The effectiveness of CEO incentive systems in Swedish Corporate Governance

What is the firm value added by CEO option ownership?

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ABSTRACT

This study aims to contribute to a better understanding of the effectiveness of equity-based compensation as an incentive-creating mechanism for interest alignment of shareholders and CEOs in public Swedish companies. Exclusive access to comprehensive data on the complete set of different components included in total CEO compensation contracts between 1999 and 2005 provides new opportunities to look into the true relationships between the generation of CEO wealth and shareholder wealth. First, we examine whether CEOs are actually rewarded for better performance. We find that a 10 percent increase in firm performance increases the share of CEO option value relative fixed salary by 5.4 percentage points. Second, we seek to reveal to what extent any eventually prevailing responsiveness of firm performance to CEO compensation is driven by equity-based incentives. We see that firm return declines by less than 0.2 percent per 10 percent increase in current CEO shareholding value. We conclude that no evident relation can be found between CEO ownership of options and performance in terms of firm return. Following our research, we emphasize the need for improved availability to company information, in order to enable extended research on this topic. There through, new tools for value enhancement in public companies may be provided, which in a wider perspective would favour socioeconomic utility and common wealth.

Keywords: CEO remuneration, equity-based compensation, options, incentive system, interest alignment, firm performance, shareholder wealth, corporate governance, agency theory

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1. Introduction

Background an problematization

Throughout the global corporate sphere there is a recurring debate concerning the short-comings of corporate governance and the implications of agency theory. This debate is to a large extent focused on how to overcome conflicts between diverging interests of diverse corporate stakeholders and how to design effective mechanisms for interest alignment of company owners and their executive management (Murphy 1997, Nichols and Subramaniam 2001, Döscher 2011). This debate has seemingly become even more intense over the last years and is by no doubt a hot topic frequently discussed both in media and on the political agendas, thus being subject to large public pressure (Nordling and Ohlander 2008, Murphy 1995, Bång and Waldenström 2009). One consequence of the current financial turbulence is the medial criticism of high bonuses and severance pay to management, especially within firms with negative bottom line, low margins, weak liquidity or low credit ratings (Kanagaretnam, Lobo and Mohammad 2009, Bång and Waldenström 2009). Although corporate governance in the sense of regulative system is globally applied, the variability amongst nations is remarkable. Consequently, research pursued on this subject is strongly influenced by national idiosyncrasy and its validity across borders is therefore limited (Sevenius 2007). An extensive branch of the US research on corporate governance has focused on how compensation policies for executives impact their business decisions concerning, for example, investment strategies, dividend policies and risk taking schemes. Great attention has also been appointed to how this possibly prevailing correlation may have changed since the initiation of the industrialization in the beginning of the 20th century (Murphy 1997, Inderst and Müller 2004). Specifically, a commonly used measure to quantify the relationship between compensation policy and firm performance is the *pay-to-performance elasticity* or *sensitivity* (Jensen and Murphy 1990, Hall and Liebman 1998). It is interesting to compare different types of compensation to one another in terms of their respective effectiveness in aligning interests of firm owners and firm management, which aims to provide incentives for optimal firm value generation. The most well cited study on this topic is probably performed by Hall and Liebman (1998). They reveal a strong correlation between CEO compensation and firm performance of firms traded in the US during 1980's and 90's, and conclude that this correlation is driven mainly by the value changes in CEO holdings of stocks and stock options[1]. Alike Jensen and Murphy (1990), who base their study on 1974 to 1986 years US data, Hall and Liebman find that the incentives generated by equity-based ownership are large relative to incentives generated by cash pay. Though, in contrast to Jensen and Murphy, Hall and Liebman suggest that "both the level of CEO compensation and the sensitivity of compensation to firm performance have risen dramatically since 1980, largely because of increases in option grants[2]". Following these and related studies, there are

[1] An option is a financial derivative giving the possessor the right but not the obligation to trade the underlying asset to a

[2] Throughout this paper the terms option grant or option holding refer to receipt or ownership, respectively, of options with the stock of the specific firm as underlying asset.

evidently two major obstacles encountered in previous research studies dealing with pay-to-performance sensitivities. Firstly, the lack of transparency and access to data on private holdings of equity-based assets (including stocks, stock options and convertibles) is critical. Secondly, a major concern is the difficulty of option valuation, as a consequence of incomplete information on option characteristics, such as volatility, strike price, maturity date and yield to maturity (Svederud and Green 2008, Elvinsson and Engström 2009, Nordling and Ohlander 2008), and other features hard to quantify, such as vesting-periods, performance-contingency policies and differences in performance metrics (Bettis, Bizjak, Coles and Kalpathy 2007).

Nevertheless, the US is by far not a unique case. Also in Sweden this debate is highly topical. Corporate scandals arising as a consequence of biased management conduct are frequently subject to medial attention, followed by growing awareness and dissatisfaction of the public. This increased pressure on policy makers urges politicians to respond to the changing circumstances and the demands of transparency and effective countermeasures (Nachemson-Ekwall 2007, Hallvarsson and Halvarsson 2008). Albeit the problems within corporate governance are seen both in Sweden an in the US, the conclusions based on US research are not fairly applicable on Swedish corporate governance. Rather, there are yet many issues to investigate more in-depth, in order to acquire a better picture of causalities valid within Swedish corporate governance.

Purpose of the study

In this study, the availability of a unique data sample based on Swedish companies traded on the OMX Stockholm Stock Exchange between 1999 and 2005 enables exclusive insight into CEO compensation levels and structure, and a more complete picture of the true enterprise ownership of key managers. This provides fundamentally new opportunities to investigate correlations between different components of CEO compensation contracts and performance. Therefore, the study aims to use this data to acquire better understanding of effectiveness optimization of incentive programs, and there through establish a common ground for creating shared interests amongst firm stakeholders.

However, in contrast to most of previous literature, we focus explicitly on the impact of option-based incentives to the CEO. Nevertheless, in order to correctly perceive the relative contribution of option-based incentives, it is important to look at the complete set of compensation components included in the total CEO contract. Therefore, this study aims to display the relative contribution of each one of the compensation components, and here through induce a deepening insight specifically into equity-based compensation incentives. Therefore, we pose the overarching research question, pervading throughout this study: *Is there a relationship between equity-based incentive compensation and firm performance?*

Outline of the report

Here forth, this report will be outlined as follows. In section 2, a theoretical framework is outlined. Section 3 provides an overview of previous research on the topic. Section 4 presents our operational questions and describes the examined hypotheses. Section 5 describes the method applied, including data collection, final sample descriptive characteristics and regression models, whilst section 6 presents the empirical results. In section 7 the findings are analysed, discussed and critically reviewed. In section 8 we conclude our findings, and in section 9 we discuss interesting aspects and recommendations for further research.

2. Theoretical framework

In this section we outline a theoretical framework to deepen the understanding of the complexity of the problem and support further analysis and discussion on the issue.

Corporate governance

Corporate governance is an abstract and complex concept and its definitions are vast and often broad. The lack of consensus and clarity exhibits the degree of uncertainty and complexity that prevail within the area of corporate governance (Sevenius 2007). In *the Code of Best Practice on Corporate Governance*, corporate governance is defined as a system of mechanisms, relations and objectives, through which companies are directed and controlled (Cadbury Committee, 1992, section 2.5). Regardless of the discrepancies in definitions, the corporate governance framework encompasses a set of dispositive directives, wherefore it is dependent on the legal, regulatory and institutional environment (OECD 2004). Thus, corporate governance varies considerably across countries.

A major source of economic inefficiency within corporations is caused by the conflicts of interests between stakeholders. Consequently, one main focus of contemporary corporate governance is to seek solutions to mitigate these conflicts and thereby optimize effectiveness of the firm and its efficiency in using resources to generate economic growth (OECD 2004). In Europe, where most countries are dominated by majority ownership structures, the corporate governance mechanisms and controls are based upon auto-regulation and normativity, focusing on internal controls. The aim is to monitor and align business activities in accordance with organizational objectives. Such mechanisms include monitoring by the board, large shareholders or creditors; separation of power; internal principles and audit; and remuneration schemes (Sevenius 2007). This may be put in contrast to the corporate environment in the US, which is characterized by an ownership structure of disperse minority shareholders. The Anglo-American corporate governance relies mainly on market-based mechanisms and controls exercised by active external stakeholders and legislation. This includes competition, debt covenants, public access to performance information, government regulations, labour market, media and hostile takeovers (Sevenius 2007). The Swedish corporate environment is characterized by a tradition of majority ownership concentrated to a few large shareholders with effective control of the firm. This concentrated ownership structure is likely to provide strong owner engagement, often by influential corporations or institutional organizations with support from governmental structures. As a consequence, Swedish corporate governance is largely dealing with relatively stable and powerful owner structures, but to the expense of inflexibility and weaker ability to adapt and react quickly to the dynamics in the global environment (Sevenius 2007).

The factual differences in corporate governance policies across countries will influence which type of mechanisms and controls that come into play when looking for solutions to governance issues, and how these are exerted.

Agency theory

Principal-agent problem

Agency theory is central to corporate governance and deals with problems arising from the separation of ownership and control, *the principal-agent problem*. It is based on the assumption that the individual behaves economically egoistic and opportunistic (Nichols and Subramaniam 2001, Sevenius 2007). Jensen and Meckling (1976) defines the principal-agent relation as a contract according to which one party (the principal) delegates some degree of authority and decision making rights to another party (the agent), conditioned on certain liabilities to perform or to attain predetermined objectives. Applying this in a corporate context, governance thus becomes a consequence of the relations between the company decision makers (management and board) and its owners (shareholders). The consensus is basically that a disperse ownership structure leads to a passivized owner engagement and decreasing incentives of each individual minority shareholder to sacrifice private resources in favour of the common good of the company. This reluctance follows from the risk that the private costs will exceed the private gains for the individual owner, whereby the personal utility from owning a stake in the company would diminish. Without an active involvement in running the firm by the minority owners, separation of ownership and control arises. Thereby the auto-regulative ability of the executives to take on a shareholder perspective deteriorates, resulting in diverging interests of firm owners and firm managers (Berle and Means 1932).

Mitigating the separation of interest issue and maintaining the relations between managers and owners induce costs to the firm.[3] Most often, the largest costs for the company are the residual costs that arise in spite of counteractions to mitigate the separation of interest issue. A main source to these costs is *moral hazard* in combination with *asymmetric information*. Moral hazard is an *ex-post* problem, in which diverging interests and lack of transparency enables the agent to maximize private benefits at the expense of the principal (Sevenius 2007).

Equity-based compensation

Tying managers to firm performance through share-based remuneration is a well-established mechanism to align management and shareholder interests (Hall and Liebman 1998). However, in the case of large firms with minority holding positions, the economic upside from owning firm equity becomes small for disperse shareholders. For an individual manager this implies that other interests than those tied to the ownership in the firm is ascribed a higher economic value than the factual share in the company. Thereby the control-through-ownership mechanism in managing the company becomes ineffective. This may lead to unjustified residual costs to the company, such as private consumption or investment biases following a moral hazard behaviour and asymmetric information (Sevenius 2007).

[3] Jensen and Meckling (1976) categorize these expenses as *monitoring costs*, *bonding costs* and *residual costs.* Monitoring costs include, among others, external audit and compliance expenses. Bonding costs are, for example, costs for compensation-based incentive programs aiming to align the economic interests of executives and shareholders.

Designing optimal managerial compensation programs is an important mechanism within corporate governance, aiming to circumvent the presence of asymmetric information and give managers incentives to pursue actions which increase firm value (Hallvarsson & Halvarsson 2008). A compensation program is an *ex-ante* contractual arrangement between an executive (the agent) and the company (the principal), through which liabilities are specified and the reward of the agent is conditioned on attaining certain goals (Jensen and Murphy 1990). However, within the frames of agency theory, contract theorists claim that *ex-ante* contracts can impossibly be complete, since all managerial actions and investment opportunities cannot be perfectly observed or contracted upon (Jensen and Murphy 1990). As a consequence "all complex contracts are unavoidably incomplete" (Williamson 1975). Instead, building in governance structures into the contracts may provide a tool of *ex-post* renegotiation, without breaking the contract (Gibbons and Murphy 2007).

The usage of financial securities in compensation schemes is a way of creating an incomplete contract, which allows *ex-ante* investment incentives to be evaluated *ex-post* (Segal 1999, Hart 1995). According to Gibbons and Murphy (1992), this is fundamental in order to provide long-term incentives for managers to pursue positive net present value (NPV) investment decisions, albeit the current expenses are large relative to the time horizon of the expected future cash-flows. Since neither the *ex-ante* NPV of an investment is known with certainty, nor are all investment alternatives observable by the shareholders, the compensation must reflect the probability of future shareholder wealth increase. Gibbons and Murphy (1992) further argue, that to the extent that stock price reflects market expectations on future firm value generation, compensation contingent on stock performance provide a more effective incentive for managers to undertake value-maximizing operations than *ex-ante* contracted compensation.

Compensation schemes and incentive programs in practice

Alike the US and UK, compensation-based incentive plans are frequently used in Swedish public firms, especially in large and mid-cap companies. Most commonly, the incentive programs include only management and key employees, since the connection between the variable component of the compensation and the business operations and performance is more distinct for these individuals. Also, differences in national tax policies impact how compensation programs are applied in different countries. According to the Swedish Corporate Governance Law (Aktiebolagslagen), the company compensation policy, which for instance embraces directives and design concerning incentive plans, is an issue for the Annual General Meeting of shareholders and the decision rights apply to the owners (ABL ch. 7 § 61, ch. 8 §§ 51-54). Through this procedure shareholders approve the proposed compensation contracts to managers, allowing the company owners to impact corporate governance through their voting rights. Though it is worth to note that the Swedish Corporate Governance Law applies exclusively to domestically owned companies, wherefore foreign companies listed on the OMX Stockholm Stock Exchange are not comparable in terms of legitimate impact of shareholders on

management compensation. Nevertheless, a study by Hallvarsson & Halvarsson (2008) shows that over the last decade an increase in foreign investor engagement has influenced the size and structure of management compensation, and especially incentive programs. As a consequence of this, in combination with the upsurge of a public debate and the strengthened role of large institutional owners, policies relating to incentive plans have become more stringent with stricter requirements on transparency and comprehensiveness of the program design as part of the total compensation contract. Also, the expectations on openness and financial reporting regarding size and structure of incentive programs are greater, due to medial pressure and overall interests in the issue. Still, there are considerable deficits of the transparency concerning performance contingency, risk exposure and communication to shareholders relating to incentive programs (Hallvarsson & Halvarsson 2008).

