in comparison with their inside counterparts. Nevertheless, managerial hegemony theory argues the board of directors to be incapable of fulfilling its supervisory role and protecting shareholders' wealth.

However, Vancil (1987) is reluctant about the independent judgment of outside directors, as CEOs have a dominant role in the selection procedure of outside directors. Also, Conyon and Peck (Conyon & Peck, 1998) argues that outside directors have not enough incentives to monitor management effective, since they hold not sufficient equity ownership within firms. Furthermore, Carter and Lorsch (Carter & Lorsch, 2004) criticize the fact that outside directors are over committed, as a result of additional directorships held at other firms, therefore not being effective monitors and possibly adversely affecting firm performance.

5.3.2 CEO duality

The Chief Executive Officer (Hereafter, CEO) is the highest ranking corporate executive within the firm, and is responsible for day-to day decision-making within the firm, implementing corporate strategies and communicating important news, both externally (press, media) and internally (employees, managers).

In contrast, the role of the chairman in the company and on the board of directors is to ensure the board is effective in monitoring, advising and evaluating the performance of the executive directors, including the CEO. Therefore, at first sight, the role of the CEO and chairman within an organization can be defined as opposing, where the chairman is the spokesman of the owners of the firm, with the responsibility to oversee if the CEO acts in the best interest of the owners and key stakeholders. However, it is quite common for firms to combine this position, making the CEO of the company also the chairman of the board. For instance, Anderson and Anthony (Anderson, 1986) suggest that the advantage of combining the CEO position with the chair of the board of directors, is that it can provide more efficient and effective corporate leadership and decision-making, possibly with a more comprehensive long-term mission and strategy for the firm. According to Anderson and Anthony (1986), CEO duality could lead to more stability and continuity for the firm, resulting in stronger firm performance.

However, agency theorists do not share this view. Agency theorist provide evidence that CEO duality is negatively associated with firm performance (Chen et al., 2005), suggesting that the CEO position and chairman of the board must be separated (Higgs, 2003). CEO duality leads to, not only more powerfull CEOs, but also ineffective boards in monitoring managerial opportunism (Daily & Dalton, 1993; Messier, 2000), clearly undermining the referred intent of the board of directors, by shareholders, to separate decision-making and decision-control (Fama &

Jensen, 1983). As a result, increasing the likelihood of managerial opportunism and decreasing board independence due to the reduction in elected in independent directors on the board ((Finkelstein & DAveni, 1994; AF & S, 2004).

Although, the relationship between CEO duality and firm performance has been studied to a limited extent, evidence on the duality-performance relationship is still mixed and inconclusive. (Chaganti, Mahajan and Sharma, 1985; Rechner and Dalton, 1989, 1991; Pi and Timme, 1993; Boyd,1994).

5.3.3 Board Size

Prior literature, such as Yermack (1996) have criticized the effectiveness and performance of large boards, suggesting that the enactment of SOX could have some negative effects on board effectiveness if large firms simply increase their board size to be compliant, in stead of revising their board. Yermack (1996) finds empirical evidence that increased board size is negatively related to firm value.

Prior literature, such as Brickley et al. (1997) suggest that larger boards (beyond seven or eight) can be less effective than smaller boards. According to Lipton & Lorsch (2005), the behavioral standards within most boardrooms are dysfunctional because directors rarely criticize the policies of the top managers. They suggest to limit the board of directors to ten, with a preference to a size of eight or nine. Even if the monitoring capabilities increase with the size of the board, board effectiveness is declined due to slower decision-making, less candid discussions of managerial performance, and biases against risk-taking.

The insight behind this is, when board size increases, the effect to tackle agency problems within the firm are reduced, making the boardroom more symbolic and less a part of the management process (Lipton & Lorsch, 2005; Eisenberg et al., 1998).

5.3.4 Outside directors with ownership

Two measures are used to reflect independent outside directors with ownership. The first measures is the sum of the total stock ownership in percentage of independent outside directors within a firm, and the second is a ratio between independent outside directors divided by total outside directors. Both measures are part of the board effectiveness index.

The initial idea for employing outside directors with ownership in the board effectiveness index, is that by providing outside independent directors incentives in the form of stockholdings, their wealth is directly in line with the wealth of the shareholders and therefore, interest of both parties is to maximize shareholder value. This will result in increased wealth enjoyed by the outside independent directors and the shareholders. This is consistent with the findings of Morck, Shleifer, and Vishny (1988) who examine the effects of stockholdings by board of directors on firm performance. According to them, firm performance (measured by Tobin's Q) is highest when the board of directors own moderate levels of stock ownership within the firm. An explanation for this increase in firm performance, is that by providing board of directors with stock ownership, agency

costs substitutes the costs of managerial entrenchment, which lead to the increased firm performance (Demsetz, 1983).

According to Demsetz (1983), managerial entrenchment arises when CEOs or managers obtain enough power to use their private benefits of control, and use the organization as a means to increase their own interest at the expense of the shareholders and key stakeholders. By providing independent directors with stock ownership, their capabilities to monitor the CEO is improved, as there only tie to the firms is directly linked to the firm's objective: maximizing shareholder value. By doing so, their incentives to monitor management is optimal and their social ties within the firm are limited in contrast with dependent directors, who are former employees or employees. Therefore, it is assumed that providing independent outside directors with moderate stock ownership will increase board effectiveness.

5.3.5 Corporate governance index

To examine if the levels of compensation is related with corporate governance, the measure introduced by Gompers, Ishii and Metrick (2003), also know as the Governance Index, is used. The measure reflected the shareholders rights within the respective firm, where a high index values expresses weak shareholder rights (bad corporate governance) and a low index values expresses strong shareholders rights (good corporate governance).

The governance variable expresses the number of provisions that are in place, that decrease shareholder rights, and therefore corporate governance within the firm. The values range from 24, indicating that all provisions that reduce shareholders are in place, to 0, indicating that none of the provision are in place. Gomper, Ishii and Metrick (2003) refer to companies with a G-index of 5 or less as Democracies and to companies with a G-index of 14 or higher as Dictatorships. The corporate governance index is used to asses the effects of SOX on the relationship between board effectiveness and CEO compensation, and firm performance.

5.3.6 Mean age board of directors

the mean age of the members of board controls for age being a driver of board effectiveness.A board of directors comprising older executives, age exceeding 70 years, are expected to be less effective monitors, thus be positively related to the level of executive compensation (Core, Holthausen, and Larcker, 1999).

5.3.7 CEO characteristics

Consistent with the extant theoretical literature, Palia (2001) finds that CEO characteristics such as tenure and age, strongly correlate with changes in the CEO's compensation. Murphy (1986), and Barro and Barro (1990) find that managers with different years of experience have different pay-performance sensitivities.

According to Hermalin and Weisbach (1998), the longer a CEO has been in office (represented by the number of years as a CEO in the same firm), the higher the compensation received by the respective CEO. This provides some evidence that tenure is positively related to

executive compensation. Which is consistent with organization behavior theory, that predicts that CEO tenure is positively related to the compensation received by the CEO. Moreover, Perel (2003) finds evidence that CEO tenure proxies for CEO experience, which is reflected in the levels of compensation received by CEO in their new positions.

In addition, Cyert et al. (2002) argue that the age of a CEO might influence the effectiveness of corporate governance mechanisms within the firms. Of course, CEO age also represents seniority within the firm, which plays a major role in the levels of compensation received by CEO, which is part of today's organizational culture.

5.4 Variables: measuring firm performance

ROA and Tobin's Q are used as firm performance measures to examine, whether significant changes in firm performance arise in the post-SOX period in comparison with the pre-SOX period.

ROA and Tobin's Q are chosen to measure firm performance, as it is assumed that both measure a contradicting measures of firm performance. This contradiction is reflected in the different time-perspective, since ROA is retrospective and Tobin's Q prospective in nature. Furthermore, ROA is an accounting-based performance measure, where Tobin's Q origin lies in the field of Finance. Therefore, when both measure are used simultaneously, it is widely believed that both measures of firm performance complement one another. Enabling to provide both a short term and a long term perspective on firm performance, which is ideal for research with a relative short time period to examine long-term firm performance.

5.4.1 Tobin's Q

Tobin's Q or Q is a firm performance measure often used in the relevant literature in economics and finance. Tobin's q was originally developed by James Tobin as a ratio between the market value and the replacement value of an asset, where the numerator represents the market value as the going market price for exchanging existing assets, and the denominator represents the replacement value or replacement cost equal of the assets. For measuring firm performance, through Tobin's Q, the market value of the firm is scaled by its replacement costs of total assets. In this equation, market value is equal to the tangible (e.g., plant, equipment, and inventory) and intangible assets (patents, scale economies) of the firm (Lindenberg and Ross, 1981). Furthermore, using intangible assets in the equation turns out to be one of its main advantages over other (accounting-based) performance measures.

Another difference between, for instance, Tobin's Q and accounting-based performance measures, such as return on assets (ROA) is the difference in time perspective. Tobin's Q uses a prospective time perspective (reflecting investors expectations) , in contrast with accounting-based performance measure which make use of a retrospective time perspective (reflecting previous year firm performance).

In this study, the calculation of Tobin's Q follows the approach of Chung and Pruitt (1994), where the approximate value of Tobin's Q is calculated as the sum of the share price times the number of common shares outstanding (market capitalization) , the value of preferred stock, the value of

short-term liabilities net of short-term assets, and the book value of long-term debt, divided by the book value of assets. If Tobin's Q represents a value higher than one, the value of a firms assets exceed book value.

5.4.2 Return on assets (ROA)

As an additional performance measure, this study makes use of return on assets (hereafter, ROA) which is an accounting-based performance measure. As previously mentioned, accounting-based performance measure is retrospective in a way that it measure historical firm performance. The reason for this, is that ROA is related to the accounting standards that are valued on an historical basis. ROA shows the level of efficiency between the use of corporate resources (firm's assets) and the generated profit. The higher the value of ROA, the more efficient the corporate resources are used to generate profit. The calculation of ROA is the operating income (defined as the earnings before interest and taxes) divided by firm's total assets at book value.

Using ROA, has some disadvantages in a sense that accounting-based measures can suffer from inconsistencies in the reporting process, since executives have some discretion in the reporting process, that this can lead to managerial opportunism by increasing their compensation through reporting higher accounting earnings (Kahn, 2000). Also, ROA does not focus on long-term firm performance.

5.5 Control variables: relationship between board effectiveness and CEO compensation

5.5.1 Firm size

The firms market capitalization and the book value of a assets are used as two different measures for controlling for firm size. The firms market capitalization is used in the model to asses the influences of SOX on the relationship between board effectiveness (model specification 1 till 5) and the firms book value of the assets is used in the model to asses the influences of SOX on firm performance (model specification 6 till 7). Both measures are scaled down by taking the natural logarithm as is often used in the field of corporate governance e.g. Himmelberg et al. (1999).

In the first model (model specification 1 till 5) the dependent variables are the different CEO compensation measures. In terms of executive or CEO compensation, prior research suggest that firm size is a main factor of explaining the level and structure of compensation received by executives. Different explanations exists on how firm size influences the level and structure of executive compensation. For instance, Roberts (1956), Cosh (1975) and Cyert et al. (2002) suggest that firms size is one of the main determinants influencing the three different CEO compensation components, also used in this study.

Furthermore, Ittner et al. (2003) argue that an inverse relationship between firm size and executive compensation may exist, as maximizing shareholder-value is much more difficult in larger firms in comparison with small more dynamic firms. Furthermore, larger firms are much more complex of nature, that is shareholders experience difficulties in monitoring executives to

act in shareholders interest in contrast with smaller firms. To align interest of the shareholders, with these executives, who are more difficult to monitor, increases in bonding expenditures are inevitable. This suggests that when firms grow in size, their complexity increases and the capability of boards decreases, which must be complemented with increased executive compensation (Demsetz and Lehn, 1985).

In the second model (model specification 6 till 7), the dependent variables are the performance measures (ROA and Tobins'Q). Consistent with Ahmed et al. (2010), firms size controls for other unobservable firm-specific characteristics associated with operating performance.

5.5.2 Leverage

Similar to the leverage measure of Ahmed et al. (2010), this study constructs a leverage variable as the book value of the total debt divided by the book value of the total assets, where debt include all non-shareholder equity. This measure reflects how much debt is used to finance the assets, used for the operating activities and proxies for firm risk.

5.5.3 Growth opportunities

Similar to the measure of Ahmed et al. (2010), this study constructs a variable to control for the growth opportunities of a firm. The growth opportunities are reflected by a firm's lagged book-to-market ratio (Lag_BTM).

5.5.4 Firm efficiency

It is expected that firm efficiency leads to better operating performance. Therefore, firm efficiency is included in the firm performance model, where the asset turnover ratio (Asset_Turn) is a proxy for firm efficiency.

5.5.5 Economy-wide factors

Economy-wide factors are believed to be main drivers of changes in firm performance. Two measures are therefore introduced in the firm performance model to control for the economic determinants. To control for economic conditions that occur at the firm level, the ΔRevenue is used, which is the year-over-year percentage change in revenues. To control for broader shifts in macro-economic conditions, the ΔGDP is used, which expresses the percentage change in U.S. gross domestic product during the year. Both measures are consistent with the model used by Ahmed et al. (2010).

5.5.6 Industry fixed effects

this study will also control for industry effects to ensure that the compensation and monitoring structures observed, or changes in firm performance are not simply outcomes of industry practices or traditions. In all models, no attempt is made to control for year fixed effects, due to

the fact that this would complicate the interpretations of the post-SOX indicator, possibly eliminating the effect SOX has on the relationship between board effectiveness and CEO compensation, and firm performance.

