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The Effects of Stock Option-Based Compensation on Share Price Performance

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ABSTRACT

This thesis investigates the relationship between stock option-based compensation and share price performance. As opposed to previous studies, we view executives as a heterogeneous group and employ executives' age as a proxy for differences between individuals to explain the changing effects of stock option compensation on share price performance. Firstly, we find that the overall effect of stock option compensation has a negative contribution to share price performance, indicating that the compensation has not been optimally structured from a shareholder perspective. Secondly, we find that executive age affects the compensation-performance relationship negatively, but that this effect is attributable to a lower fraction of stock option compensation of total compensation which we find arise with executives' age. Our findings suggest that stock option compensation plans would generate higher stock returns if the stock option compensation fraction of total compensation were to remain constant as the executive ages.

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Keywords: Executive compensation, Share price performance, Stock Options, Executive age

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I. INTRODUCTION

Over the past two decades the level of executive compensation has risen immensely (Gabaix and Landier (2008)). A significant portion of this increase can be explained by an even higher increase in stock-based compensation, rendering restricted stocks and stock options an important component of executive incentive systems. For instance, during the 1990's US corporations increased their stock option grants more than ten-fold from USD 11bn (in 1992) to USD 119bn (in 1999) (Hall and Murphy (2003)). The purpose of this increase has been to better align principal-agent interests and to balance incentives against risk-sharing[1], which has led to several studies trying to document the implications and effects this has on companies. It has been found both that incentive systems affects executive behavior and that it can be used by shareholders to control executives to act in their interest (Brockman, Martin and Unlu (2010)). However it has also been found that stock options can prove to be counterproductive as incentive system as they can exacerbate risk-aversion in managerial project selection (Brisley (2006)) and thus dampen company growth in the longer term. Giving these contradicting findings this paper seeks to examine what effects executives' stock-based compensation have to shareholders and investors in terms of share price performance in both the longer-term and the shorter-term. More specifically we study the effects on share price performance from an immediate perspective at the grant date and follow the annual development over a three-year period. This is to provide a comprehensive overview of the causality and to combine previous research approaches to find the aggregate effect on share price performance. Moreover, since previous studies have treated executives as a homogenous group and developed conclusions and recommendations based on this assumption, we intend to illuminate the suitability of stock options compensation between different individuals (i.e. executives). In order to do this we use executive age as a proxy for differences where we study what effect executive age has on the relationship between stock option compensation and share price performance. The purpose of this paper is thus to determine the short-term and long-term effect of stock-based compensation on share price performance and to examine whether executive age has an impact on this relationship.

There is a vast amount of research on executive stock option compensation let alone a still larger amount of research on executive compensation that studies various aspects of the subject[2]. For instance studies have been performed on how board and ownership structure explain variations in CEO compensation (e.g. Chhaochharia and Grinstein (2009)), how CEO tenure correlates with the possibility to affect compensation decisions (Core, Holthausen and Larcker (1999)), how compensation structure affects stock price performance following M&A activity (Datta, Iskandar-Datta and Raman (2001)) and how stock options can be used by companies as a cheap financing method (Babenko, Lemmon and Tserlukevich

[1] For instance see Jensen and Meckling (1976).

[2] Excellent surveys include Abowd and Kaplan (1999), Murphy (1999), Prendergast (1999), Core, Guay, and Larcker (2003), and Hall and Murphy (2003) (Dittmann and Maug (2007)).

(2011)). There are also studies on how share price performance is affected by different levels, structures and timing of compensation, however fewer treat executives as a heterogeneous group when analyzing the effects of stock options in both the short- and long-term on share price performance. By accounting for this and determining the relationship, we hope to add insight in how to structure compensation in an optimal way, should there be any significant differences between age categories. These findings could be of interest to board of directors/compensation committees to better understand what effects their compensation policies will yield; to investors as a complement to traditional company valuation to understand and predict company performance; and to regulatory bodies to better understand how corporate governance controls should be designed.

To fulfill the purpose of the paper our study takes its stance from the primary research question: "How is share price performance affected in short- and long-term by stock option compensation?". Following previous papers from for instance Datta, Iskandar-Datta and Raman (2001) we enter the study with one main hypothesis: stock options as executive compensation increase share price performance in both the short and long term since they align principal-agent interest.

To examine the impact of executive age in compensation plans we have formulated a second research question: "What role if any does age play in affecting the relationship between share price performance and stock option-based compensation?". This could potentially give more detailed insights and explanations to potential differences in firm performance between otherwise comparable companies with similar compensation structures. The hypothesis we present is that older executives, even though they might be more experienced, face retirement sooner than younger executives and therefore try to maximize their stock value over a shorter time period, hence increasing the risk level of the firm. However we would also expect an inverted scenario where older executives have a positive effect on the relationship between stock option compensation and share price performance as younger executives likely have a larger fraction of their wealth as well as their future careers exposed to the company and therefore are eager to maximize company performance by taking additional risk. The latter explanation is highly plausible following the findings of Ofek and Yermack (2000) that nearly all shares obtained from exercised options are sold immediately by executives – thereby removing the aligned long term principal-agent interest.

To test our hypothesis we use data from Compustat Annual Fundamentals, Compustat's ExecuComp and CRSP on all companies included in the current constituency list of the S&P 500, S&P MidCap 400 and S&P SmallCap 600 indices for the years 1992-2010. From this data we calculate annual stock return for each company which we set as the dependent variable in our regressions. We also calculate several executive characteristics metrics, compensation metrics and firm metrics which we include in our regressions. We perform a panel data study using one- to three-year lagged stock option compensation variables to determine longer-term effects on share price performance following stock option

compensation. We also perform an event study regression on cumulative abnormal return[3] for several event windows around the stock option grant date to study the short/immediate term effect of a stock option grant.

We find statistically significant results indicating that there is a negative relationship between stock option compensation and share price performance on a one-year time frame. We also find evidence suggesting that stock options contribute positively to share price performance on a two-year time frame, implying that stock options work in shareholder interest in the longer-term. However, we fail to find statistically significant support that stock options have an effect on share price performance more than three years following their grant. In addition, we find that the immediate effect of stock option grants is positive – implying that the market consensus/investor belief is that they will grow favorable corporate decisions.

We also find that age does not have a clear effect on the relationship between share price performance and stock option-based compensation. We find significant results suggesting that age (as it increases) has a negative effect on annual stock return, however we also find that the fraction of stock option of total compensation decreases with age. This means that our results do not entail whether the decline in stock return is a consequence of a lower impact of stock option compensation or a consequence of older executives. As a result, we cannot isolate the aggregate effect of age.

From these findings we argue that stock option compensation as it has been constructed over the past two decades does not provide the optimal incentive system in order to maximize shareholder value. Although stock options can be used to overcome the principal-agent problem[4] we suggest that they can yield a more profound desired effect if the fraction of stock options of total compensation were to remain more constant over time.

The paper is structured as follows: Section II gives an overview of previous; related literature, Section III describes our data; our data gathering and potential data biases; Section IV describes the methodology of our study and the regressions performed in our analysis; Section V describes the results of the panel data study and event study and discusses the economic interpretation and the implications of the results as well as results from our robustness tests; Section VI presents the conclusion of the paper, its limitations and suggestions for future research. All tables are located at the end of the paper.

[3] Cumulative abnormal return has been calculated from a market model using the CRSP value-weighted index as a proxy for market return.

[4] For instance see Jensen and Meckling (1976).

II. LITERATURE REVIEW

The academic literature on executive compensation has during the past two decades increased immensely due to the rise in executive compensation (see for instance Gabaix and Landier (2008), Holmström and Kaplan(2001)). Many studies have focused on different aspects of the optimal composition of the compensation structure while others examine the effects of compensation on different performance and risk-taking measures or reversely - the construction of the compensation plan as a consequence of different firm parameters. In general, all seek different understandings of corporate governance issues and consequences associated with the separation of ownership and control resulting from the standard agency problem (e.g. Jacobsen and Thorsvik (2008)). However, the standard principal-agent model of constructing compensation plans using a balance of salary, cash bonus, restricted stocks and stock options (disregarding any regulatory requirements) has been questioned by Dittmann and Maug (2007), who conclude that it cannot rationalize the observed contracts in their study[5]. They suggest that CEOs should not hold any options and instead receive shares in their respective company and have lower base salaries (some CEOs should also purchase additional stock in the company) to better follow the efficient contracting paradigm.

A. Purpose of Stock option Compensation

With regards to the composition of compensation and incentive plans, it has become increasingly common for firms to issue equity to executives by granting them stock options (Holmström and Kaplan (2003)). Holmström and Kaplan (2003) even link the rise in compensation levels during recent years to the rise of stock-based compensation. Over the last decade of the 20th century, stock options granted by U.S. corporations increased from USD 11bn to USD 119bn in aggregate value (Hall and Murphy (2003)). The level of this amount indicates the importance of stock option plans in today's corporate life, as it has proven to be significantly larger than the aggregate value of other stock issuances by U.S. companies such as private placements and seasoned equity offerings (Fama and French (2007)). Although the purpose of option-plans is to align principal and agent interests by introducing firm ownership to executives following traditional models from for instance Jensen and Meckling (1976)[6], Ofek and Yermack (2000) find that when executives exercise obtained options, nearly all of the shares are sold. Their findings illuminate that managerial ownership of firms develops under a tension between two countervailing forces: (1) the goal of increasing the executives wealth exposure to the firm by the board and (2) the executives' diversification goals. While this suggests that stock options actually might not provide the desired incentive alignment of executives and shareholders, Babenko, Lemmon and Tserlukevich (2011) find that stock option-based

[5] Dittmann and Maung (2007) uses a data sample consisting of 598 U.S. CEOs in the year 2000 (obtained from Compustat ExecuComp), of which 21 (3.5%) have no options in their compensation package, and 254 (42%) have options on more than 1% of their company.

[6] Jensen and Meckling (1976) defines the concept of agency costs, show its relationship to the 'separation and control' issue, investigate the nature of the agency costs generated by the existence of debt and outside equity, demonstrate who bears the costs and why, and investigate the Pareto optimality of their existence.

compensation can be used by firms as a mean of cheap financing. Results from their study show that firms, on average, increase investments by USD 0.34 for each dollar received from exercised stock options and that firms facing higher external financing costs allocate more of the proceeds to investment.

B. Construction of Compensation Plans

Other empirical studies have examined corporate governance and the relationship between firm characteristics and executive compensation. While some point to the labor market for talent as the major cause that sets the compensation levels and the designs of compensation contracts (see for instance Gabaix and Landier (2008) and Hubbard (2005)), others have chosen to study the influence of the Board of Directors on CEO pay (as it is this corporate governance function that decides on the CEO compensation contract). A study performed by Core, Holthausen, and Larcker (1999) analyzes how board and ownership structure explain a significant amount of cross-sectional variation in CEO compensation and conclude that firstly, weaker governance structure have greater agency problems and secondly, CEOs employed by firms with greater agency problems receive greater compensation. This is further verified following regulatory changes to board structures in 2002 and the finding that CEO compensation was cut in the order of 17% following this implementation, highly suggesting that board structure and procedures have a significant effect on the structure and size of CEO compensation (Chhaochharia and Grinstein (2009)).