As mentioned, the total compensation contract consists of several components, which are selected and weighted relative to each other to create an optimal incentive-aligning structure. Thus, compensation programs are differently composed, depending on the needs and objectives of the business and its shareholders, characteristics of the managers concerned, the time-horizon etcetera. Finding the optimal structure is a non-trivial task and much research and business advisory services are concerned within the area (Bång and Waldenström 2009). A total compensation program often consists of (1) base salary (fixed salary), (2) variable salary (flexible salary, bonus, perks), (3) long-term incentive plan, and (4) pension (Lindberg 2011). The variable salary and incentive plans are tied to a firm performance metric that must be concrete and measurable. Most commonly used is profitability, but also other operational and financial measures may be used, in combination or in isolation. Nevertheless, Swedish companies show discrepancies in whether the incentive plan is accounted as part of the total compensation or excluded from remuneration reporting. Also, information on the proportion of the incentive programs relative to the total compensation package is rarely reported. Neither is reported to what extent an existing incentive plan represses other components of the total compensation package (such as fixed and flexible salary as well as bonuses), nor what performance requirements that have to be accomplished[4]. (Hallvarsson & Halvarsson 2008)

Incentive plans are constructed by some combination of stock, stock-options, convertibles[5] and cash, which are granted or offered for purchase to the employees. Stock programs may be granted free of charge, offered at market price or offered at discount. Option programs include call options[6], warrants[7] and employee options[8]. Long-term incentive plans are most commonly constituted by stocks or stock options that are typically vested for a pre-contracted period, thus providing longer-term

[4] In 2008, 38 percent of Swedish companies that proposed an incentive program at the annual general meeting included information concerning performance requirements in the notice to the shareholders (Hallvarsson and Halvarsson 2008).
[5] Convertibles entitle the holder to switch bonds to shares at a predetermined price, within a predetermined time period.
[6] Call options gives the right to buy existing outstanding shares, and thus implies no dilution effect.
[7] Warrants give the right to sign up for shares in a new equity issue, and thus will imply dilution for existing shareholder.
[8] Employee options are call options, which are often but not always granted without charge, and most often contingent on continued employment under a vested period. Conditions for employee options are vast, which makes valuation and comparability difficult.

incentives. Nevertheless, regulations on selling or pledging these stocks and options vary across companies or are entirely absent. Hence their incentive generating impact is complex and not easily assessed (Bång and Waldenström 2009). Swedish companies display similar trends as US and European companies, with an increase in the usage of equity-based compensation components over the last decades (Roine and Waldenström 2006, Bång and Waldenströn 2009). For example, figures from Nordea (2011) show that the share of Large Cap companies that made a new grant in a long-term equity-based incentive plan increased from 21 percent to 31 percent between 2003 and 2005, and exceeded 51 percent in 2007. The same data visualizes that performance-contingent incentive plans, as a share of total equity-based compensation, have constantly increased in frequency during the last decade. The types of plans launched each year in Sweden are influenced by factors in the surrounding business environment, such as opinions of institutional shareholders and proxy voting agencies influences from the UK market, and the Swedish Code of Corporate Governance (Lindberg 2011). Notwithstanding, Hallvarsson & Halvarsson (2008) show that a well-designed equity-based incentive plan successfully aligns the interests of management and owners, hence increases shareholder wealth and contributes to the ability of the firm to attract, retain and motivate key employees.

3. Literature review

In this section we present relevant literature dealing with the compensation-to-performance relation.

Previous research

There is substantial research within the area of compensation as an incentive aligning mechanism and optimal contracting in public companies, its connection to agency theory and its relevance to corporate governance. Early literature deals mainly with the relation between cash compensation to CEOs and firm performance as an incentive creating mean in public companies (Murphy 1985). Most studies based on data samples dating before 1980's show that there is a small connection between firm performance and CEO remuneration (Jensen and Murphy 1990, Bertrand 2009, Frydman and Jenter 2009). Though, the last two decades there has been an increasing interest in equity-based compensation and its effectiveness in optimal contracting (Kanagaretnam et al. 2005, Bertrand 2009, Frydman and Jenter 2009).

Jensen and Murphy (1990) is one of the earliest well-cited works dealing with compensation structure optimization which takes into account the full range of compensation components. It looks at performance-based bonuses, salary revisions and dismissal decisions, as well as equity-based compensation such as wealth generated by stock and stock option ownership. Jensen and Murphy estimate the magnitude of the incentives created by each of these interest aligning mechanisms, using data between 1974 and 1986. Their main conclusion is that even though the correlation between equity-based compensation and firm performance is significant and large relative to the correlation between other compensation components and performance, the fraction of private ownership in the company is small for the majority of CEOs, especially in large firms. Thus, the total incentive-creating effect of pay-to-performance sensitivity is small. Taking into consideration that the manager role is an occupation where incentive pay is expected to serve as a control tool for shareholders, in accordance with classical agency theory, they argue that there are inefficiencies in the optimal contracting mechanisms.

This study has been a landmark for further research concerned with pay-to-performance sensitivity that monitors the relative effectiveness of different types of incentive pay, for example Gibbon and Murphy (1990). Specifically, there is a rise in studies focusing on the contribution of equity-based compensation (Jensen and Murphy 1990, Griner 1996). Following Jensen and Murphy, worth to mention are Hall and Liebman (1998) who extends their research on the relative contribution of various types of compensation to pay-to-performance sensitivity. They use comprehensive information on CEO remuneration in the largest companies traded in the US between 1980 and 1994, including detailed data on stock and stock option holdings. In contrast to Jensen and Murphy (1990), they conclude there is a strong correlation between CEO compensation and performance, driven

basically entirely by value changes in the CEO holdings of equity-based derivatives in the firm[9]. Further, they show that both the level of compensation and the responsiveness of compensation to performance have risen during the sample period. Other studies based on the same time period supports these findings (Griner 1996, Murphy 1999, Inderst and Müller 2004, Bertrand 2009, Frydman and Jenter 2009, Bettis et al. 2007). Inderst and Müller (2004) add to their supporting findings by hypothesizing that the increasing role of options during the 80's and 90's is explained by the increased profitability of reallocating assets. Bettis et al. (2007) state that performance-based pay is the most significant component in the total compensation for CEOs in public US companies, and that stock options and restricted stock are the securities most frequently used to tie CEO pay to firm performance. This study adds to the overall research by examining the use and characteristics of vesting effects and performance contingency of stock and option grants. They find that these grants are used to increase executive incentives to improve financial and accounting measures of firm performance, and to attract and retain managers, rather than as an attempt by the CEO to extract higher pay or manipulate earnings metrics.

Nevertheless, other studies show results contradictive to these empirical findings, supporting a negative relation between the proportion of option value of total compensation and interest alignment efficiency (Cheng and Farber 2008, Edmans and Gabaix 2009). Common for these studies is that their findings are put in a context relating the value change of options to risk-taking incentives, wherefore their conclusions do not perfectly apply to the scope of this study.

Further, several recent metastudies show that most previous research within compensation contracting optimization concerns the US corporate environment (Bertrand 2009, Edmans and Gabaix 2009, Frydman and Jenter 2009, Bång and Waldenström 2009). Research based specifically on Swedish data is scarce. Roine and Waldenström (2006), however, examines the evolution and key drivers of income distribution and levels in Sweden over the last century. They conclude that Swedish top income development follows similar trends as in the US and Europe; the sharp drop between 1903 and 1950 is explained mainly by decreases in capital income, followed by a period with a slowing decrease up to 1980. After 1985, the increase in top income is driven by the capital gains from financial investments in the Swedish stock market. They raise the question to what extent these capital gains are strategically included as part of the total compensation plan, or rather random, which would imply that they are unrelated to job performance. Also Bång and Waldenström (2009) conclude that even though the top income levels have risen in Sweden since 1985, and the impact of incentive pay is increasing, there is still a lack of accessible comprehensive data on this topic. Hence, reliable statistical results can hardly be achieved. They further claim that as a consequence of the heterogeneous characteristics of firms, it is difficult to establish general econometric relations between the effectiveness of various firm specific incentive programs and firm performance.

[9] The total mean pay-to-performance sensitivity is \$3.25 per \$1000 change in shareholder wealth, of which \$2.25 is an effect of change in CEO shareholdings.

Moreover, it is worthwhile to mention that few Swedish studies have been found that additionally takes into consideration the impact of value changes in option holdings when evaluating CEO compensation contracts in Swedish companies (Green and Svederud 2008, Nordling and Ohlander 2008, Elvinsson and Engström 2009). These studies all have in common that failure to evaluate the option holding value is a function of a general lack in reporting essential features of option programs in the company filings. Bång and Waldenström (2009) point out that the prevailing lack of detailed information about conditions, performance-contingency and evaluation measures of compensation programs impairs the possibilities for shareholders to correctly decide upon optimal incentive contracts. Additionally, in contrast to the findings by Bettis et al. (2007), the lack of reporting disguises to what extent the CEO oneself is in a position to influence the conditions of the own incentive plan, or to manipulate the performance evaluations. From this perspective, complex compensation programs with inbuilt incentive generating mechanisms create an agency problem, rather than providing the solution to it. In line with this, several studies conclude that designing effective incentive plans is a non-trivial task and must be accomplished by adapting to firm specific needs and conditions.

To summarize, the literature overview shows that research on Swedish companies appears to be scarce. However, the corporate scandals relating to CEO bonuses, golden parachutes and other perks in multinational companies in the early 2000's (in the US as well as in Europe and Sweden) revealed considerable weaknesses in corporate governance policies (Sevenius 2007, Kanagaretnam et al. 2005). As a consequence, the upswing in medial attention, public awareness and political forces are elevating the pressure on corporate boards and the demand on transparency and public access to information on compensation policies (Murphy 1995, Sevenius 2007, Bång and Waldenström 2009). The last decades, compensation-based incentive plans as interest alignment tool has been a frequently discussed topic in Sweden. Consequently, research on Swedish companies has increased, contributing to the relevance of the debate.

Relevance and contribution

This study seeks to add new empirical substance to existing arguments and allow for new views in the debate on corporate governance and agency theory. Based on exclusive access to comprehensive data on CEO compensation in public firms in Sweden, it aims to all in all contribute to a fairer and truer foundation for progress and improvement of incentive program effectiveness. Therefore, we argue that this study is relevant to the extent it succeeds in inducing a deeper and more complete comprehension of the behavioural and interpersonal phenomena that constitute the pillars of corporate governance mechanisms and the principal-agent relation.

The major contributions of this study are threefold. Firstly, comprehensive information on the complete set of the various components in the total CEO compensation contract has been collected and valuated in relative measures. Secondly, all historical holdings, purchases and sales of equity-based firm assets, relating to the CEO or its family, have been traced for the entire sample period., This, in order to correctly mirror the value changes between the year-end snapshots of the CEO ownership position in the company. Thirdly, each CEO has been independently monitored and every single option program in possession has been identified for each observation year in isolation, in order to access data on the option specific parameters required for valuation of the program. As far as the literature review reveals, this has never previously been accomplished using Swedish data.

4. Hypothesis development

In this section we explain our operational questions more in detail and formulate two hypotheses that will follow throughout the study.

Based on classical agency theory, modern corporate governance and previous relevant literature outlined above, this study looks into the effectiveness of compensation-based incentive generating mechanisms in Swedish corporate governance, in respect of creating shareholder value. Alike Hall and Liebman (1998) we break down the total compensation package into its components. *Direct compensation* is all contracted payment attributable to the work activities pursued during the current fiscal year. It is subdivided into its components consisting of fixed and flexible salary, bonus, perks, and the value of stock-option grants. *Indirect compensation* is defined as the capital gain generated by the CEO's personal holdings of securities with firm-based derivatives as the underlying asset. Hence, indirect compensation may be either positive or negative, depending on the performance of the firm and the market. It is subdivided into the change in value of company stock and stock option holdings over the current fiscal year, and dividends received during the year. *CEO wealth* is defined as the absolute value of total current year holdings of company stock and stock options, as well as fixed salary, flexible salary, bonus, perks, granted options and dividends received during the year.

Hypotheses

Hypothesis 1:

The first hypothesis is developed employing the Hall and Liebman study (1998) as a benchmark model. It aims to answer the same question as they pose, applied to Swedish data: *Are CEOs paid as bureaucrats?* The answer to this question would provide a fundamental and more objective basis to support relevant arguments in the contemporaneous debate dealing with compensation to key managers in traded companies. The anticipated outcome is that CEO compensation increases as a function of higher firm performance, and that this increase is driven mainly by an increase in the market value of equity-based remuneration components.

Hence, the first hypothesis states that CEOs are rewarded for excess firm performance over market performance and punished for underperformance, largely as a consequence of their holdings in firm equity-based remuneration components.

Hypothesis 2:

The second hypothesis takes one step further and looks into the actual effectiveness of compensation-based incentive programs. We intend to answer the question: *Given the compensation the CEO currently receives, does it matter for the future of the firm?* The aim here is to provide an insight into whether current and future performance of the firm is driven by growth in CEO compensation and, if so, the relative impact of the different components of the remuneration package. By answering this question we hope to provide a deepened understanding of compensation-based incentive generating

mechanisms in Swedish corporate governance and thereby contribute to more effective compensation contract design henceforth. We expect that any eventually prevailing responsiveness of current or future firm performance caused by CEO compensation is positively driven mainly by the equity-based components in the total compensation contract. Additionally, we suspect there is a growing impact of option-based compensation components.

Therefore, the second hypothesis claims that, to the extent that current and future firm performance is sensitive to compensation-based incentive mechanisms, it is mainly driven by equity-based compensation, and specifically options.

Delimitations

The definitions of the metrics direct and indirect CEO compensation components used in this study do not include stock grants, convertibles and pensions. Hence, these types of compensation instruments are neither analysed nor discussed within the scope of this study.

Neither will this study take into account gradients in economic value implied by firm specific discrepancies in qualitative features of the equity-based incentive programs, such as vesting periods, employment-contingencies, performance measurements and general company policies.

5. Method

In this section the method for analysis is outlined. Hence, the choice of data is motivated, the data management procedure and option valuation are described, including important assumptions, the data sample characteristics are displayed and the regression models for analysing the hypotheses are explained.

Data selection and motivation

The factual access to exclusive data covering unique information on key executive remuneration, and specifically option-related remuneration metrics, has to a great extent shaped this research in terms of investigational topic and procedural approach. The data was collected with explicit focus on revealing information concerning the various components of executive compensation. It was provided on manager specific level as quantitative absolute values and other qualitative information. This was performed by an external party, the Nordic Investor Services (NIS), and financed by the Department of Finance at the Stockholm School of Economics. The unprocessed sample included CEOs of every company listed on the OMX Stockholm Stock Exchange between 1999 and 2005.

We have chosen to investigate exclusively compensation of the corporate management Chief Executive Officer. Because the CEO is the key executive with the uttermost liabilities and is normally always eligible to participate in incentive programs of the firm, the CEO is a good representative of the company management for studies related to incentive programs (Hallvarsson & Halvarsson 2008).

Improvement of data quality and identification of options

In order to obtain a comprehensive and useful data set, the crude data received from NIS was complemented where information was incomplete. The majority of missing information could be manually added using the insider trading list (Insynsregistret, Finansinspektioen) and company annual reports. In case data could not be identified elsewhere, imputation of essential option specific parameters was made based on feasible assumptions. As a last resort, the observation concerned or entire entity was excluded from the sample.

The NIS data on number of options held by each CEO at each year-end was matched with the specific option programs enrolled at that time, using annual reports of 1997 to 2006. If the number of options in possession could not be perfectly matched to the programs identified, assumptions were made in order to receive a "best fit" of the CEO option ownership at each year-end. The assumptions made during the identification process of option programs were ranked as "strong", "medium" and "weak", based on its reliability, where "strong" implies the most unreliable and "weak" the least unreliable assumption. Out of the 265 companies in the original data set, strong assumptions were made for 21 companies, medium assumptions were made for 33 companies and weak assumptions were made for 24 companies in order to classify the options. For further elaboration on essential assumptions, please refer to Table 2 in Appendix 1.