The first two digits of the SIC code are used to construct dummy variables, in order to control for industry fixed effects. This approach is consistent with prior literature e.g. Himmelberg et al. (1999) and controls for unobservable firm heterogeneity in the firm's environment.

5.6 The model design

Based on the methodology and the variables, the following equations will be used to test the hypotheses:

$$(BoardEff)_{it} = \beta_0 + \beta_1(SOX)_{it} + \gamma_1(Governance)_{it} + \gamma_2(ROA)_{it} + \gamma_3(Tobin'sQ)_{it} + \gamma_4(MarketCap)_{it} + \gamma_5(maturity)_{it} + \gamma_6(\Delta \mathrm{GDP})_{it} + \sum \eta IndustryIndicators + \epsilon_{it} \quad \textbf{(1)}$$

In this Equation, the dependent variable is the board effectiveness index. The independent variable in this model is SOX (a dummy variable, where 1 = Post and 0 = Pre-Sox) to see if the period after the enactment of SOX can explain the differences in board effectiveness, predicting that board effectiveness is positively related to SOX, since SOX increases board effectiveness through increased board independence.

For the control variables, market capitalization (controlling for firm size), ROA (controlling for firm performance) and industry fixed effects based on SIC 2 digit code are used. The idea behind equation (1) to control for firm size and firm performance, is due to the expectations that larger firms must have more effective boards, in contrast with smaller firms, as larger firms have a responsibility to not only shareholders, but also other key stakeholders, and to achieve strong consistent firm performance is partly due to effective boards that are more capable in aligning shareholders interest with management

For testing hypothesis 1, the impact of SOX on the relationship between board effectiveness and CEO compensation is analyzed. A Tobit regression model is used to see if there is an association between board effectiveness and SOX, controlled for economic factors literature suggest could influence the levels of CEO compensation. Equations 2, 3 and 4 are used to asses the possible influences of the enactment of SOX on the relationship between board effectiveness is as follows:

$$\begin{aligned}(TotComp)_{it} = {} & \beta_0 + \beta_1(SOX)_{it} + \beta_2(Boardeff)_{it} + \beta_3(SOX \times Boardeff)_{it} \\ & + \beta_4(governance)_{it} + \beta_5(SOX \times governance)_{it} + \gamma_1(ROA)_{it} \\ & + \gamma_2(Boardage)_{it} + \gamma_3(CEOage)_{it} + \gamma_4(Tenure)_{it} \\ & + \gamma_5(MarketCap)_{it} + \gamma_6(maturity) + \sum \eta\, IndustryIndicators + \epsilon_{it}\end{aligned} \quad \textbf{(2)}$$

$$\begin{aligned}(EquityComp)_{it} = {} & \beta_0 + \beta_1(SOX)_{it} + \beta_2(Boardeff)_{it} + \beta_3(SOX \times Boardeff)_{it} \\ & + \beta_4(governance)_{it} + \beta_5(SOX \times governance)_{it} + \gamma_1(ROA)_{it} \\ & + \gamma_2(Boardage)_{it} + \gamma_3(CEOage)_{it} + \gamma_4(Tenure)_{it} \\ & + \gamma_5(MarketCap)_{it} + \gamma_6(maturity) + \sum \eta\, IndustryIndicators + \epsilon_{it}\end{aligned} \quad \textbf{(3)}$$

$$\begin{aligned}(CashComp)_{it} = {} & \beta_0 + \beta_1(SOX)_{it} + \beta_2(Boardeff)_{it} + \beta_3(SOX \times Boardeff)_{it} \\ & + \beta_4(governance)_{it} + \beta_5(SOX \times governance)_{it} + \gamma_1(ROA)_{it} \\ & + \gamma_2(Boardage)_{it} + \gamma_3(CEOage)_{it} + \gamma_4(Tenure)_{it} \\ & + \gamma_5(MarketCap)_{it} + \gamma_6(maturity) + \sum \eta\, IndustryIndicators + \epsilon_{it}\end{aligned} \quad \textbf{(4)}$$

In equations 2,3 and 4, the dependent variables are the different components of CEO compensation, being the logarithm of the total compensation, equity-based compensation and cash compensation. The independent variables consist of the post-Sox indicator (SOX), the board effectiveness index and the governance variable.

As control variables, different economic factors are implemented in the model. For instance, this study controls for firm age, mean age of the members of the board, CEO tenure, firm performance, firm size, and industry fixed effects; where firm age controls for the experience of the firm, since experience may be related to the measures of compensation, ownership, and monitoring structures; the mean age of the members of board controls for age being a driver of board effectiveness. ROA controls for firm performance and the logarithm of the market capitalization controls for the size of the firm. Finally, this study will also control for industry effects to ensure that the compensation and monitoring structures observed are not simply outcomes of industry practices or traditions, and ϵ = error term of the model.

To test hypothesis 2, the effect of SOX on firm performance are analyzed. Operating performance is measured by two different variables, which are Tobin's Q and ROA. Tobin's Q and ROA are chosen, since prior studies in corporate finance and corporate governance suggest that both variables are assumed to contrast one another. This is due to the difference in time-perspective, where ROA is backward-looking and Tobin's Q is forward looking (Mehran, 1995).

A Tobit regression model is used, which is based on the approach by Ahmed et al (2010), to examine if after the enactment of SOX, firm performance changes. Equations 5 and 6 are employed to test for firm operating performance differences in the post-SOX period relative to the pre-SOX period:

$$(ROA)_{it} = \beta_0 + \beta_1(SOX)_{it} + \gamma_1(AssetTurn)_{it} + \gamma_2(LagBTM)_{it} + \gamma_3(Leverage)_{it} + \gamma_4(Size)_{it} + \gamma_5(\Delta \mathrm{Re}venue)_{it} + \gamma_6(\Delta GDP)_{it} + \gamma_7(Maturity)_{it} + \sum \eta IndustryIndicators + \epsilon_{it} \quad \textbf{(5)}$$

$$(Tobin'sQ)_{it} = \beta_0 + \beta_1(SOX)_{it} + \gamma_1(AssetTurn)_{it} + \gamma_2(LagBTM)_{it} + \gamma_3(Leverage)_{it} + \gamma_4(Size)_{it} + \gamma_5(\Delta \mathrm{Re}venue)_{it} + \gamma_6(\Delta GDP)_{it} + \gamma_7(Maturity)_{it} + \sum \eta IndustryIndicators + \epsilon_{it} \quad \textbf{(6)}$$

The dependent variables for Equation 5 and 6 are ROA and Tobin'Q, respectively. The independent variable in both equations is the post-SOX indicator (SOX). The control variables consist of turnover ratio (Asset_Turn) as a proxy for firm efficiency, The lag book-to-market ratio (Lag_BTM) controls for firms' growth opportunities. In addition, leverage (Lev) is included as a proxy for risk. To control for economic factors and firm characteristics, two variables are included, such as ΔRevenue, the year-over-year percentage change in revenues, to control for economic conditions that manifest at the firm level. ΔGDP, the percentage change in U.S. gross domestic product during the year to capture broader shifts in macro-economic conditions. Furthermore, firm size (the natural logarithm of total assets) are included, to control for other unobservable firm-specific characteristics associated with operating performance.

In order to test hypothesis 3, the effect of SOX on performance between strong governed and weak governed firms, are analyzed. A Tobit regression model is used, which is based on the approach by Ahmed et al (2010), to examine if after the enactment of SOX, firm performance changes. Equations 7 and 8 are employed to test for firm operating performance differences between strong governed and weak governed firms in the post-SOX period relative to the pre-SOX period:

$$(ROA)_{it} = \beta_0 + \beta_1(SOX)_{it} + \beta_4(governance)_{it} + \beta_5(SOX \times governance)_{it} + \gamma_1(AssetTurn)_{it} + \gamma_2(LagBTM)_{it} + \gamma_3(Leverage)_{it} + \gamma_4(Size)_{it} + \gamma_5(\Delta \text{Revenue})_{it} + \gamma_6(\Delta GDP)_{it} + \gamma_7(Maturity)_{it} + \sum \eta IndustryIndicators + \epsilon_{it} \quad \textbf{(7)}$$

$$(Tobin'sQ)_{it} = \beta_0 + \beta_1(SOX)_{it} + \beta_4(governance)_{it} + \beta_5(SOX \times governance)_{it} + \gamma_1(AssetTurn)_{it} + \gamma_2(LagBTM)_{it} + \gamma_3(Leverage)_{it} + \gamma_4(Size)_{it} + \gamma_5(\Delta \text{Revenue})_{it} + \gamma_6(\Delta GDP)_{it} + \gamma_7(Maturity)_{it} + \sum \eta IndustryIndicators + \epsilon_{it} \quad \textbf{(8)}$$

The difference between equations 5 and 6 and equations 7 and 8, are the governance variable and the interaction term between SOX and corporate governance. The initial idea, is to examine if there is a difference between strong governed and weak governed. It is expected that SOX could be more beneficial for weak governed firms rather than strong governed firms. SOX mandates impose requirements on firms and weak governed firms need to make more changes to be compliant in contrast with strong governed firms.

However, it is also possible that strong governed firms experience lower direct and indirect costs to comply with SOX mandates, in contrast with weak governed firms.

TotComp = total compensation a CEO receives in year t, the total compensation is a sum of the base salary component, bonus compensation, stock compensation and options compensation and other annual compensation;

EquityComp = the option and stock grants a CEO receives in year t, where the option grants are computed using Black-Scholes formula, and the stock grants are computed as the stock grants received times closing price shares;

CashComp = the annual salary and bonus a CEO receives in year t, the cash compensation is the sum of the base salary and a bonus component;

BoardEff = Board effectiveness is an index variable based on board size, board independence CEO duality, additional seats held by outside directors, ownership by outside directors calculated as outsiders divided by common shares outstanding, and a ratio of outside owner directors divided by total outside directors. Index scores range from 0 to 4, where 4 is the highest score and 0 the lowest score. The scores are based on quantiles of the full sample;

SOX = a dummy variable of 1 for the post-SOX years (2003-2006), 0 for pre-SOX years (1999-2002);

Governance = The governance variable expresses the number of provisions that are in place, that decrease shareholder rights, and therefore corporate governance within the firm. The values range from 24, indicating that all provisions that reduce shareholders are in place, to 0, indicating that none of the provision are in place. Gomper, Ishii and Metrick (2003) refer to companies with a

	G-index of 5 or less as Democracies and to companies with a G-index of 14 or higher as Dictatorships.
Tobin's Q =	(((share price * common shares outstanding) + preferred stock + short-term liabilities net of short-term assets + book value of long-term debt) / book value of assets);
ROA =	ROA (operating income / book value of firm's total assets at end of *t*);
Size =	Size is a measure used to reflect the size of the firm,and is computed as the natural logarithm of the book value of the assets within a firm;
MarketCap=	Size is a measure used to reflect the size of the firm, computed as the natural logarithm of the firm's market capitalization (common shares outstanding * closing price),
Boardage =	The mean age of the members of board in a firm at year t;
CEOage =	The age of a CEO in a firm at year t;
Tenure =	The number of years the CEO has been in office at the same firm;
Maturity =	The age of the firm at year t;
AssetTurn =	Annual revenues scaled by fiscal-year end total assets;
LagBTM =	Prior fiscal-year end book value of equity to prior fiscal-year end market value of equity;
Leverage =	Fiscal-year end total long-term debt to fiscal-year end total assets;
ΔRevenue =	The annual percentage change in revenues;
ΔGDP =	The annual percentage change in the U.S. gross domestic product.

5.7 CEO compensation

In this section, the changes in CEO compensation around the enactment of SOX is examined for the entire sample over a period starting from 1999 till 2006, where the enactment of SOX took place in 2002. The compensation components are expressed in 1999 constant dollars, and are divided in three groups of compensation. The three groups are cash compensation (consisting of annual salary and bonus), equity-based compensation (consisting of restricted stock grants and option grants), and the total compensation (consisting of LTIP, cash and non cash compensation, etc.) a CEO receives at the fiscal year end. Also, the different compensation components are winsorized at the 99th percentile to censor the results for outliers within the sample.

Table 1 reports the changes in CEO compensation for the entire sample, where panel A shows mean CEO compensation and Panel B shows median CEO compensation. For panel A, the mean cash compensation per CEO increased Post-Sox and the difference between the pre-Sox period and the post-Sox period is statically significant with a t-statistic of 5.02, which suggests that the enactment of Sox, definitely, has some effect on the level of CEO cash compensation. The equity-based compensation component per CEO decreased post-SOX and the difference between pre-Sox and post-Sox is statistically significant with a t-statistic of 7.42, which is contradictive with the cash compensation increase after SOX.

Furthermore, the mean total compensation per CEO, similar to the equity-based compensation, decreased in the post-Sox period and the difference between the two periods for total compensation is statistically significant at the 5% level with a t-statistic of -1.84. These results are consistent with literature by Cohen, Dey, and Lys (2007) who suggest that the enactment of SOX made CEOs more vulnerable to risk.

As a response, firms reduced CEO incentive pay and increased annual salary to provide additional insurance to the CEOs. For comparison, panel B reports median CEO compensation. The cash compensation and equity-based compensation components show similar patterns with the results reported in panel A, where the differences between the pre-Sox period and the post-sox period for cash compensation and equity-based compensation are statistically significant.

However, the median total compensation received by CEOs is increasing, in contrast with the mean total compensation as shown in panel A. One reason for this is that although on average CEO receive less compensation after SOX, the lower bound of this sample in the post-sox period increased, resulting in a smaller gap between CEO pay and a higher median total compensation. Therefore, the average pay a CEO receives is lower after SOX, but the gap between his colleague CEOs is reduced by SOX.