It is also suggested that CEO tenure is correlated with increased CEO influence over compensation decisions (see for instance Core, Holthausen, and Larcker (1999) and Harford and Li (2007)). This not only implies that CEO compensation increases with CEO tenure, but consequently that it increases with CEO age (which to some extent is correlated with tenure). Furthermore, it has been found that external blockholders improve compensation arrangement and better align agent and principal goals, as they put pressure on developing stronger corporate governance measures (Bertrand and Mullainathan (2001)).

C. Compensation Plans and Firm Performance

The compensation of executives provide incentives to executives to act in certain ways in accordance to the construction of the compensation plan, both in terms of compensation levels, composition and goals or vesting requirements within the compensation contract. The way executives act inevitably affects the firm (both in terms of performance and others ways such as risk-taking)[7]. Stock options within compensation packages influences managerial risk preferences by exposing the executives' wealth and option portfolio to changes in firm stock prices (known as "delta") and firm stock return volatility (known as "vega"). Firms can thus use stock option plans to control executives behavior, knowing that larger

[7] For ways in which CEO behavior affects the firm, see for instance Brockman, Martin and Unlu (2010).

deltas discourages managerial risk taking, while larger vegas encourage risk taking (Knopf, Nam and Thornton (2002) and Coles, Daniel and Naveen (2006)). Consequently it has been found that there exists a strong correlation between stock price performance and the acquiring executives' equity-based compensation around and after acquisition announcements (Datta, Iskandar-Datta and Raman (2001)). This finding suggests that compensation composition clearly affect executives to act in the interest of shareholders[8], and that this (if desired by the board or shareholders) can be used to add stock price value. However, even as stock options can provide a good mean for boards to align agent and principal interest, they may also prove to be counterproductive as compensation contracts typically are constructed in such ways that they allow fixed numbers of options to vest periodically, independent of stock price performance (see for instance Brisley (2006)). Since such options can climb deep in-the-money even long before the vesting opportunity (exercise date) approaches, they can exacerbate risk aversion in managerial project selection. Therefore, Brisley (2006) shows that making the proportion of options that vest a gradually increasing function of the stock price can ensure that appropriate numbers of options are retained while they provide risk-taking incentives, but are exercised once they have lost their convexity.

Stock option plans can also prove to affect firms in more subtle ways, for instance that creditors become more (less) likely to lend short-term funds when CEOs have a high vega exposure (low delta exposure) through their incentive plans (Martin and Unlu (2010)). But overall, it is the level of total compensation that has the most profound effects on firms, where unusually large CEO compensation levels reflect managerial entrenchment or poor governance mechanisms, and that firms with more entrenched executives or poorer governance systems perform worse (Core, Holthausen, and Larcker (1999)).

Even though stock option-based compensation can present positive effects to firms issuing them (whether in terms of incentive alignment or other), they have been particularly beneficial to the executives being granted them (Bebchuk, Grinstein and Peyer (2010)). Virtually all stock option grants are granted at the money on the grant date[9] (although they in practice can be set both above and below), which Hall and Murphy (2003) offer economic rational to. They show that pay-to-performance incentives for risk-averse undiversified executives are typically maximized by setting exercise prices at (or near) the grant-date market price. However, despite that virtually all companies practice this economically feasible price setting method, Bebchuk, Grinstein and Peyer (2010) find that opportunistic timing via backdating, also known as "spring-loading" (timing option grants at lower share prices to make them more profitable to the recipient), is a problem in granting stock options and that the phenomenon still occurs even after the adoption of the Sarbanes-Oxley Act (SOX)[10, 11]. (They also find a correlation between opportunistic

[8] Datta, Iskandar-Datta and Raman (2001) find that compared to low equity based compensated (EBC) executives, high EBC executives pay lower acquisition premiums, acquire targets with higher growth opportunities, and make acquisitions engendering larger increases in firm risk. They also find that EBC significantly explains post acquisition stock price performance even after controlling for acquisition mode, means of payment, and "glamour" versus "value" acquirers.

[9] For example, 94% of stock option grants to S&P 500 CEOs in 1998 were at the money grants (see for instance Hall and Murphy (2000)).

[10] Bebchuk, Grinstein and Peyer (2010) show that "lucky" grants (grants awarded the lowest price of the grant month) are associated with higher CEO compensation from other sources, no majority of independent directors, no outside blockholder on the compensation committee, and a long-serving CEO.

timing and factors associated with greater CEO influence on corporate decision making, see further section II. B: Construction of Compensation Plans). Following their results, they estimate that the monetary gain to CEOs following favorably timed option grants on average exceed 20% of the total value of the grant. They further estimate that more than 10% of the CEO's total reported compensation for the year is attributable to the favorable timing in cases when spring loading has occurred. This finding puts forward that option plans might not actually be initiated by the interest of the board (or shareholders) but rather by the CEO. This finding complements other research findings in the area, such as the link between opportunistic timing of CEO grants and certain aspects of governance such as board interlock, link through auditors and geographic location of firms (Bizjak, Lemmon and Whitby (2009))[12].

III. DATA

A. Panel Data

The study is based on data for all companies in the current S&P 500, S&P MidCap 400 and S&P SmallCap 600 indices from 1st of January 1992 to 31st December 2010[13]. We obtain our data on executive compensation for all these companies from the database ExecuComp from Compustat. ExecuComp provides annual data on executive compensation for the top-five highest paid executives in each company included in the database (Ofek and Yermack(2000); Datta, Iskandar-Datta and Raman(2001)). This data includes the level and the composition of the compensation which can be divided into three subgroups; salary compensation, bonus compensation in cash and stock option compensation[14]. Furthermore it contains executive-specific data such as the executives' age and dates for when/if the executive became CEO as well as left as CEO. This data is used to calculate CEO tenure in this paper[15]. Since executive age plays a major part in our study we drop all missing values for this variable. In addition missing values for salary, bonus, stock options and dividends are dropped as well. As a result our dataset consists of 43,188 observations, covering 1,060 different companies in 61 different industries. Data on daily stock prices are included for all companies in our study and is obtained from the CRSP database. We have also gathered financial data for each company from Compustat. The financial data includes book value at the end of each fiscal year for total assets, liabilities and equity, as well as data on revenue, net income acquisitions, cash dividends on common stock and market value on equity. This data is then used to calculate

[11] The SOX Act provides a set of principles to guide boards in the design of top executive compensation. This includes, among other things, that equity compensation should be "reasonable and cost effective" and that key executives and directors should "acquire and hold" a meaningful amount of company stock. In particular, the purpose of SOX (compensation-wise) is to achieve greater transparency and appropriate expensing of options and to make the costs of options more clear to both shareholders and boards.

[12] Bizjak, Lemmon and Whitby (2009) find that in some empirical specifications, over one fourth of the unconditional probability that a firm starts to backdate options is explained by having a board member linked to another firm that already backdates.

[13] These indices provide a large dataset which is representative for the US corporate sector (Aggrawal and Samwick (2003)).

[14] The value of the stock options is calculated using the Black-Scholes option pricing model at the option grant date.

[15] See Table I.

performance measures such as return on equity (ROE) and return on assets (ROA), the Tobin's-Q measure and the debt to equity ratio as well as creating a measure for firm size using the logarithm of total assets (see for instance Bebchuk, Grinstein and Peyer (2010)) (for methods used to calculate these measures see Section IV: Methodology). The data on executive compensation, stock prices and financial data are merged by CUSIP identification number for each year. Since the level of compensation between firms differ substantially, we have taken the logarithm of the different compensation groups as well as for dividends and acquisitions to overcome this problem (Bebchuk, Grinstein and Peyer (2010)). However we treat the logarithm of stock options as lagging when constructing our regressions since we expect that the stock options grants will have a larger impact on stock return the year after they were granted (as the executive now has more of his wealth exposed to company performance) (Jensen and Meckling (1976)). We also use a "new economy" dummy variable which takes the value of one if the firm is a new economy firm and the value of zero otherwise[16]. The reason for bringing this dummy variable into account is because stock-based compensation is especially important in new economy firms (Murphy (2003)). In addition we include a SOX dummy variable which is one after year 2002 and zero for all other years.

Across our dataset of more than 43,188 observations, the level of compensation in stock options vary significantly between firms of different size (S&P index constituency). The level of compensation also varies between CEOs and directors, as can be seen in Table II.

B. Event Study

For the event study we use Compustat's ExecuComp to obtain specific data on grant date and the Black-Scholes dollar value of the stock options. Action date is defined as the date when a stock option is announced. This is the date we use in the event study. However, note that the available data in this study only stretches over a five-year period from 2006-2010 as compared to previous data (which spans 1992-2010). If more than one executive has recorded options grants on the same action date, these grants have been added to one sum. For the event study we construct four event windows; action date +/- 1 trading day, +/- 3 trading days, +/- 5 trading days, and +/-7 trading days respectively. Dates which are not included in the event windows are dropped which gives us a data sample of 8,981 observations. In the event study we use the same source for executive characteristics and company characteristics data as in the panel data study, only limited to the years 2006-2010. Table III shows descriptive statistics for our data sample. In addition daily stock returns are obtained from the CRSP database.

[16] New economy dummy variable is equal to one for all firms with specific SIC codes. The major differences between old economy firms and new economy firms are the following: in terms of sales and employees new economy firms are smaller, have a higher growth, invest more heavily in research and development, and have much lower marginal tax rates (Murphy (2003)).

C. Data Biases

The data in our sample which is used in our study may in one way or another be biased. Firstly, we do not make any separation between calendar vesting contra performance vesting stock options. Since calendar vesting stock options are more common (Brisley (2006)) in practice, our dataset is likely to be biased towards them. Consequently the interpretation of our results may only be applicable on calendar vested stock options. Secondly our data sample contains a significant larger number of observations of compensation for directors than for CEOs (which can be seen in Table II). Hence, this unequal distribution would suggest that the regressions containing executive compensation variables are biased towards directors and thus describe how director's compensation affect annual stock return. On the other hand, considering the size of the stock option compensations the dataset could be biased towards CEOs. The median stock option compensation for CEOs in the S&P 500, S&P MidCap 400 and S&P SmallCap 600 is ($000') 1,507; 547; and 192 respectively. On the contrary, for directors the median stock option compensation is ($000') 455; 150; and 45 respectively which would imply that CEOs' stock option compensation will affect the results more.

IV. METHODOLOGY

Given the panel data set we have, we perform a set of standard Ordinary Least Squares (OLS) regressions in order to approximate the estimator(s) in the best possible way. Furthermore by using OLS regressions we will obtain a consistent estimator(s) if exogenous variables are used and no multicollinearity exists[17].

When considering the short-term effect of stock option grants on share price performance, we conduct an event study. The grant date is set as the event and four different event windows are constructed in order to examine any possible effects on share price performance.

A. Panel Data OLS Regressions on Share Price Performance

In our study we test the relationship between share price performance and executive compensation with a set of different fixed effect OLS regressions[18]. In an effort to overcome some of the potential endogeneity issues associated with the regression setting presented in equation (1) to (6) below we run fixed effect regressions, clustering our standard errors on industry-level (based on the two first digits in respective SIC-code[19]) to capture any differences in omitted variables effecting firm performance across industries.