In cases where data on more than one CEO of the same company was reported the same year, all these observations were dropped. This is reasonable since none of the CEOs was employed during the entire year, wherefore the compensation data would not represent comparable full year levels.

Additionally, outliers were analysed in order to eliminate unintentional errors, such as typos. This was done by reviewing all CEO observations with an annual fixed salary below 360 000 SEK or above 10 000 000 SEK, and correcting them according to company filings. In cases where sensible information was missing the observation was dropped. Please refer to Table 3 in Appendix 2 for further specification of deleted or corrected data items.

Shareholding valuation

CEOs may hold both untraded and publicly traded company stock. In order to best reflect the value of the untraded shares, the share price of traded stock has been applied on both traded and untraded shareholdings indistinguishably. Similarly, missing information on yearly dividends for untraded shares was set to equal dividend yield reported for the corresponding traded shares. In case of missing dividend information for a specific company, the dividend yield was set to zero.

Option valuation

The stock options were valued using the Black-Scholes model for valuation of European call options (further described in Appendix 8), in accordance with previous American research (Jensen and Murphy 1990, Hall and Liebman 1998). Notwithstanding the scepticism of using the Black-Scholes formula for valuation of employee stock options, because of their specific features[10] (Hall and Murphy 2003), the model has been considered appropriate for valuation of CEO option ownership. We examine employee stock options granted to the CEO as part of direct compensation, as well as call options privately purchased by the CEO, which do not possess the features characteristic for employee stock options. As input variables in the Black-Scholes equation knowledge about six option specific parameters is required, including strike price, time to maturity, current price and volatility of the underlying stock, dividend yield and risk-free interest rate.

Strike price

In case the option strike price was missing (17 percent of the option programs), the strike price was imputed by calculating a three months average share price prior to the start date. The rationale behind using an average is that disproportionally large impact of misestimates caused by short-term price fluctuations is circumvented to some extent. Additionally, in case of unknown start date, the first known date of ownership (either purchase date, grant date or registration date as reported in company filings or the insider trading list) of the reviewed option program was used as a proxy. This is feasible since a large part of employee option programs are granted at the money (Hall and Liebman 1998), implying a strike price equal to the share price on the start date of the option program. If needed, the

[10] Employee stock options are in general conditioned on continued employment within the firm, implying they are neither hedgeable nor sellable, and will be lost if the CEO leaves the company before the end of the vesting period.

strike price was converted to Swedish kronors using the exchange rate at the start date proxy throughout.

Strike date

In case the strike date was specified neither in the data received from NIS nor in the annual reports, strike date could be obtained through its option name as specified in the insider trading list. If no reliable assumption could be made for strike date the option program was left out.

Time to maturity

The options are valued at each year-end. Therefore, time to maturity was calculated as the number of days between 31st December each year and the strike date of the option program.

Stock price volatility

Basically no company did report the volatility used for option valuation during the sample period. Therefore, volatilities have been estimated using two-year stock price data prior to the option start date (or proxy). A two-year window was considered reasonable in order to avoid short-term stock price fluctuations. An alternative method would have been to estimate the implied volatility by backwardation from the Black-Scholes equation, using the market price of each option as input variable. However, as market option prices were not consequently reported, this was not considered appropriate for estimation.

Risk-free interest rate

The daily one week Stockholm Interbank Offered Rate (SIBOR) has been used as risk-free interest rate.

Dividend yield

The yearly dividend yield for each company has been applied in the valuation procedure. As discussed, the B-share dividend yield was used as a proxy for the A-share dividend pay-out for 20 percent of the companies.

Description of final data

The data contains information on CEO remuneration for almost all companies traded on the OMX Stockholm stock exchange at the end of 2005 (Large Cap, Mid Cap and Small Cap). All observations are year-end snapshots, stretching from 1999 to 2005 inclusive. Though, the time period subject to analysis is 2000 to 2005, since the data of the first observed year is used to calculate a change in value for each data entity. After data quality improvements, the final sample included 1093 CEO and year specific observations, covering 245 companies[11].

The CEO specific compensation information concerned for this study includes fixed salary, flexible salary, bonus, perks, granted options, share holdings (A- and B-shares) and option holdings for each respective year. The option specific information includes the maximum number of options to be issued, as well as the actual number of issued options of enrolling option program at each year-end, and the key characteristics of these programs (start date, strike date, strike price, shares per option and share price volatility).

Daily share prices, the risk-free rate (daily SIBOR one week rate) and yearly dividends yields for each company during the examined period were retrieved from Thomson Reuters Datastream (2011). The daily Stockholm All Share Index was also retrieved from Thomson Reuters Datastream (2011). Additionally, CHF/SEK, EUR/SEK, GBP/SEK, CAD/SEK, USD/SEK and ISK/SEK exchange rates were retrieved from Oanda (2012) as of each balance day.

Summary statistics

In Table 1 below, summary statistics of the CEO compensation data is presented.

Table 1. CEO compensation descriptive statistics

(SEK 000)	Fixed Salary	Flexible Salary	Bonus	Perks	Granted Options	Yearly Dividends	Increase Share Value	Increase Option Value
Mean	2 844	377	487	83	58	98	17 800	-194
St. Dev	2 666	1 176	1 808	369	1 103	7 263	143 000	6 356
Min	200	0	0	0	0	0	-1 350 000	-85 200
Median	2 033	0	0	0	0	4	257	0
Max	30 600	11 300	30 400	9 040	25 800	113 000	1 680 000	72 000
Number of observations	1 093	1 093	1 093	1 093	1 093	1 093	716	716

The far largest fluctuation in the CEO compensation data is represented by the change in value of share holdings, ranging from negative 1.4 billion SEK to 1.7 billion SEK, with a standard deviation of 143 million. Also in terms of absolute size the economic value generated from shareholdings (even

[11] Astra Zeneca and Anoto are excluded from the sample due to low quality of the data (difficulties to reliably identify the option program belongings). Duroc and Orc were deleted because of frequent changes of CEOs, whereby comparability of the data is lost. Balder, Connecta, Hemtex, Husqvarna, Indutrade, Millicom, Oriflame and Wihlborgs were dropped as a consequence of missing information on company performance.

excluding dividends) is the largest compensation component in the total compensation package, with a mean value of 17.8 million SEK. This is followed by fixed salary with an essentially lower mean of 2.8 million SEK and flexible salary at 0.4 million SEK. All compensation variables but fixed salary and increase in option holding values are skewed towards the right, with their medians far lower than their means (Doane and Seward 2011).

Figure 1 below aims to visualize how the mean CEO compensation has evolved between 1999 and 2005 in terms of absolute levels. The compensation components are divided into direct compensation (fixed salary, flexible salary, bonus, perks and granted options), indirect compensation (value change of share holdings and option holdings, respectively) and total compensation (the sum of direct and indirect compensation). As can be seen, the mean indirect compensation takes on negative values in 2000 (although small) and 2002. This is mainly due to the negative share return of various companies, which reduces the value of the average CEO shareholdings. In 2002 to 2003, indirect compensation experiences a sharp increase, to reach a peak in 2004. The direct compensation is more stable, being approximately 3 to 4 million SEK during the entire sample period

Figure 1. CEO compensation over time

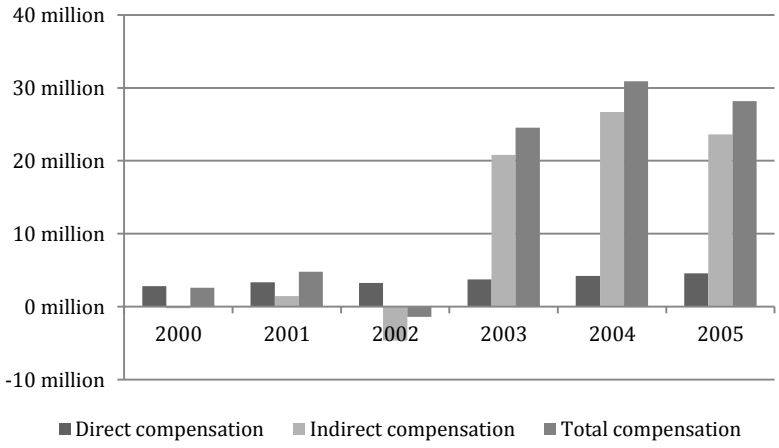
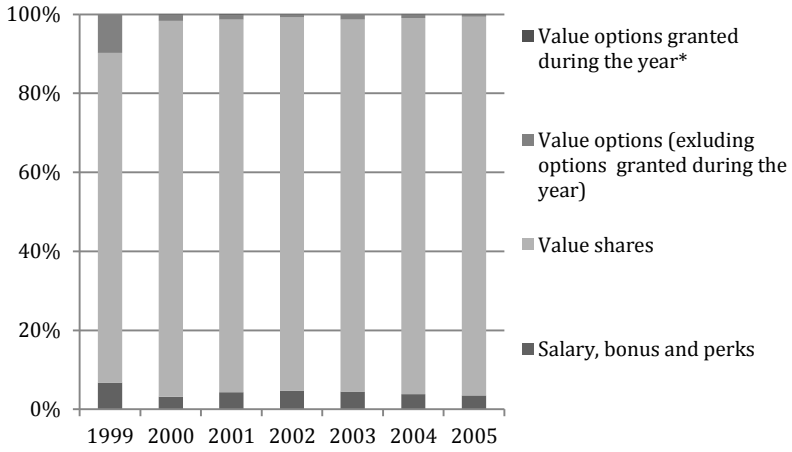


Figure 2 below shows the development of average CEO compensation between 1999 and 2005 in relative terms. As displayed, the average CEO's wealth portfolio (including salary, bonus, perks and granted options for the current year, as well as the value of shareholdings and option holdings at year-end) is heavily weighted toward shareholdings, representing over 80 percent of the mean CEO's portfolio in all examined years. The value of granted options represents less than 1 percent per year, whilst the value of option holdings lies in the range of slightly above 0 percent to 10 percent.

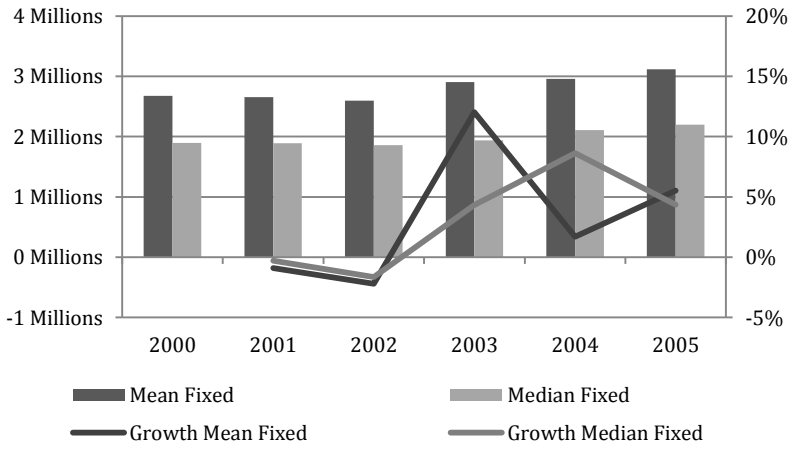
Figure 2. CEO company wealth level over time



*Granted option value represents a smaller fraction than 1 percent of the CEO's wealth each year

Figure 3 below presents mean and median fixed salary levels in absolute numbers (the left axis), as well as percentage growth in each measure, respectively, (the right axis) over the year. The graph visualizes that both mean and median values drop by about 2 percent during 2001, and thereafter increase sharply during 2002 by about 12 percent. In 2003 to 2005, the growth is centred on 5 percent yearly.

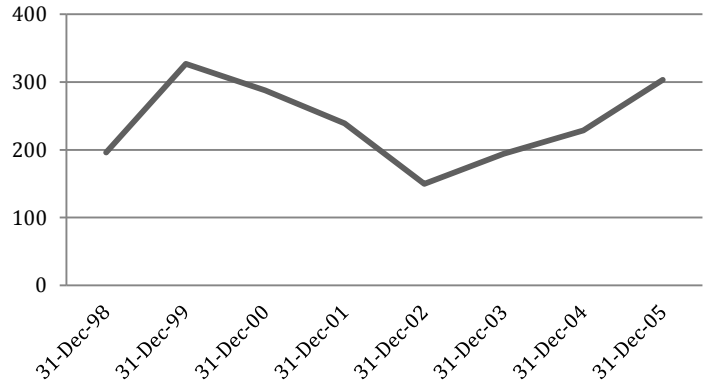
Figure 3. CEO fixed salary over time



Data biases and quality evaluation

Concerning valuation of options (and stocks), one must bear in mind that the value of these instruments directly follow by the share price of the company, which in turn is more or less correlated to market performance. As a consequence, periodical fluctuations and cycles of the economy will, to some extent, be reflected by the relative development of these compensation components. Figure 4 shows the development of the Stockholm All Share Index during the examined period. As can be seen below, the market experienced a drop during the IT crisis in 2000, 2001 and 2002.

Figure 4. The Stockholm all share index (OMX) development



Regarding the concerns with valuation of vesting stock options, we do not make any separation between calendar vesting stock options and performance vesting stock options. During the examined period, the most frequently used option type was calendar vesting options (Lindberg 2011), hence our dataset is likely to be biased towards this type of options. Additionally, we have not taken into consideration the impact of the vesting period on the valuation of vested options , but used the final option maturity date (strike date) as end date of the option program.

Moreover, we are urged to emphasize that the crude NIS data received contained a large number of missing and incorrect data values. Due to the relatively poor original data quality, valuation biases may occur as a consequence of strong assumptions made both during the data quality improvement procedure and the manually conducted option identification work.

Methodology

We use a hypothetical deductive approach to the econometric considerations in this study. That is, hypothetical questions are first developed based on established theory and previous research work (section 2 and 3). Thereafter, the hypotheses are concretized through an econometric model. The model is applied on real-world data using regression analysis and the resulting predictions are compared to observed values. The level of congruence is statistically tested, where after the model may be evaluated and adjusted accordingly.

Regression specifications

The hypotheses are tested using standard Ordinary Least Squares (OLS) regressions on panel data.

Hypothesis 1

Recall the first hypothesis (section 4), which hypothesizes that CEOs are rewarded for surplus firm performance over market performance and punished for underperformance, largely as a consequence of their holdings in firm equity-based assets, such as shares and options. To test this hypothesis, we examine the responsiveness of compensation to return. Hence, we run a set of regressions using a relative growth variable of each compensation component in isolation as the dependent variable. As independent variables we use current and lagged firm return, as well as a set of control variables, including current and lagged market return, idiosyncratic volatility, market capitalization, industry dummies and year dummies. The regression model is expressed as:

$Regression\ set$ 1:

$$growth\left[\frac{Component_{i,t}}{Fixed\ Salary_{i,t}}\right] =$$

$$\beta_0 + \beta_1 r_{i,t} + \beta_2 r_{i,t-1} + \beta_3 r_{omx,t} + \beta_4 r_{omx,t-1} + \beta_5 \sigma_i + \beta_6 \ln\left[Market\ Cap_{i,t}\right] + [\varphi_z D_z]_{Z=Industry} + \left[\theta_y D_y\right]_{y=2001}^{2005} + \varepsilon_c$$

[Equation 1]

Dependent variables

Relative compensation growth

The set of compensation components ($Component_{i,t}$) subject for regression analysis are fixed salary, flexible salary, bonus, perks, granted options, value change in option holdings, value change in stock holdings, dividends, total direct compensation, total indirect compensation and total compensation, respectively.