Table 1
CEO compensation

Table 1
CEO compensation

Panel A: Mean CEO compensation

		N	Cash compensation ($)	Equity-based compensation ($)	Total compensation ($)
1999	*1999*	344	1.938	5.553	8.454
2000	*2000*	352	1.884	7.240	10.093
2001	*2001*	335	1.837	7.163	10.148
2002	*2002*	319	2.010	5.446	8.599
2003	*2003*	322	2.240	4.652	8.302
2004	*2004*	323	2.591	5.362	8.899
2005	*2005*	307	2.520	4.940	8.776
2006	*2006*	303	1.462	823	9.507
Pre-SOX	Pre-SOX	1031	1.887	6.652	9.564
Post-SOX	Post-SOX	1574	2.170	4.278	8.809
Difference	Difference Post-Sox and Pre-Sox		(5.02)***	(-7.42)***	(-1.84)**

Panel B: Median CEO compensation

		N	Cash compensation ($)	Equity-based compensation ($)	Total compensation ($)
1999	*1999*	344	1.573	2.762	5.325
2000	*2000*	352	1.529	2.957	5.431
2001	*2001*	335	1.516	4.240	6.402
2002	*2002*	319	1.673	3.314	5.896
2003	*2003*	322	1.673	2.818	5.896
2004	*2004*	323	2.307	3.386	6.806
2005	*2005*	307	2.200	3.293	6.253
2006	*2006*	303	1.065	-	7.270
Pre-SOX	Pre-SOX	1031	1.527	3.200	5.654
Post-SOX	Post-SOX	1574	1.854	2.543	6.508
Difference	Difference Post-Sox and Pre-Sox		(-6.12)***	(-6.42)**	(-2.89)***

The table reports m
and bonus. Equity-b
the value of option g
previous fiscal year
and other annual pa
observations with th
two-tailed T-test for
10% level, respectiv

The table reports mean CEO (panel A) and median CEO compensation (panel B), where cash compensation cosists of annual salary and bonus. Equity-based compensation consists of the value of option and stock grants. The Black-Scholes model is used to calculate the the value of option grants and the value of the stock grants is based on the number of shares granted times the closing stock price at the previous fiscal year end. Total compensation consists of cash compensation, Equity-based compensation and, long-term incentive pay, and other annual payments. All levels of compensation are expressed in 1999 constant dollars. The sample consists of 2605 firm-year observations with the necessary data for CEO compensation calculations. ***, **, * indicates the significance of a independent two-tailed T-test for mean reported by t-statistics and Wilcoxon two-tailed test for median reported by z-statistic at the 1%, 5%, 10% level, respectively.

5.8 Descriptive statistics

Table 2 shows descriptive statistics for variables used to analyze the effects of SOX on the relationship between board effectiveness and CEO compensation, the impact of SOX on firm performance, and the difference in firm performance between strong governed firms in comparison with poor governed firms after the enactment of SOX. All variables expressed in us dollars, are adjusted for inflation (measured in 1999 constant dollars). Furthermore, the variables in the entire sample are winsorized at the 99th percentile in order to reduce the effect of outliers.

Panel A of Table 2 provides descriptive statistics for the entire sample. In terms of board effectiveness, panel A shows that the mean value is 13.21 and the median value is 13.00, suggesting that the majority of the firms in the sample have at least four mechanism in place to improve the boards monitoring capabilities. The maximum value is 20.00 which is equal to the maximum index score a firm can obtain, and the minimum score is 4, which suggest that every firm in the entire sample have at least one mechanism in effect that is beneficial for monitoring CEOs. The mean and median values for the governance variable (G-index) is 9.88 and 10.00, respectively.

The governance variable expresses the number of provisions that are in place, that decrease shareholder rights, and therefore corporate governance within the firm. The values range from 24, indicating that all provisions that reduce shareholders are in place, to 0, indicating that none of the provision are in place. Gomper, Ishii and Metrick (2003) refer to companies with a G-index of 5 or less as Democracies and to companies with a G-index of 14 or higher as Dictatorships. The sample firms show a mean (median) value of 9.88 (10.00), which is right in the middle between a democracy and a dictatorship. As this sample is constructed by using only S&P 500 firms, it is expected that the firms in the sample are quite large in size.

The size of the firms, which are expressed in the market capitalization and the natural log of fiscal-year end total assets, show a mean values of $18.9 billion and 8.70 and median values of $7.4 billion and 8.61, respectively. Therefore, the firms can be defined as being quite large in size. Furthermore, Tobin's Q (ROA) is 2.19 (0.16) and the median is 1.58 (0.15). Mean and median values of asset turnover (Asset_Turn) are 1.10 and 0.94, respectively. The mean book-to-market ratio (Lag_BTM) is 0.36, and mean annual revenue growth (ΔRevenue) is 11%. The mean leverage ratio (Lev) is 0.19. These values suggest that ,on average, the operating performance of the sample firms are outperforming the median firm in their respective industries.

Panel B of Table 2 provides the same descriptive statistics divided in a time period before the enactment of SOX (1999-2002) and a time period after the enactment of SOX (2003-2006). As predicted, board effectiveness increases from pre- to the post-SOX period. In terms of firm performance, both Tobin's Q and ROA show a decrease in both mean and median values from the pre- to the post-SOX. Also, Median leverage (lev) decreases after the enactment of SOX while both mean and median book-to-market ratio (Lag_BTM) increase in the post-SOX period.

Overall, the mean and median values of both Tobin's Q as ROA suggest that operating performance after the enactment of SOX decreased, indicating that unconditional performance deteriorates in the post-SOX period. These findings are opposing as compared to the results

obtained by Ahmed et al. (2010), who find that after SOX operating performance improves in both mean and median value. The difference in findings can be the result of different sample selection criterion. Where, Ahmed et al. (2010) focused on all levels of firm size, this study focuses on S&P 500 companies, being the largest companies in the US. The S&P 500 companies could have faced the impact of the economic crises earlier than the smaller firms, also due to their size they are more vulnerable and more complex to respond fast to the economic crises, thus stronger affected by the economic crises than smaller firms.

Table 2

Descriptive statistics and correlations for the sample of 411 firms over the period 1999–2002 and 2003–2006.

Panel A: descriptive statistics — full time period

Variable	Mean	Median	Min	Max	Stdev	N
BoardEff	13,21	13,00	4,00	20,00	3,06	2605
Bsize	10,34	10,00	4,00	16,00	2,28	2605
Seats	10,34	9,00	1,00	29,00	6,33	2605
Chair	0,61	1,00	0,00	1,00	0,49	2605
Indep	70,65%	72,73%	10,00%	92,31%	15,70%	2605
Outowner	0,09%	0,01%	0,00%	2,91%	0,00	2605
Outtot	0,89	0,89	0,57	0,89	0,01	2605
Governance	9,88	10,00	3,00	16,00	2,56	2605
Boardage	59,45	59,67	42,33	66,75	3,41	2605
CEOage	52,96	53,00	32,00	68,00	6,89	2605
Tenure	10,91	9,59	0,05	35,32	6,61	2605
MarketCap	18928	7350	74	243083	36522	2605
Maturity	64,22	57,00	0,00	204,00	43,67	2605
Tobin's Q	2,19	1,58	0,04	12,27	1,93	2605
ROA	0,16	0,15	0,00	0,43	0,08	2605
Asset_turn	1,10	0,94	0,05	3,74	0,67	2605
Lag_BTM	0,36	0,29	-2,69	1,52	0,29	2605
Lev	0,19	0,18	0,00	0,54	0,13	2605
Size	8,70	8,61	5,69	11,79	1,11	2605
ΔRevenue	0,11	0,08	-0,69	0,98	0,21	2605
ΔGDP	0,05	0,06	0,03	0,07	0,01	2605

Panel B: descriptive statistics — pre- and post-SOX

	Pre-SOX				Post-SOX				Difference	
	Mean	Median	Stdev	N	Mean	Median	Stdev	N	Mean	Median
BoardEff	12,69	13,00	3,05	1031	13,55	14,00	3,02	1574	(7.04)***	(-6.91)***
Bsize	10,40	10,00	2,47	1031	10,30	10,00	2,14	1574	(-1.03)	(-1.05)
Seats	10,74	10,00	6,97	1031	10,07	9,00	5,86	1574	(-2.52)***	(-1.25)
Chair	0,61	1,00	0,49	1031	0,61	1,00	0,49	1574	(0.09)	(-0.09)
Indep	66,05%	66,67%	16,84%	1031	0,74	0,75	0,14	1574	(12.00)***	(-11.62)***
Outowner	0,09%	0,01%	0,35%	1031	0,09%	0,01%	0,39%	1574	(0.41)	(-2.69)***
Outtot	0,89	0,89	0,01	1031	0,89	0,89	0,01	1574	(0.24)	(-0.34)
Governance	9,83	10,00	2,64	1031	9,91	10,00	2,50	1574	(0.74)	(-0.56)
Boardage	58,87	59,23	3,59	1031	59,83	60,00	3,24	1574	(6.99)***	(-6.32)***
CEOage	53,10	54,00	7,16	1031	52,87	53,00	6,72	1574	(-0.85)	(-1.52)*
Tenure	11,62	10,59	7,24	1031	10,44	9,20	6,12	1574	(-4.32)***	(-4.01)***
MarketCap	18625	5967	38202	1031	19126	8007	35390	1574	(0.34)	(-4.97)***
Maturity	63,06	55,00	43,74	1031	64,98	57,00	43,63	1574	(1.10)	(-1.42)*
Tobin's Q	2,63	1,71	2,50	1031	1,91	1,50	1,36	1574	(-8.53)***	(-4.60)***
ROA	0,17	0,16	0,08	1031	0,16	0,15	0,07	1574	(-3.53)***	(-3.49)***
Asset_turn	1,12	0,97	0,67	1031	1,09	0,92	0,68	1574	(-0.94)	(-1.80)*
Lag_BTM	0,35	0,27	0,32	1031	0,36	0,31	0,27	1574	(0.96)	(-4.83)***
Lev	0,20	0,20	0,14	1031	0,18	0,17	0,13	1574	(-3.95)***	(-3.69)***
Size	8,51	8,37	1,10	1031	8,82	8,73	1,11	1574	(7.07)***	(-6.76)***
ΔRevenue	0,12	0,07	0,25	1031	0,10	0,08	0,18	1574	(-2.10)**	(-1.23)
ΔGDP	0,05	0,06	0,01	1031	0,05	0,06	0,01	1574	(0.04)	(-8.40)***

This table provides descriptive statistics and correlation coefficients for the sample of firms.
Panel A presents descriptive statistics over the full sample period. Panel B presents descriptive statistics for the pre-SOX (1999–2002) and post-SOX (2003–2006) time periods. Panel B reports the difference between the post-sox period and pre-sox period, by using a independent t-test for mean comparisson and mann-whitney (wilcoxon rank sum) test for median comparison, where ***, **, * indicates the significance of mean and median differences. The mean differences are reported by t-statistics and median differences by z-statistics at the 1%, 5%, 10 %, respectively

CHAPTER 6 Empirical results

6.1 Board effectiveness after SOX

In order to answer the main research question, as stated in chapter 4, it is important to see if the enactment of SOX actually leads to increased board effectiveness.

Table 3

The impact of SOX on board effectiveness

Independent variables	Predicted signs	(1)	(2)
SOX	+	0,940	1.099
		(0.00)***	(0.00)***
Governance	-	-0,114	-0,063
		(0.00)***	(0.09)*
ROA	+	1,426	1,339
		(0.36)	(0.36)
Tobins' Q	+	0,119	0,134
		(0.04)**	(0.01)***
MarketCap	+/-	-0,477	-0,508
		(0.00)***	(0.00)***
Maturity	+/-	-0,005	-0,005
		(0.05)**	(0.04)**
ΔGDP	+/-	6,696	11,679
		(0.14)***	(0.00)***
Fixed firm effects		**Yes**	**Yes**
Adjusted R^2		0,12	0,09
Number of observations		2605	2605

Table 3 reports regression estimates of the impact of SOX on board effectiveness during a period from 1999 till 2006. To be included in the test, a firm needs to have the necessary IRRC, EXECUCOMP and COMPUSTAT data. Board effectiveness (1) is an index variable based on board size, board independence, CEO duality, and a ratio of outside owner directors divided by total outside director. The index is constructed by giving each variable a score ranging from 0 to 4, where 4 is the highest score and 0 the lowest score. The scores are based on quantiles of the sample firms. Boadrd effectiveness (2) is a similar index variable as board effectiveness (1). However, the score are based on literature and is used as a robustness test. SOX - a dummy variable of 1 for the post-SOX years (2002-2006) , 0 for the pre-SOX years (1999-2001). Governance is the GIM G-index, reflecting shareholder rights and is a measure for corporate governance. A higher score is associated with weaker corporate governance, and a lower score with stronger corporate governance. ROA is operating income before depreciation scaled by total assets. Tobin's Q is the market value plus total debt plus preferred stock capital scaled by total assets. MarketCap is the natural logarithm of a firm's market capitalization and controls for firm size. Maturity is the age of the firm, used to control for firm maturity/complexity. ΔGDP is the annual percentage change in the U.S. Gross Domestic Product. Both regression estimates are given by using a Tobit model, where both dependent variables are censored at zero. The standard error is clustered at the firm level. P-values are reported in parentheses *,**, and *** indicate the significance at the 10%, 5% and 1% levels, respectively

Table 3 presents the empirical findings of equation 1, which include two measures of board effectiveness as dependent variables. The first measure of board effectiveness is based on quantiles of the full sample, and the second board effectiveness measure serves as a robustness check and is based on scientific literature. The independent variable in equation 1 is the post-SOX indicator (SOX), where 1 is equal to the post-SOX period, and 0 equal to the pre-SOX period.