[17] For a further discussion on OLS and its implications see Greene (2002).

[18] We also control for heteroscedasticity in our regressions by using the robust command in STATA.

[19] Standard Industry Classification codes (SIC-codes) are grouped into progressively narrower industry classifications: division, major group and industry group. 2-digit SIC categorization imply grouping at the major group industry level (e.g. group 21: Mining, and group 23: Construction).

Important to note is that clustering could exacerbate measurement problems which can affect the magnitude of the coefficient (Roberts and Whited (2011)).

In order to determine the effect on share price we use a number of independent compensation variables: logarithm of options granted, logarithm of salary and logarithm of cash bonus. When regressing we implement different time windows for the logarithm of options granted since we intend to evaluate both the short-term effect on share price as well as the long-term effect caused by the stock option grants. By using lagging options we also limit potential endogeneity issues (such as simultaneity). As a consequence, we examine options granted over a 3-year period where we construct three new independent variables: *lagging_options, 2_year_lagging_opt* and *3_year_lagging_opt* which we add to the regressions subsequently. Each lagging option variable is constructed using the Black-Scholes dollar value of the option grant (as obtained from Compustat's ExecuComp) for each executive for each fiscal year prior to the observation point (corresponding to one, two or three prior for each lagging option variable):

$$log(options\ granted) = \begin{cases} 1\ year\ lagging\ options \\ 2\ year\ lagging\ options \\ 3\ year\ lagging\ options \end{cases} \qquad (1)$$

We use several independent variables in the regressions to capture differences between companies as well as individual executives affecting the share price. For a complete list of the variables included in our regressions see Table VII. The independent variables are divided into two sub-groups, Executive Characteristics and Firm Characteristics.

Executive Characteristics variables include:

1. Executive age. Executive age is divided in three different variables depending on the age of the executive[20] as well as an independent variable for the actual age depending on regression setting.
2. CEO tenure.
3. CEO tenure squared. The square of CEO tenure has also been included in the regression setting to capture any non-linear effect that tenure might present[21].
4. Executive gender.
5. Amount of restricted stock holding, calculated using the logarithm of the dollar amount of restricted stock holding at the end of each year.

Firm Characteristics variables include:

1. Firm size, which in the regression is defined as the logarithm of the dollar value of total assets as obtained from Compustat for each year.
2. Debt-to-Equity ratio, calculated using the book value of total liabilities and the book value of equity on the balance sheet date.

[20] This method is used by for instance Bebchuk, Grinstein and Peyer (2010). See variable list in Table VII for overview of the age group used.

[21] For other studies using this method see e.g. Bebchuk, Grinstein and Peyer (2010).

3. Tobin's Q, calculated using the book value of equity and total liabilities on the balance sheet date and the market value of equity from Compustat on the corresponding date (which is derived using the market capitalization).
4. Return on assets (ROA), calculated using net income over book value of assets on the balance sheet date.
5. Return on equity (ROE), calculated using net income over the book value of equity on the balance sheet date.
6. Dividends paid (defined as the logarithm of the dollar value of total dividends paid during the fiscal year).
7. Level of acquisitions (defined as the logarithm of the dollar value of acquisitions carried out over the fiscal year as obtained from Compustat)[22].

See Appendix A for an overview of the formulas used when calculating the firm characteristics variables.

The regressions also include dummy variables to control for time and selected other events/properties potentially affecting share price. Thus, we control for year, for whether the executive is a CEO or not and for before/after the Sarbanes-Oxley Act legislation implementation.

The OLS regressions performed are:

$$y_{i,t} = \beta_0 + \beta_1 \, log(bonus)_{i,t} + \beta_2 \mathbf{1} \, year\ lagging\ options_{i,t} + X + Z + \gamma_t + \alpha_t + \varepsilon \quad (9)$$

$$y_{i,t} = \beta_0 + \beta_1 \, log(bonus)_{i,t} + \beta_2 \mathbf{1} \, year\ lagging\ options_{i,t} + \beta_3 \mathbf{2} \, year\ lagging\ options_{i,t} + X + Z + + \gamma_t + \alpha_t + \varepsilon_i \quad (10)$$

$$y_{i,t} = \beta_0 + \beta_1 \, log(bonus)_{i,t} + \beta_2 \mathbf{1} \, year\ lagging\ options_{i,t} + \beta_3 \mathbf{2} \, year\ lagging\ options_{i,t} + \beta_4 \mathbf{3} \, year\ lagging\ options_{i,t} + + \gamma_t + a_t + \varepsilon_i \quad (11)$$

$$y_{i,t} = \beta_0 + \beta_1 \, log(bonus)_{i,t} + \beta_2 \mathbf{1} \, year\ lagging\ options_{i,t} + Q + W + \gamma_t + \alpha_t + \varepsilon_i \quad (12)$$

$$y_{i,t} = \beta_0 + \beta_1 \, log(bonus)_{i,t} + \beta_2 \mathbf{1} \, year\ lagging\ options_{i,t} + \beta_3 \mathbf{2} \, year\ lagging\ options_{i,t} + \gamma_t + \alpha_t + \varepsilon_i \quad (13)$$

$$y_{i,t} = \beta_0 + \beta_1 \, log(bonus)_{i,t} + \beta_2 \mathbf{1} \, year\ lagging\ options_{i,t} + \beta_3 \mathbf{2} \, year\ lagging\ options_{i,t} + \beta_4 \mathbf{3} \, year\ lagging\ options_{i,t} + + \gamma_t + a_t + \varepsilon_i \quad (14)$$

Where (*y*) is the dependent variable for company (*i*)*'s* share price performance during year (*t*), X and Q represents controls for executive characteristics under the specification in equation (15) and (16) below, Z and W represent controls for firm characteristics under the specification in equation (17) and (18) below, and ε_i is the error term. (γ) represents industry fixed effects control and (*a*) represent year dummies for the

[22] Previous research show that there is a strong relationship between equity-based compensation and stock price response when controlling for level of acquisitions (Datta, Iskandar-Datta and Raman (2001)).

years 1993-2010 (since we include one year lagging options, the earliest observation our data will contain is the 1993 year lagging option from our data on option grants in 1992).

$$X \equiv \beta_1 d[Executive<50]_{e,t} + \beta_2 d[Executive\ 50\ to\ 65]_{e,t} + \beta_3 d[Executive>65]_{e,t} + \\ + \beta_4 d[CEO\ flag]_{e,t} + \beta_5 [CEO\ tenure]_{e,t} + \beta_6 (CEO\ tenure)^2_{e,t} + \beta_7 log(restricted\ stocks)_{e,t} \quad (15)$$

$$Q \equiv \beta_1 [Executive\ age]_{i,t} + \beta_2 d[CEO\ flag]_{i,t} + \beta_3 [CEO\ tenure]_{i,t} + \beta_4 (CEO\ tenure)^2_{i,t} + \\ + \beta_5 log(restricted\ stocks)_{i,t} \quad (16)$$

$$Z \equiv \beta_1 Tobin's Q_{i,t} + \beta_2 [Debt\text{-}Equity\ ratio]_{i,t} + \beta_3 ROA_{i,t} + \beta_4\, log(acq.)_{i,t} + + \beta_5 log(dividends)_{i,t} \quad (17)$$

$$W \equiv \beta_1 Tobin's Q_{i,t} + \beta_2 ROE_{i,t} + \beta_3 log(acq.)_{i,t} + \beta_4 log(dividends)_{i,t} \quad (18)$$

Where subscript *e* denotes each executive-firm (*i*) combination at year (*t*).

To capture any potential effects different executive characteristics might have on the structure of compensation and to analyze the effect of executives' age, we set a regression on stock options as percentage of total compensation (the sum of *SALARY*, *BONUS* and *OPTIONS_AWARDS_BLK_VALUE* from ExecuComp) using several executive characteristics variables. The regression performed is an OLS regression where we control for years and cluster standard errors at an industry level to control for any unobservable differences between executives and industries.

To verify the robustness of our results three different robustness tests are conducted. In the first test we use the winsorizing technique since extreme values may create a biased result[23]. The second test we conduct is the Hausman test which we control for both random effects and fixed effects[24]. As a third test we divide our sample into subsamples by the level of total CEO compensation by creating two new variables; *totalcomp_dummy_low* and *totalcomp_dummy_high,* where an executive's total compensation[25] is less than the total compensation median for the whole sample and total compensation is higher than the sample median respectively.

B. Event Study of Share Price Performance Around the Stock Option Grant Date

In the event study we test for whether the announcement of an option grant has an abnormal short-term impact on the share price. We examine the share price before and after the action date with four different event windows (+/- 1, 3, 5, and 7 days). By using several event windows for the grant events we increase

[23] Winsorizing is a technique which recodes observations which lie outside a specified percentile to assess the values of the observation at the specified percentile (Bollinger and Chandra(2004)).

[24] The Hausman test intends to show that under the null hypothesis, H is asymptotically distributed as a central x where p is the number of unknown regression parameters. If the latter statistic, at a given level of confidence, is higher than the tabulated value of a x we reject the hypothesis that the difference between estimators is not systematic and as a result reject the ordinary least-squares(Hausman (1978)).

[25] Total compensation is obtained from ExecuComp's *tdc1* variable.

the possibility of capturing any possible abnormal returns following lagging stock market reactions (Brown, Liang and Weisbenner(2007)). The return over each event window can thus be stated as:

$$R_{i,t} = \prod_{\tau_1}^{\tau_2} (1+r_t^i) \qquad (19)$$

where $\tau=0$ is the grant date, and τ_1 and τ_2 is the event window starting point and ending point, respectively (i.e. +/- 1, 3, 5, and 7 days). The event window starting point is set to before the grant date to capture any leakages of information or other indications that could have made the grant decision available to investors prior to the actual grant date. The ending window is set to an upper limit of 7 trading days to still capture any effects should the filing of the option grant occur on a later date than the actual grant date.

To calculate abnormal returns, we construct a market-model to benchmark each stock return with a market index return. We use the value weighted CRSP index return for the same time period as our event windows to eliminate the general movement of the market[26]. To perform this simplified abnormal return estimation we assume that $\beta=1$ and $a=0$ for all firms. This yields a simplified abnormal return estimation equation:

$$AR_{i,\tau} = R_{i,\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m,\tau} = R_{i,\tau} - R_{m,\tau} \quad \text{for} \quad \tau \in (T_1, T_2) \qquad (20)$$

Using these results we then calculate cumulative abnormal returns:

$$CAR_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau=\tau_2} AR_{i\tau} \quad \text{where} \quad T_1 \leq \tau_1 < \tau_2 \leq T_2 \qquad (21)$$

The CAR is then regressed against similar variables as in the panel data section. Also, a dummy variable for the direction of the CAR is generated and used in the same regression setting as the CAR to capture the direction of any possible abnormal return since the magnitude could be difficult to assess should the $\beta=1$ and $a=0$ assumption for abnormal return estimation prove invalid:

$$dCAR = \begin{cases} 1: CAR>0 \\ 0: CAR \leq 0 \end{cases} \qquad (22)$$

The event study regressions performed are specified to use CAR for each event window (+/- 1, 3, 5 and 7 trading days) as the dependent variable, and a set of firm and executive characteristics as independent variables for every (i) executive grant event. They also include year dummies (a) and industry fixed effect controls (γ). The regression following regression specification is used:

$$CAR_{i,t} = \beta_0 + \beta_1 \, log(options)_{i,t} + \beta_2 (Ownership)_{i,t} + \beta_3 (Firm\ Size)_{i,t} + \beta_3 (Gender)_{i,t} + \\ + \beta_3 (Age)_{i,t} + \beta_3 (CEO\ flag)_{i,t} + \gamma + a_t + \varepsilon_{i,t} \qquad (23)$$

[26] The CRSP value weighted return index is calculated as the relative weight of a security in a market portfolio multiplied by its return. Securities are weighted by their market capitalization at the end of the previous period (The Center for Research in Security Prices (2012)).