Alike previous studies (Jensen and Murphy 1990, Hall and Liebman 1998) we are interested in the sensitivity of compensation to firm performance. That is, how compensation reacts on fluctuations in the market valuation of the firm. Thus, we look at the changes in compensation following changes in return for each fiscal year in the sample time period.

Additionally, in order to create comparability between CEOs and disregard factors on individual level that impacts compensation, such as previous experience, education, age, gender etcetera, we look at each compensation component, relative to fixed salary. Fixed salary is chosen as denominator for several reasons. Firstly, fixed salary is a non-volatile variable, with a relatively constant and predictable growth, which is further supported by Figure 1 through 3. This is a good illustration of the agency theoretical perspective on fixed salary as an *ex-ante* contracted incentive to encourage CEO performance. Secondly, fixed salary is often used in the Articles of Association as a measure to report the cap of the various non-fixed compensation components (Hallvarsson & Halvarsson 2008).

Hence, it is sensible to calculate the independent variable as the change in percentage units of each compensation component relative to fixed salary, over the current fiscal year.

$$\boldsymbol{growth}\left[\frac{\boldsymbol{Component_{i,t}}}{\boldsymbol{Fixed\ Salary_{i,t}}}\right] = \left(\frac{\boldsymbol{Component_{i,t}}}{\boldsymbol{Fixed\ Salary_{i,t}}} - \frac{\boldsymbol{Component_{i,t-1}}}{\boldsymbol{Fixed\ Salary_{i,t-1}}}\right)$$

[Equation 2]

Independent variables

Firm return

In the first set of regressions we use the realized firm return to measure firm performance. This return is a financial measurement of the market reactions on the company's business activities and other strategic decisions. The reason for using a financial measure of performance, in contrast to alternative accounting measures such as return on assets (ROA), return on investments (ROI) or EBITDA margin, is mainly that this represents the going concern capital gain (or loss) attributable to the shareholders of the firm. Also, it is sensible to include the current year dividend pay-outs in the return, since it adds to the economic value generated for the firm owners (principals) by the firm management (agent). Thus, the realized return is calculated, as defined by Berk DeMarzo (2007), using the balance day share prices and current year dividends.

$$\boldsymbol{r_{i,t}} = \frac{\boldsymbol{P_{i,t}} + \boldsymbol{div_{i,t}}}{\boldsymbol{P_{i,t-1}}} - \mathbf{1}$$

[Equation 3]

Moreover, to capture both the immediate impact and the impact of longer-term firm performance, we include both firm return of current and preceding fiscal year.

$$\beta_1 r_{i,t} + \beta_2 r_{i,t-1}$$

Market return

Alike Hall and Liebman (1998), we take into consideration the relative performance, i.e. the firm specific performance relative to market performance, by including the Stockholm All Share Index as an independent variable. Thereby, we assess the surplus return over the market return attributable to the firm. The market return is calculated as the ratio of current to previous year index, which monitors the change in the index over the year.

$$\boldsymbol{r_{omx,t}} = \frac{\boldsymbol{omx_t}}{\boldsymbol{omx_{t-1}}} - \mathbf{1}$$

[Equation 4]

Hence, we include a current and a lagged year market return in the model.

$$\beta_3 r_{omx,t} + \beta_4 r_{omx,t-1}$$

Control variables

Volatility (idiosyncratic risk)

Previous research shows that CEO compensation is correlated to the specific risk of the company. In companies with a higher idiosyncratic risk, the share price is more exposed to firm-specific fluctuations, compared to low idiosyncratic risk companies, and the key managers are officially liable towards the share owners, other stake holders and the public. As this may lead to larger variations in realized share return, we include the idiosyncratic volatility (a proxy for idiosyncratic risk) as a control variable in the regression. The volatility is estimated from the *Capital Asset Pricing Model* (CAPM), in association with the estimation of firm specific market (systematic) risk. (Please, refer to the explanation of the dependent variable *beta-adjusted firm return* under Hypothesis 2, below.)

$$\beta_5 \sigma_i$$

Market capitalization (firm size)

To account for potential size related higher realized returns we control for firm size in the model. Market capitalization is used as a proxy for firm size, since this is a price-sensitive measure, self-adjusting for fluctuations in share performance and thus reflecting firm intrinsic value, assuming an efficient market (Hsieh, Hodnett and van Rensburg 2012). Alternative proxies, such as book value, are not price-sensitive and may therefore give a deceptive estimation of the firm value. The logarithmised value of market capitalization[12] is used in order to obtain a metric in terms of elasticity.

$$\beta_6 \ln\left[Market\ Cap_{i,t}\right]$$

Sector dummies

In order to control for sector specific effects in compensation responsiveness to firm performance, we include sector dummies in the model. The subdivision of the sample companies is based on the sector classification according to NIS, which includes seven sectors (media, commodities, industry, services, IT, healthcare, finance, telecom and consumer goods).

Hence, we include six sector dummies, employing consumer goods as reference.

$$[\varphi_z D_z]_{Z=Industry}$$

Year dummies

We control for time specific effects by including year dummies in the model. Our sample includes observations for six years, 2000-2005. Thus, five year dummies are included, employing 2000 as reference.

$$\left[\theta_y D_y\right]_{y=2001}^{2005}$$

[12] This is the sensitivity of compensation to an increase in market capitalization; a 1 percent increase of market cap implies a β percentage units change in the growth of compensation

Fixed effects and robustness

The regressions are adjusted for fixed effects and heteroskedasticity by using the built-in functions in the statistical software employed for econometric analysis, STATA.

Hypothesis 2

Now, recall the second hypothesis (section 4) hypothesizing that, given that future firm performance is affected by compensation-based incentive mechanisms, this effect is mainly driven by the equity-based components of the compensation package, and specifically options. In order to test the second hypothesis, we seek to quantify the responsiveness of firm performance to changes in each one of the compensation components included in the CEO compensation package. We run a set of regressions using beta adjusted firm return as the dependent variable. In order to reveal both short-term and longer-term effects of different types of compensation incentives, we repeat the same set of regressions using next and current year return separately as the dependent variable. The growth rate of each compensation component (besides option grants and dividends) is used as independent variables, thereby taking note of their respective contribution to the resulting coefficient estimates. As before, we control for firm size, sector and year specific effects.

Regression set 2:

$$\left.\begin{matrix} r_{i,t+1}^{\beta adj} \\ r_{i,t}^{\beta adj} \end{matrix}\right\} =$$

$$\beta_0 + \beta_1 \left[\frac{Fixed_{i,t}}{Fixed_{i,t-1}}\right] + \beta_2 \left[\frac{Flexible_{i,t}}{Flexible_{i,t-1}}\right] + \beta_3 \left[\frac{Bonus_{i,t}}{Bonus_{i,t-1}}\right] + \beta_4 \left[\frac{Perks_{i,t}}{Perks_{i,t-1}}\right] + \beta_5 ln\left[Option\ grants_{i,t}\right] +$$

$$\beta_6 ln\left[Dividend\ payouts_{i,t}\right] + \beta_7 \left[\frac{Stock\ holdings_{i,t}}{Stock\ holdings_{i,t-1}}\right] + \beta_8 \left[\frac{Option\ holdings_{i,t}}{Option\ holdings_{i,t-1}}\right] + \beta_9 \ln\left[Market\ Cap_{i,t}\right] +$$

$$[\varphi_{iz} D_z]_{z=industry} + \left[\theta_{iy} D_y\right]_{y=2001}^{2005} + \varepsilon_T$$

[Equation 5]

Dependent variable

Beta-adjusted firm return

We have chosen to test this hypothesis using beta-adjusted realized return figures. Also, the regressions are repeated with both future and current year dependent variables, in order to capture both immediate short-term impact and longer-term incentives.

It is well known that the firm share price fluctuations to some extent depend on macroeconomic factors. This sensitivity is known as the systematic, or non-diversifiable, risk of the company, i.e. the correlation of the firm share performance to a market portfolio performance. A common measure of systematic risk is the *beta*, which is estimated through the *Capital Asset Pricing Model* (Berk DeMarzo 2007). To account for firm specific market sensitivity of the sample companies, we calculate a beta-adjusted firm return. Firstly, we estimate the firm specific betas $\beta_{i,omx}$ of each

company by regressing observed excess firm return on observed excess OMX return and saving the gradient coefficients as beta, in accordance with the CAPM model. We run the OLS regression[13]

$$\boldsymbol{r_{i,t} - r_{f,t} = \alpha_i + \beta_{i,omx}(r_{omx,t} - r_f) + \varepsilon_{i,t}}$$

[Equation 6]

Secondly, we calculate the beta adjusted firm return by subtracting the estimated excess systematic return from the observed excess firm returns[14].

$$\boldsymbol{r_{i,t}^{\beta adj} = (r_{i,t} - r_{f,t}) - \widehat{\beta}_{i,omx}(r_{omx,t} - r_{f,t})}$$

[Equation 7]

Similarly, we calculate future and current beta-adjusted firm return, respectively.

$$\left.\begin{matrix} r_{i,t+1}^{\beta adj} \\ r_{i,t}^{\beta adj} \end{matrix}\right\}$$

Estimating the variance of the residuals resulting from this regression gives the volatility that is used as a proxy for idiosyncratic risk, as described for volatility under Hypothesis 1.

Independent variables

Relative compensation growth

To track the structure of the compensation package, we use a component growth variable as stated in Equation 8 below for the regression defined in Equation 5.

$$growth\left[\frac{Component_{i,t}}{Fixed\ Salary_{i,t}}\right]$$

[Equation 8]

Control variables

Similarly to the first model (Equation 1), we control for firm size, sector and year specific fixed effects, as explained above.

$$\beta_9 \ln\left[Market\ Cap_{i,t}\right] + \left[\varphi_{iz} D_z\right]_{z=sector} + \left[\theta_{iy} D_y\right]_{y=2001}^{2005}$$

[13] NB: This is not the CAPM, but an Ordinary Least Square regression used to determine β. The CAPM equation predicts firms return as a function of the β-estimator:

$$\boldsymbol{E(r_{i,t} - r_{f,t}) = \widehat{\beta}_{i,omx}(r_{omx,t} - r_{f,t})}$$

[14] *Excess return* refers to the excess in return over zero-risk return that is, the risk-free rate.

Sensitivity tests

The first regression (Equation 1) is conducted dividing the sample into two parts, one where the current fixed salary is lower than the median fixed salary, and one with a fixed salary higher than the median. This was conducted in order to observe if the level of fixed salary has any impact of the results.

In respect of the second regression (Equation 5), two alternative sensitivity regressions were run with ROE and annual sales growth, respectively, as alternative measures for firm performance.

Heteroskedasticity

In order to run the fixed effects OLS regressions, the standard deviation of the error term (σ_ε) is assumed to be constant. That is, the standard deviation of the error is invariable, or homogenous, regardless what value the independent variables take on. If the standard deviation of the error term is variable, the error term ε is said to be heteroskedastic. (Wooldridge 2005). However, heteroskedasticity does not lead to biased estimators, but rather inefficiency of the model (Wooldridge 2005). In order to obtain robust results despite heteroskedasticity issues, the regressions are performed using a built-in function of the statistical software, correcting for heteroskedasticity-robust standard errors.

Fixed effects model versus random effects model

In this analysis we have assumed a fixed effects model. In the fixed effects model unobserved heterogeneity is assumed to have non zero covariance with the explanatory variables. This is in contrast with the random effects model, where the covariance between the expected variance and the unobserved heterogeneity is assumed to be zero (Schmidheiny 2012). We have performed the Hausman Test to determine whether a random effects specification may be deemed satisfactory or not (Hausman, 1978). In the majority of cases, we could not reject the null hypothesis, indicating that either a fixed effects model or a random effects model could be used (please, refer to Table 10 in Appendix 6). As the "zero covariance assumption" in the random effects model is a strong assumption (Schmidheiny 2012), we have applied the fixed effects model in all the conducted tests.

6. Empirical results

In this section we describe the empirical tests performed and present the statistically significant regression results obtained. Please, refer to Table 5 and 6 in Appendix 4 for details on the complete regression outcome.

Regression results

Regression set 1

The first hypothesis (if the CEO is rewarded for excess firm performance over market performance) is tested by running the regression specified in Equation 1. Thus, current year change of each compensation component, respectively, in relation to fixed salary, measured in percentage units, is regressed on current and lagged year firm performance and market performance. As presented in Table 5, few results are significant.

Considering current year firm performance, regression (8) displays a positive impact on the change of option holdings as a share of fixed salary, at a 5 percent significance level. The coefficient implies that a 100 percent increase in firm return leads to an increase in option holding value relative fixed salary by 54 percentage points. Also, regression (7) indicates that the sensitivity of current year dividend value to current year firm return is negative; a 100 percent growth in return leads to a 47 percent decrease in dividends, with 99 percent confidence.

Moving on, looking at the previous year firm return, regression (9) and (10) indicate that the lagged return variable has negative impact on the change in indirect and total salary, as a percentage of fixed salary, both on a 5 percent significance level. More precisely, the lagged return coefficients in regression (9) and (10) both show that a 100 percent increase in previous year return decreases the indirect and total salary share, respectively, relative fixed salary, by about 190 percentage points. Moreover, alike the results obtained for current year return, the sensitivity of dividend pay-outs to previous year firm return is negative, although slightly less, with 35 percent decline in dividend value per 100 percent increase in firm return, compared to 47 percent.

Additionally, the sensitivity of dividend value to previous year market return is significant on a 1 percent level, indicating a 41 percent decline in dividend value per 100 percent increase in market return the previous year.

Briefly commenting on the control variables, the regression analysis for hypothesis 1 indicates that controlling for market capitalization, the healthcare and finance sectors, and a few of the year specific effects, respectively, occasionally gives significant correlations to all compensation components but perks-to-fixed salary growth, option grants sensitivity and option-to-fixed salary growth. Please refer to Table 5 in Appendix 4 for further details.

Regression set 2

The second hypothesis (whether different types of incentive generating compensation components display dissimilar effectiveness in controlling firm performance) is tested by running the regression specified in Equation 5. Thus, the market risk-adjusted current and following year firm return, respectively, is regressed on growth multiples of the complete set of the various compensation components. The results are presented in in Table 6, Appendix 4.

Looking at regression (11), where the immediate impact of the different compensation-based incentives is examined, solely the responsiveness of current year return to changes in dividend pay-outs is significant, with 95 percent confidence. The coefficient implies a decrease in firm return by 6.8 percent per 1 percent increase in dividend value.

Regarding the control variables, market capitalization is significant with 99 percent confidence, indicating that the return is positively impacted by 32.4 percent for each 1 percent the firm increases in market value.