As expected, the estimated coefficient on the post-SOX indicator (SOX) is positive in both board effectiveness measures and statistically significant at the 1% level ($P<0.01$). This implies that the governance provisions, mandated by SOX, increase board effectiveness. The magnitude of the coefficient implies that, ceteris paribus, a one-standard deviation increase in the post-SOX

indicator (SOX) is associated with a 5.50% and 3.76% increase in board effectiveness, respectively[2]. These results are consistent with the predictions, which suggest that SOX indeed increases the monitoring capabilities of the board of directors in the full sample of this study.

The results provided by Table 3, are statistically and economically significant and shows that firms experience 5.50% increase in board effectiveness. This provides some evidence that the most important requirement of SOX to increase participation of independent outside directors on the board, results in increased capabilities for board of directors to monitor and align the CEO with the shareholders of the firm.

Furthermore, these results are consistent with prior literature which state that independent outside directors as monitors are more effective to align management with ownership ((Brickley & James (1987); Byrd & Hickman (1992); Peasnell et al. (2000); Solomon & Solomon (2004); McCabe & Nowark (1992); Fernandes & Fransisco (2008); Mura (2007); Chin-Jung & Ming-Je (2007); Schellenger et al. (1989); Elloumi &Gueyie (2001); OSullivan & Wong (1999)). In addition, the results are robust to the different measure of board effectiveness, again providing more evidence that board effectiveness increases after the enactment of SOX. As a first step to address the main research question, Table 3 provides empirical support, by finding a positive relationship, that is both statistically and economically significant, between the enactment of SOX and board effectiveness.

Equation 1 controls for different determinants that could effect the dependent variable. The control variables consist of governance (controlling for difference in firm's governance structure) Size (controlling for firm size), ROA and Tobin's Q (controlling for firm performance), maturity (controlling for firm maturity expressed by the age of the firm), ΔGDP (to control for broader shifts in macro-economic conditions) and industry fixed effects based on SIC 2 digit.

As expected, the governance variable is negatively related to both measures of board effectiveness, providing evidence that effective boards are inherent to strongly governed firms. The firm performance measures, Tobin's Q and ROA are positively associated with both measures of board effectiveness. This implies that firms with effective boards are more capable in aligning interest between shareholders and management, expressed in stronger firm operating performance. As Tobin's Q and ROA complement one another, it shows that the results are consistent with the predicted signs, both in a prospective and retrospective view, respectively.

The measure for the size of the firm, expressed by the natural logarithm of a firms market capitalization, shows a negative relationship with both measures of board effectiveness. This is consistent with prior literature (Itner et al., 2003), which implies that as firms grow in size they become more complex of nature. Inherently to the growth in firm size, board of directors will experience more difficulties in monitoring CEOs to act on behalf of the shareholders. Firm's maturity is negatively associated with both measure of board effectiveness and statistically significant at the 5% level ($p<0.05$). However, the magnitude of the coefficients (-0.005 for both measures of board effectiveness) are not economically meaningful, which suggest that as firms

2 The percentage change in the measures of board effectiveness are computed, by dividing the coefficients with the the total obtainable index score. For the first measure of board effectiveness the total score is 20 and for the second measure of board effectiveness the total score is 25.

become more mature in terms of their organizational life cycle, board effectiveness decreases with 0.03% and 0.02%, respectively.

The last variable in equation 1 controls for shifts in macro-economic conditions, which is expressed by the annual change in the U.S. Gross Domestic Product (ΔGDP). ΔGDP shows a positive relationship with both measures of board effectiveness and is statistically significant at the 1% level ($P<0.01$). This implies that positive changes in the U.S. Gross Domestic Product (ΔGDP) increase board effectiveness on the firm level. A reason for this could be that as macro economic conditions are favourable, firms and mainly shareholders are more concerned with monitoring CEOs.

In contrast, as macro economic conditions worsen, shareholders shift their focus to secure shareholder wealth in the short term, and therefore not able or willing to address the agency conflict with management. Since shareholders wealth is more exposed to risk than that of the management, shareholders become more dependent on management. In this perspective, the shareholders of the firm can not put their relationship at stake with an unbeneficial outcome, simply to overcome the agency conflict, where the increased value can possible be reflected at a much later period in time.

In conclusion, board effectiveness improves after the enactment of SOX, suggesting that the boards of the sample firms are more capable in monitoring there respective CEOs and aligning interest between management and owners.

6.2 SOX and the relationship between board effectiveness and CEO compensation

In this section, hypothesis 1 is tested to examine if SOX has an impact on the relationship between board effectiveness and CEO compensation. A Tobit regression model is used to see if there is an association between board effectiveness and SOX, controlled for economic factors literature suggest could have influence on the levels and/or composition of the compensation received by CEOs.

Table 4 reports the empirical findings of equation 2,3 and 4. In equation 2, TotComp is the dependent variable, which is the natural logarithm of the total annual compensation a CEO receives. The independent variables consist of the post-SOX indicator (SOX), the measure for board effectiveness (Boardeff), and a corporate governance measure (governance). To examine if SOX has a moderate effect on the independent variables Boardeff and Governance with the dependent variable TotComp, Boardeff and Governance are interacted with SOX. The interaction terms are SOX * Boardeff and SOX * governance, respectively.

Table 4

The effects of SOX on the relationship between board effectiveness and CEO compensation

Independent variables	Predicted signs	(1)	(2)	(3)
SOX	+/-	0,105	0,057	0,284
		(0.61)	(0.80)	(0.01)***
BoardEff	+/-	0,026	0,012	0,005
		(0.01)***	(0.28)	(0.46)
SOX * BoardEff	-	-0,030	-0,024	-0,025
		(0.01)***	(0.05)**	(0.00)***
Governance	+/-	0,010	-0,007	0,033
		(0.48)	(0.68)	(0.00)***
SOX * Governance	-	0,026	0,007	0,014
		(0.02)**	(0.59)	(0.03)**
ROA	+	-0,839	-1,733	0,644
		(0.02)**	(0.00)***	(0.01)***
Boardage	+	-0,003	-0,032	0,007
		(0.75)	(0.01)***	(0.36)
CEO age	+	0,007	-0,003	0,014
		(0.10)*	(0.55)	(0.00)***
Tenure	+	0,029	0,130	-0,003
		(0.45)	(0.02)**	(0.93)
MarketCap	+	0,341	0,480	0,156
		(0.00)***	(0.00)***	(0.00)***
Maturity	+/-	0,001	-0,002	0,003
		(0.28)	(0.04)**	(0.00)***
Fixed firm effects		**Yes**	**Yes**	**Yes**
Adjusted R^2		0,15	0,36	0,13
Number of observations		2600	2077	2583

Table 4 reports regression estimates of the impact of SOX on the relationship between board effectiveness and CEO compensation during a period from 1999 till 2006. To be included in the test, a firm needs to have the necessary IRRC, EXECUCOMP and COMPUSTAT data. (1) is the natural logarithm of the total compensation, where total compensation consist of cash compensation, equity-based compensation, long-term incentive pay, and other annual payments. (2) is the natural logarithm of the equity-based compensation, where equity-based compensation consists of the value of option and stock grants. The Black-Scholes model is used to calculate the value of option grants and the value of the stock grants is based on the stock grants received times closing price. (3) is the natural logarithm of the cash compensation, where cash compensation consists of annual salary and bonus. All levels of compensation are expressed in 1999 constant dollars. Board effectiveness is an index variable based on board size, board independence, CEO duality, and a ratio of outside owner directors divided by total outside director. The index is constructed by giving each variable a score ranging from 0 to 4, where 4 is the highest score and 0 the lowest score. The scores are based on quantiles of the sample firms. SOX - a dummy variable of 1 for the post-SOX years (2002-2006) , 0 for the pre-SOX years (1999-2001). Governance is the GIM G-index, reflecting shareholder rights and is a measure for corporate governance. A higher score is associated with weaker corporate governance, and a lower score with stronger corporate governance. ROA is operating income before depreciation scaled by total assets. Board age is is the mean age of the board of directors. CEO age is the age of the CEO at that time, and Tenure is the natural logarithm of the CEOs tenure. MarketCap is the natural logarithm of the market capitalization of the firm and controls for a firms size. Maturity is the age of the firm and controls for a firms maturity/complexity. All regression estimates are given by using a Tobit model, where both dependent variables are censored at zero. The standard error is clustered at the firm level. P-values are reported in parentheses *,**, and *** indicate the significance at the 10%, 5% and 1%levels, respectively

Table 4 shows that SOX is positively related with TotComp, although not significant at any conventional level. Boardeff shows a positive relationship with TotComp and is statistically significant at the 1% level (P<0.01). This suggest that firms with boards more effective in monitoring, compensate their respective CEO more. The magnitude of the coefficient implies that, ceteris paribus, a one-standard deviation increase in the measure of board effectiveness

(Boardeff) is associated with a 3% increase in a CEOs total annual compensation (TotComp). This results suggest that there is not a negative (or substitutive) but positive relationship between board effectiveness and CEO total pay. However, it is difficult to conclude that more effective boards are not able to overcome the agency conflict, as the composition of the total compensation is not observable in equation 1. Furthermore, without any moderation effect on the board effectiveness measure, it is again difficult to conclude that there is no substitutive effect between monitoring and bonding mechanisms.

To examine this moderation effect on board effectiveness, SOX is interacted with Boardeff. Consistent with hypothesis 1a, the interaction between SOX and Boardeff is negatively related with TotComp and statistically significant at the 1% level ($p<0.01$). Furthermore, the magnitude of the coefficient implies that, ceteris paribus, a one-standard deviation increase between board effectiveness (Boardeff) and the post-SOX indicator (SOX) is associated with a 3% decrease in CEO annual total compensation (TotComp). This result is consistent with prior literature and provides some evidence that there exists a substitutive relationship between monitoring and bonding mechanisms (Westphal and Zajac, 1994) Beatty and Zajac,1994) Lipert and Moore, 1995)). Consistent with Lipert and Moore (1995), these findings imply that as the internal monitoring mechanisms improve due to SOX mandates, CEO contracts show a weaker alignment with shareholder interest in the post-SOX period. In addition, this results provides empirical evidence and support for hypothesis 1a, which suggest that the enactment of SOX leads to an increase in board effectiveness and a decrease in CEO annual total pay.

Governance is positively related with TotComp, although not significant at any conventional level. However, the interaction term with SOX and Governance shows a positive association with TotComp and is statistically significant at the 5% level ($P<0.05$). The magnitude of the coefficient implies that, ceteris paribus, a one-standard deviation increase between the post-SOX indicator (SOX) and corporate governance (Governance) is associated with a 2.6% increase in CEO annual total compensation (TotComp). Consistent with the predictions, this result suggest that after SOX firms who are weakly governed compensate their respective CEO more. Assuming that shareholders show rational behavior, they will act upon the inevitable agency conflict between owners and management, by increasing bonding expenditures if monitoring systems are weak (Lipert & Moore, 1995).

Table 4 provides empirical support for hypothesis 1a, by finding a negative, statistic and economic significant relationship between board effectiveness and CEO annual total compensation after the enactment of SOX. Since Hypothesis 1a holds, the obtained results from Table 4 answer part of the main research question.

Equation 2 controls for different determinants that could effect the dependent variable. The control variables consist of ROA (controlling for firm performance), Boardage (controlling for the mean age of the members of the board) CEOage (controlling for CEO seniority), Tenure (number of years the CEO has been in office at the same firm) Size (controlling for firm size), maturity (controlling for firm maturity expressed by the age of the firm), and industry fixed effects based on SIC 2 digit.

ROA shows a negative association with TotComp, which is not in line with the predicted sign. This result implies that a decrease in firm performance leads to an increase in CEO annual total compensation. An explanation for this could be that a small proportion of a CEOs pay is incentive based. Board age is negatively related to TotComp, which implies that as the mean age of the board is lower, they are more willing to compensate their respective CEO more. In contrast with this results, Core, Holthausen, and Larcker (1999) find that board members exceeding the age of 70 are positively related to the level of executive compensation. A reason for this contrast, is that in this study the mean age of the board never exceeds the age of 70. Actually, the highest mean age is 66. Therefore, this results has no further meaning both statistically and economically, expressed in both the age difference between both samples, P-value and the magnitude of the coefficient.

The measure for CEO age and CEO tenure are positively associated with TotComp, and are in line with the predicted sign and prior literature in corporate governance ((Palia, 2001) Murphy, 1986) Barro and Barro, 1990) Hermalin and Weisbach, 1998)Perel ,2003)). Furthermore, the measure of firm size is positively related to TotComp and statistically significant. This is consistent with earlier studies on the relationship with firm size and executive compensation, which suggest that firms size is one of the main drivers to the levels of CEO compensation (Roberts ,1956) Cosh ,1975) Cyert, 2002)). In addition, the measure for maturity shows a positive relation with TotComp, which is in line with the predicted sign, and implies that as a firm becomes more mature and complex, CEO are more compensated.

For equation 3, the regression analysis is repeated by replacing the measure for annual total CEO compensation (TotComp) with a measure for equity-based compensation. Table 4 reports a positive relationship between the post-SOX indicator (SOX) and a measure for equity-based compensation (EquityComp). However this relationship, similar to the relationship between SOX and TotComp, is not significant at any conventional level. Board effectiveness (BoardEff) is positively related to EquityComp, but again not statistically significant at any conventional level.