V. RESULTS

The results section is structured to first present the results of the regressions and then to discuss the economic interpretations and implications of the findings. At the end of the section, robustness test results are presented and discussed, and a general discussion of the overall results the study is conducted.

A. Panel Data Study

A.1 Descriptive results

The regression results obtained from our sample are presented in Table IV and Table V. Regression (1) to (6) in Table IV use annual stock return as the dependent variable with a combination of different independent and control variables and are performed as discussed in section IV: Methodology. The purpose of the regressions are to capture different compensation characteristics' and executive characteristics' effect on share price performance. Regression (1) to (5) in Table V use stock options compensation as fraction of incentive based compensation (the sum of *SALARY*, *BONUS* and *OPTIONS_AWARDS_BLK_VALUE* from ExecuComp) as dependent variable (in accordance with section IV: Methodology). They are performed to analyze what effect executive age has on the construction of compensation structures to support the analysis of regression (1) to (6) in Table IV.

Across all regressions (1) to (6) in Table IV, the coefficients show that stock options lagged by one year have a negative impact on firm performance as measured by annual stock return at significant levels (at the 1% and 5% levels). Furthermore the regressions show that bonus compensation has a positive coefficient and effect on annual stock return at the 1% significance level. The coefficients from the different regressions suggest that for every integer exponent increase on USD 10,000[27] in cash bonus, the annual stock return will increase by around 1 percentage points. The results also indicate that acquisitive undertaking has had a negative impact on yearly stock return on the 1% significance level for the sample period which is in line with previous findings (Datta, Iskandar-Datta and Raman (2001)).

Regression (1) to (3) use a regression setting where executive age is controlled for by dummy variables for three age groups[28]. Regression (1) shows that the coefficient for lagged one-year options is negative and statistically significant at 1% level. This implies that every integer exponent increase on USD 10,000 in option grant decreases the annual stock return by 1.09 percentage points. Also the regression shows that executive age has a diminishing effect annual stock return on a 5% significance level. In addition CEO tenure also has a negative effect on annual stock return on a 5% significance level. The regression is performed on 41,303 observations yielding an R^2 of 0.0818. Regression (2) shows a negative coefficient

[27] I.e. $10{,}000^1$ implies a 1 percentage point increase: $10{,}000^2$ implies a 2 percentage point increase etc.

[28] See Table VII for a description of the respective age groups and a complete descriptive list of all variables included in the regression.

for *lagging_options* with the magnitude implying a -1.55 percentage points change in annual stock return per USD 10,000 stock option grants when also including the effect of the two year lagging option variable (at a 5% significance level). Interestingly, the effect of the two-year lagging options variable has a positive impact on annual stock return at the 10% significance level. As in regression (1), age appears to have a diminishing effect on annual stock return at significant levels (1% and 10%). This effect appears to be stronger when also including the variable for two-year lagging options. The regression is performed on 30,714 observations, generating an R^2 of 0.0737. When also controlling for three-year lagging options the regression result loose significance but provide positive coefficients for two-year and three-year lagging options. The previous trend of diminishing returns to executive age also seem to be observed in this regression, however without any meaningful significance. This regression is performed on 22,220 observations and has an R^2 of 0.0809.

In regressions (4) to (6) the defined age groups have been substituted with a single age independent variable which provides coefficients with similar (close to identical) magnitude as in regression (1) to (3) for the compensation variables. Regression (5) provides negative coefficient result for the age variable although the coefficient is close to having zero impact on the dependent variable. Regressions (4) to (6) are performed on the same number of observations as regressions (1) to (3) respectively and are set to capture the return on equity measure instead of the debt-to-equity and return on assets measures yielding R^2s of 0.0809, 0.0731 and 0.0806 for regressions (4), (5) and (6) respectively (note that these R^2s are lower than in the previous regressions, implying a not as good model specification fit).

Table V displays the regression results for how the fraction of stock option compensation depends on executive characteristics to capture any age effect. The results from regressions (1) to (5) suggest that the fraction of stock option compensation decreases with age at significant levels (at 5% and 1% significance level). Furthermore the coefficient for the new economy control variable is positive and significant at a 10% level in line with the findings of (Murphy (2003))[29]. The positive coefficient for CEO indicator implies that the level of stock options increases significantly (at around 10% points), although the level decreases with CEO tenure on the 1% significance level, see regression (5). Regressions (1) to (5) are run on 43,088 observations yielding R^2s of 0.009, 0.0010, 0.0031, 0.0034 and 0.0034 respectively.

A.2 Regression Analysis

Important to note when analyzing the regression results is that the regressions are performed on a data sample that potentially is biased towards including calendar vesting options rather than a balanced mix of calendar and performance vesting options. According to FW Cook & Co.'s 2002 report, out of the 99% of the top 50 percentile firms from the S&P 500 index that apply stock option plans in their compensation practice, only 16% uses performance vesting contracts (Brisley (2006)). This implies that the results

[29] For a further discussion on the new economy variable see Murphy (2003).

observed are likely to primarily describe the effect of calendar vested stock option grants on firm performance, and thus should only be interpreted in such a way. The effect of performance vested options could thus be substantially different, both in magnitude and direction, and the understanding of their effect could potentially be misled if the results for our regressions are applied to them.

A.2.1 Effects of Executive Compensation on Share Price Performance

When analyzing the results from regression (1), (2) and (3) in Table IV, they suggest that the impact of stock options on share price the first year following the grant date contribute negatively to share price performance. Although the regressions do not provide answers as to why the coefficient assumes this negative magnitude, there are possible economical explanations: firstly the stock options can provide incentives to the executives to undertake less aggressive and risky operations (and thereby generating lower returns) in order to ensure a stable share price above the option strike price (however this depends on the option vesting contract type, i.e. calendar or performance). Secondly the stock options could provide incentives for the executives to undertake more significant risk in order to maximize share price and thereby the value of their options, but that they fail in their risk-taking leading to a negative contribution to share price performance. However the latter is less plausible when regarding the results from regressions (2) and (3) that provide positive coefficients for longer term option holdings (two-year lagging options and three-year lagging options). Although these coefficients are insignificant in regression (3), regression (2) suggests on a 10% significance level that every integer exponent increase on USD 10,000 in stock options grant adds 0.7 percentage points to the share price development the second year after the option grant. This suggests that executives make corporate decisions that have longer-term effect, likely since they are exposed to the performance of the firm (depends on the option vesting contract type) and wants the share price to enter and stay in-the-money. Provided that we fail to find any evidence of stock option compensation affecting share price performance more than two years after their grant date, our results imply that stock options perhaps do not work in shareholder interest since the overall contribution over the first two years is negative, and that the measurable effect ceases to exist following the third year. When also regarding the results from Ofek and Yermack (2000) showing that almost all stock options are sold when the options are exercised, it becomes clear that the exposure of executive wealth to company performance is limited to the option period. Since this period does not yield positive shareholder effects, it becomes difficult to motivate the use of stock options as a mean for creating shareholder value.

The R^2 obtained from regressions (1) to (6) are weaker than in other studies[30], suggesting that the regressions provide a weak goodness of fit. This implies that the future predictability of the regression results become limited. We point to that a weak R^2 could be a consequence of extreme outliers in the

[30] See for instance Bebchuk, Grinstein and Peyer (2010)

analyzed data sample (which is highly plausible regarding the maximum values of both bonus and options to executives presented in Section III: Data in relation to the median values).

A.2.2 Effects of Executive Age on the Compensation-Performance Relationship

The results from regressions (1) to (5) in Table V suggest that the fraction of stock option compensation decreases with age at significant levels (at 5% and 1% significance level). This fits with the economic intuition that executives can affect their compensation composition as their tenure at the company increases in support with previous research (Core, Holthausen and Larcker (1999)). This could also possibly be explained by two other factors: firstly if stock options are used as retention incentives[31] they are likely to decrease with time (age) as the executive approaches his termination date (ie pension etc). Secondly this could be a result of executives' inability to affect share price development after they leave the company, something that becomes increasingly probable with time (age). Thus, to reflect this in the incentive system, less of the total compensation is granted in stock options.

In regressions (1) to (3) in Table IV the age group variables suggest that age has a diminishing effect on annual firm performance (regression (2) provides significance at the 1% and 5% level for *exec_under50* and *exec_50_65* respectively). This effect can also be verified by regression (5) where the *age* variable has a negative coefficient at the 10% significance level. However, regarding the results from regressions (1) to (5) in Table V imply that age has a negative effect on the fraction of options of total compensation received. Thus the entire effect of stock options on share price performance is actually diminishing with age. Hence the coefficient magnitude observed in regression (5) for the *age* variable (and the effect implied by the age groups in regressions (1) to (3)) is overstated as to which effect age has on share price performance in the context of incentives provided by stock options. In this context our results fail to find support for stock options having different incentive effect depending on executive age, since we cannot isolate the effect of age on its own.

The effect observed that the age has an increasingly diminishing effect on share price performance (as observed in regression (2) in Table IV is highly interesting, and could possibly also be linked to the findings of Ofek and Yermack (2000). The intuition behind it is somewhat unclear, but could be explained by the fact that the when controlling for two year options, we inevitably control for two years of option grants which for older executives are smaller as a fraction of total compensation for both years than for younger. Thus, the effect that having a smaller fraction of total compensation exposed to firm performance adds up when controlling for multiple years of stock option grants.

[31] For instance see Hall and Murphy (2002).

A.3 Endogeneity Issues

Although several of the coefficients in our regression results are observed with statistical significance the results are faced with major endogeneity problems. For instance there could be a simultaneity issue present in respect to the dependent variable annual share price return and the independent variable *log_bonus*. It can plausibly be argued either that the incentive system created through the bonus opportunity affect executives' behavior to act in order to create share price growth or that the share price development allows for the bonus to occur in the first place (Roberts and Whited (2011)). In our regression setting we assume the former to be the case since we assume that executives are wealth maximizes. However, should this setting be invalid (which it to some extent is given that bonuses kicks in at certain threshold points of the stock price development depending on the incentive agreement) the simultaneity bias will be difficult to sign since we cannot know the relative magnitude of the different effect a priori. Also, we have most likely excluded several explaining variables creating an omitted variable bias in our results (for example firm performance depend on executives' abilities which are difficult to quantify, much less observed). This could create a significant problem in case the variable(s) are correlated with any of the included variables as this would cause inference to break down (Roberts and Whited (2011). For example, omitted variables that potentially could affect the share price performance include firm geographical location, human capital and Herfindahl index levels[32] etc. In an effort to overcome some of these endogeneity problems we have run a fixed effect regression, clustering our standard errors on industry-level to capture any differences in omitted variables effecting firm performance across industries. This clustering could exacerbate measurement problems which can affect the magnitude of the coefficient (Roberts and Whited (2011)).