Examining regression (12), which displays a longer-term incentives created by the relative structure of the total compensation package, gives significant coefficients for growth in fixed and flexible salary, as well as the value of shareholdings. A doubling of fixed salary impacts the following year return negatively by 3.9 percent, on a 5 percent significance level. Also, duplicating the flexible salary affects future firm return slightly negatively (almost 0 percent), yet significantly on a 1 percent level. Additionally, doubling the shareholding value implies a 1.6 percent decrease in following year return.

The intercepts are significant on a 1 percent significant level for firm return of both the current and the following year, with negative values on cc. (4.0) percent and (3.4) percent, respectively.

Sensitivity tests

In order to test the sensitivity of our results, two sensitivity tests are performed.

Regression sensitivity set 1

To test the sensitivity of the first regression model, which aims to display CEO reward for performance, the sample is divided into two parts, (i) with CEOs earning a fixed salary above the median fixed salary, and (ii) with CEOs earning a fixed salary below the median fixed salary. Regressions (1) to (10) were repeated for these two samples. For the below-median sample (Table 7 in Appendix 5), we still observe a decrease in dividends as an effect of increased current and lagged return, although the decrease is larger than before. In respect of the above-median sample (Table 8), we observe the same relationship between current return and decrease in dividends, although in this case no significant sensitivity is observed for lagged return. The above-median sample also show that the direct compensation in relation to fixed salary increase by 7.4 percentage points when the current year return increase by 100 percent (on a 5 percent significance level).

These sensitivity results allow displaying some discrepancies compared to the original regression analysis, which was based on the entire sample indistinctively.

Regression sensitivity set 2

To test the sensitivity of the second regression model, which seeks to analyse the effectiveness of CEO remuneration systems, we run the second set of regressions (11) and (12) with increase in sales and increase in ROE, respectively, as alternative metrics for firm performance. The results are presented in Table 9, displayed in Appendix 5.

When inserting current year sales increase as dependent variable, we find no significant results. When testing the effectiveness of CEO compensation in respect of next year sales increase, we see that growth in perks has a significant zero-correlation on a 5 percent significance level. It can also be noted that a 100 percent increase in shareholding value increases next year sales with 1.9 percent, also on a 5 percent significance level. This finding is in contrast to previous regressions, when a negative relation between share value growth and lead share return was observed. Additionally, we no longer observe significant coefficients in respect of growth in fixed salary and flexible salary.

When inserting current ROE as dependent variable, we see that a 100 percent increase in option grants value increases the ROE with 5 percent (on a 5 percent significance level). Also growth in dividends has a positive increase on current year ROE, where a 1 percent dividend increase increases ROE with 2.6 percent (on a 1 percent significance level). These results differ from the relationships observed when using current share return as dependent variable. When testing the effectiveness of CEO compensation in respect of next year ROE increase, we see that a 100 percent growth in fixed salary decreases the ROE with 1.7 percent (on a 1 percent significance level). We also note that an increase in perks has a significant zero-value effect on next year ROE. A 1 percent increase in dividends has a

negative impact on next year's ROE, imposing a decrease of 1.7 percent (on a 5 percent significance level). Additionally, a change in the value of option holdings has no significant effect on next year's ROE. Also, the intercepts and several significant year specific effects deviate on significant levels when running the sensitivity tests.

These sensitivity test results reveal some prevailing divergency compared to the original model, where share return is used as measurement of firm performance.

Model fit and endogeneity issues

Table 5 and Table 6 in Appendix 4 present resulting R^2 (within), R^2 (between) and R^2 (overall) for the twelve regressions. It can be noted that R^2 (overall) values are less than 0.015 in all regressions and that the R^2 (within) are higher than the R^2 (between) values. This is not surprising since the employed fixed effects model captures individual effects, resulting in regressions which better explains within-firm differences than differences between firms. Below, we briefly describe some issues that may impact the R^2 values achieved from the model regressions.

Omitted variables

Omitted variables problem is an endogeneity issue which arises when independent variables are correlated to the error term. This implies that there are explanatory effects not caught by the model (i.e. essential explanatory variables have not been correctly identified). This endogeneity of the model leads to biased estimates (Wooldridge 2005).

Simultaneity

Simultaneity is an endogeneity problem that occurs when the dependent variable and one (or several) independent variables influence each other at the same time, thus being jointly estimated. In the logic of casual order, the main issue is the direction of causality between such variables (Coleman 2006). This impairs the appropriateness of the independent variables to explain the dependent variable.

Multicollinearity

Multicollinearity, on the other hand, is an endogeneity impairment dealing with how well the independent variables explain the dependent. If two or more of the independent variables are strongly correlated, the assumption of no collinearity is untrue. One area of concern is that as the degree of multicollinearity increases, the regression model estimates of the coefficients become unstable and the standard errors for the coefficients may get inflated. That is, several explanatory variables correlate to one another and differentiation between their effects, respectively, is problematic. Thus, estimating contribution effects of different explanatory variables on the dependent is difficult. None of the regressions Equation 1 and Equation 5 indicates problematic correlations between the independent variables, with all absolute values being below 0.8 and mostly far below, with amplitude of two-decimal digits (Allison 1999, Cooper and Schindler 2003). The correlation matrices are presented in Table 11 and 12 in Appendix 7.

Autocorrelation

Autocorrelation occurs when observed errors are correlated over time. As a consequence of using time series data, the observed dependent and independent variables for a certain firm are likely to be serially correlated. The consequences of autocorrelation in OLS regression are similar to those of heteroskedasticity. Explicitly, the regression coefficients remain unbiased, but the OLS regression is inefficient. Additionally, the standard error estimates will be incorrect, and the standard deviations of the coefficient estimates are usually underestimated.

7. Discussion

In this section we firstly comment upon the prevailing patterns in the data set. Secondly, we attempt to interpret our results from an economic point of view. Thirdly, we discuss the implications of the interpretation on incentive program optimization and corporate governance. Finally, we review our study from a critical point of view.

Economic interpretation of data characteristics

From our summary statistics (Figure 1 through 3, p. 21) we see that the mean CEO wealth generated from shareholdings, in terms of capital gains, constitutes the largest part of the mean total compensation (cc. 84 percent), amounting almost 6.3 times the mean fixed salary. We also see that the mean CEO wealth generated from ownership of options, in terms of value changes in the holding positions, pushes down the mean total CEO compensation slightly, by less than 1 percent, being the only component contributing negatively to total compensation. Further, we notice that all compensation variables but fixed salary and increase in option holding value are skewed towards the right. This indicates that most CEOs during this period did not receive abnormal levels of flexible salary, bonuses, perks, grants, nor dividends. Moreover, changes in option holding value appears to be relatively well centred on the median with upper and lower tails of comparable lengths. This indicates that the value change is normally distributed among CEOs, supporting that the value of unrealized option holdings changes randomly. It can be argued that this provides evidence that option ownership is an ineffective control instrument to generate incentives for the CEO to increase firm value. Nevertheless, the figures show that the equity-based compensation components provide the most extreme fluctuations, with large standard deviations and accounting for the most distinctive driving forces. Figure 1 (p. 21) shows that total compensation has experienced an immense development between 1999 and 2005. However, taking into account the dynamics of the structure of the total compensation package over the sampling period, Figure 1 and Figure 2 illustrate that capital gains from shareholdings is clearly the most powerful driving force in generating CEO wealth, which is in line with previous research in Sweden and the US. On the contrary, Figure 3 (p. 22) displays that fixed salary has remained remarkably stable in Sweden during this period, giving a deviating picture from the expectations based on the development in the US. General conclusions relating to the option-based compensation cannot be drawn based on these figures, except that it evidently increases the personal risk taken by the CEO by increasing the volatility, and thus the uncertainty, of compensation levels. To enable further analysis regarding the impact of option holdings on incentive creating compensation, we look into the results from our regression models.

Economic interpretation of regression results

In the first hypothesis we assume that CEOs are rewarded for excess firm performance over market performance and punished for underperformance. We estimate that an increase in current year firm return has a higher positive impact on the value of option holdings than on fixed salary, since the

growth of option holding value as a percentage of fixed salary is positive. For a 10 percent increase in firm performance, the CEO is rewarded through an increase in the share of option value relative fixed salary by 5.4 percentage points. This finding is in line with previous research in Sweden and the US, indicating that the relationship between pay and performance is almost entirely driven by changes in the value of stock and option revaluations (Bång and Waldenström 2009, Hall and Liebman 1998). Unfortunately, within the scope of this study it is not possible to draw any conclusions on how the amplitude of this displayed performance reward compares to the amplitude of the correlation found in previous studies. However, unlike US-based studies, for instance Bettis et al. (2007), we observe no significant relationships between share return and the increase in CEO shareholdings value, in relation to fixed salary. Neither do we observe that an increase in current or last year share return has a significant impact on the value of options grants, which we would expect if CEOs were rewarded for excess firm-over-market performance.

There are several explanations to why CEOs are rewarded differently for firm performance in Sweden compared to in the US. One explanation is that the comparability of Swedish and US compensation systems is impaired by differences in the institutional environment. As previous mentioned, the US has experienced a large increase in stock option usage during the last decades. This large increase of employee stock options have been argued to depend on tax rule changes in the US (Hall and Liebman 2000), even though few empirical studies have been able to support this hypothesis (Hite and Long 1982). In contrast, the Swedish tax system penalizes firms using stock options as a mean of compensation (Thomas 2008). A second explanation to why utilization of equity as compensation to the CEO differs between Sweden and the US lies within classical agency theory. More precisely, the owners of the firm seek to control unobservable behaviour of the CEO by tying the interests of the CEO to the performance of the firm through performance-based remuneration systems. Because firm ownership in Sweden is concentrated compared to in the US, there has traditionally not been the same need of a strong shareholder protection by external control mechanisms in Sweden as in the US, which has an extensive legal protection of dispersed minority shareholder interests (La Porta, Lopez-deSilanes, Shleifer and Vishny 1999). This lacks counterpart in Swedish legislation.

Looking at the responsiveness of dividend pay-outs to firm return, the negative relation may indicate that the CEO sells off private shareholdings in the firm whilst the share price is peaking, in order to realize the capital gains. Hence, as the CEO ownership of firm shares decreases, the value of received dividend pay-out decreases accordingly. The decline in dividend value is steeper for current year return than for previous year return (a 4.7 percent decline in dividend pay-outs per 10 percent increase in current year firm value versus a 3.5 percent decline per 10 percent increase previous year), implying that the sales of the private shares by the CEO occurs relatively well coordinated in time with the share price peak. It may be argued that this is an indication of insider information, where the CEO possesses information that is not yet publicly accessible to the market, whereby he is in the

position to sell off his shares just in time before the share price starts to fall, also known as a case of asymmetric information according to agency theory.

Regarding the occasionally significant correlations that were obtained for some of the control variable coefficients, we refrain from discussing these more in detail, since it is not within the scope of our thesis. That said, it is sufficient to conclude that none of the control variables display significant correlation neither to option grants nor to the value change in option holdings.

In the second hypothesis we assume that, to the extent that firm performance is affected by compensation-based incentive mechanisms, it is mainly driven by equity based compensation. The results show that an increase in the value of received dividends this year leads to a drop in current year beta-adjusted firm return by almost 7 percent per 1 percent increase in dividends. The increase in dividends value can either be (i) a function of the company paying out higher dividends per share to its owners; (ii) an effect of the CEO acquiring a larger stake in the company, thus owning an additional number of dividend yielding shares; or (iii) a combination of these. Since there is no room for investigating transaction values from trading equity-based securities within the scope of this thesis, we cannot draw any conclusions based on these results. Nonetheless, in case the first scenario would dominate, the observed effect is not surprising, since paying dividends to shareholders directly impacts share price by decreasing the remaining expected future cash flows included when pricing the stock. Additionally, this relation is not seen when looking at firm return the year subsequent to a dividend pay-out, which further emphasizes that the dividend effect is instant.

In line with this, we see that the market-risk adjusted future return declines slightly, by less than 0.2 percent for a 10 percent increase in current year shareholding value. By similar argumentation as for dividends above, the increase in shareholdings value can either be an effect of (i) an increase in share price or (ii) the CEO buying (or receiving) additional shares. Again, we abstain from speculations, due to lack of empirical support.

Looking at fixed salary impact on future firm return, although weakly correlated, an explanation to the negative effect is provided by optimal contracting theory. In accordance with this, fixed salary is an *ex-ante* contracted incentive and thus has no positive impact on future performance. Rather, it has a passivizing impact on CEO engagement, leading to value destruction of firm assets through a moral hazard behaviour, such as investment bias or private consumption.

As well the flexible salary growth has a negative impact on future firm performance, in contrast to our expectations. This may be explained by the factual negativistic debate and criticism from media and the public concerned with high flexible salary and bonuses. Thus, regardless of whether flexible salary has a positive incentive generating effect on CEO behaviour or not, the negative market reaction on increasing executive pay is outweighing any eventual positive effect that might prevail.

Significant relations are found neither between firm performance and options grants, nor between performance and option value changes.

Economic interpretation of sensitivity tests

The sensitivity test for the first hypothesis indicate that CEOs in the upper fixed salary range are significantly rewarded for firm performance through an 0.7 percentage points increase in direct salary relative to fixed salary per 10 percent increase in return, in contrast to CEOs in the lower fixed salary range. Given that the *ex-ante* contracted salary increases with increasing liabilities and greater responsibility of the firm, in accordance with contract theory, this finding may support that CEOs require stronger incentives in order to take on further responsibilities as their personal risk increases. Thus, the sensitivity of pay-to-performance need to be greater to optimize incentive effectiveness as the CEO climb the ladder of legislate liabilities to the firm.

As previously mentioned, firm performance can be measured by a variety of metrics. Looking deeper into the model, it is therefore essential to investigate to what extent the results from the regression analysis vary when alternating the metrics used as independent variables in the model. We have chosen to focus on three of them, share return, increase in sales and ROE. We have identified that changes in CEO remuneration components affect these measures differently. In order to enable exhaustive analysis of the effectiveness of CEO compensation, it is important to understand the reason behind these varying results. A share price (which is used to calculate share return) is a financial metric, reflecting the value of expected future cash flows based on public information about the firm. Sales and ROE, on the other hand, are accounting metrics reflecting historical data on operational and net income, respectively. Sales measures revenues whilst ROE measures firm profitability during an already incurred period (Berk DeMarzo). Alike Hirschey and Wichern (1984), we find it beneficial to use several types of performance measures in order to receive a full perspective of firm performance.

For instance, we observe that an increase in the value of shareholdings in relation to fixed salary has a positive impact on next year's sales growth. This can be a consequence of various factors, for example that the share price incorporates expected future events, imposing a sales increase the subsequence year. It may also indicate the CEO being less risk-avert, thus increasing risk-taking, when holding additional shares. As sales will not reflect the operational costs imposed to obtain the sales increase, there are likely additional expenses associated with this increase (as these will be subtracted further down on the income statement).

When analysing the sensitivity by using ROE as an alternative measure of firm performance, an increase in dividends value has a positive effect on this year's ROE but a negative effect on share return. This may be explained by the deduction of future cash flows expected when pricing the stock, as explained above. Additionally, a 10 percent growth in fixed salary decreases next year's ROE by almost 0.2 percent while the decrease in share return is cc. 0.4 percent, indicating that the market is

slightly exaggerating the passivizing effect of fixed salary on the CEO. We have also determined that an increase in options grants value has a positive effect on current year ROE, while no significant impact can be observed on share return. This may actually support the existence of an incentive generating effect of option grants on the CEO; the knowledge of receiving additional compensation in case the firm performs well on the income statement (contingent on net income metrics) may incur a behaviour that enhances firm value. At the same time, this additional compensation may imply negative market reactions, pushing down the stock price in the short-term and hence lowering the firm return.