The interaction term between BoardEff and SOX shows a negative association with EquityComp and is statistically significant at the 5% level ($P<0.05$). Moreover, the magnitude of the coefficient implies that, ceteris paribus, a one-standard deviation increase in BoardEff * SOX is associated with a 2.4% decrease in EquityComp. This finding provides empirical support for hypothesis 1b and is consistent with the predicted sign and prior literature. In addition to the results reported in the first regression in Table 4, this finding provides more empirical evidence that monitoring and bonding mechanisms are substituted for one another and that SOX also affects equity-based compensation negatively. Furthermore, after the enactment of SOX it is possible to conclude that CEO compensation does not show a shift towards equity-based compensation. This implies that board effectiveness increased on the whole, addressing managerial opportunism and making sure that shareholders do not excessively compensate their respective CEOs.

Since both the total compensation measure and the equity-based component measure show similar results, it provides more evidence and empirical support to answer the main

research question that SOX indeed influences the relationship between board effectiveness and CEO compensation.

The measure for corporate governance (Governance) is negatively related to EquityComp, although not significant at any conventional level. In addition, interacting SOX with governance shows a positive relationship with EquityComp. The interaction term between SOX and BoardEff shows a similar pattern for both TotComp and EquityComp, although EquityComp is not statistically significant. However, Governance differs between TotComp and EquityComp. A reason for this difference in coefficients is that strong governed firms implemented compensation contracts that are more in line with shareholder interest, by increasing importance of equity-based compensation in CEOs contracts.

Table 4 provides empirical support for hypothesis 1b, by finding a negative, statistic and economic significant relationship between board effectiveness and the equity-based compensation component after the enactment of SOX. Since both Hypothesis 1a and 1b holds, the obtained results from Table 4 increase the probability of answering the main research question in favour of this study.

The control variables are similar for equation 3 and show similar results. However, CEO age and maturity differ in EquityComp in comparison with TotComp. An explanation for the difference in the sign, is that younger CEO have a longer horizon and by giving them more equity-based compensation they not only act on behalf of the shareholders, but are also bonded for a longer term. This will make sure that the younger CEOs will make more long-term and value enhancing decisions.

The measure of maturity is negatively related to EquityComp and statistically significant at the 5% level ($P<0.05$). In contrast with TotComp, younger firms or less mature firms are willing to compensate their respective CEOs more through equity-based compensation. An explanation for this, is that less mature firms are still in a phase to obtain continuity. By implementing compensation contracts that are more in line with shareholder interest, they make sure that their respective CEOs show less myopic and opportunistic behavior, and are more concerned with shareholder value maximization.

Equation 4 is identical to equation 1 and 2, however for the regression analysis the dependent variable is replaced by a measure for cash compensation (CashComp). Cash compensation is part of the total compensation, and is the sum of the annual salary and bonus. Table 4 reports SOX is positively related to CashComp and statistically significant at the 1% level ($P<0.01$). Furthermore, the magnitude of the coefficient implies that, ceteris paribus, a one-standard deviation increase in SOX is associated with 28.4% change in CashComp. This result is consistent with the findings of Cohen, Dey and Lys (2007), which argue that the enactment of SOX significantly increases CEO annual salary and bonus. Cohen et al. (2007), claim that after the enactment of SOX, firms have redesigned compensation contracts to provide CEOs with more cash compensation. An explanation for this is that SOX requirements (section 302 and 304) made CEOs more risk-averse, by requiring CEOs to return any incentive-based compensation they received in the event of subsequent accounting earnings restatements. By

redesigning the compensation contracts of CEOs towards more cash compensation, firms act on section 302 and 304 of SOX in order to make their respective CEOs less risk-averse. According to Guay (1999) and Cohen et al. (2007), CEOs with more cash compensation are better diversified and are less risk-averse, thus more willing to invest in projects with more risk.

Board effectiveness (BoardEff) is positively related to CashComp, although not statistically significant at any conventional level. The result is in line with regression 1 and 2 and is as expected. In addition, the interaction term between BoardEff and SOX shows a negative association with CashComp and is statistically significant at the 1% level ($P<0.01$). Furthermore, the coefficient is significant and implies that, ceteris paribus, a one-standard deviaton increase in BoardEff * SOX is associated with a 2.5% decrease in CashComp. This finding provides empirical support for hypothesis 1c and is consistent with the predicted sign and prior literature.

In addition to the results reported in the first regression and the second regression in Table 4, this finding provides more empirical evidence that monitoring and bonding mechanisms are substituted for one another and that SOX also influences total compensation, equity-based compensation and cash compensation negatively.

Governance is positively related with CashComp and statistically significant at the 1% level ($P<0.01$). The coefficient is significant which implies that, ceteris paribus, a one-standard deviation increase in Governance is associated with a 3.3% increase in CashComp. This is line with prior research, which suggest that rational shareholders will act on the inevitable owner-manager conflict by insisting on high levels of bonding in cases where monitoring is weak (Lipert & Moore, 1995).

Interacting SOX with governance leads to a positive association with CashComp and is statistically significant at the 5% level ($P<0.05$). The coefficient is significant and implies that, ceteris paribus, a one-standard deviation increase in SOX * Governance is associated with a 1.4% increase in CashComp. Consistent with the predictions and prior literature, this results suggest that after SOX weak governed firms pay CEOs 1.4% more cash compensation, in contrast with strong governed firms. However, the difference between strong and weak governed firms after SOX is minimized with 1.9%. This suggest that weak governed firms find SOX more beneficial than strong governed firms, in reducing CEO cash compensation.

The control variables are similar for equation 2 and 3 and show similar results. However, ROA, Boardage and Tenure differ from column 1 and 2. As expected, ROA shows a positive and statistical relationship with CashComp. The reason for this is that the bonus in the cash compensation is based on a predetermined performance measure. Therefore, if firm performance increases, of course the bonus of the CEO increases as well. This is a typical pay-for-performance contract and enables shareholders to exert more effort from management in maximizing shareholder value. Board age is positively related to CashComp, although not statistically significant at any conventional level. The measure for tenure shows a different sign than predicted, where Tenure is negatively related to CashComp. Although not significant, this result suggest that relatively new CEOs receive less cash compensation, than CEOs that are longer within the firm, consistent with the managerial power theory.

Overall, Table 4 provides empirical support for hypothesis 1(a till c), and evidence to answer the main research question of this study. Following regression analysis 1,2 and 3, Table 4 reports a significant negative relationship between the different compensation component and board effectiveness after SOX, suggesting that after SOX was implemented board effectiveness increased, therefore substituting the need for compensating CEOs more to align their interest with shareholders. Thus providing some evidence that monitoring mechanisms are substitutes for bonding mechanisms. In addition, SOX makes boards more effective in monitoring CEOs and reduces the risk that CEOs entrench themselves at the cost of the shareholders and key stakeholders.

6.3 Robustness check

As a robustness check, the regression analysis in Table 4 are repeated by replacing the initial board effectiveness index with an other measure of board effectiveness. In stead of using quantiles to construct the board effectiveness index, the alternative measure is based on scientific literature in the field of corporate governance and finance.

Table 5

Robustness check

Independent variables	predicted signs	(1)	(2)	(3)
SOX	+/-	0,098	-0,049	0,256
		(0.45)	(0.82)	(0.01)***
BoardEff	+/-	0,020	0,007	0,005
		(0.02)**	(0.47)	(0.18)
SOX * BoardEff	-	-0,029	-0,017	-0,023
		(0.00)***	(0.15)	(0.00)***
Governance	+/-	0,010	-0,007	0,033
		(0.48)	(0.67)	(0.00)***
SOX * Governance	-	0,025	0,007	0,013
		(0.05)**	(0.62)	(0.06)*
ROA	+	-0,826	-1,733	0,635
		(0.02)**	(0.00)***	(0.01)***
Boardage	+	-0,003	-0,032	0,007
		(0.73)	(0.01)***	(0.34)
CEO age	+	0,007	-0,003	0,014
		(0.11)	(0.54)	(0.00)***
Tenure	+	0,030	0,130	-0,002
		(0.43)	(0.02)**	(0.95)
MarketCap	+	0,337	0,480	0,156
		(0.00)***	(0.00)***	(0.00)***
Maturity	+/-	0,001	-0,002	0,003
		(0.31)	(0.04)**	(0.00)***
Fixed firm effects		**Yes**	**Yes**	**Yes**
Adjusted R^2		0,15	0,36	0,13
Number of observations		2600	2077	2583

Table 4 reports regression estimates of the impact of SOX on the relationship between board effectiveness and CEO compensation during a period from 1999 till 2006. To be included in the test, a firm needs to have the necessary IRRC, EXECUCOMP and COMPUSTAT data. (1) is the natural logarithm of the total compensation, where total compensation consist of cash compensation, equity-based compensation, long-term incentive pay, and other annual payments. (2) is the natural logarithm of the equity-based compensation, where equity-based compensation consists of the value of option and stock grants. The Black-Scholes model is used to calculate the value of option grants and the value of the stock grants is based on the stock grants received times closing price. (3) is the natural logarithm of the cash compensation, where cash compensation consists of annual salary and bonus. All levels of compensation are expressed in 1999 constant dollars. The index is constructed by giving each variable a score ranging from 0 to 4, where 4 is the highest score and 0 the lowest score. The scores are based on quantiles of the sample firms. Boadrd effectiveness (2) is a similar index variable as board effectiveness (1). However, the score are based on literature and is used as a robustness test. SOX - a dummy variable of 1 for the post-SOX years (2002-2006) , 0 for the pre-SOX years.(1999-2001). Governance is the GIM G-index, reflecting shareholder rights and is a measure for corporate governance. A higher score is associated with weaker corporate governance, and a lower score with stronger corporate governance. ROA is operating income before depreciation scaled by total assets. Board age is is the mean age of the board of directors. CEO age is the age of the CEO at that time, and Tenure is the natural logarithm of the CEOs tenure. MarketCap is the natural logarithm of the market capitalization of the firm and controls for a firms size. Maturity is the age of the firm and controls for a firms maturity/complexity. All regression estimates are given by using a Tobit model, where both dependent variables are censored at zero. The standard error is clustered at the firm level. P-values are reported in parentheses *,**, and *** indicate the significance at the 10%, 5% and 1%levels, respectively

Table 5 reports the results of the robustness check. The main variables, show similar results as the reported results in Table 4. However, the equity-based compensation variable is not significantly related to the interaction term between SOX and board effectiveness, although with a P-value of 0.15 it is almost statistically significant. Table 5 therefore concludes that the results are robust to different model specifications and are still consistent with the predetermined hypothesis and earlier stated predictions.

6.4 SOX and firm performance

In this section, hypothesis 2 is tested to examine the effect of SOX on firm performance. A Tobit regression model is used, which is based on the approach by Ahmed et al (2010), to examine if after the enactment of SOX, firm performance changes.

Table 6
The impact of SOX on firm performance

independent variables	predicted signs	ROA	Tobins' Q
SOX	-	-0,008	-0,648
		(0.00)***	(0.00)***
Asset_Turn	+	0,037	-0,205
		(0.00)***	(0.12)
Lag_BTM	-	-0,105	-2,259
		(0.00)***	(0.00)***
Leverage	-	-0,059	-2,770
		(0.01)	(0.00)***
Size	+/-	-0,006	-0,268
		(0.05)**	(0.00)***
ΔRevenue	+	0,034	1,939
		(0.00)***	(0.00)***
ΔGDP	+	0,224	0,259
		(0.00)***	(0.89)
Maturity	+/-	0,000	-0,003
		(0.03)**	(0.04)**
Fixed firm effects		**Yes**	**Yes**
Adjusted R^2		0,38	0,38
Number of observations		2605	2605

This table provides the results of the regressions of operating profitability measures on post-SOX year indicators, controlling for economic determinants and firm characteristics. A Tobit model is used for estimates, where the dependent variables are censored at zero. P-values are reported in the parentheses, where *,**,*** indicate significance at the 10%, 5% and 1%, respectively

Table 6 reports the empirical findings of equation 5 and 6. In equation 5, the dependent variable is return on assets (ROA) and the independent variable is the post-SOX indicator (SOX). Table 6 reports a negative and statistically significant association (P<0.01) between ROA and SOX. Furthermore, the magnitude of the coefficient implies that, ceteris paribus, a one-standard deviation increase in SOX is associated with a 0.8% decrease in ROA. This result suggest that after the enactment of SOX, firms experience a decrease of 0.8% in firm performance expressed by ROA. This is consistent with earlier studies on the relationship between firm performance and SOX. For instance, Ahmed et al (2010), provide evidence on the increased net-cost of the enactment of SOX. They find empirical evidence that after SOX, firms experience declines in firm

performance expressed by cash-flow profit of 1.3% of assets and 1.8% of revenue. Therefore, these findings provide empirical support for hypothesis 2a, which suggest that after the enactment of SOX, firm performance is negative, reflected by ROA..

Equation 5 controls for different determinants that could effect the dependent variable. The control variables consist (Asset_Turn) turnover ratio as a proxy for firm efficiency, (Lag_BTM) the lag book-to-market ratio controls for firms' growth opportunity, (Lev) leverage controls for a firms risk, (ΔRevenue) the year-over-year percentage change in revenues, to control for economic conditions that manifest at the firm level and (ΔGDP) the percentage change in U.S. gross domestic product during the year to capture broader shifts in macro-economic conditions. Furthermore, (Size) the natural logarithm of total assets, is included in Equation 5, to control for other unobservable firm-specific characteristics associated with operating performance.

As predicted, ROA shows a positive relationship with Asset_Turn. This implies that indeed more efficient firms experience stronger firm performance, expressed by ROA. In addition, this result is in line with Ahmed et al. (2010), who find a similar result between firm profitability and firm efficiency.