B. Event Study

B.1 Descriptive Results

The regression results from our event study can be observed in Table X and Table XI. Table X provides the regression results on cumulated abnormal return +/- 1, 3, 5 and 7 trading days for regression (1) to (4) respectively. The coefficient for the variable *log_options* in regression (1) is significant at the 10% level. When extending the event window this effect seem to disappear although our results are not significant at or below the 10% level. The regression (1) is performed on 8,958 options grant observations yielding an R^2 of 0.0012. We fail to find any interesting and meaningful significant results in regressions (2) to (4).

When performing the same regressions but on a dummy variable assuming the value of 1 if positive cumulative abnormal return occurs over the event window or zero otherwise, the level effect of the return is disregarded while still capturing the direction of any movement. The results for regressions (1) to (4)

[32] The Herfindahl Index provide an indication of the relative size of the company to its industry in which it operates.

can be viewed in Table XI. We find that regressions (1), (2) and (4) all have a positive and significant coefficient for the variable *log_options*. This implies that stock option grants have a positive effect on short-term share price development. Also, the results seem to be stronger if the executive is a CEO at the 5% significance level over the +/- 3 trading days window (regression (2)). The regressions (1) to (4) are performed on 8,961 observations yielding an R^2 0.0008 , 0.0021, 0.0019 and 0.0033 respectively.

B.2 Regression Analysis

The results from the regression in Table X imply that there seems to be a negligible short-term (immediate) effect on announcements of stock options grants. The coefficient for the variable *log_options* in regression (1) is significant at the 10% level. The magnitude of the coefficient suggest that the cumulative abnormal return of the event window increases with 0.09 percentage points for every USD 10,000 in stock option grants. The economic intuition supporting this observation the stock market reacts positively to the announcement since this could create incentives for executives to make decisions that positively affect share price development. Also, when the time frame for the event window is extended, this effect seem to disappear although our results are not significant at or below the 10% level. A possible explanation to why we do not find statistically significant results on the magnitude of the event could be due to the estimated cumulative abnormal return, where we used a market model assuming $\beta=1$ and $a=0$ for each i firm to estimate the normal return over the event window. This is a wrongful estimation, although it is significantly easier to perform.

The results from Table XI disregard any wrongfully estimated magnitudes of abnormal return, and thus disregards the effect from the possible estimation error[33]. They present evidence of the direction of any possible cumulative abnormal return, and regarding the observed coefficient the evidence suggests that the direction is positive around the grant event. This implies that the stock market reacts positively to the announcement, possibly presuming that this reflects an incentive for managers to produce better future returns to the company.

B.3 Endogeneity Issues

The endogeneity issues in this regression setting (event study as opposed to panel data study) are far less problematic as less factors are unobserved and other factors influencing the individual firm remain constant over the event windows, only the event occurs. However the event itself may be endogenous which would imply a biased estimation. For instance, (Bebchuk, Grinstein and Peyer (2010)) find that 11%

[33] From a statistical perspective we argue that

of stock option grants occur on "lucky" dates[34]. They also find that the share price increases after the event and decreases prior to the grant event. If this is the case in our data sample our results would be biased as to the effect of stock market reactions to stock option grant announcements.

C. Robustness Test

To verify the regression results we perform three sets robustness test. The results are presented in Table VI, Table XII and Table XIII.

To control for extreme values for firm performance we winsorize our annual stock return using a 98% winsorizing (i.e. setting the top 1% values equal to the 99th percentile and the bottom 1% to the 1st percentile). The results from our test are presented in Table VI. With regards to executive compensation we find that the *log_bonus* coefficient is still positive in regressions (1) to (6) and significant at the 1% level. Regression (1) presents a 17% drop in magnitude of the variable *log_bonus* and a 46% drop in magnitude of the *log_options* variable (on the 1% significance level). This suggests that the original regression is exposed to heavy estimation bias due to the extreme values observed in some companies. The same effects are observable in regressions (2) to (6) where two-year and three-year lagging options variables loose significance (the change of the magnitude is also material with a drop of for example 77% in regression (3)). A material and significant increase of the explanatory effect of the SOX dummy variable is also observed across all regressions. Thus this effect could be underestimated in our original regression settings in Table IV. The winsorizing also provides regression results that are more robust to extreme outliers in our data sample. However, the winsorized results can provide a better indication of a true regression estimation which is observed in the significant increase in the model fit, the R^2 for regressions (1) to (6) (the regressions yield R^2 0.0028, 0.0023, 0.0022, 0.0028, 0.0023 and 0.0022 respectively).

To further test for the robustness of our findings to the share price performance provided by compensation characteristics we stratify our sample into two groups of executives: those with less than median total compensation and those with more than the median for each year (for similar stratification examples, see for instance Aggrawal and Samwick (1999)). We then estimate the same regressions as in Table IV with the annual stock return as the dependent variable. The results of these regressions are presented in Table XII and Table XIII. The estimates for the variable *log_bonus* effect annual stock return is positive and significant at the 1% significance level across all regressions. However the magnitude of the coefficients seem to differ from our original coefficients in such ways that the sample of below median total compensation yields higher positive effect of bonus incentives while the sample of above median total compensation yields lower positive effect on annual stock return. The same but inverted observation can be made when regarding lagging one-year stock option variable – the negative coefficients are of

[34]Bebchuk, Grinstein and Peyer (2010) defines a grant as "lucky" if the grant was given on a date where the lowest share price of the month prevailed.

higher magnitude when we control for the sample of above median total compensation and lower in the other setting. This is in line with the findings of Core, Holthausen and Larcker (1999) that large CEO compensation levels reflect poor governance mechanisms, and companies with poor governance mechanisms perform worse. Note however that significance is lost, especially in the above median total compensation setting for this independent variable. When regarding two-year an three-year lagging options we observe the same coefficient magnitude effects as with the log_bonus variable, that below median total compensation has a more profound effect compared to our original regression setting. The same but opposite effect is observed for above median total compensation. Further support for our previous age effect on annual stock return is provided by the regression coefficients results under executive characteristics.

D. Discussion

The findings from the study present somewhat contradicting results, but the overall conclusion that can be made is still clear. Stock markets react positively to the announcements of stock option grants, indicating that investors regard stock options as a good mean for aligning principal-agent interest and a good corporate governance tool. Also, the business-wise decisions made by executives when they hold stock options are better in the longer term than decisions made in the absence of stock options. However, stock options seem to bring either a more cautious approach to project selection, or an even more aggressive/eager approach that either way initially destroys shareholder value. Based on this latter findings we cannot conclude that stock options provide work in the interest of shareholders since the aggregation of the effects result in an overall negative relationship between stock options and share price performance.

Also, our findings suggest that age per se might not impact the relationship between stock options and share price performance. Instead, we find that what differs with age between executives is the fraction of options as part of total compensation, where older executives exhibit a lower fraction and younger a higher. This implies that what might be an impacting factor in our regressions is the fraction of stock options rather than age. This suggests that as executives obtain less stock options, the performance of their firms decrease which is somewhat contradicting with our other regression results (that stock options have a negative impact on performance). However, this might be a consequence of that other compensation parameters (such as bonus as used in our regression setting) decrease in importance/declines asymptotically as the fraction shifts towards only including them, and might not actually reflect any impact of stock options (i.e. their relationship might not be linear with firm performance).

Following the findings of the paper we note in particular two interesting implications; Firstly as we show that share prices decline when the fraction of stock options of total compensation decline, and as the fraction declines with age, we also show that stock option plans have not been optimally constructed

during the sample period. Instead of following the observed "traditional" method of lowering stock options in relation to other compensation as the executive ages, we argue that the fraction should remain more constant over time (age). According to our results, this would create a scenario where shareholders could expect a better share price performance. Secondly, as other studies on the subject include age as an independent variable to capture effects between executives, what they actually measure is differences in the fraction of share price performance of total compensation. Therefore, studies should consider to include a variable for fraction of share price performance of total compensation to better explain their dependent variable.

VI. CONCLUSION

This paper examines the relationship between executives' stock option compensation and firm share price performance and how the suitability of stock options as incentive type varies between individuals. We employ executive age as a proxy for estimating differences between executives. We test the hypothesis that stock option-based compensation has a positive effect on share price performance both in the short- and long-term and that executive age has an impact (although we cannot hypothesize the direction) on this relationship. We study 1,060 U.S. companies from the S&P 500, S&P MidCap 400 and S&P SmallCap 600 over a 18 year period and perform a set of fixed effects OLS regressions with different compensation measures, different executive characteristics variables, firm characteristics variables and a set of control variables to test the hypothesis.

In contrast to our hypothesis, we find that there is a negative and statistically significant relationship between primarily calendar vested stock option compensation and share price performance the first fiscal year following the option grant. However, we also show that there is a small positive and statistically significant effect on share price performance the second fiscal year following the option grant, and that there is no support for executive stock options having an impact on share price performance the third fiscal year following their grant. The aggregate effect of these relationships is negative, suggesting that stock options fail to add shareholder value over the first two years following the option grant. We also find that the announcement of stock option grants have a positive effect on share price development around the announcement date. The effect is observable over a +/- 1, 3, and 7 trading day event window. This is in line with the findings of Bebchuk, Grinstein and Peyer (2010), although the magnitude of the effect cannot be statistically confirmed in our study.

Our study also shows that it is difficult to conclude that age has an effect on the relationship between stock option compensation and share price performance. Our results show that share price performance decreases when executive age increases. However, when we examine differences between executives using the employed age proxy, we find that the difference lies in the development of stock option compensation as a fraction of total compensation. Our results suggest that the fraction decreases as the executive

becomes older. This means that the isolated effect of age on the relationship between stock options and share price return cannot be determined, since the results do not reveal whether the observed decline is a consequence of a lower fraction stock options or an ageing executive. The results appear to be contradicting to our previous results (that share price decline when stock option compensation increases) however this could be explained by the effect of other compensation parameters changes when less and less of the compensation is paid in stock options. Thus, the interpretation of these results is that the effect observed when including an age proxy is attributable to the development of stock option compensation as fraction of total compensation rather than age per se.

Following these findings we argue that firms should implement compensation systems where stock option compensation as fraction of total compensation should remain constant as executives ages. This conclusion could align the incentive system with the agent-principal interest when regarding the findings Ofek and Yermack (2000) that generally stocks are sold immediately as the options are exercised. Our results suggest that this could have a positive impact on share price performance. In addition we also suggest that future studies should include a fraction stock option of total compensation as a independent variable in the regressions performed.