We round off the analysis of our empirical regression results, by stating that it is difficult to draw any clear and concise conclusions based on these. Although we do find significant relationships in line with the first hypothesis, the correlations are weak and must not be regarded as anomalies. Even more unfortunate, we conclude that none of the significant results obtained when testing the second hypothesis can easily be ascribed to the role of options as an incentive generating instrument in the attempt to optimize CEO compensation structure. Thus, based on these results, it is not possible to assess whether a well-structured equity-based incentive plan provides remedy to the ex-post moral hazard problem. We are urged to conclude that there are no general recommendations, applicable to all firms, on what types of incentive creating compensation to use in order to structure an effective incentive plan. Rather, we see that the diversity of firms, operating in dissimilar industries and business environments and with vast characteristics in terms of profitability margins, cash flow and risk, calls for tailor maid incentive plans. We believe that in order to truly align shareholder and manager interests, an incentive plans must be individually adapted to the specific business goals of the firm and personal traits of the CEO, such as priority needs and risk aversion.

Below, we outline some possible explanations to why the outcome of our two models is neither very distinct, nor very reliable. Additionally, we take the discussion one step further by making an attempt to provide possible remedies to overcome the problems and improve the models. First, we touch upon some quantitative and regressional issues from an econometric point of view. Second, we discuss some qualitative explanations from an economic and political point of view.

Critical review

Looking at the complexity of this problem from an econometric and modelling perspective, it is evident that the model is suffering from essential shortcomings, especially endogeneity. Unlike heteroskedasticity and fixed effects, this misspecification is difficult to detect and to fix, and it leads to biasedness of the estimates. In our model, industry specific effects are captured by the sector dummy variables, firm size is captured by the market cap proxy variable, and macroeconomic factors are to some extent captured by the year dummy variables. Nevertheless, these observable variables do not perfectly reflect the explanatory effect on CEO compensation or firm return, respectively. The conducted regressions report low R^2 measures, indicating that our model only explains a limited amount of the tested relationships. Thus, the low quality of the results is likely due to a serious endogeneity problem and misspecification of the model. There are several possible reasons to this low explanatory power.

Firstly, an omitted variables problem is likely present for the second regression ([Equation 5, p. 27), since the model fail to identify all unobservable variables affecting both firm performance and the CEO compensation (for example corporate governance policies and regulations, CEO abilities, and the business environment). We partly redress this issue by regressing firm performance on explanatory variables based on relative changes in CEO pay, instead of absolute measures. This filters out effects tied to a specific CEO, a specific company, or systematic and macroeconomic effects.

Secondly, supported by the low R^2 values, there is a simultaneity issue present. For the second model it can easily be understood that employing firm return as the variable on the left-hand side simultaneously with different types of salaries on the right hand side, which are either directly or indirectly based on firm performance, will lead to causality confusion. When regressing current firm return on compensation the relation is obvious, and the question becomes whether the firm return explains the effects of compensation, or whether compensation drives firm return. Looking instead at how future return is explained by compensation should erase the questionability of causality. This, because future firm performance is hardly providing corporate boards and shareholders evidence of the ability of the CEO or its current engagement in the firm, and consequently neither a measurement upon which compensation could be based.

Thirdly, autocorrelation appears in the model as a consequence of serial correlation of the error terms in the panel data. This is accounted for by adjusting for fixed effects during the regression analysis. However, it is not obvious to which extent fixed effects impairs the model, compared to random effects or mixed effects. Therefore, the fixed effects adjustment is likely an imperfect remedy to the serial correlation issue.

Moving on, looking at the complexity of the difficulty in understanding compensation-based incentive generating mechanisms from a political and accounting regulation perspective instead, we perceive several impairments in this study.

First, the fact that the companies themselves report CEO remuneration figures will have an impact on the results. It has previously been revealed that Swedish companies listed on the stock exchange in general report less company option program information than expected (Hallvarsson & Halvarsson 2008, Bång and Waldenström 2009). Often, access to company information relating to their prevailing option programs is limited to such an extent that valuation based on established pricing models cannot be pursued, as a consequence of missing data. Therefore, in order to evaluate the option programs, we have relatively frequently must impute data based on assumptions ranging from very weak to very strong. Likely, this impacts the presented results.

Second, neither for option-based compensation components nor other compensation components (such as bonus, perks and flexible salary) there are standardized measurements. Rather, companies in Sweden during the sampling period report compensation differently. A reason for this may be that companies are reluctant to share complete information due to the offensive debate and public opinion stressing that CEO compensation levels are too high.

8. Conclusions

Where are we today?

How to design effective incentive programs is a highly interesting question, certainly in the light of the contemporaneous dynamic environments of unpredictable changes and debates. Increasing focus is directed towards how longer-term incentive programs influence management behaviour. The relationship between key manager incentives and their business decisions is an expression of the classical *principal-agent problem,* which roughly speaking may be seen as the main source of the hurdles that corporate governance mechanisms aim to counteract. A good understanding of the causality relations between the incentives of company management and the economic value for its shareholders is a prerequisite for designing effective long-term incentive programs and improve corporate governance mechanisms, in Sweden as well as internationally.

Data on CEO compensation used in this study reveals that value changes in shareholdings constitute the major driver in the evolution of CEO compensation over the sample period, in accordance with previous Swedish and US research. Fixed salary has remained stable, in contrast to previous findings, whilst the value changes in option holdings have contributed negatively to CEO wealth.

The first hypothesis tests whether CEOs are remunerated for excess firm-over-market performance, and punished for under performance. Based on the obtained results, we conclude that an increase in firm share return by 10 percent leads to an increase in CEO option holdings value by 5.4 percentage points compared to fixed salary. Thereby, the CEO is rewarded for excess firm performance in terms of a greater increase (or smaller decrease) in option holdings value than in fixed salary. The results do not support the prevalence of significant correlation between performance and the value of granted options. Hence, we cannot determine whether the CEO is rewarded for excess firm performance through an increased value in option grants.

The second hypothesis tests the effectiveness of compensation-based incentive systems, by stating that to the extent that firm performance is affected by CEO remuneration, it is mainly driven by equity-based compensation. It is estimated that the market-risk adjusted return declines by less than 0.2 percent the following year for each 10 percent increase in current year shareholding value. We highlight that this relationship is difficult to comment on, as we do not test for transaction values from traded equity-based securities by the CEO. We also estimate that an increase in fixed salary or flexible salary, respectively, has a negative impact on next year's share return. This may be explained by negative market reactions on the enlightenment of increase in executive salary. No significant relation is found between firm performance and option-based compensation.

We emphasize that clear and concise conclusions based on the results cannot be made. As a consequence of diverging firm characteristics, possible prevailing relations between firm performance and equity-based incentive compensation are more likely to be found on a company level.

Recommendations for future research

We have identified interesting aspects which would be beneficial in order to further investigate whether the CEO is compensated for better firm performance.

First, due to the lack of significant relationships, we would suggest investigating a longer and more recent time period. As equity-based compensation systems are implemented in order to maximize longer-term value creating activities, a longer time-frame may implicate deviating results.

Second, it would be interesting to investigate the potential impact of CEO compensation on other aspects of the firm, such as the involvement in risky investment projects or exposure to risky capital, by looking at the responsiveness of firm risk exposure to compensation. This may be achieved by regressing volatility, debt-to-equity ratio or some other risk metric in the model in [Equation 5.

Adding to this, the research would be even more attractive by looking separately on the impact of in-the-money (ITM) options holdings and out-of-the-money (OTM) options holdings on firm risk level. This, in order to clarify whether ownership of unrealized in-the-money options affects risk behaviour of the CEO and there through firm value, as opposed to ownership of out-of-the-money options. According to our theory, holding unrealized in-the-money options tends to increase the risk aversion of the CEO due to fear of putting private assets at risk, leading to less risky investment decisions. By the same rationale, a CEO holding out-of-the-money options may tend to become less risk avert and engage in more risky investment project, thus increasing the volatility and the probability of peaking share value, without taking any private risk. Therefore, we have developed a third hypothesis, not within the scope of this study, as an additional interesting input to further widen the view of option-based compensation as an incentive creating mechanism to engage the CEO in firm value maximizing projects. We pose the question: *Given the previous performance of the company, how does this affect the CEO's private investments in firm equity-based assets?* The idea is to investigate to what extent insider information impacts private transaction decisions of the CEO, in terms of sales and purchases of privately held securities with firm related derivatives as underlying assets. An answer to this question may deepen the understanding of the psychology behind market behaviour and provide a more complete informational framework for decision making regarding the optimization of investment strategies for other firm stakeholders, as well as third party investors. As the CEO assumingly is the most informed party of the firm, we suspect that asymmetric information impacts the cash flows from traded firm equity-based assets privately held by the CEO. Thus, this additional third hypothesis points out that the CEO increases sales of private holdings prior to declining share

price and, vice versa, increases purchases of private firm equity-based assets prior to increasing share price. Please, refer to [Equation 9 in Appendix 9 for inspiration to a regression model.

Implementing these kinds of research would add to the insight into the factually prevailing situation regarding compensation levels and true CEO engagement in the firm. Acquiring this knowledge would enhance the understanding of incentive creating causalities in the dynamics between principals and agents. Employed correctly, this could provide new tools to create synergies for diverse stakeholders, and there through, in a wider perspective, for contribution to economic growth and socioeconomic utility.

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Appendix 1

Assumptions made when determining option program belonging

In order to determine to which option programs the options held by the CEO belong, various assumptions were made. The assumptions were classified as strong, medium and weak. Please see the list below for which assumptions were conducted for specific companies. If stated assumptions seem similar, although with different classifications, the assumption level is due to varying amount of known information. Hence, the uncertainty will differ.

Table 2. Assumptions made in classifying the options according to different option programs

	Company	Action performed
Strong	Aspiro	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	Assa Abloy	The total number of options are divided equally between the option programs
	Avanza	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	Bergman & Beving	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	Capio	Assuming there was a typo in the original file, and changed a holding in relation to this
	Framfab	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	HiQ	One of the option programs has been deleted
	IBS	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	Kaupthing	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	LBI	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	Ledstiernan	Assuming holdings not reported in the insider trading list are granted, and belonging to specific programs
	Lundin Petrolium	Assuming some options are granted, and partially sold during the years
	Mandator	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	Net Insight	Assuming that holdings not reported in the insider trading list are granted
	Nexus	Assuming belonging in accordance to reported values in the insider trading list, although large uncertainty remains
	Nobel Biocare Holding	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	Nobia	Assuming holdings not reported in the insider trading list are granted, and belonging to specific programs
	Poolia	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	Probi	Assumption made regarding number of shares per option
	Sensys	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	SKF	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list

	Company	Action performed
Medium	Autoliv	Assuming average holdings accordfing to the reported figures in the insider trading list
	Axis	A weighted average has been conducted of the two most likely programs
	Beijer G & L	Assuming typo in number of holdings
	Biolin	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	Boliden	Assuming no holdings as no holdings are reported
	Boss Media	Assuming CEO still hold options when leaving
	Broström	Assuming typo in number of holdings
	Digital Vision	A weighted average has been conducted of the most likely programs
	Fingerprint	Assuming holings not reported in the insider trading list are granted, weighted between the most likely programs
	Gambro	Options are classified according to information on known holdings previous years
	HL Display	Assuming two typos in number of holdings
	Investor	Options are classified according to information on known holdings previous years
	Lagercrantz Group	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	Lindex	Assuming holdings in one program since holdings in the other programs are known
	Lundin Mining	Assuming holdings in one program since holdings in the other programs are known
	Nordnet	Assuming holdings in one program since holdings in the other programs are known
	Observer	Assuming that known holdings one year was granted the year before
	Onetwocom	Options are classified according to information on known holdings previous years
	Ortivus	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	Peab	Assuming holdings in one program since holdings in the other programs are known, assuming options not reported in the insider trading list are granted
	Perfect Biometrics	Assuming the difference in classified holdings and total holdings was granted the year before
	Pergo	Assuming that known holdings one year was granted the year before
	Pricer	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	Project Data	Assuming sale of options one year according to information on known holdings other years
	SEB	Assumption made regarding which programs are converted in one year
	Stora Enso	Assuming holdings in one program since holdings in the other programs are known
	Switchcore	Assuming the difference in classified holdings and total holdings was granted the year before
	Telelogic	Assuming the difference in classified holdings and total holdings was granted the year before
	Teligent	Uncertainty regarding what option programs are alotted

	Company	Action performed
Medium	TicketTravels	Assuming difference in classified holdings and total holdings one year are an weighted average of the other programs
	Trio	Assuming typo in number of holdings in one year and assuming holings not reported in the insider trading list are granted
	Volvo	Assuming belonging to different programs due to limited information provided in annual reports and the insider trading list
	Xponcard	Assuming difference in classified holdings and total holdings are due to a rounding error and the annual report not representing the whole year
Weak	Audiodev	Assuming a program of holdings in one of the years (though only this program possible according to the annual report)
	Biotage	Assuming holding options of a program in 1999
	Bure Equity	Assuming holdings in one program in relation to known holdings in the other programs, some small uncertainty remains
	Electrolux	Assuming holdings in one program in relation to known holdings in the other programs, some small uncertainty remains
	Elekta	Assuming difference in classified holdings and total holdings are due to the annual report not representing the whole year
	Gunnebo	Assuming holdings in one program in relation to known holdings in the other programs, some small uncertainty remains
	Haldex	Assumtion regarding the strike price, it shall equal 140 percent of the shareprice when the program was started
	Holmen	Correcting number of holdings 2000 in accordance with the annual report and assuming the CEO still has options when leaving the company
	IFS	Assuming holdings in one program in relation to known holdings in the other programs, some small uncertainty remains
	Kinnevik	Assuming no option holdings
	Lawson	Assuming the holdings of one program in relation to information given in the annual report and the insider trading list
	Medivir	Assuming holdings in one program in relation to known holdings in the other programs, some small uncertainty remains
	OMX	Assuming holdings in one program in relation to known holdings in the other programs, some small uncertainty remains
	Partner Tech	Assuming an weighted average between two programs
	Prevas	Assuming difference in classified holdings and total holdings one year was granted (which is the same number as in the annual report)
	Sandvik	Assuming holdings in one program in relation to known holdings in the other programs, some small uncertainty remains
	Sardus	Assuming a typo in holdings in one program
	SAS	Assuming no option holdings some years
	Scanmining	Assuming holdings in one program in relation to known holdings in the other programs, some small uncertainty remains
	Semcon	Assuming a typo in holdings in one program (corrected in accordance with the annual report)
	SHB	Assuming options are belonging to the only program outstanding
	Skandia	Assuming options are belonging to the program outstanding for key persons within the company
	Tripep	Assuming holdings in programs in relation to known holdings in the other programs the year the CEO leaves, some small uncertainty remains
	Unibet	Assuming no option holdings

Appendix 2

Elimination of fixed salary data errors

The table provides information on which data items were deleted due to data errors in fixed salary. A check was conducted in order to determine outliers below 360 000 SEK, as a fixed salary below 30 000 SEK monthly is not likely for the examined companies. In case only one observation was included for a specific CEO (i.e. only one year of data existed) and the fixed salary was below 360 000, the item was dropped. A search was also conducted for fixed salary items above 10 000 000 SEK.

Table 3. Elimination of outliers due to data errors

(SEK 000)*	Company	Year	Action performed
Fixed salary < 360	Biotage	2000	dropped
	Duroc	2001	dropped
	Elektronikgruppen	2004	dropped
	Eniro	2003	dropped
	Geveko	2005	dropped
	Hexagon	2000	dropped
	Jeeves	2000	dropped
	KABE	2005	dropped
	LjungbergGruppen	2003	dropped
	Novestra	2000	dropped
	Orc	2004	dropped
	Ortivus	1999	dropped
	Prevas	1999	dropped
	Qmed	1999	dropped
	Sensys Traffic	2001	dropped
	Softronic	2000	dropped
	Studsvik	2001	dropped
	Traction	2001	dropped
	Tripep	2004	dropped
	XANO	2002	dropped
	Ångpanneföreningen	2000	dropped
	Biolin	2005	dropped
	Nilörngruppen	2000	dropped
	Bilia	2002	dropped
Fixed salary > 10 000	Eniro	2003	corrected

*Non-SEK items (presented in USD, GBP, ISK and EUR) has been converted to SEK using the respective balance-day exchange rate (OANDA, 2012)

Appendix 3

Overview of regression variables

Table 4. Variable determinations

Variable	Description
r_t	Current firm share return
r_{t-1}	Last year's firm share return
r_{t+1}	Next year's firm share return
Increase $Sales_t$	Current year increase in sales (($Sales_t$/ $Sales_{t-1}$) -1)
Increase $Sales_{t+1}$	Next year's increase in sales (($Sales_{t+1}$/ $Sales_t$) -1)
ROE_t	Current year return on equity (Net $Sales_t$/ Book Value of $Equity_t$)
ROE_{t+1}	Next year's return on equity (Net $Sales_{t+1}$/ Book Value of $Equity_{t+1}$)
OMX_t	Current year OMX increase
OMX_{t-1}	Last year's OMX increase
σ	Firm share price volatility
ln(Mcap)	Logarithmised market capitalization
Media	Dummy variable taking the value 1 if the company operates within the media sector
Commodities	Dummy variable taking the value 1 if the company operates within the commodities sector
Industry	Dummy variable taking the value 1 if the company operates within the industry sector
Services	Dummy variable taking the value 1 if the company operates within the services sector
IT	Dummy variable taking the value 1 if the company operates within the IT sector
Health	Dummy variable taking the value 1 if the company operates within the health sector
Finance	Dummy variable taking the value 1 if the company operates within the finance sector
Telecom	Dummy variable taking the value 1 if the company operates within the media sector
2001	Dummy variable taking the value 1 if the year is 2001
2002	Dummy variable taking the value 1 if the year is 2002
2003	Dummy variable taking the value 1 if the year is 2003
2004	Dummy variable taking the value 1 if the year is 2004
2005	Dummy variable taking the value 1 if the year is 2005
_cons	Regression intercept
g flexible/ fixed	Growth in flexible salary in relation to fixed salary
g bonus/ fixed	Growth in bonus in relation to fixed salary
g perks/ fixed	Growth in perks in relation to fixed salary
ln(grants)	Logarithmized value of options granted during the year
g direct/ fixed	Growth in direct salary in relation to fixed salary
g shares/ fixed	Growth in shareholdings value in relation to fixed salary
ln(dividends)	Logarithmized value of received dividends
g options/ fixed	Growth in option holdings value in relation to fixed salary
g indirect/ fixed	Growth in indirect compensation in relation to fixed salary
g total/ fixed	Growth in total compensation in relation to fixed salary
g fixed	Growth in fixed salary compared to last year
g flexible	Growth in flexible salary compared to last year
g bonus	Growth in bonus compared to last year
g perks	Growth in perks compared to last year
g shares	Growth in shareholdings value compared to last year
g options	Growth in options holdings value compared to last year

Appendix 4

Regression results

Table 5. Regression results for Hypothesis 1

The table presents regression results where the dependent variable is growth in each compensation component, in isolation, in relation to fixed salary. The sample in regression (1) through (10) consists of compensation and firm specific data for the period 2000-2005, including control variables and dummy variables for year and sector. Coefficients and standard errors (in parenthesis) are reported, based on fixed effects panel data regressions with robust standard errors. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Regression	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable	g flexible/ fixed	g bonus/ fixed	g perks/ fixed	ln(grants)	g direct/ fixed	g shares/ fixed	ln(dividends)	g options/ fixed	g indirect/ fixed	g total/ fixed
Explanatory variables										
r_t	0.040	0.523	0.004	-0.185	0.210	12.252	-0.470***	0.540**	16.165	16.299
	(0.020)	(0.029)	(0.009)	(0.269)	(0.169)	(6.568)	(0.120)	(0.270)	(8.506)	(8.523)
r_{t-1}	0.026	-0.014	0.023	-0.478	-0.000	-4.529	-0.352***	0.065	-19.106**	-19.094**
	(0.017)	(0.026)	(0.012)	(0.332)	(0.183)	(4.554)	(0.115)	(0.218)	(9.213)	(9.217)
Control variables										
OMX_t										
OMX_{t-1}							-0.412***			
							(0.128)			
σ										
ln(Mcap)	0.009	-0.020	0.004	1.586	0.94	10.270	.673***	-0.304	3.081	3.014
	(0.027)	(0.050)	(0.014)	(0.643)	(0.804)	(7.058)	(0.17)	(0.396)	(12.050)	(12 062)
Media										
Commodities										
Industry										
Services										
IT										
Health	0.078	-0.354**	0.064	-1.465	4.334***	-17.012		-0.654		
	(0.077)	(0.143)	(0.056)	(1.540)	(1.025)	(27.294)		(2.102)		
Finance	-0.038	0.878***	-0.034	-0.516	0.305	5.484		0.260	24.157**	24.871**
	(0.047)	(0.295)	(0.021)	(0.674)	(0.598)	(13.366)		(0.455)	(11.641)	(11.644)
Telecom										
2001	-0.007	-0.227**	-0.026	-1.544	-0.221	3.377	-0.103	-0.582	0.653	0.421
	(0.033)	(0.109)	(0.024)	(0.847)	(0.191)	(7.901)	(0.071)	(0.443)	(15.451)	(15.453)
2002	0.075**	-0.137	0.040	-0.810	-0.023	-5.955	-0.066	0.176		
	(0.035)	(0.079)	(0.026)	(0.643)	(0.133)	(12.930)	(0.083)	(0.294)		
2003	0.022	-0.108	0.008	-1.927	0.128	17.656		0.251	0.570	0.549
	(0.032)	(0.080)	(0.019)	(0.812)	(0.328)	(10.345)		(0.312)	(8.883)	(8.885)
2004	0.039	0.089	-0.004	-1.786	0.052	27.941**	0.441***	0.040	1.314	1.388
	(0.038)	(0.079)	(0.022)	(0.853)	(0.209)	(11.300)	(0.109)	(0.357)	(11.530)	(11.530)
2005	0.038	0.138	0.008	-2.721	-0.481	15.685	0.683***	0.267	-13.000	-13.092
	(0.039)	(0.085)	(0.023)	(1.108)	(0.268)	(13.096)	(0.142)	(0.346)	(15.159)	(15.160)
_cons	-0.149	0.286	-0.064	-43.413	-13.960	-152.347	0.993	4.023	-43.936	-43.052
	(0.380)	(0.701)	(0.198)	(8.531)	(11.608)	(101.393)	(2.625)	(5.567)	(167.565)	(167.739)
Observations	1 031	1 031	1 031	1 031	1 031	1 031	1 031	1 031	708	708
R^2 (within)	0.026	0.036	0.033	0.040	0.031	0.025	0.378	0.019	0.040	0.040
R^2 (between)	0.013	0.004	0.002	0.006	0.000	0.006	0.007	0.001	0.004	0.004
R^2 (overall)	0.017	0.003	0.008	0.000	0.001	0.013	0.005	0.004	0.021	0.022
F	1.43	4.70	1.26	1.04	25181.72	1.41	15.81	0.57	2.05	2.11

Table 6. Regression results for Hypothesis 2

The table provides regression results where the dependent variable is return adjusted for systematic risk. The sample in regression (11) through (12) consists of compensation and firm specific data for the period 2000-2005, including year and sector dummy variables. Coefficients and standard errors (in parenthesis) are reported, based on fixed effects panel data regressions with robust standard errors. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	(11)		**(12)**	
Dependent variable	$r(adj)_t$		$r(adj)_{t+1}$	
	b	s.e.	b	s.e.
Explanatory variables				
g fixed	-0.001	(0.028)	-0.039**	(0.017)
g flexible	-0.000	(0.000)	-0.000***	(0.000)
g bonus	-0.000	(0.000)	-0.000	(0.000)
g perks	0.000	(0.000)	-0.000	(0.000)
ln(grants)	-0.001	(0.006)	0.004	(0.004)
g shares	0.010	(0.005)	-0.016***	(0.005)
ln(dividends)	-0.068**	(0.031)	0.008	(0.030)
g options	0.000	(0.000)	-0.000	(0.000)
Control variables				
ln(Mcap)	0.324***	(0.057)	-0.207***	(0.057)
Media				
Commodities				
Industry				
Services				
IT				
Health				
Finance				
Telecom				
2001	0.038	(0.053)	-0.090	(0.046)
2002	0.033	(0.056)	-0.043	(0.052)
2003	-0.007	(0.062)	-0.051	(0.053)
2004	-0.046	(0.063)	-0.005	(0.058)
2005	-0.123	(0.076)	-0.011	(0.077)
_cons	-3.988***	(0.920)	3.388***	(0.976)
Observations	606		605	
R2 (within)	0.154		0.135	
R2 (between)	0.001		0.002	
R2 (overall)	0.001		0.016	
F	5.11		4.95	

Appendix 5

Sensitivity test results

Table 7. Sensitivity test (i) for Hypothesis 1: CEO fixed salary < median fixed salary

The table provides regression results where the dependent variable is growth in each compensation component, in isolation, in relation to fixed salary. The sample in regression (13) through (22) consists of compensation and firm specific data for the period 2000-2005, including year and sector dummy variables, if the CEO receives a lower fixed salary than the median (i.e. CEO fixed salary < median fixed salary). Coefficients and standard errors (in parenthesis) are reported, based on fixed effects panel data regressions and robust standard errors. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Regression	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**	**(18)**	**(19)**	**(20)**	**(21)**	**(22)**
Dependent variable	g flexible/ fixed	g bonus/ fixed	g perks/ fixed	ln(grants)	g direct/ fixed	g shares/ fixed	ln(dividends)	g options/ fixed	g indirect/ fixed	g total/ fixed
Explanatory variables										
r_t	0.060	0.094	-0.002	-1.069	0.933	5.719	-0.607***	0.358	8.484	8.738
	(0.036)	(0.074)	(0.022)	(0.852)	(0.949)	(3.702)	(0.192)	(0.503)	(6.113)	(6.097)
r_{t-1}	0.034	-0.037	0.041	-0.934	0.313	-5.199	-0.543***	0.208	-5.251	-5.244
	(0.030)	(0.070)	(0.030)	(0.688)	(0.652)	(4.476)	(0.188)	(0.380)	(3.859)	(3.857)
Control variables										
OMX_t										
OMX_{t-1}										
σ										
ln(Mcap)	0.027	0.002	-0.005	1.775	2.078	7.083	0.777***	-0.663	2.004	1.819
	(0.040)	(0.099)	(0.032)	(1.085)	(1.810)	(6.045)	(0.260)	(0.681)	(7.814)	(7.804)
Media										
Commodities										
Industry										
Services										
IT										
Health										
Finance										
Telecom										
2001	-0.015	-0.445**	-0.040	-0.176	-0.388	-1.896	0.220	-0.072	2.606	2.532
	(0.051)	(0.222)	(0.037)	(0.824)	(0.431)	(4.067)	(0.173)	(0.324)	(3.936)	(3.962)
2002	0.090	-0.284	0.010	-0.384	-0.229	0.291	0.209	-0.023	3.088	3.238
	(0.063)	(0.163)	(0.023)	(0.709)	(0.354)	(4.205)	(0.213)	(0.321)	(5.587)	(5.603)
2003	0.030	-0.283	0.003	-1.102	0.072	-2.008	0.375	0.054	3.719	3.861
	(0.054)	(0.167)	(0.025)	(0.850)	(0.627)	(5.127)	(0.203)	(0.429)	(5.578)	(5.582)
2004	0.013	-0.248	-0.017	-0.965	-0.294	6.071	0.626***	-0.198	3.005	3.330
	(0.071)	(0.172)	(0.040)	(0.981)	(0.469)	(4.434)	(0.211)	(0.410)	(2.649)	(2.638)
2005	-0.002	-0.343	-0.008	-1.975	-1.399	-7.400	0.963***	0.008		
	(0.067)	(0.185)	(0.044)	(1.361)	(0.901)	(9.525)	(0.244)	(0.503)		
_cons	-0.418	0.254	0.075	-48.799***	-32.178	-108.051	-1.899	10.187	-36.325	-33.587
	(0.614)	(1.472)	(0.471)	(15.948)	(28.315)	(92.134)	(4.087)	(10.358)	(121.825)	(121.685)
Observations	526	526	526	526	526	526	371	526	370	370
R^2 (within)	0.023	0.055	0.057	0.039	0.069	0.023	0.399	0.015	0.093	0.095
R^2 (between)	0.022	0.000	0.019	0.001	0.000	0.001	0.001	0.000	0.000	0.001
R^2 (overall)	0.017	0.035	0.023	0.000	0.003	0.000	0.001	0.000	0.005	0.006
F	1.08	1.10	0.85	0.54	0.62	1.44	10.69	0.61	1.81	1.93

Table 8. Sensitivity test (ii) for Hypothesis 1: CEO fixed salary > median fixed salary

The table provides regression results where the dependent variable is growth in each compensation component, in isolation, in relation to fixed salary. The sample in regression (23) through (32) consists of compensation and firm specific data for the period 2000-2005, including year and sector dummy variables, if the CEO receives a higher fixed salary than the median (i.e. CEO fixed salary > median fixed salary). Coefficients and standard errors (in parenthesis) are reported, based on fixed effects panel data regressions and robust standard errors. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Regression	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)
Dependent variable	g flexible/ fixed	g bonus/ fixed	g perks/ fixed	ln(grants)	g direct/ fixed	g shares/ fixed	ln(dividends)	g options/ fixed	g indirect/ fixed	g total/ fixed
Explanatory variables										
r_t	0.015	0.032	0.006	0.152	0.074**	10.104	-0.417**	0.541	23.006	23.079
	(0.015)	(0.022)	(0.010)	(0.307)	(0.037)	(9.803)	(0.162)	(0.377)	(15.428)	(15.448)
r_{t-1}	0.014	-0.010	0.021	-0.263	0.000	-11.410	-0.085	-0.119	-41.204	-41.164
	(0.018)	(0.016)	(0.014)	(0.466)	(0.035)	(9.309)	(0.104)	(0.457)	(21.854)	(21.854)
Control variables										
OMX_t										
OMX_{t-1}										
σ										
ln(Mcap)	0.022	0.038	0.007	1.937**	0.134**	22.150	0.699***	-0.152	9.669	9.701
	(0.028)	(0.025)	(0.019)	(0.927)	(0.063)	(16.146)	(0.196)	(0.707)	(25.953)	(25.966)
Media										
Commodities										
Industry										
Services										
IT										
Health										
Finance	-0.047	0.794***	-0.048	-1.058	0.691***	-7.908		0.535	46.460	46.909
	(0.060)	(0.283)	(0.030)	(1.196)	(0.202)	(29.146)		(0.457)	(27.692)	(27.697)
Telecom										
2001	0.031	-0.041	0.004	-2.828	-0.191	9.093	0.193	-0.918	36.398	36.227
	(0.043)	(0.045)	(0.035)	(1.616)	(0.150)	(18.017)	(0.132)	(0.913)	(40.452)	(40.462)
2002	0.055	0.010	0.082	-1.745	0.054	-7.703	0.344**	0.353	31.340	31.412
	(0.041)	(0.034)	(0.055)	(1.268)	(0.115)	(28.406)	(0.141)	(0.568)	(36.977)	(36.979)
2003	0.009	-0.019	0.039	-2.737	-0.123	41.143	0.446***	0.579	33.564	33.520
	(0.045)	(0.038)	(0.036)	(1.575)	(0.128)	(24.898)	(0.141)	(0.680)	(32.562)	(32.568)
2004	0.058	0.001	0.030	-2.739	-0.026	60.724**	0.398**	0.493	35.672	35.659
	(0.046)	(0.036)	(0.033)	(1.643)	(0.123)	(29.538)	(0.158)	(0.920)	(29.377)	(29.380)
2005	0.042	-0.039	0.054	-3.634	-0.117	50.179	0.585***	0.398		
	(0.051)	(0.042)	(0.033)	(2.048)	(0.145)	(33.850)	(0.216)	(0.601)		
_cons	-0.299	-0.619	-0.120	-45.456***	-1.798**	-303.007	1.982	1.292	-154.382	-154.846
	(0.350)	(0.318)	(0.264)	(10.881)	(0.774)	(216.133)	(2.613)	(9.187)	(349.232)	(349.404)
Observations	506	506	506	506	506	506	233	506	338	338
R^2 (within)	0.041	0.119	0.039	0.094	0.108	0.042	0.440	0.033	0.066	0.066
R^2 (between)	0.008	0.026	0.002	0.018	0.023	0.016	0.002	0.020	0.037	0.038
R^2 (overall)	0.024	0.010	0.009	0.000	0.015	0.042	0.008	0.026	0.045	0.045
F	1.18	2.40	0.83	0.58	4.38	0.99	7.04	0.62	1.17	1.18

Table 9. Sensitivity test for Hypothesis 2: ROE and sales growth

The table provides regression results where the dependent variable is increase in sales and ROE for the period 2000-2005. The sample in regression (33) to (36) consists of compensation and firm specific data for the period 1999-2005, including year and sector dummy variables. Coefficients and standard errors (in parenthesis) are reported, based on fixed effects panel data regressions and robust standard errors. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	(33)		(34)		(35)		(36)	
Dependent variable	Increase $Sales_t$		Increase $Sales_{t+1}$		ROE_t		ROE_{t+1}	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Explanatory variables								
g fixed	-0.000	(0.017)	-0.018	(0.021)	0.009	(0.009)	-0.017***	(0.006)
g flexible	-0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)
g bonus	-0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)	0.000	(0.000)
g perks	-0.000	(0.000)	0.000**	(0.000)	-0.000	(0.000)	0.000***	(0.000)
ln(grants)	-0.017	(0.010)	0.003	(0.008)	0.005**	(0.002)	-0.004	(0.003)
g shares	0.002	(0.012)	0.019**	(0.007)	-0.001	(0.002)	0.001	(0.003)
ln(dividends)	-0.042	(0.076)	-0.034	(0.055)	0.026***	(0.009)	-0.017**	(0.008)
g options	0.000	(0.000)	0.000	(0.000)	-0.000	(0.000)	-0.000**	(0.000)
Control variables								
ln(Mcap)	0.399**	(0.202)	-0.267**	(0.125)	0.067***	(0.020)	0.130***	(0.027)
Media								
Commodities								
Industry								
Services								
IT								
Health								
Finance								
Telecom								
2001	-0.179	(0.179)	0.025	(0.105)	0.013	(0.019)	-0.093***	(0.024)
2002	-0.122	(0.192)	-0.144	(0.079)	-0.054***	(0.020)	-0.087***	(0.020)
2003	-0.336	(0.220)	0.267	(0.164)	-0.095***	(0.019)	-0.091***	(0.022)
2004	-0.080	(0.291)	0.166	(0.129)	-0.093***	(0.019)	-0.081***	(0.026)
2005	-0.346	(0.353)	0.264	(0.161)	-0.098***	(0.025)	-0.090***	(0.034)
_cons	-5.570	(3.262)	4.475**	(1.967)	-0.992***	(0.299)	-1.622***	(0.398)
Observations	593		587		594		594	
R2 (within)	0.059		0.053		0.203		0.254	
R2 (between)	0.002		0.000		0.065		0.042	
R2 (overall)	0.004		0.000		0.048		0.037	
F	1.62		2.56		8.0		8.68	

Appendix 6

Fixed effects vs. random effects test

Table 10. Hausman test results

The Hausman test is a test of whether the individual effects are fixed or random. The null hypothesis is that both fixed and random effects are consistent; the alternative hypothesis is that random effects are not consistent. Below the Hausman test results are listed. * indicates significant results, i.e. in favour of fixed effects.

Equation	Regression	Dependent variable	Test results
1	(1)	g flexible/ fixed	0.883
	(2)	g bonus/ fixed	0.368
	(3)	g perks/ fixed	0.998
	(4)	ln(grants)	0.150
	(5)	g direct/ fixed	0.215
	(6)	g shares/ fixed	-15.900
	(7)	ln(dividends)	0.431
	(8)	g options/ fixed	0.686
	(9)	g infixed/ fixed	0.517
	(10)	g total/ fixed	0.446
5	(11)	$r(adj)_t$	0.000*
	(12)	$r(adj)_{t+1}$	-1.760

Appendix 7

Correlations

Table 11. Covariance between independent variables, Hypothesis 1

	r_t	r_{t-1}	OMX_t	OMX_{t-1}	σ	ln(Mcap)	Media	Commodities	Industry	Services	IT	Health	Finance
r_t	1.00												
r_{t-1}	0.04	1.00											
OMX_t	0.48	0.10	1.00										
OMX_{t-1}	-0.00	0.42	0.05	1.00									
σ	0.06	0.00	-0.01	-0.01	1.00								
ln(Mcap)	0.07	0.17	0.08	0.13	-0.10	1.00							
Media	-0.03	-0.01	-0.00	-0.01	-0.17	-0.04	1.00						
Commodities	0.03	0.04	0.02	-0.01	-0.08	0.09	-0.04	1.00					
Industry	0.01	-0.00	-0.03	0.04	-0.01	0.02	-0.10	-0.15	1.00				
Services	0.05	0.02	0.02	0.01	0.02	0.00	-0.03	-0.05	-0.13	1.00			
IT	-0.04	-0.06	0.00	-0.04	-0.04	-0.27	-0.07	-0.10	-0.26	-0.09	1.00		
Health	-0.00	0.00	0.03	0.00	0.23	-0.09	-0.05	-0.08	-0.21	-0.07	-0.14	1.00	
Finance	0.02	0.03	-0.02	0.01	-0.05	0.18	-0.08	-0.11	-0.29	-0.10	-0.20	-0.16	1.00
Telecom	-0.08	-0.04	-0.01	-0.00	-0.06	0.13	-0.04	-0.06	-0.14	-0.05	-0.10	-0.08	-0.11
2001	-0.17	-0.08	-0.34	-0.21	0.00	0.02	0.01	-0.00	0.03	-0.01	-0.02	-0.03	-0.01
2002	-0.35	-0.18	-0.74	-0.32	0.02	-0.13	0.01	-0.02	-0.02	-0.01	0.03	-0.01	0.02
2003	0.24	-0.31	0.43	-0.65	-0.01	-0.06	-0.01	0.03	-0.01	-0.01	0.01	-0.00	-0.01
2004	0.06	0.31	0.22	0.40	0.01	-0.00	0.01	0.00	-0.03	0.03	0.01	0.02	-0.02
2005	0.02	0.11	0.51	0.20	-0.00	0.11	0.01	-0.01	-0.02	0.02	-0.00	0.03	-0.01

Table 11. Covariance between independent variables, Hypothesis 1 (cont.)

	Finance	Telecom	2001	2002	2003	2004	2005
r_t							
r_{t-1}							
OMX_t							
OMX_{t-1}							
σ							
ln(Mcap)							
Media							
Commodities							
Industry							
Services							
IT							
Health							
Finance	1.00						
Telecom	-0.11	1.00					
2001	-0.01	0.00	1.00				
2002	0.02	0.01	-0.17	1.00			
2003	-0.01	-0.01	-0.19	-0.21	1.00		
2004	-0.02	-0.00	-0.20	-0.23	-0.25	1.00	
2005	-0.01	0.00	-0.20	-0.23	-0.25	-0.26	1.00

Table 12. Covariance between independent variables, Hypothesis 2

	g fixed	g flexible	g bonus	g perks	ln(grants)	g shares	ln(dividends)	g options	ln(MCap)	Media	Commodities	Industry	Services	IT	Health
g fixed	1.00														
g flexible	0.01	1.00													
g bonus	-0.01	-0.02	1.00												
g perks	-0.03	0.01	-0.00	1.00											
ln(grants)	0.02	0.02	-0.00	-0.00	1.00										
g shares	-0.00	-0.02	0.01	-0.02	0.03	1.00									
ln(dividends)	-0.08	0.01	0.00	-0.04	0.01	-0.16	1.00								
g options	0.04	-0.02	-0.01	-0.01	-0.00	-0.02	-0.02	1.00							
ln(MCap)	-0.01	0.16	0.12	0.13	0.08	0.05	-0.08	0.07	1.00						
Media	-0.02	-0.03	-0.01	-0.01	-0.00	-0.02	-0.04	0.00	-0.07	1.00					
Commodities	0.02	-0.04	-0.02	-0.01	-0.00	-0.03	-0.08	-0.02	0.06	-0.03	1.00				
Industry	-0.01	-0.00	-0.02	-0.03	-0.04	-0.00	-0.08	-0.01	-0.13	-0.09	-0.18	1.00			
Services	0.04	0.09	-0.02	0.04	-0.00	-0.02	0.07	-0.00	-0.01	-0.03	-0.06	-0.16	1.00		
IT	0.08	-0.04	-0.02	-0.02	-0.04	-0.05	0.14	-0.02	-0.18	-0.03	-0.07	-0.20	-0.06	1.00	
Health	0.01	0.04	-0.00	-0.00	0.04	0.10	0.04	-0.02	0.04	-0.03	-0.06	-0.17	-0.05	-0.07	1.00
Finance	-0.06	0.02	-0.00	-0.04	0.06	0.00	0.13	0.07	0.12	-0.07	-0.14	-0.40	-0.12	-0.16	-0.13
Telecom	0.01	0.02	0.17	0.21	-0.00	0.03	-0.08	0.01	0.25	-0.02	-0.05	-0.14	-0.04	-0.06	-0.05
2001	0.08	-0.03	-0.03	-0.04	-0.07	-0.10	-0.03	-0.04	-0.05	0.02	0.00	0.03	0.01	0.05	-0.04
2002	-0.06	0.07	0.02	0.05	-0.01	-0.10	0.03	-0.02	-0.10	0.02	-0.01	-0.01	0.04	0.02	-0.02
2003	0.00	0.00	-0.02	0.09	-0.03	-0.01	-0.03	-0.04	0.06	-0.02	0.02	-0.00	0.01	-0.06	0.02
2004	-0.03	0.06	-0.04	-0.00	-0.01	0.02	0.01	0.00	0.03	-0.02	0.02	-0.00	-0.02	-0.00	0.02
2005	0.02	-0.06	-0.02	-0.04	0.03	0.20	0.05	0.02	0.11	-0.03	-0.01	-0.04	-0.01	0.00	0.03

Table 12. Covariance between independent variables, Hypotheseis2 (cont.)

	Finance	Telecom	2001	2002	2003	2004	2005
g fixed							
g flexible							
g bonus							
g perks							
ln(grants)							
g shares							
ln(dividends)							
g options							
ln(MCap)							
Media							
Commodities							
Industry							
Services							
IT							
Health							
Finance	1.00						
Telecom	-0.11	1.00					
2001	-0.04	0.00	1.00				
2002	0.03	-0.06	-0.19	1.00			
2003	0.00	-0.02	-0.20	-0.19	1.00		
2004	-0.00	-0.01	-0.21	-0.20	-0.22	1.00	
2005	0.01	0.05	-0.22	-0.21	-0.23	-0.24	1.00

Appendix 8

The Black-Scholes formula

The Black-Scholes formula for valuing European call options used has been modified in accordance with Merton (1973) to also consider continuous dividends. The pricing formula is set up as below:

$$V_{options} = N\{Se^{-dT}N(Z) - Ke^{-rT}N(Z - \sigma\sqrt{T})\},$$

where

$$Z = \ln(S/K) + T(r - d + \sigma^2/2) \Big/ \sigma\sqrt{T}$$

N = number of shares
S = price of the underlying stock
K = exercise price of the option
T = time to expiration
r = risk free interest rate
d = continuous compounded dividend rate
σ = expected standard deviation of stock return
N = cumulative probability function for normal distribution

Appendix 9

Suggested future research regression

$$\left.\begin{matrix}\frac{\sigma_t}{\sigma_{t-1}} \\ \frac{[D/E]_t}{[D/E]_{t-1}}\end{matrix}\right\} = \beta_0 + \beta_1\left[\frac{Fixed_{i,t}}{Fixed_{i,t-1}}\right] + \beta_2\left[\frac{Flexible_{i,t}}{Flexible_{i,t-1}}\right] + \beta_3\left[\frac{Bonus_{i,t}}{Bonus_{i,t-1}}\right] + \beta_4\left[\frac{Perks_{i,t}}{Perks_{i,t-1}}\right]$$
$$+ \beta_5 ln\left[Option\ grants_{i,t}\right] + \beta_6 ln\left[Dividend\ payout_{i,t}\right] + \beta_8\left[\frac{Option\ holdings_{i,t}}{Option\ holdings_{i,t-1}}\right]$$
$$+ \beta_9\left[\frac{ITM_{i,t}}{ITM_{i,t-1}}\right] + \beta_{10}\left[\frac{OTM_{i,t}}{OTM_{i,t-1}}\right] + \beta_{11}\ln\left[Market\ Cap_{i,t}\right] + \left[\varphi_{iz}D_z\right]_{z=industry}$$
$$+ \left[\theta_{iy}D_y\right]_{y=2001}^{2005} + \varepsilon_T$$

[Equation 9]