The measure for a firms growth opportunities (Lag_BTM) is negatively related to ROA and is consistent with the predicted sign. This suggest that that firms with higher-growth opportunities (low Lag_BTM) experience better firm performance. Again, this result is in line with Ahmed et al. (2010), who find a similar result between firm profitability and a firms growth opportunities. Leverage is in line with the predicted sign, however not significant at any conventional level. The negative relationship between Leverage and ROA suggest that, riskier firms experience less firm performance. Firm size (Size) is negatively related with firm performance (ROA). This implies that, as firm become more complex and bureaucratic, firm profitably decreases.

Both economic determinants, ΔRevenue and ΔGDP are positively related to ROA and statistically significant. This results implies that if the year-over-year percentage change in revenues is positive, this will lead to better firm profitability. Furthermore, the positive percentage change in U.S. gross domestic product will result in better firm profitability. The measure for maturity (Maturity) shows no sign, as the coefficient equals zero. Maturity, therefore, has no effect on the firm performance.

For equation 6, the regression analysis is repeated by replacing the dependent variable with Tobin’s Q. The difference with ROA, is that Tobin’s Q is prospective and captures the changes in market value, where ROA is retrospective and shows historical or short term performance.

Table 6 reports a negative and statistically significant ($P<0.01$) association between Tobin’s Q and SOX. Furthermore, the magnitude of the coefficient implies that, ceteris paribus, a one-standard deviation increase in SOX is associated with a 64.8% decrease in Tobin’s Q. This result suggest that after the enactment of SOX, firms experience a decrease of 64.8% in firm performance expressed by Tobin’s Q. In comparison with ROA, the decrease in Tobin’s Q after SOX is quite large and economically meaningful. Therefore, these findings provide empirical

support for hypothesis 2b, which suggest that after the enactment of SOX, firm performance is negative, reflected by Tobin's Q.

Equation 6 controls for different determinants that could effect the dependent variable. The control variables consist (Asset_Turn) turnover ratio as a proxy for firm efficiency, (Lag_BTM) the lag book-to-market ratio controls for firms' growth opportunity, (Lev) leverage controls for a firms risk, (ΔRevenue) the year-over-year percentage change in revenues, to control for economic conditions that manifest at the firm level and (ΔGDP) the percentage change in U.S. gross domestic product during the year to capture broader shifts in macro-economic conditions. Furthermore, (Size) the natural logarithm of total assets, is included in Equation 6, to control for other unobservable firm-specific characteristics associated with operating performance.

As predicted, ROA shows a positve relationship with Asset_Turn. This implies that indeed more efficient firms experience stronger firm performance, expressed by ROA. In addition, this result is in line with Ahmed et al. (2010), who find a similar result between firm profitability and firm efficiency. The measure for a firms growth opportunities (Lag_BTM) is negatively related to ROA and is consistent with the predicted sign. This suggest that that firms with higher-growth opportunities (low Lag_BTM) experience better firm performance. Again, this result is in line with Ahmed et al. (2010), who find a similar result between firm profitability and a firms growth opportunities.

Leverage is in line with the predicted sign, however not significant at any conventional level. The negative relationship between Leverage and ROA suggest that, riskier firms experience less firm performance. Firm size (Size) is negatively related with firm performance (ROA). This implies that, as firm become more complex and bureaucratic, firm profitably decreases.

Both economic determinants, ΔRevenue and ΔGDP are positively related to ROA and statistically significant. This results implies that if the year-over-year percentage change in revenues is positive, this will lead to better firm profitability. Furthermore, the positive percentage change in U.S. gross domestic product will result in better firm profitability. The measure for maturity (Maturity) shows no sign, as the coefficient equals zero. Maturity, therefore, has no effect on the firm performance.

As mentioned earlier, ROA and Tobin's Q are complementing performance measures, in a sense that ROA is retrospective and Tobin'Q is prospective. Therefore, these findings provide some evidence that SOX is unbeneficial for firm performance on both short and long term.

6.5 The effect of SOX on firm performance: Good versus Bad corporate governance

In this section, hypothesis 3 is tested to examine the effect of SOX on performance between strong governed and weak governed firms. Similar to Table 6, operating performance is measured by two different variables, which are Tobin's Q and ROA. A Tobit regression model is used, which is based on the approach by Ahmed et al (2010), to examine if after the enactment of SOX, firm performance changes.

Table 7

The effect of SOX on firm performance between strongly governed and weakly governed firms

Independent variables	predicted signs	ROA	Tobins' Q
SOX	-	0,012	-1,524
		(0.23)	(0.00)***
Governance	+/-	0,002	-0,125
		(0.03)**	(0.00)***
SOX * Governance	+/-	-0,002	0,090
		(0.03)**	(0.00)***
Asset_Turn	+	0,037	-0,204
		(0.00)***	(0.12)
Lag_BTM	-	-0,107	-2,170
		(0.00)***	(0.00)***
Leverage	-	-0,062	-2,572
		(0.01)***	(0.00)***
Size	+/-	-0,006	-0,276
		(0.05)*	(0.00)***
ΔRevenue	+	0,036	1,866
		(0.00)***	(0.00)***
ΔGDP	+	0,227	0,106
		(0.00)***	(0.95)
Maturity	+/-	0,000	-0,002
		(0.04)**	(0.14)
Fixed firm effects		**Yes**	**Yes**
Adjusted R^2		0,32	0,27
Number of observations		2591	2591

This table provides the results of the regressions of operating profitability measures on post-SOX year indicators and governance measures, controlling for economic determinants and firm characteristics. A Tobit model is used for estimates, where the dependent variables are censored at zero. P-values are reported in the parentheses, where *,**,*** indicate significance at the 10%, 5% and 1%, respectively

Table 7 reports the empirical findings of equation 7 and 8. In equation 7, the dependent variable is return on assets (ROA) and the independent variables consist of is the post-SOX indicator (SOX) and a measure for corporate governance (Governance). In order to see if after SOX a significant difference arises between weak and strong governed firms in how they experience firm performance, an interaction term between SOX and Governance is employed.

The relationship between SOX and ROA is positive, although not statistically significant at any conventional level. Governance is positively related to ROA and statistically significant at the 5% level ($P<0.05$). The magnitude of the coefficient implies that, ceteris paribus, a one-standard deviation increase in Governance is associated with a 0.2% increase in ROA. This suggest that weak governed firms show a small increase in firm performance, expressed by ROA. An explanation for this is, that as ROA is an accounting-based performance measure, it does not capture changes in market value. Thus, only the costs of increased governance mechanisms is reflected in ROA.

The interaction term between SOX and Governance shows a negative relationship with ROA and is statistically significant at the 5% level ($P<0.05$). The magnitude of the coefficient implies that, ceteris paribus, a one-standard deviation increase in Governance is associated with

a 0.2% decrease in ROA. This implies that after SOX, strong governed firms experience stronger firm performance in contrast with weak governed firms. A reason for this, is that strong governed firms incur less cost to be compliant with SOX madates, in contrast with weak governed firms. Since ROA is an accounting-based profitability measure, based on historical firm performance. No conclusions can be made if implementing good governance structures is value enhancing.

For equation 8, the regression analysis is repeated by replacing the dependent variable with Tobin's Q. The difference with ROA, is that Tobin's Q is prospective and captures the changes in market value, where ROA is retrospective and shows historical or short term performance. Table 7 reports a negative and statistically significant ($P<0.01$) association between Tobin's Q and SOX. Furthermore, the magnitude of the coefficient implies that, ceteris paribus, a one-standard deviation increase in SOX is associated with a 152.4% decrease in Tobin's Q. This result suggest that after the enactment of SOX, firms experience a decrease of 152.4% in firm performance expressed by Tobin's Q.

The measure for corporate governance (Governance) is negatively related to Tobin's Q and statistically significant at the 1% level ($P<0.01$). Furthermore, the magnitude of the coefficient implies that, ceteris paribus, a one-standard deviation increase in Governance is associated with a 12.5% decrease in Tobin's Q. This implies that, before the enactment of SOX, strong governed firms experience stronger firm performance, reflected by Tobin's Q. This results is contradicting with Equition 7, where ROA was the dependent variable.

As mentioned earlier, the difference in results come from the fact that ROA is an accounting-measure based on historical performance and Tobin's Q is a market-based performance measure. Tobin's Q captures the changes in firm value, thus makes it possible to see if good corporate governance structure maximizes shareholder value. However, ROA only captures the extra costs derived from implementing good corporate governance mechanisms, thus reflecting firm profitability in stead of a firms ability to enhance or add value.

The interaction between SOX and governance shows a positive association with Tobin's Q and is statistically significant at the 1% level ($P<0.01$). The magnitude of the coefficient implies that, ceteris paribus, a one-standard deviation in the interaction between SOX and Governance is associated with a 9% increase in Tobin's Q. This result implies that, after the enactment of SOX, weak governed experience more benefits from SOX than strong governed firms. An explanation for this, is that strong governed firms already have optimal governance structure, thus being compliant with SOX mandates does not maximize shareholder-value.

However, weak governed firms are required by SOX to make drastic changes in their governance mechanisms in order to be compliant. By being compliant, weak governed firms greatly improve their governance mechanisms, which maximizes shareholder-value and shows that improving corporate governance is a value enhancing decision, as viewed by the market.

Therefore, consistent with hypothesis 3b, the empirical findings are consistent with prior literature, and provide mixed evidence. In terms of firm profitability (ROA), SOX seems to be more beneficial for strong governed firms. In addition, SOX proves to be more beneficial for weak governed firms in maximizing shareholder-value.

Conclusion

A substantial amount of research has been done solely on the effects SOX has on board structure, board size, CEO compensation, and out firm performance. However, this study is the first to conduct research on the influences of the enactment of SOX on the relationship between board effectiveness and executive compensation. This is important, since research has shown that board effectiveness is strongly related to executive compensation in a way that monitoring capacity of the board of directors and executive compensation are both manners to mitigate agency conflicts between ownership and management, and could therefore substitute one another. By increasing monitoring capacity or board effectiveness, it is predicted that less or different types of compensation is needed to align interest between shareholders and management.

In this study, board effectiveness reflects the effectiveness of the board of directors in monitoring the CEO, and executive compensation reflects the total compensation (annual salary, bonus, stock ownership, option grants) the CEO receives in order to make decisions that increase shareholder wealth. Since SOX increases independence throughout the organization, such as board of directors and key committees, it is expected that this will increase board effectiveness. By increasing board effectiveness (monitoring expenditures) less compensation (bonding expenditures) is needed to align interest of executives with shareholders.

As predicted, for a sample of 411 S&P 500 firms over a period of seven years (1999 – 2006), this study finds that board effectiveness is positively related to SOX at the 1% level, suggesting that the enactment of SOX increases board effectiveness by mandating governance provisions. Therefore, board effectiveness improves after the enactment of SOX, suggesting that the boards of the sample firms are more capable in monitoring there respective CEOs and aligning interest between management and owners. In addition, evidence shows that after SOX was implemented board effectiveness increased, therefore substituting the need for compensating CEOs more to align their interest with shareholders. This provides evidence that monitoring mechanisms are substitutes for bonding mechanisms. Also, SOX makes boards more effective in monitoring CEOs and reduces the risk that CEOs make use of their private benefits of control or show managerial opportunism at the cost of the owners.

In conclusion, board effectiveness improves after the enactment of SOX, suggesting that the boards of the sample firms are more capable in monitoring there respective CEOs and aligning interest between management and owners. Consistent with the first hypothesis , this study finds evidence of a significant inverse relationship between the different compensation component and board effectiveness after SOX, suggesting that after SOX was implemented board effectiveness increased, therefore substituting the need for compensating CEOs more to align their interest with shareholders. Thus providing some evidence that monitoring mechanisms are substitutes for bonding mechanisms.

In addition, SOX makes boards more effective in monitoring CEOs and reduces the risk that CEOs entrench themselves at the cost of the shareholders and key stakeholders. Total compensation and cash compensation show a significant inverse relationship with board

effectiveness after SOX at the 1% level, where the equity-based compensation components shows an inverse statistical relationship at the 5% level. Furthermore, corporate governance is positively related to cash compensation, providing evidence that bad governed firms compensate CEOs more. This is consistent with prior corporate governance literature which suggest that weak governed firms allow more managerial opportunistic behavior, at the cost of shareholders. Moreover, after SOX, evidence shows that this relationship becomes stronger, suggesting that after SOX weak governed firms pay their CEOs more.

Results on the relationship of the enactment of SOX and firm performance, is consistent with prior research, as findings show a negative relationship between SOX and the operating performance variables (ROA and Tobin's Q) both statistically significant at the 1% level. As mentioned earlier, ROA and Tobin's Q are complementing performance measures, in a sense that ROA is retrospective and Tobin'Q is prospective. Therefore, these findings provide some evidence that SOX is unbeneficial for firm performance on both short and long term.

Findings on the impact of SOX on weak and strong governed firms suggest that weak governed firms greatly improve their governance mechanisms post-SOX, maximizing shareholder-value and showing that improving corporate governance is a value enhancing decision, as viewed by the market. In terms of firm profitability (ROA), SOX seems to be more beneficial for strong governed firms.

Since strong governed have less implementation costs to be compliant with SOX. In addition, SOX proves to be more beneficial for weak governed firms in maximizing shareholder-value. Strong governed firms already reached a sub-optimal level of governance within the organization, therefore SOX does not prove to be beneficial for strong governed firms in maximizing shareholder value, in comparison with weak governed firms.

Overall, this study has provided empirical evidence that the enactment of SOX increases board effectiveness, making board of directors more capable of monitoring the CEOs to act in the best interest of the shareholders and maximize shareholder value. As a result of this the compensation received by a CEO decreases after the enactment of SOX, consistent with the hypothesis, providing evidence that the relationship between board effectiveness and executive compensation is of an inverse nature and that monitoring mechanisms and bonding mechanism serve as substitutes for one another.