However, important to note is that the data is biased towards calendar vested stock options (as opposed to performance vested). This points out a limitation that our findings likely describe the effects of calendar vested stock options on share price performance rather than performance vested. Following this topic, a further drawback in the study is that we do not consider the vesting contracts for each option granted – thus, our results only provides guidelines to how stock options in general affect share price performance. It would therefore be interesting to perform a similar study but on the effects of options with different time (and performance) vesting requirements to better understand the effects of compensation design on annual stock return. Furthermore, there are several endogeneity issues to concern in our study. Should any of them prove to violate the OLS assumption of uncorrelated variables and error term, our regression results could be questioned.

It would be interesting to perform further studies to verify our results by looking at different time frames, companies and regression settings. Our results are limited to the companies we study and in order to generalize our conclusions it would be desirable to find support of our results.

This paper determines the causality effect(s) of executive compensation (and certain executive characteristics) on share price performance but does not explain why the effect(s) occurs. Future studies on the topic could therefore focus on more in-depth examination of the effects this study highlights. Such studies could be performed using similar regression but analyze the effect on income statement and cash flow metrics to understand how and where the value-affecting factors occurs. More qualitative studies could also be performed to analyze how the behavior of executives are affected by incentive systems and

how the behavior changes over time (to better understand what effect age has on the incentive system), for instance by case studies.

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APPENDIX A: Variable Calculations

The firm characteristics independent variables included in Table VII: Variable List are calculated using the following formulas where (*i*) denotes each individual firm at year (*t*):

$$Firm\ Size = log(Assets_{i,t}) \quad (2)$$

$$Tobin's\ Q = \frac{Market\ value\ of\ equity_{i,t} - Book\ value\ of\ total\ liabilities_{i,t}}{Book\ value\ of\ equity_{i,t} - Book\ value\ of\ total\ liabilities_{i,t}} \quad (3)$$

$$Debt\text{-}Equity\ ratio = \frac{Total Liabilities_{i,t}}{Book\ value\ of\ Equilty_{i,t}} \quad (4)$$

$$ROA = \frac{Net\ Income_{i,t}}{Total\ Assets_{i,t}} \quad (5)$$

$$ROE = \frac{Net\ Income_{i,t}}{Book\ value\ of\ Equity_{i,t}} \quad (6)$$

$$Level\ of\ acq. = log(acquisition\ value) \quad (7)$$

$$Dividends = log(dividends\ paid) \quad (8)$$

Table I
Data Description of Company and Executive Characteristics

The table provides summary statistics of the sample properties in total and divided by S&P index list following company constituency. The data spans the period 1992-2010 and includes 1,060 companies from the S&P 500, S&P MidCap 400 and S&P SmallCap 600 (companies with compatible data to fit our study from Compustat's ExecuComp database) covering 61 different industries with a total of 43,188 executive-year observations. Panel B includes statistics of the 14,428 executive-year observations and the characteristics of the executives. The data in Panel A is measured by book value at the end of each fiscal year. *Years in data sample* is the number of years for which each company is included in the data sample. *Tobin's Q* is calculated using market capitalization and book value from each corresponding date of the fiscal year-end.

Panel A: Company descriptive statistics					
Variable		S&P 500	S&P 400 MidCap	S&P 600 SmallCap	Total
Number of firms		358	297	405	1,060
No. industries covered		61	57	56	61
Size	Mean	35,551	3,490	1,198	15,291
(total assets, $'000)	Median	8,316	1,920	633	2,080
	Min	108	27	47	27
	Max	2,264,909	47,563	28,499	2,264,909
Tobin's Q	Mean	2.14	1.89	1.69	1.92
	Median	1.61	1.48	1.36	1.48
	Min	0.57	0.49	0.40	0.40
	Max	78.56	37.77	14.84	78.56
	St. Dev	1.82	1.50	1.07	1.52
Debt-Equity ratio	Mean	2.85	2.42	3.25	2.87
	Median	1.39	1.24	0.87	1.16
	Min	0	0	0	0
	Max	595.97	357.19	4,564.58	4,564.58
	St. Dev	11.60	10.04	84.78	50.02
Years in data sample	Mean	12.19	9.58	7.06	9.46
	Median	15	10	5	10
	Max	17	17	17	17
Number of observations		16,935	11,733	14,520	43,188

Panel B: Executive characteristics					
Variable		S&P 500	S&P 400 MidCap	S&P 600 SmallCap	Total
Gender	Male	6,137	3,796	4,235	14,168
	Female	105	49	106	260
Age	Mean	54	53	53	56
	Median	54	53	53	56
	Min	30	28	28	30
	Max	90	95	94	94
CEO Tenure	Mean	7	8	9	7
	Median	5	6	6	5
	Max	46	46	59	59
No. shares owned	Mean	6,589	1,976	1,143	3,374
	Min	1,225	663	470	720
	Max	1,270,096	52,027	38,743	1,270,096
	St. Dev.	53,634	4,583	2,724	32,796
Number of observations		6,242	3,845	4,341	14,428

Table II
Executive Compensation Descriptive Statistics

The table provides descriptive statistics over executive compensation data for the 43,188 executive-year observations included in the panel data sample from Compustat's ExecuComp database for the period 1992-2010. All figures are presented in USD'000 unless otherwise specified. Summary statistics of the compensation data is provided in total and for CEOs and Directors respectively, divided to S&P index list depending on list constituency. *Number of observations* indicates each executive-year observation included in the sample.

		CEO			Directors			
Variable ($ 000)		S&P 500	S&P 400	S&P 600	S&P 500	S&P 400	S&P 600	Total
Salary	Mean	905	662	541	550	393	306	524
	Median	900	650	508	500	356	281	440
	Max	8,100	3,456	5,250	8,100	2,036	1,500	8,100
	St. Dev	480	265	230	337	185	136	348
Cash Bonus	Mean	963	442	268	402	193	90	361
	Median	399	138	0	13	0	0	7
	Max	76,951	30,402	16,501	33,000	20,500	10,662	76,951
	St. Dev	2,326	1,145	702	1,213	668	268	1,220
Stock Options	Mean	3,575	1,296	574	1,201	415	165	1,102
	Median	1,597	547	192	455	150	45	219
	Max	600,347	244,539	18,597	152,308	114,654	7,600	600,347
	St. Dev	11,392	5,121	1,138	3,948	1,645	355	5,178
	Grant events	4,854	2,625	2,727	8,057	5,133	6,055	29,451
Number of observations		6,242	3,845	4,341	10,690	7,890	10,180	43,188

Table III

Descriptive Statistics Over Grant Date Data: Compensation, Executive and Firm Characteristics

The table provides descriptive statistics over executive compensation data for 8,963 executive stock option grant events from the period 2006-2010 for 1,060 firms from the S&P 500, S&P MidCap 400 and S&P SmallCap 600 indices (Panel A). Panel B provides summary statistics over executive characteristics for 8,430 male and 533 female executives from the data sample. Panel C provides firm characteristics for the companies granting the stock option. *Assets* and *Tobin's Q* variables are based on book value (market value for market capitalization) for fiscal year end for the grant year.

Panel A: Compensation characteristics

		CEO			Directors			
Variable ($ 000)		S&P 500	S&P 400	S&P 600	S&P 500	S&P 400	S&P 600	Total
Number of observations		889	547	711	2,870	1,685	2,261	8,963
Stock options	Mean	7,745	3,640	1,924	6,984	3,377	1,593	4,416
($ '000)	Median	4,426	2,361	1,200	4,127	2,105	963	2,000
	Max	169,001	52,177	30,400	177,478	68,352	18,387	177,478

Panel B: Executive descriptive statistics

Variable		S&P 500	S&P 400 MidCap	S&P 600 SmallCap	Total
Age	Mean	52	52	51	52
	Median	52	51	51	52
	Min	31	33	27	27
	Max	90	91	85	91
Gender	Male	3,538	2,095	2,797	8,430
	Female	221	137	175	533

Panel C: Firm descriptive statistics

Variable		S&P 500	S&P 400 MidCap	S&P 600 SmallCap	Total
Assets	Mean	56,588	4,275	1,404	25,262
($ '000)	Median	11,603	2,415	729	2,830
	Min	78	136	49	49
	Max	2,264,909	47,563	34,542	2,264,909
Tobin's Q	Mean	1.90	1.71	1.62	1.76
	Median	1.49	1.40	1.34	1.41
	Min	0.57	0.52	0.42	0.42
	Max	15.51	9.76	15.40	15.51
	St. Dev	1.25	0.99	0.94	1.10

Table IV

Executive Compensation, Age and Annual Stock Return

The table provides regression results where the dependent variable is annual stock return in %, calculated using the CRSP database for daily company stock performance for the period 1992-2010. The sample in regression (1) to (6) consists of compensation data from Compustat's ExecuComp on 1,060 companies from the S&P 500, S&P MidCap 400 and S&P SmallCap 600 for the period 1992-2010, and data on company fundamentals from Compustat for the corresponding companies and years. The independent variables are described in Table VII. We report coefficients and standard errors (in parentheses) of OLS fixed effects regressions with year dummies and where errors are clustered at industry level (using a two-digit SIC-code level). *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Annual Stock Return					
Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Compensation characteristics						
log_bonus	0.012***	0.014***	0.008***	0.012***	0.015***	0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
lagging_options	-0.011***	-0.016**	-0.016**	-0.011***	-0.015**	-0.016**
	(0.006)	(0.020)	(0.021)	(0.006)	(0.021)	(0.022)
2_year_laggging_opt		0.007*	0.005		0.007	0.004
		(0.094)	(0.255)		(0.096)	(0.263)
3_year_lagging_opt			0.005			0.005*
			(0.106)			(0.098)
SOX dummy	0.291***	-0.004	-0.207**	0.288***	-0.010	-0.024
	(0.001)	(0.942)	(0.014)	(0.001)	(0.861)	(0.792)
Executive characteristics						
Age				-0.001*	-0.001	-0.001
				(0.171)	(0.099)	(0.375)
Under 50 years	0.035**	0.047***	0.035			
	(0.018)	(0.008)	(0.107)			
50-65 years	0.028**	0.028**	0.021			
	(0.026)	(0.039)	(0.102)			
Over 65 years	(omitted)	(omitted)	(omitted)			
CEO flag	0.034**	0.008	0.019	0.033**	0.007	0.019
	(0.034)	(0.542)	(0.227)	(0.043)	(0.593)	(0.231)
CEO tenure	-0.005**	-0.003	-0.003	-0.005**	-0.003	-0.003
(flagged)	(0.036)	(0.165)	(0.170)	(0.043)	(0.175)	(0.165)
CEO tenure^2	0.000	0.000	0.000	0.000	0.000	0.000
(flagged)	(0.133)	(0.337)	(0.285)	(0.163)	(0.363)	(0.288)
log(restricted stocks)	0.006**	0.009**	0.006**	0.006**	0.009**	0.006**
	(0.047)	(0.016)	(0.039)	(0.047)	(0.015)	(0.037)
Firm characterisitcs						
Tobins Q	0.049***	0.055***	0.053***	0.054***	0.060***	0.058***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
ROE				-0.001*	-0.001	-0.001***
				0.037	0.059	0.000
Debt-to-Equity	0.000***	0.000***	0.000***			
	(0.000)	(0.000)	(0.000)			
ROA	0.261***	0.210*	0.170			
	(0.001)	(0.087)	(0.154)			
Firm size	0.016	0.021	0.012	0.014	0.019	0.012
	(0.184)	(0.211)	(0.265)	(0.234)	(0.249)	(0.279)
log(acquisitions)	-0.012***	-0.013***	-0.010***	-0.012***	-0.013***	-0.010***
	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)	(0.002)
log(dividends)	-0.032***	-0.036***	-0.025***	-0.030***	-0.035***	-0.025***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
_cons	-0.032	-0.036***	-0.025	-0.030	-0.035	-0.025***
	(0.235)	(0.000)	(0.151)	(0.603)	(0.002)	(0.592)
Observations	41,302	30,712	22,221	41,302	30,712	22,221
R^2	0.082	0.074	0.081	0.081	0.073	0.081
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Table V