By increasing one of the mechanisms, as SOX does in terms of monitoring capabilities, the other mechanism will decrease and be substituted, which is reflected in the executives compensation. In terms of Firm performance, this study provides evidence consistent with prior literature, that after the enactment of SOX, firm performance decreases. Furthermore, this study provides evidence that SOX is more beneficial for weak governed firms in the short term, but on the long run strong governed firms find SOX to be the most beneficial of the two.

Limitations and recommendations for future research

As with any research, this study is subjected to some limitations as well. The foremost concern of this study is related to the temporal effects of SOX. When focussing on temporal effects of a certain event, it is difficult to exclude other contemporaneous determinants that could possibly affect the empirical findings. In particular, the examinations of firm performance after the enactment of SOX could be affected by other unobservable factors. To partially solve this problem, this study includes control variables for firm characteristics, industry fixed effects, and macro-economic changes (for the tests on firm performance).

As Ahmed et al. (2010) suggest, an ideal solution for this problem would be to include a control sample of firms which are not subjected to SOX mandates. However, as the control group would consist of large foreign or dual listed firms, both samples would not match perfectly. The difference between the control group and the group with SOX would differ to much, in terms of different legal systems, possibly differences in accounting standards (U.S. GAAP versus IFRS), other unobservable macro-economic changes and cultural aspects that leads to differences in firm characteristics.

Another important limitation of this study, is that recent financial crisis is not included in the post-SOX period while the DotCom crisis is included in the pre-SOX period. This could lead to arguments, suggesting that the empirical findings derived from this study are coincide with the time trend. However, if this was the case, the empirical findings on firm performance should be in favour of SOX, reporting increased firm performance in the post-SOX. As mentioned earlier, this is not the case. The empirical results suggest the opposite and are therefore not consistent with the economic time trend, both in accounting based and market based performance measures.

For future research it would be interesting to see if increased board effectiveness outweighs the cost of attracting outside-independent directors. Prior research on SOX and board structure reports an increase in board size and director compensation. Therefore, it is important to know that the increased monitoring costs outweigh the increased board effectiveness. For instance, if monitoring costs do not outweigh the increased board effectiveness, would it not be easier for the respective firms to compensate their CEOs more and in sum incur less costs related to the agency problem. Future research could contribute to the existing literature in a way that monitoring mechanisms are cost effective.

REFERENCES

Anderson, C.A. and R. N. Anthony, The New Corporate Directors, New York: John Wiley and Sons, 1986.

Agrawal, Anup and Charles R. Knoeber, 1996, Firm performance and mechanisms to control agency problems between managers and shareholders, Journal of Financial and Quantitative Analysis 31, 377-397.

Beasley, M. (1996). An empirical analysis of the relation between the board of director composition and financial statement fraud. Accounting Review, 71, 443–465. 6

Bebchuk, L.A., Fried, J.M. and Walker, D.I. (2002), Managerial power and rent extraction in the design of executive compensation, The University of Chicago Law Review, Vol. 69 (3), pp. 751-846

Bebchuk, Lucian A. and Jesse M. Fried (2003) "Executive Compensation as an Agency Problem," Journal of Economic Perspectives, 17, 71-92.

Bebchuk, L., & Grinstein, Y. 2005. The growth of executive pay. Oxford Review of Economic Policy, 21(2): 283-303.

Bebchuk, L. A., & Fried, J. M. 2004. Pay Without Performance: The Unfulfilled Promise of Executive Compensation: Harvard University Press.

Bebchuk, L. A., & Fried, J. M. 2006. Pay without performance: Overview of the issues. Journal of Applied Corporate Finance, 17(4): 8-23.

Bebchuk, Lucian, Alma Cohen, and Allen Ferrell, 2009, What matters in corporate governance? Review of Financial Studies 22, 783-827.

Berle, A.A. and Means, G.C. (1932), The modern corporation and private property, New York: Macmillan

Bhagat, Sanjai and Bernard Black, 2002, The non-correlation between board independence and long term firm performance, Journal of Corporation Law 27, 231-274.

Bhagat, Sanjai and Brian Bolton, 2008, Corporate governance and firm performance, Journal of corporate Finance 14, 257-273,

Boyd, B.K. (1994), Board Control and CEO Compensation, Strategic Management Journal, Vol. 15 (5), pp. 335-344

Brickley, J. & James, C. (1987). The takeover market, corporate bond composition, and ownership structure: the case of banking. Journal of Law and Economics, 30, 161–181. 6

Brickley, James A., Jeffrey L. Coles, and Gregg Jarrell, 1997, Leadership structure: Separating the CEO and chairman of the board, Journal of Corporate Finance, 3, 189-220.

Byoung-Hyoun Hwang, Seoyoung Kim, It pays to have friends ,Journal of Financial Economics 93 (2009) 138–158

Byrd, J. & Hickman, K. (1992). Do outside directors monitor managers? evidence from tender offer bids. Journal of Financial Economics, 32, 195–222. 6

Carter, C. B. & Lorsch, J. (2004). Back to the drawing board: Designing corporate boards for a complex world. MA: Harvard Business School Press, . 7

Charlie Weir, Corporate governance, performance and take-overs: an empirical analysis of UK mergers, Applied Economics, 1997, 29, 1465Ð 1475

Chen, Z., Cheung, Y. L., Stouraitis, A., & Wong, A. (2005). Ownership concentration, firm performance, and dividend policy in hong kong. Pacific-Basin Finance Journal, 13 (4). 7

Chhaochharia, Vidhi and Yaniv Grinstein, 2007, Corporate governance and firm value: the impact of the 2002governance rules, Journal of Finance 62, 1789-1825.

Chin-Jung, L. & Ming-Je, T. (2007). Where is independent director efficacy? Corporate Governance: An International Review, 15 (4), 636–643. 6

Chung, K., and Pruitt, S., (1994), "A simple approximation of Tobin's q."Financial Management 23, 70-74.

Conyon, M. J. & Peck, S. I. (1998). Board size and corporate performance: evidence from European countries. European Journal of Finance, 4 (3). 7

Conyon, M. J., & He, L. 2004. Compensation Committees and CEO Compensation Incentives in US Entrepreneurial Firms. Journal of Management Accounting Research, 16: 35–56.

Core, J.E., Holthausen, R.W., Larcker, D.F., 1999. Corporate governance, chief executive officer compensation, and firm performance. Journal of Financial Economics 51, 371–406.

Core, John E., Robert W. Holthausen, and David F. Larcker, 1999, Corporate governance, chief executive office rcompensation, and firm performance, Journal of Financial Economics 51, 371-406.

Cyert, R., Kang, S.-H. and Kumar, P. (2002), Corporate governance, takeovers, and top management compensation: Theory and evidence, Management Science, Vol. 48, pp. 453-469

Daily, C. M. & Dalton, D. R. (1993). Board of directors' leadership and structure: control and performance implications. Entrepreneurship Theory and Practice, 17 (3). 7

Daniel A. Cohen, Aiyesha Dey, Thomas Z. Lys, The Sarbanes Oxley Act of 2002: Implications for Compensation Structure and Risk-Taking Incentives of CEOs, workingpaper, 2007

David Yermack , Higher market valuation of companies with a small board of directors, Journal of Financial Economics 40 (1996) , 185-211

Davies, J.R., Hillier, D. and McColgan, P. (2005), Ownership structure, managerial behavior and corporate value, Journal of Corporate Finance, Vol. 11 (4), pp. 645-660

Dehaene A., De Vuyst V., Ooghe H., Corporate Performance and Board Structure in Belgian Companies, International Journal of Strategic Management Volume 34, Number 3, June 2001 , pp. 383-398(16)

Demsetz, H. and Lehn, K. (1985), The structure of corporate ownership: causes and consequences, Journal of Political Economy, Vol. 93, pp. 1155-1177

Demsetz, Harold, 1983, The structure of ownership and the theory of the firm, Journal of Law and Economics 26,

Dufour, J., 1997, Some impossibility theorems in econometrics, with applications to structural and dynamic models, Econometrica 65, 1365-1389.

Eisenberg, T., Sundgren, S., & Wells, M. (1998). Larger board size and decreasing firm value in small firms. Journal of Financial Economics, 48 (1). 8

Eisenhardt, K.M. (1989), Agency theory: An assessment and review, Academy of Management Review, Vol. 14 (1), pp. 57-74

Elloumi, F. & Gueyie, J. (2001). Financial distress and corporate governance: an empirical analysis. Corporate Governance, 11 (1), 15–23. 6
Fernandes, N. (2008), Board compensation and firm performance: The role of 'independent' board members, Journal of Multinational Financial Management, Vol. 18 (1), pp. 30-44

Fich, Eliezer M. and Anil Shivdasani (2006): Are busy boards effective monitors?, Journal of Finance, 689-724

Finkelstein, S. 1992. Power in top management teams: dimensions, measurement, and validation. Academy of Management Journal, 35, 505-38.

Finkelstein, S. & DAveni, R. (1994). Ceo duality as a double-edged sword: how boards of directors balance entrenchment avoidance and unity of command. Academy of Management Journal, 37 (5). 7

Guay, W. 1999. The Sensitivity of CEO Wealth to Equity Risk: An Analysis of the Magnitude and Determinants. Journal of Financial Economics 53, 43-71.

Gompers, Paul A., Joy L. Ishii, and Andrew Metrick, 2003, Corporate governance and equity prices, Quarterly Journal of Economics 118(1), 107-155.

Grabke-Rundell, A., & Gomez-Mejia, L. R. 2002. Power as determinant of executive compensation. Human Resource Management Review, 12: 3-23.

Hart, O. (1995), Corporate governance: Some theory and implications, The Economic Journal, Vol. 105 (430), pp. 678-689

Hatice Uzun, Samuel H. Szewczyk, Raj Varma, Board Composition and Corporate Fraud, Financial Analysts Journal, Vol. 60, No. 3 (May - Jun., 2004), pp. 33-43

Hermalin, B.E., Weisbach, M.S., 1998. Endogenously chosen boards of directors and their monitoring of the CEO. American Economic Review 88, 96–118.

Hermalin, Benjamin E. and Michael S. Weisbach,, 1998, Endogenously chosen boards of directors and their monitoring of the CEO, American Economic Review 88, 96-118.

Higgs (2003). Review of the role and effectiveness of non-executive directors. London: Department of Trade and Industry, . 7

Himmelberg, C.P., Hubbard, G. and Palia, D. (1999), Understanding the determinants of managerial ownership and the link between ownership and performance, Journal of Financial Economics, Vol. 53 (3), pp. 353-384

Igor Filatotchev and Kate Bishop, Board Composition,Share Ownership, and 'Underpricing' of U.K. IPO Firms, Strategic Management Journal, Vol. 23, No. 10 (Oct.,2002), pp. 941-955

Ittner, C.D., Lambert, R.A. and Larcker, D.F. (2003), The structure and performance consequences of equity grants to employees of new economy firms, Journal of Accounting and Economics, Vol. 34, pp. 89-127

James D. Westphal, Edward J. Zajac, The costs and benefits of managerial incentives and monitoring in large U.S. corporations: when is more not better? Strategic Management Journal, Vol. 15, (1994), pp. 121-142

James S. Linck and Jeffrey M. Netter, The Effects and Unintended Consequences of the Sarbanes-Oxley Act on the Supply and Demand for Directors, oxford journals,review of financial studies, Vol 22 No. 8 (2009)

James S. Linck, Jeffry M. Netter, Tina Yang, The determinants of board structure, Journal of Financial Economics 87 (2008) 308–328
Jay Dahya and John J. McConnell, Outside Directors and Corporate Board Decisions (2003)

Jensen, M.C. and Meckling, W.H. (1976), Theory of the firm: Managerial behavior, agency costs and ownership structure, Journal of Financial Economics, Vol. 3 (4), pp. 305-360

Jensen, M.C. and Murphy, K.J. (1990a), Performance pay and top-management incentives, Journal of Political Economy, Vol. 98 (2), pp. 225-264

Kahn, J. (2000), Presto chango! Sales are huge!, Fortune, Vol. 141, pp. 90-96

Li J., Ownership Structure and Board Composition: A Multi-count Test of agency Theo Predictions, Managerial and Decision economics, Vol. 15,359-368 (1994)

Linck, James S., Jeffry M. Netter and Tina Yang, 2008, The determinants of board structure, Journal of Financial Economics 87, 308-328.

Linck, James S., Jeffry M. Netter and Tina Yang, The effects and unintended consequences of the Sarbanes-Oxley Act on the supply and demand for directors, Review of Financial Studies, forthcoming,

Lipton, M. & Lorsch, J. (2005). Corporate boards in oecd countries: size, composition, functioning and effectiveness. Corporate Governance, 13 (2).

Manne, H.G. (1965), Mergers and the market for corporate control, Journal of Political Economy, Vol. 73 (2), pp. 110-120

Mary Ellen Carter, Luann J. Lynch and Sarah L. C.Zechman,2009. Changes in bonus contracts in the post-Sarbanes–Oxley era, REVIEW OF ACCOUNTING STUDIES, Volume 14, Number 4, 480-506

Mary Ellen Carter, Luann J. Lynch, Sarah L. C. Zechman,The relation between executive compensation and earning smanagement: Changes in the post-Sarbanes-Oxley era, Workingpaper, (August, 2005)

McCabe, M. & Nowark, M. (1992). The independent directors on the board of company directors. Managerial Auditing Journal, 23 (6), 545–566. 6

Mehran, H. (1995), Executive compensation structure, ownership, and firm performance, Journal of Financial Economics, Vol. 38 (2), pp. 163-184

Messier, W. (2000). Auditing and assurance services: a systematic approach. Boston, MA:Irwin/McGraw-Hill. 7

Morck, Randall, Andrei Shleifer, and Robert W. Vishny, 1988, Management ownership and market valuation,Journal of Financial Economics 20, 293-315.

Mura, R. (2007). Firm performance: do nonexecutive directors have minds of their own? Evidence from uk panel data. Financial Management, 36 (3), 81–112. 6

Noel O'Sullivan, The Impact Of Board Composition And Ownership On Audit Quality: Evidence From Large UK Companies, British Accounting Review (2000) 32, 397–414

OSullivan, N. & Wong, P. (1999). Board composition, ownership structure and hostile takeovers: some uk evidence. Accounting and Business Research, 29, 337–352. 6
Palia, D. (2001), The endogeneity of managerial compensation in firm valuation: A solution, The review of Financial Studies, Vol. 14 (3), pp. 735-764

Peasnell, K., Pope, P., & Young, S. (2000). Board monitoring and earnings management: Do outside directors influence abnormal accruals? SSRN Working Paper Series, . 6

Porta, R. La, Lopez-de Silanes, F., Shleifer, A. and Vishny, R. (2000), Investor protection and corporate governance, Journal of Financial Economics, Vol. 58 (1-2), pp. 3-27

The Practitioner's Guide to the Sarbanes-Oxley Act, Volume 1, The American Bar Association, 2004

Randolph P. Beatty ,Edward J. Zajac, Managerial Incentives, Monitoring, and Risk Bearing: A Study of Executive Compensation, Ownership, and Board Structure in Initial Public Offerings, Administrative ScienceQuarterly, Vol. 39, N0. 2 (Jun., 1994), pp. 313-335

Renneboog L., Ownership, managerial control and the governance of companies listed on the Brussels stock exchange, Journal of Banking & Finance 24 (2000)1959±1995

Robert L. Lippert, William T. Moore, Monitoring versus Bonding: Shareholder Rights and Management Compensation, Administrative Science Quarterly, Vol. 24,N0. 3 (Autumn., 1995), pp. 54-62

Santanu Mitra, Donald R. Deis, Mahmud Hossain, The association between audit fees and reported earnings quality in pre- and post-Sarbanes-Oxley regimes, Review of Accounting and Finance Vol. 8 No. 3 (2009) pp. 232-252

Schellenger, M.,Wood, D., & Tashakori, A. (1989). Board of director composition, shareholder wealth, and dividend policy. Journal of Management, 15 (3), 457–467. 6

Scherrer, P. (2003). Director's responsibilities and participation in the strategic decision-making process. Corporate Governance, 3 (1). 6

Shleifer, A. and Vishny, R.W. (1997), A survey of corporate governance, The Journal of Finance, Vol. 52 (2), pp. 737-783
Solomon, J. & Solomon, A. (2004). Corporate Governance and Accountability. Chichester, UK: John Wiley. 6

Sridhar Arcot, Valentina Bruno, Antoine Faure Grimaud,Corporate Governance in the UK:Is the Comply-or-Explain Approach Working?, Corporate Governance at LSE Discussion Paper Series No 001, November 2005
Tosi, H. L., Gomez-Mejia, L. R., Loughry, M. L., Werner, S., Banning, K., Katz, J., Harris, R., Silva, P. 1999. Managerial discretion, compensation strategy and firm performance. IN FERRIS, G. (Ed.) Research in personnel and human resource management. Greenwich, CT: JAI Press.

Vancil, R. (1987). Passing the baton: Managing the process of ceo succession. MA: Harvard Business School Press, .

*Wendy Beekes**, Peter Pope and Steven Young, The Link Between Earnings Timeliness, Earnings conservatism and board Composition: evidence from the UK*, Number 1January 2004*

Westphal, J. and Zajac, E. (1994), Substance and symbolism in CEO's long-term incentive plans, Administrative Science Quarterly, Vol. 39, pp. 367-390

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APPENDIX A. Variable definition (alphabetical order)

TotComp = total compensation a CEO receives in year t, the total compensation is a sum of the base salary component, bonus compensation, stock compensation and options compensation and other annual compensation;

EquityComp = the option and stock grants a CEO receives in year t, where the option grants are computed using Black-Scholes formula, and the stock grants are computed as the stock grants received times closing price shares;

CashComp = the annual salary and bonus a CEO receives in year t, the cash compensation is a sum of the base salary and a bonus component;

BoardEff = Board effectiveness is an index variable based on board size, board independence CEO duality, additional seats held by outside directors, ownership by outside directors calculated as outsiders divided by common shares outstanding, and a ratio of outside owner directors divided by total outside directors. Index scores range from 0 to 4, where 4 is the highest score and 0 the lowest score. The scores are based on quantiles of the full sample;

SOX = a dummy variable of 1 for the post-SOX years (2003-2006), 0 for pre-SOX years (1999-2002);

Governance = The governance variable expresses the number of provisions that are in place, that decrease shareholder rights, and therefore corporate governance within the firm. The values range from 24, indicating that all provisions that reduce shareholders are in place, to 0, indicating that none of the provision are in place. Gomper, Ishii and Metrick (2003) refer to companies with a G-index of 5 or less as Democracies and to companies with a G-index of 14 or higher as Dictatorships.

Tobin's Q = (((share price * common shares outstanding) + preferred stock + short-term liabilities net of short-term assets + book value of long-term debt) / book value of assets);

ROA = ROA (operating income / book value of firm's total assets at end of t);

Size = Size is a measure used to reflect the size of the firm,and is computed as the natural logarithm of the book value of the assets within a firm;

MarketCap= Size is a measure used to reflect the size of the firm, computed as the natural logarithm of the firm's market capitalization (common shares outstanding * closing price),

Boardage = the mean age of the members of board in a firm at year t;

CEOage = The age of a CEO in a firm at year t;

Tenure = The number of years the CEO has been in office at the same firm;

Maturity = The age of the firm at year t;

AssetTurn = annual revenues scaled by fiscal-year end total assets;

LagBTM = prior fiscal-year end book value of equity to prior fiscal-year end market value of equity;

Leverage = fiscal-year end total long-term debt to fiscal-year end total assets;

ΔRevenue = the annual percentage change in revenues;

ΔGDP = the annual percentage change in the U.S. gross domestic product.

APPENDIX B. Pearson (Spearman) correlation

Appendix B Pearson (Spearman) correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1 *BoardEff*	1,00	***-,46****	***-,32****	***-,66****	***,30****	***,16****	***,07****	***-0,03***	***-,01****	***-,09****	***0,03***	***-,13****	***-,13****	***0,03***	***-,05****	***-,05****	***0,02***	***-,08****	***-,21****	***0,03***	***,05****
2 *Bsize*	-,47**	1,00	***,51****	***0,02***	***,08****	***-,10****	***-,05****	***,19****	***,20****	***,15****	***-,11****	***,26****	***,29****	***-,14****	***,05****	***,09****	***0,03***	***,19****	***,43****	***-,12****	***0,01***
3 *Seats*	-,39**	,49**	1,00	***0,01***	***,41****	***-,20****	***-,04****	***,22****	***,17****	***,08****	***-,12****	***,22****	***,27****	***-,17****	***0,02***	***,12****	***0,01***	***,16****	***,41****	***-,15****	***0,00***
4 *Chair*	'-,66**	0,02	0,01	1,00	***-0,01***	***0,01***	***0,01***	***0,02***	***,04****	***,05****	***-0,00***	***-0,01***	***0,01***	***-0,01***	***-0,01***	***-0,00***	***0,02***	***0,00***	***-0,00***	***0,01***	***-0,01***
5 *Indep*	,28**	,06**	;,40**	-0,01	1,00	***,08****	***-,04****	***,20****	***,11****	***0,01***	***-,09****	***,05****	***,13****	***-,17****	***-,05****	***-0,01***	***,10****	***,08****	***,18****	***-,12****	***,07****
6 *Outowner*	0,01	,09**	-,040*	0,01	,05*	1,00	***0,02***	***0,02***	***-0,00***	***-,06****	***,10****	***-,36****	***-,16****	***0,00***	***-,08****	***-0,02***	***,10****	***-0,03***	***-,40****	***0,00***	***0,01***
7 *Outtot*	,07**	-,05**	-,04*	0,01	-,04*	0,01	1,00	***0,01***	***,04****	***0,03***	***-0,01***	***-0,01***	***-0,03***	***-,04****	***-0,01***	***0,03***	***0,03***	***-0,01***	***0,00***	***-0,02***	***0,00***
8 *Governance*	-,04*	,18**	,19**	0,02	,21**	-,04*	0,02	1,00	***,13****	***,09****	***-,09****	***-,17****	***,25****	***-,21****	***-0,02***	***0,01***	***,19****	***,'19****	***-0,02***	***-,10****	***-0,03***
9 *Boardage*	-,12**	,22**	,20**	,04*	,15**	-,04*	0,03	,16**	1,00	***,37****	***0,02***	***,10****	***,12****	***-,13****	***-0,02***	***-,07****	***,13****	***,07****	***,21****	***-,05****	***,03****
10 *CEOage*	-,08**	,14**	,09**	,05**	0,03	0,00	,05**	,10**	,40**	1,00	***,06****	***0,02***	***,12****	***-,06****	***0,03***	***0,00***	***,07****	***,09****	***,11****	***-,05****	***0,02***
11 *Tenure*	,04*	-,12**	-,14**	-0,00	-,11**	,04*	-0,00	-,08**	,03*	,15**	1,00	***-0,02***	***-,07****	***,10****	***,08****	***-,03****	***-0,01***	***-0,03***	***-,10****	***;,12****	***-0,02***
12 *MarketCap*	-,16**	,26**	,21**	-0,00	0,00	-,05**	-,05**	-,19**	,04*	0,03	-0,02	1,00	***-0,03***	***,45****	***,29****	***-,12****	***-,41****	***-,20****	***,71****	***,22****	***,08****
13 *Maturity*	-,13**	,28**	,26**	0,01	,13**	,07**	-0,03	,22**	,14**	,10**	-,10**	0,01	1,00	***-,18****	***,06****	***,12****	***,07****	***,23****	***,13****	***-,19****	***0,01***
14 *Tobin's Q*	,04*	-,19**	-,14**	-0,00	-,15**	-0,01	-0,03	-,19**	-,18**	-,07**	,08**	,25**	-,17**	1,00	***,61****	***-,08****	***-,73****	***-,33****	***-,21****	***,27****	***,04****
15 *ROA*	-0,02	0,02	0,02	-0,00	-0,03	0,03	-0,02	-0,02	-0,00	,04*	',08**	,17**	,05**	,50**	1,00	***,28****	***-,51****	***-,14****	***-,11****	***,20****	***,08****
16 *Asset_turn*	-,07**	,07**	,06**	0,02	-,04*	0,02	0,03	-0,03	-,03*	-0,02	-0,02	-,07**	,04*	-,08**	,18**	1,00	***0,03***	***-0,03***	***-,10****	***-,03****	***0,03***
17 *Lag_BTM*	0,02	0,01	0,01	0,00	,06**	-0,01	0,03	,13**	,11**	,06**	-0,02	-,22**	0,02	-,45**	-,42**	,04*	1,00	***,16****	***,07****	***-,17****	***-0,01***
18 *Lev*	-,08**	,19**	,14**	0,00	,04*	,04*	0,01	,16**	,06**	,09**	-0,03	-,17**	,20**	-,25**	-,10**	-,08**	,13**	1,00	***,12****	***-,14****	***-,11****
19 *Size*	-,22**	,47**	,39**	-0,00	,16**	-,04*	-0,02	-,05**	,23**	,11**	-,10**	,60**	,13**	-,22**	-,13**	-,07**	,04*	,09**	1,00	***0,00***	***,04****
20 *Δrevenue*	,03*	-,10**	-,13**	0,00	-,112**	-0,01	0,00	-,10**	-,10**	-,06**	,10**	,07**	-,16**	,29**	,14**	-0,03	-,13**	-,08**	-0,00	1,00	***,23****
21 *ΔGDP*	,04*	0,01	-0,01	-0,01	,041*	-0,02	0,01	-,04*	,06**	0,03	-0,01	,04*	0,00	,07**	,10**	,03*	-,06**	-,10**	0,02	,19**	1,00

Appendix B presents the Pearson (Spearman) correlation coefficients. *,**, indicate significance at the 5% and 1% level, respectively.

APPENDIX C. Board effectiveness index

Component	Quantile			
	20%	40%	60%	80%
Average directorships per director within a firm	1	1	1	1
Score	1	1	1	1
Board size: number of board members per firm	8	10	11	12
Score	4	3	2	1
Board independence: independent board members scaled by total board members	0,57	0,69	0,78	0,85
Score	1	2	3	4
Outside directors with ownership scaled by total outside directors	0,89	0,89	0,89	0,89
Score	1	1	1	1
CEO duality: if CEO is also chairman of the board	0	1	1	1
Score	0	0	0	4

Component	Based on literature					
Average directorships per director within a firm	>= 3	2	1	0		
Score	0	1	3	5		
Board size: number of board members per firm						
Optimal board size: 7	5=<	6	7	8	9	>=10
Score	1	3	5	3	1	0
Board independence: independent board members scaled by total board members	=<50%	51% -60%	61%-70%	71% -80%	81%-90%	91%-100
Score	0	1	2	3	4	5
CEO duality: if CEO is also chairman of the board	No	Yes				
Score	5	0				
Outside directors with ownership scaled by total outside directors	=<50%	51% -60%	61%-70%	71% -80%	81%-90%	91%-100
Score	0	1	2	3	4	5