Stock Options as Fraction of Total Compensation and Age

The table provides regression results where the dependent variable is stock options as fraction of total compensation in % calculated using the ExecuComp database for executive compensation for the years 1992-2010. The independent variables are described in Table VII. The regressions (1) to (5) consists all of data from ExecuComp on 1,060 companies from the S&P 500, S&P MidCap 400 and S&P SmallCap 600 indices. We report coefficients and standard errors (in parentheses) of OLS fixed effects regressions with year dummies and where errors are clustered at industry level (using a two-digit SIC-code level). *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Stock Options as % of Total Compensation				
Dependent Variable	(1)	(2)	(3)	(4)	(5)
Age	-0.003***	-0.003***	-0.004***	-0.003***	-0.003***
	(0.004)	(0.004)	(0.000)	(0.001)	(0.001)
Gender		-0.053*	-0.039	-0.039	-0.039
		(0.056)	(0.163)	(0.160)	(0.161)
CEO flag			0.089***	0.114***	0.108***
			(0.000)	(0.000)	(0.000)
CEO Tenure				-0.004***	-0.002
(flagged)				(0.000)	(0.153)
CEO tenure^2					0.000
(flagged)					(0.175)
New economy	0.062**	0.063**	0.058**	0.059**	0.059**
	(0.036)	(0.034)	(0.048)	(0.045)	(0.046)
Observations	43,088	43,088	43,088	43,088	43,088
R^2	0.001	0.001	0.003	0.003	0.003
Year dummies	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes

Table VI

Executive Compensation, Age and Winsorized Annual Stock Return

The table provides fixed effects regression results of executive compensation characteristics, executive characteristics and firm characteristics, using annual stock return (in %) as the dependent variable. In regression (1) to (6), annual stock return has been winsorized at the 1%-level. We report coefficients and standard errors (in parentheses) of OLS fixed effects regressions with year dummies and where errors are clustered at industry level (using a two-digit SIC-code level). *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Winsorized Annual Stock Return at the 98% level					
Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Compensation characteristics						
log_bonus	0.010***	0.011***	0.009***	0.010***	0.011***	0.010***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
lagging_options	-0.006***	-0.007***	-0.007***	-0.006***	-0.007***	-0.007***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
2_year_laggging_opt		0.002	0.001		0.001	0.001
		(0.354)	(0.605)		(0.390)	(0.644)
3_year_lagging_opt			0.001			0.001
			(0.477)			(0.443)
SOX dummy	0.410***	0.248***	-0.035	0.407***	0.247***	-0.034
	(0.000)	(0.000)	(0.687)	(0.000)	(0.000)	(0.695)
Executive characteristics						
Age				0.000	0.000	0.000
				(0.404)	(0.155)	(0.345)
Under 50 years	(omitted)	(omitted)	0.015			
			(0.211)			
50-65 years	-0.006	-0.009***	0.003			
	(0.130)	(0.049)	(0.761)			
Over 65 years	-0.011	-0.017*	(omitted)			
	(0.219)	0.087				
CEO flag	0.013*	0.007	0.009	0.012*	0.006	0.009
	(0.055)	(0.373)	(0.224)	(0.094)	(0.432)	(0.235)
CEO tenure	-(0.002)	-0.001	-0.001	-0.002	-0.001	-0.002
(flagged)	(0.172)	(0.210)	(0.236)	(0.175)	(0.182)	(0.181)
CEO tenure^2	0.000	0.000	0.000	0.000	0.000	0.000
(flagged)	(0.484)	(0.419)	(0.427)	(0.438)	(0.326)	(0.323)
log(restricted stocks)	0.004***	0.005***	0.004***	0.005***	0.005***	0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm characterisitcs						
Tobins Q	0.038***	0.040***	0.039***	0.042***	0.043***	0.045***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROE				-0.001**	-0.001**	-0.001***
				0.019	0.026	0.000
Debt-to-Equity	0.000***	0.000***	0.000***			
	(0.000)	(0.000)	(0.000)			
ROA	0.231***	0.170***	0.214***			
	(0.000)	(0.000)	(0.000)			
Firm size	0.007*	0.011**	0.007	0.005	0.010*	0.006
	(0.059)	(0.044)	(0.110)	(0.175)	(0.085)	(0.167)
log(acquisitions)	-0.009***	-0.009***	-0.008***	-0.008***	-0.009***	-0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log(dividends)	-0.021***	-0.023***	-0.020***	-0.019***	-0.022***	-0.019***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
_cons	-0.187***	-0.253***	-0.040	-0.169***	-0.228***	-0.011
	(0.000)	(0.000)	(0.636)	(0.000)	(0.000)	(0.901)
Observations	41,303	30,713	22,221	41,303	30,713	22,221
R^2	0.280	0.234	0.224	0.276	0.233	0.223
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Table VII
Variable List

Variable	Definition
log_bonus	Logaritm of the variable BONUS from Compustat's ExecuComp
log_options	Logaritm of the variable OPTION_AWARDS_BLK_VALUE Compustat's ExecuComp
log_cash_comp	Logaritm of the sum of variables BONUS and SALARY from Compustat's ExecuComp
log_div	Logaritm of the variable the variable DV from Compustat's Funtamentals Annual database
ownership	Logaritm of the value of shares owned in the company as obtained from the variable SHROWN_TOT (Execucomp)
lagging_options	1 year lagging logaritm of the variable OPTION_AWARDS_BLK_VALUE Compustat's ExecuComp
yr2_lag_opt	2 year lagging logaritm of the variable OPTION_AWARDS_BLK_VALUE Compustat's ExecuComp
yr3_lag_opt	3 year lagging logaritm of the variable OPTION_AWARDS_BLK_VALUE Compustat's ExecuComp
fraction_opt	Fraction options of total compensation calculated as OPTION_AWARDS_BLK_VALUE / (tdc1) from Compustat's ExecuComp
age	Age of the executive for the year observed
exec_under50	Dummy variable equal to one for executives below 50 years of age, zero otherwise
exec_50_65	Dummy variable equal to one for executives between 50 and 65 years of age, zero otherwise
exec_over65	Dummy variable equal to one for executives over 65 years of age, zero otherwise
gender	Dummy variable equal to one if the executive is female, zero otherwise
SOX_dummy	Dummy variable equal to one for options granted after 2002, zero otherwise
ceo_flag	Dummy variable equal to one if the Executive is CEO for the year studied, zero otherwise
ceo_tenure	Number of years a CEO held its position, multiplied by the ceo_flag dummy variable
ceo_tenure_sqr	Square of number of years a CEO held its position, multiplied by the ceo_flag dummy variable
tobins_q	Book value of liabilities plug book value of equity divided by the book value of assets. Variables invluded are AT, LT and MKTVAL from Compustat.
debt_equity	Debt-to-Equity ratio calculated using LT/(AT-LT) from Compustat
firm_size	Logaritm of the book value of assets as obtained from the AT variable from Compustat
log_aqc	Logatirm of the dollar value of acquisitions
roe	Net income divided by the book value of equity
roa	Net income divided by the book value of assets
mkvalt	Market value of the company at the end date for the fiscal year (balance sheet date)
new_economy	Dummy variable equal to one for firms with SIC-codes as defined by Murphy (2003)
return	Annual share price performance calculated as the development in % from the first trading day of each year to the last trading day of the same year
CAR	Cumulative Abnormal Return (in %) calculated using an estimated market model whith the assumption $\beta=1$ and $\alpha=0$. The CRSP value-weighted index has been used as the index proxy
dCAR	Dummy variable for the direction of the CAR, equal to one of possitive and zero otherwise

Table VIII
Development of Bonus Compensation Over Time

The table provides descriptive statistics over stock option compensation per year, both in dollar terms and in fraction of total compensation. The data is obtained from the ExecuComp database for the period 1992-2010.

	Fraction Option of Total Compensation			Value of Option Grants (USD'000)		
Year	Min	Median	Max	Min	Median	Max
1992	0%	14.59%	89.14%	0	52	5,599
1993	0%	18.00%	96.47%	0	114	30,022
1994	0%	25.02%	100.00%	0	156	31,081
1995	0%	20.84%	100.00%	0	142	41,575
1996	0%	25.08%	100.00%	0	186	193,532
1997	0%	30.72%	100.00%	0	301	130,354
1998	0%	36.36%	100.00%	0	375	152,308
1999	0%	42.70%	100.00%	0	429	201,356
2000	0%	42.55%	100.00%	0	537	600,347
2001	0%	49.29%	100.00%	0	675	140,341
2002	0%	45.08%	100.00%	0	571	89,445
2003	0%	35.73%	100.00%	0	396	35,980
2004	0%	35.57%	100.00%	0	455	119,459
2005	0%	30.75%	100.00%	0	337	55,825
2006	0%	28.80%	100.00%	0	208	39,359
2007	0%	30.35%	100.00%	0	167	71,373
2008	0%	28.85%	100.00%	0	150	78,421
2009	0%	23.98%	100.00%	0	116	61,947
2010	0%	22.51%	100.00%	0	118	28,620

Table IX
Cash Bonus Compensation and Age

The table provides regression results where the dependent variable is the logarithm of cash bonus compensation calculated using the ExecuComp database for executive compensation for the period 1992-2010. The sample in regression (1) to (5) consists of data from ExecuComp on 1,060 companies from the S&P 500, S&P MidCap 400 and S&P SmallCap 600 indices. We report coefficients and standard errors (in parentheses) of OLS fixed effects regressions with year dummies and where errors are clustered at industry level (using a two-digit SIC-code level). *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	log(bonus)				
Dependent Variable	(1)	(2)	(3)	(4)	(5)
Age	0.030***	0.029***	0.017***	0.018***	0.018***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Gender		-0.731***	-0.572***	-0.572***	-0.575***
		(0.000)	(0.000)	(0.000)	(0.000)
CEO flag			0.999***	1.050***	1.173***
			(0.000)	(0.000)	(0.000)
CEO Tenure (flagged)				-0.007	-0.041**
				(0.324)	(0.011)
CEO tenure^2 (flagged)					0.001***
					(0.003)
New economy	-0.090	-0.088	-0.143	-0.139	-0.131
	(0.541)	(0.568)	(0.365)	(0.376)	(0.405)
Observations	43,188	43,188	43,188	43,188	43,188
R^2	0.007	0.009	0.033	0.033	0.034
Year dummies	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes

Table X
Cumulative Abnormal Return

The table provides regression results where the dependent variable is the Cumulative Abnormal Return (CAR) calculated using the CRSP database for daily stock returns for the period 2006-2010. The sample in regression (1) to (4) consists of compensation and CEO data from ExecuComp on 8,963 executive grant events from the S&P 500, S&P MidCap 400 and S&P SmallCap 600 indices. Regression (1) to (4) are constructed with the event windows action date +/- 1 trading day, +/- 3 trading days, +/- 5 trading days, and +/-7 trading days respectively. We report coefficients and standard errors (in parentheses) of OLS fixed effects regressions with year dummies and where errors are clustered at industry level (using a two-digit SIC-code level). *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Cumulative Abnormal Return (CAR)			
Dependent Variable	(1)	(2)	(3)	(4)
log(Options)	0.001*	-0.001	-0.001	0.001
	(0.060)	(0.675)	(0.576)	(0.536)
Ownership (USD'000)	0.000	0.002	0.003*	0.003
	(0.256)	(0.183)	(0.095)	(0.105)
Firm size	0.000	0.001	0.000	-0.002
	(0.221)	(0.644)	(0.947)	(0.471)
Age	0.000	0.000*	0.000	0.000*
	(0.204)	(0.096)	(0.200)	(0.090)
Gender	0.000	-0.002	0.002	-0.002
	(0.833)	(0.603)	(0.556)	(0.735)
CEO flag	0.002	0.005	0.004	-0.001
	(0.308)	(0.493)	(0.623)	(0.953)
_cons	0.001	0.009	0.013	0.038
	(0.878)	(0.700)	(0.584)	(0.229)
Observations	8,958	8,953	8,951	8,951
R^2	0.001	0.003	0.003	0.002
Year dummies	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes

Table XI
Direction of Cumulative Abnormal Return

The table provides regression results where the dependent variable is a dummy variable for the direction of the Cumulative Abnormal Return (CAR) calculated using the CRSP database for daily stock returns for the period 2006-2010. The sample in regression (1) to (4) consists of compensation and CEO data from ExecuComp on 8,963 executive grant events from the S&P 500, S&P MidCap 400 and S&P SmallCap 600 indices. Regression (1) to (4) are constructed with the event windows action date +/- 1 trading day, +/- 3 trading days, +/- 5 trading days, and +/-7 trading days respectively. We report coefficients and standard errors (in parentheses) of OLS fixed effects regressions with year dummies and where errors are clustered at industry level (using a two-digit SIC-code level). *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Sign of Cumulative Abnormal Return (CAR)			
Dependent Variable	(1)	(2)	(3)	(4)
log(Options)	0.006**	0.009**	0.007	0.007*
	(0.042)	(0.037)	(0.119)	(0.091)
Ownership (USD'000)	-0.001	-0.001	0.001	0.001
	(0.863)	(0.828)	(0.842)	(0.719)
Firm size	-0.004	-0.006	-0.005	-0.007
	(0.301)	(0.174)	(0.375)	(0.113)
Age	0.000	0.000	0.000	-0.001
	(0.949)	(0.657)	(0.821)	(0.313)
Gender	-0.009	-0.030	0.001	-0.023
	(0.644)	(0.175)	(0.975)	(0.312)
CEO flag	-0.001	0.029**	0.003	0.014
	(0.973)	(0.020)	(0.878)	(0.284)
_cons	0.459***	0.502***	0.505***	0.551***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	8,961	8,961	8,961	8,961
R^2	0.001	0.002	0.002	0.003
Year dummies	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes

Table XII
Executive Compensation, Age and Annual Stock Return Stratified by Total Compensation (Low)

The table provides regression results where the dependent variable is the annual stock return in %, calculated using the CRSP database for daily company stock performance for the period 1992-2010. The sample included in the regression has been stratified at the median of total compensation, and includes all below-median observations. The sample in regression (1) to (6) consists of all observations with a total compensation less than the total compensation median for the sample used in Table IV. We report coefficients and standard errors (in parentheses) of OLS fixed effects regressions with year dummies and where errors are clustered at industry level (using a two-digit SIC-code level). *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Annual Stock Return					
Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Compensation characteristics						
log_bonus	0.013***	0.018***	0.008**	0.014***	0.020***	0.010***
	(0.006)	(0.009)	(0.019)	(0.002)	(0.004)	(0.004)
lagging_options	-0.009***	-0.012***	-0.018***	-0.009***	-0.012***	-0.018***
	(0.002)	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)
2_year_laggging_opt		0.007**	0.006*		0.007**	0.006
		(0.040)	(0.228)		(0.047)	(0.255)
3_year_lagging_opt			0.008*			0.008*
			(0.067)			(0.064)
SOX dummy	-0.046***	0.219***	-0.074	-0.060	0.215***	-0.090**
	(0.314)	(0.004)	(0.074)	(0.210)	(0.004)	(0.036)
Executive characteristics						
Age				-0.001	0.000	0.000
				(0.562)	(0.659)	(0.973)
Under 50 years	(omitted)	0.019***	(omitted)			
		(0.428)				
50-65 years	-0.001	0.004***	0.004			
	(0.945)	(0.806)	(0.790)			
Over 65 years	-0.017	(omitted)	-0.006			
	(0.469)		(0.752)			
CEO flag	0.096**	0.041*	0.048	0.093*	0.037	0.045
	(0.041)	(0.094)	(0.102)	(0.051)	(0.129)	(0.120)
CEO tenure	-0.013**	-0.006**	-0.007**	-0.013**	-0.006**	-0.007**
(flagged)	(0.016)	(0.042)	(0.030)	(0.015)	(0.035)	(0.029)
CEO tenure^2	0.000**	0.000*	0.000*	0.000**	0.000*	0.000*
(flagged)	(0.032)	(0.088)	(0.056)	(0.031)	(0.067)	(0.052)
log(restricted stocks)	0.002	0.008*	0.004***	0.002***	0.008*	0.004
	(0.616)	(0.071)	(0.141)	(0.644)	(0.073)	(0.165)
Firm characterisitcs						
Tobins Q	0.067***	0.069***	0.049***	0.076***	0.078***	0.061***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
ROE				-0.001***	-0.001**	-0.001***
				(0.006)	(0.020)	(0.000)
Debt-to-Equity	0.000***	0.000***	0.000***			
	(0.000)	(0.000)	(0.000)			
ROA	0.352***	0.369*	0.423***			
	(0.006)	(0.057)	(0.001)			
Firm size	0.018	0.019	0.020	0.017	0.016	0.019
	(0.234)	(0.401)	(0.231)	(0.279)	(0.472)	(0.262)
log(acquisitions)	-0.017***	-0.021***	-0.016***	-0.017***	-0.020***	-0.015***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
log(dividends)	-0.048***	-0.055***	-0.044***	-0.045***	-0.053***	-0.041***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
_cons	-0.274***	-0.367***	-0.022	-0.237**	-0.323**	0.004
	(0.006)	(0.007)	(0.860)	(0.020)	(0.014)	(0.979)
Observations	20,140	14,046	9,292	20,140	14,046	9,292
R^2	0.076	0.080	0.123	0.074	0.078	0.120
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Table XIII
Executive Compensation, Age and Annual Stock Return Stratified by Total Compensation (High)

The table provides regression results where the dependent variable is the annual stock return in %, calculated using the CRSP database for daily company stock performance for the period 1992-2010. The sample included in the regression has been stratified at the median of total compensation, and includes all above-median observations. The sample in regression (1) to (6) consists of all observations with a total compensation larger than the total compensation median for the sample used in Table IV. We report coefficients and standard errors (in parentheses) of OLS fixed effects regressions with year dummies and where errors are clustered at industry level (using a two-digit SIC-code level). *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Annual Stock Return					
Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Compensation characteristics						
log_bonus	0.008***	0.010***	0.008***	0.009***	0.010***	0.008***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
lagging_options	-0.014*	-0.019*	-0.016	-0.014*	-0.019*	-0.016
	(0.069)	(0.097)	(0.157)	(0.070)	(0.097)	(0.162)
2_year_laggging_opt		0.005	0.003		0.005	0.003
		(0.337)	(0.489)		(0.327)	(0.475)
3_year_lagging_opt			0.002*			0.002
			(0.493)			(0.477)
SOX dummy	0.463***	-0.004	0.313***	0.468***	0.003	0.320***
	(0.001)	(0.968)	(0.000)	(0.001)	(0.973)	(0.000)
Executive characteristics						
Age				-0.001	-0.001**	-0.001
				(0.152)	(0.048)	(0.289)
Under 50 years	0.049**	0.062**	0.061*			
	(0.020)	(0.011)	(0.086)			
50-65 years	0.038**	0.044**	0.029			
	(0.035)	(0.030)	(0.121)			
Over 65 years	(omitted)	(omitted)	(omitted)			
CEO flag	0.009	-0.003	0.006	0.008	-0.003	0.005
	(0.479)	(0.862)	(0.696)	(0.535)	(0.828)	(0.775)
CEO tenure	-0.001	0.000	-0.001	0.000	0.000	0.000
(flagged)	(0.741)	(0.935)	(0.810)	(0.831)	(0.964)	(0.849)
CEO tenure^2	0.000	0.000	0.000	0.000	0.000	0.000
(flagged)	(0.524)	(0.494)	(0.847)	(0.339)	(0.267)	(0.730)
log(restricted stocks)	0.008**	0.009**	0.007*	0.008**	0.009*	0.007*
	(0.038)	(0.050)	(0.074)	(0.036)	(0.050)	(0.069)
Firm characterisitcs						
Tobins Q	0.042***	0.052***	0.059***	0.045***	0.052***	0.058***
	(0.001)	(0.009)	(0.009)	(0.001)	(0.003)	(0.002)
ROE				0.000	0.000	0.002
				(0.917)	(0.694)	(0.598)
Debt-to-Equity	0.000**	(0.000)	0.000*			
	(0.044)	(0.025)	(0.062)			
ROA	0.149**	-0.019	-0.078			
	(0.047)	(0.909)	(0.736)			
Firm size	0.017	0.020	0.006	0.015	0.021	0.006
	(0.290)	(0.328)	(0.702)	(0.335)	(0.314)	(0.679)
log(acquisitions)	-0.010***	-0.010***	-0.008**	-0.010***	-0.010***	-0.008**
	(0.001)	(0.006)	(0.018)	(0.001)	(0.005)	(0.016)
log(dividends)	-0.023**	-0.024*	-0.015	-0.022**	-0.025**	-0.016*
	(0.017)	(0.052)	(0.139)	(0.023)	(0.041)	(0.082)
_cons	-0.297*	-0.367**	-0.136*	-0.213	-0.269	-0.035
	(0.086)	(0.025)	(0.097)	(0.250)	(0.128)	(0.768)
Observations	21,163	16,667	12,929	21,163	16,667	12,929
R^2	0.098	0.074	0.070	0.098	0.074	0.070
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes