

Executive compensation structure and company performance

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Premaster Finance, Tilburg University, Bachelor thesis, final version received May 2012

Abstract

An examination of the executive compensation structure of 1397 different U.S. companies between 1999-2006 provides evidence supporting incentive compensation. In this paper I find evidence that the level of total compensation positively effects the performance of a company, as measured by Tobin's Q. Further this research shows that firm performance is positively related to the percentage of compensation of CEOs that is equity-based. I found a much stronger relationship between equity-based compensation and company performance, than total compensation and company performance. This implies that structure rather than the level tends to have a greater impact on the performance of a company.

Table of contents

1. Introduction	3
2. Theoretical framework: compensation structure and firm performance	
2.1. Terminology	5
2.2. Relevant theory from other papers	6
2.2.1 Tournament theory	6
2.2.2. Agency theory	7
2.3. Disadvantages of equity-based payments	9
2.4. Restrictions	9
3. Methodology and sources of data	
3.1. Hypotheses.	11
3.2. Data sources and time.....	13
3.3. Explanation dependant variable: company performance	13
3.4. Explanation independent variable: compensation structure	14
3.5. Explanation control variables	15
4. Empirical results	
4.1. Results hypothesis 1	17
4.2. Results hypothesis 2	18
5. Conclusions	18
Appendix A. Calculation of Tobin's Q and ROA	22
Appendix B. Option valuation and the Black-Scholes formula	23
References	24

1. Introduction

The level and structure of compensation for Chief Executive Officers (CEOs) is an important issue nowadays. It is in the best interest of a company that its executives perform well. Substantial research has focused on the level of compensation and the observed association with company performance. Research on top management compensation has been done for more than 70 years and has accumulated towards a total of more than 300 studies in 1998 (reviews by Gomez-Mejia [1994] and Gomez-Mejia and Wiseman [1997]). The emphasis on this association between compensation and company performance arises from two theories:

- the tournament theory (Lazear & Rosen, 1981)
- the agency theory (Jensen & Meckling, 1976)

Lazear and Rosen (1981) state in their tournament theory that employees are driven by the chance of a possible promotion to get an increase in salary. Top executives often receive very high salaries, which are used to motivate lower-level-executives to compete for promotions. The tournament theory also states that individuals are more motivated if there is a possible chance of promotion. Since CEOs have already reached the highest level in the organization they have to be compensated with extra incentives. Different components of compensation can make the total compensation of managers much larger than their fixed wage. According to Magill and Quinzii (2005) the reason for a more incentive-based executive compensation system is that it has to align the incentives of executives with the interests of their companies' shareholders.

Jensen & Meckling (1976) state in their agency theory that there exists a separation of ownership and control when CEOs run a company on behalf of the shareholders. Because shareholders do not have all the information that managers have it is hard for the shareholders to monitor the actions taken by the managers of the firm. If compensation is more equity-based instead of a fixed salary, actions taken by the CEO will be based more on increasing firm value (Fama & Jensen, 1983). In line with this theory Jensen and Murphy (1990) suggest that in addition to the level of compensation, the form of compensation gives CEOs the correct incentives to maximize the value of a firm. They propose that companies whose executive compensation is more equity-based perform better than companies who favour compensation in cash. A later study by Mehran (1994) presents empirical evidence on the relationship between the structure of compensation and firm performance.

However there are also down side effects involved with stock ownership and performance-based compensation, for example accounting manipulation. These disadvantages negatively influence the use of executive compensation when trying to reduce the agency problem. Furthermore researchers using different data sets, measurements of variables, statistical techniques and model specifications have often found weak or even statistically insignificant relationships between pay and performance (e.g., Jensen & Murphy, 1990; Kerr & Bettis, 1987). With this thesis, I hope to create a better insight in top executive compensation. My main question therefore is: does executive compensation affect company performance.

The collected dataset is ranged for 1999-2006. I collect the most actual record of data items excluding the financial crisis. It is possible that the crisis gives a biased representation of company performance in normal years. The research is constructed only for the CEOs of the selected companies. Reason for this action is that there only is a limited amount of time for my research.

In my research I use Tobin's Q and the return on assets (ROA) for *company performance*. To calculate *compensation structure* I need to calculate the total compensation for a CEO and the amount of compensation that is equity-based.

My findings on company performance, as proxied by Tobin's Q and by return on assets are as follows: (1) the amount of total compensation a CEO receives is positively related to company performance; and (2) the amount of equity-based compensation a CEO receives is positively related to company performance. My findings are that both the level and structure of executive compensation have a positive and significant relationship with company performance. However I did not find any economic significance for total compensation regarding company performance since the beta is close to zero. Whereas EBC compensation does show economic significance in relation to company performance with a beta of 0.5894.

Section 2 will cover a literature review of research that already has been done on this subject. What were the most important findings on the relationship between executive compensation and firm performance, and how will it support my own research. The sample selection procedure and methods are described in chapter 3. Section 4 shows the empirical results of my study and how they must be interpreted.

Conclusively section 5 summarizes the most important findings of my research.

2. Theoretical framework: compensation structure and firm performance

In this chapter I start with a short introduction of the most important terms which are used in my research. Afterwards relevant theories from other papers are discussed which are important for my own research.

2.1. Terminology

Executive compensation

Executive compensation is a governance mechanism that seeks to align the interests of CEOs with shareholders through salaries, bonuses and long-term incentives such as stocks and options. One important concept is Equity-based compensation (EBC). This is the idea of an employer compensating his employees with equity-based incentives. The most common form is stock options, yet additional methods such as restricted stock, phantom stock and long term incentive plans (LTIP) are also used. According to the agency theory, these different incentives help CEOs to act in the best interest of shareholders. The following components are often used:

A) Stock ownership

When executives own more stock in their company, their compensation is more closely related to the stock returns of the company. This might diminish the conflict of interest between executives and shareholders. Sometimes some restrictions are made to executives concerning the time the stocks are allowed to be sold, so called restricted stock. However stocks, in contrast to stock options, are not that commonly used.

B) Stock Options

As executives are rewarded with more stock options, which they at a later time may exercise, their compensation is more closely related to the performance of the company. This reduces the conflict of interest with shareholders. However in contrast to stocks, one can never lose more than the options itself. Therefore when options stimulate to take too much risk this is a disadvantage, since then executives are rewarded for good performance but are not punished for bad performance.

C) Long Term Incentive Plans (LTIP)

These incentive plans are often also based on stocks and options. Within these plans the right to receive or exercise options, or obtain stocks are attached to performance measures. Only if

an executive achieves the target value for the specified performance measures, the stocks or options are granted.

D) Bonus plans

On the basis of accounting performance measures (and often tied to targets), executives earn cash bonuses, mostly expressed via a percentage of their base salary. Bonuses often contain some non-accounting performance measures, this part of the bonus is rewarded on the basis of a subjective judgement of the performance of the executive.

E) Other compensation

This is the compensation that does not belong to other columns, which includes items such as: severance payments, debt forgiveness, imputed interest, pay-outs for cancellation of stock options and extra performance-related bonus.

2.2. Relevant theory from other papers

In financial literature there have been many studies wherein the relation between CEO compensation and firm performance is investigated. In this paragraph we further explain the relationship between the tournament theory, agency theory and firm performance.

2.2.1 Tournament theory

The tournament theory is useful when explaining why firms are willing to give such a high compensation to their CEOs. Lazear and Rosen (1981) proposed the first theoretical model of a tournament. They showed that increases in rewards between the winners and losers will increase the performance of tournament participants. M.C. Bloom and G.T. Milkovich (1996) say that since relative performance is important, higher performing managers should get a larger share of the total fixed compensation. According to Rosen (1986) the tournament theory predicts there will be an increasing ratio of pay as individuals move up the corporate ladder. Because the performance of others serves as a benchmark, tournaments provide advantages in cases where output levels across individuals are subject to a common random shock (Green and Stokey, 1983). This implies that when an employee does his job well, there is a higher chance of possible promotion. Alongside a higher salary when promoted, employees also get the chance to compete for a larger prize, further promotion. That top executives receive very high pay, is used to motivate lower-level-executives to compete for promotions, says J.S. Leonard (1990). If employees work harder, this will be good for the

firm as well. Therefore this theory supports that higher compensation for CEOs will result in better company performance.

But how does this theory motivate CEOs, who already sit at the top of a company's pay hierarchy and therefore cannot be promoted any further internally? At this point, an approach other than internal labour market contests is needed to influence CEO behavior. According to Demsetz (2003) recognizing that tournaments may also occur in interfirm labour markets provides a valve for CEO promotion and therefore a means of motivating CEOs. One possibility to keep CEOs motivated to increase shareholders value after is to include CEO positions at other, larger companies. Baumol (1959) was among the first to observe that firm size and executive compensation appear to be positively correlated. Since then several studies have found a strong positive statistical relationship between firm size and CEO compensation.¹ When a CEO increases firm value, he has a better chance to be selected as a CEO at a larger company.

However the tournament theory also has its downsides. Kochan and Osterman (1994) argue that tournaments are unfair and demotivating. Where work is more highly interdependent, it can be damaging for a company when there is competition among top managers for higher pay as a consequence of tournament structures. Empirical results from Hill, Hitt and Hoskisson (1992) show that managerial cooperation is related to the way managers are paid. However fixed pay structures are believed to demotivate managers at the top, since the skills and effort required in upper level work are inequitably compensated compared to the lower level work (Milkovich and Newman, 1996).

2.2.2. Agency theory

Often the agency theory is taken as central point in these studies. As formulated by Jensen and Meckling (1976) this is the separation of ownership and control. They suggest that this separation also influences firm's performance. The agency theory shows this relation between a principal (the company's shareholders) and an agent of the principal (the company's executives). The principal is interested in maximizing the stock prices for the company for a given level of risk. When a CEO accomplishes this task he should be rewarded accordingly and vice versa. However top managers are being described in the literature as being risk-

¹ The "elasticity" of pay and size is approximately 0.3, implying that pay increases by about one-third as firm size doubles. George P. Baker et al., *Compensation and Incentives: Practice vs. Theory*, 43 J. FIN. 593, 609 (1988).

averse. According to Harris and Raviv (1979) managers will want their compensation structured so that they bear less personal risk. In order to reduce their compensation risk they are taking activities which reduce firm's risk, but this can also have adversely affect for shareholder's wealth.

The agency theory predicts that policies for executive compensation will depend on changes in shareholders wealth. In order to align the interests of CEOs with the interests of shareholders, executive compensation should be tied to firm performance. This can be realized by giving managers stock options or cash bonuses depending on return on stocks, because these methods reward executives for good stock return performance. So rewarding executives on stock performance is good for shareholders, although executives cannot totally control the stock price. As seen before stock options also brings risk since CEOs are only partly penalized for bad performance. Moreover in practice executives are also looking at private benefits and therefore executives may have other incentives than maximizing shareholder wealth. At the end of this paragraph I will also show the downside effects of equity-based compensation.

Next, a brief review of the researches wherein the relation between executive compensation and firm performance is investigated are given. Jensen and Murphy (1990) suggest that EBC gives CEOs the correct incentives to maximize the value of a firm. They state that companies which focus on EBC perform better than companies which favour compensation in cash. A later study by Mehran (1994) presents this empirical evidence on the relationship between the structure of compensation and firm performance. Firm performance, as proxied by Tobin's Q and return on assets, increases as the percentage of EBC with respect to total compensation rises.

Hall and Liebman (1998) also found in their research a strong positive relationship between firm performance and CEO compensation. They gathered data about CEOs from 1980-1994 with a final sample consisting of 478 U.S. companies. The change in firm performance was almost entirely caused by a change in value of CEO holdings of stock and stock options.

In their study Hall and Liebman (1998) find that cash compensation and firm performance are not related. However by adding equity payments they find different results. One important

conclusion from their research is that the pay-performance sensitivity² has massively increased due to compensation in the form of stock option grants.

2.3. Disadvantages of equity-based payments

Equity-based payments however also have their disadvantages. Previous paragraph explained that CEOs with stock options are exposed solely to the value of the option, whereas a company can lose a lot more with equity. Stock can fall below the option exercise price and drop to a minimum. In certain circumstances stock options therefore limit or eliminate most down-side risk to the CEO and may encourage riskier behavior (Sanders, 1999).

Also equity-based pay is often criticized as encouraging executives to manage short-term earnings to appease Wall Street instead of managing the company for long-run value creation. Executives therefore may be tempted to fool the market by figuring out ways to temporarily prop up their stock prices and then cash out their equity holdings (Hall, 2003).

Further restricted stocks showed to be relatively inefficient in inducing risk-averse CEOs to accept risky, value-increasing investment projects, due to its linear payoffs (Bryan & Leeseok, 2000). Also there is always the risk of executives manipulating the accounting measures on which they are examined. Because of these accounting problems that come with EBC, the results of research which investigate whether executive compensation can be used to increase firm value, is mixed.

There are many more risks for companies when using equity-based payments, however the disadvantages mentioned above are the most important when designing equity-based payments (Hall, 2003).

2.4. Restrictions

Since almost all of the above studies involve company data from 1980-1995 it is interesting to control if these conclusions are still justified. This study differs from previous work on executive compensation in several ways.

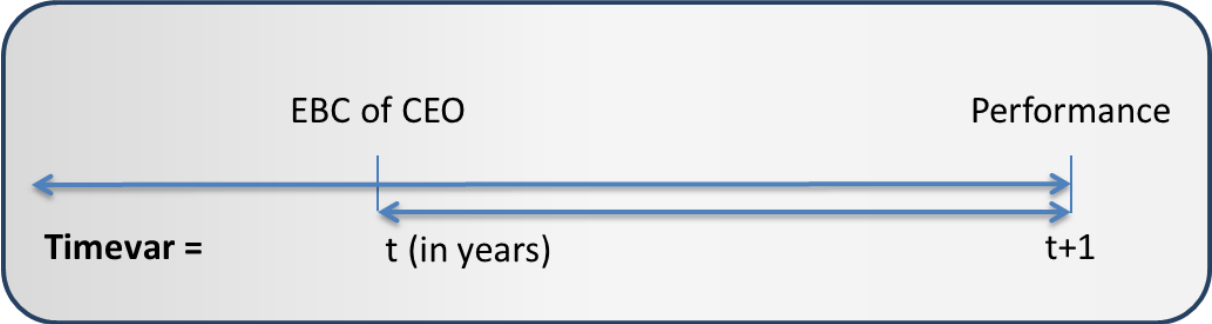
I investigate the relationship between executive compensation and company performance, in which I try to find out whether executive compensation can be used to increase company performance. This relationship also works the other way around; firm value also has an

² Pay-performance sensitivity is the change in a chief executive's payoff that is associated with a given performance of the company that s/he leads. Gian Luca Clementi, assistant professor of economics, NYU Stern School of Business

influence on executive compensation. There is a lot of research which examined this pay-for-performance sensitivity. However, with this thesis I do not want to verify whether firm value indeed determines executive compensation, but my focus is on examining whether executive compensation can be used to increase firm value, and thus reduce the agency problem.

Second the collected data is ranged for 1999-2006. I collect the most actual record of data items excluding the financial crisis. It is possible that the crisis gives a biased representation of company performance in normal years. The research also takes into account the time lapse between EBC and the performance of a company. When measuring the effect that EBC has on the performance of a company I expect to find a larger relationship when taking the EBC of a CEO one year earlier than it's accompanying performance. In this case the CEO is responsible for last year's decisions made by him or her. Since these decisions usually take over one year to have an affect on the companies performance. This corresponds to conduct a regression on company performance in year t on the EBC of a CEO in year $t-1$, as illustrated in figure 1. For my research it is therefore important to keep the timespan in mind when selecting my data. For company performance I select data from 1999-2007 and for the compensation of CEOs I select the data from 1999-2006.

Figure 1 Measuring performance in relation to EBC



This research is restricted in measuring the effects only for the CEOs of the selected companies. Since the CEO makes the most important decisions in a company and gets rewarded with the highest compensation, I interpret that the relation between CEO-compensation and company performance is representative for my study. Financial institutions are excluded from the research, because financial ratios and valuation metrics for banks are not directly comparable to financial ratios and valuation metrics of other firms.

According to previous research the EBC of CEOs is associated with improved company performance. Jensen and Murphy (1990) therefore suggest that most companies can increase their value by using more EBC instead of cash compensation.

Based on these results I therefore hypothesise that *a greater use of equity-based compensation for Chief Executive Officers results in improved company performance.*

3. Methodology and sources of data

3.1. Hypotheses.

Hypothesis 1 : There exists a positive relationship between the total compensation of a CEO and the performance of a company.

With this hypothesis I want to test if there exists a relationship between an increase in executive payment and company performance, as measured by ROA and Tobin's Q. If a firm wants to attract a high quality CEO, it is willing to pay more for it. This is among others said by J.E. Core (1999). Since a CEO of higher quality is expected to create a higher firm value, I expect to find a significant and positive relationship ($\beta_1 > 0$) between total compensation and company performance.

To test my first hypothesis I made use of the underlying regression equation:

$$\text{Company performance}_t = \alpha + \beta_1 TC_{t-1} + \beta_2 FS_t + \sum y \text{ Industry} + \sum y \text{ Year} + \varepsilon$$

Where:

- Company performance is measured in both Tobin's Q and Return on assets (ROA).
- TC is the total compensation a CEO receives.
- FS is firm size, which will be introduced as a control variable.
- The different industry groups will act as dummies to control for different industries. They are introduced to provide more accurate results.
- ε stands for standard error.

Hypothesis 2 : There exists a positive relationship between EBC received by a company's CEO and its performance.

To examine the second hypothesis I made use of the underlying regression equation:

$$\text{Company performance}_t = \alpha + \beta_1 CS_{t-1} + \beta_2 FS_t + \sum y \text{ Industry} + \sum y \text{ Year} + \varepsilon$$

Where:

- Company performance is measured in both Tobin's Q and Return on assets (ROA).
- CS is the compensation structure of a CEO. The variable is defined as the ratio of EBC divided to the value of total compensation.
- FS is firm size, which will be introduced as a control variable.
- The different industry groups will act as dummies to control for different industries. They are introduced to provide more accurate results.
- ε stands for standard error.

Wang (1997) says that managerial actions taken by the CEO are crucial to the performance of the firm. To implement desired actions, a compensation policy must be designed to give the executive proper incentives. In general, the agency theory predicts that if a CEO is paid based on company performance, the interests of the CEO and shareholders will be aligned and thus CEOs will choose more value-making decisions. I therefore expect to find a significant and positive relationship ($\beta_1 > 0$) between Company performance and EBC of CEOs. When H_1 is true, an increase in the percentage of compensation structure leads to an increase of company performance.

My null hypothesis H_0 ($\beta_1 \leq 0$) is that a greater use of EBC does not increase the performance of a company. With this null hypothesis rewarding CEOs with given structure of EBC does not give the positive effect to improve the performance of a company. When this null hypothesis holds, the performance of a company is either: (1) unaffected by the structure in which CEOs are compensated; or (2) negatively effected when CEOs receive higher EBC. Situation (1) for the null hypothesis would mean that CEOs do not perform better when EBC increases. This would suggest that managers already work to their maximum capacity and that an increase of compensation, in any form, does not lead to improved company performance. The second outcome (2) would result in a decrease of the company performance when EBC increases.

3.2. Data sources and time

All the data that is used in my research is available from the public databases, Compustat Global Database and Compustat's ExecuComp Database and is tested using STATA. Compustat's Database The Compustat Global Database is covering all financial data like balance sheets, income statements and cash flows. This database is used for the performance data necessary in this study. The Compustat's ExecuComp Database is covering all CEOs compensation data. All firms have a complete record for selected data items for minimal two subsequent years on the COMPUSTAT North America Fundamentals Annual File. All compensation dollar values are represented in thousands of dollars and the performance dollar values are represented in millions of dollars, if not noted otherwise.

3.3. Explanation dependant variable: company performance

To measure company performance I use both Tobin's Q and Return on Assets (ROA). Whether Tobin's Q and ROA are correct proxies for company performance is being discussed a lot in the literature. Both have their strengths and flaws. Tobin's Q is supposed to be a better method for firm's growth opportunity than its performance. Others argue that ROA does not give enough information about economic rates of return (Fisher and McGowan 1983). Therefore I choose to be consistent with the literature and use both Tobin's Q and ROA. Summary statistics for the variables mentioned above for the years 2000-2006 are presented in Table 1.

Table 1 Company performance statistics

The table presents descriptive statistics of 6025 U.S. observations across survey years 2000-2006 for the selected companies. Tobin's Q is the sum of common stocks, preferred stocks and debt divided by total assets. ROA is the sum of net income divided by total assets. Figures x \$1000 .

Variables	Mean	Median	SD.	Min.	Max.
<i>Net income (in \$1M)</i>	301.79	57.20	1489.01	-21176	39500
<i>Book value of TA</i>	6242.56	1271.86	25144.07	7.97	750507
<i>ROA</i>	0.034	0.050	0.141	-1.828	0.578
<i>Tobin's Q</i>	1.688	1.324	1.271	0.002	13.046

3.4. Explanation independent variable: compensation structure

For measuring compensation structure I divide EBC by the total amount of compensation that a CEO receives from the company. With this method I follow Mehran (1994) where EBC is measured as the ratio of the sum of the value of awards from grants of new stock options, restricted stocks, phantom stocks, and performance shares. In my research I make use of the Black-Scholes model³ to value the grants of new stock options. For calculating the values of other compensation components I follow Core et al. (1999). Grants of restricted stock are valued according to the price per share at the date of grant. Phantom stock grants are valued in the same way as restricted stock plans. Grants of performance shares are valued by multiplying the number of performance shares by the stock price at the grant date. Grants of performance units are valued according to the dollar value assigned to each unit at the grant date. Total compensation is the sum of the dollar values of salary, bonus, other annual, saving plans, properties, insurance and the value of the awards from grants of new stock options, restricted stocks, phantom stocks, and performance shares and performance units. Since salary and bonuses are typically paid during one single year, the valuation of these two components is relatively straightforward.

Table 2 Compensation structure statistics

The table presents descriptive statistics of 6025 observations across survey years 1999-2005 for the selected companies. It includes the three compensation components and their hypothesized determinants and the distribution of the age of CEOs. Compensation structure is equity-based compensation divided by total compensation in %. Figures of salary and compensation x \$1000.

Variables	Mean	Median	SD.	Min.	Max.
<i>Salary plus bonus</i>	1197.62	820	1553.65	0	43511.54
<i>Equity-based compensation</i>	2913.24	977.81	10645.22	0	600347.40
<i>All other compensation</i>	94.48	14.88	662.15	0	40484.59
<i>Total compensation</i>	4254.71	2036.50	11040.79	0	600347.40
<i>Compensation structure %</i>	46.50	50.10	29.40	0	97.04
<i>Age of CEO in years</i>	52.03	52	7.23	30	90.00

³ See Appendix B for the determinants of the Black-Scholes model.

In the sample statistics of Table 2 it can be seen that the mean of fixed salary is \$ 1,197,620 which is very small compared to the mean of total compensation, \$ 4,254,710. A large part of the total executive compensation therefore consists of performance-based components. The mean of compensation structure is 46.50 %. Further the table shows a high standard deviation, which indicates that there are big differences in the amount paid to CEOs.

3.5. Explanation control variables

Since the performance of a company is determined by many other variables than executive compensation, firm size, industry dummies and year dummies are needed as control variables to provide more accurate results.

Consistent with prior theory and empirical work from Rosen (1982) and Smith and Watts (1992) I expect that larger companies will demand higher-quality managers with higher wages. Since I include both small and large companies in my research I take firm size (FS), as log of total assets, into account to control for firm size in my research. This independent variable will be build into the model to function as a control variable.

Table 3 Firm years

Fiscal years	# of observations	% of sample
2000	111	1.84
2001	817	13.56
2002	879	14.59
2003	953	15.82
2004	1070	17.76
2005	1101	18.27
2006	1094	18.16
Total	6025	100

Another control variable which I will use in my research is the control for different firm years. Table 3 shows the different firm years with the number of observations. With the introduction

of control variables and industry- and year dummies, I can say with a great reliability that observed effects are due to the respective independent variable.

Further I include nine different industry-indicator variables to act as a control for industry differences. The industries are divided through the use of a SIC (Standard Industrial Classification) system. This divides the U.S. industries in several divisions using a nine digit code. I chose to keep the first number which causes industry effects to be taken into account. Based in this first figure ten dummy variables are made, of which nine are used in the regression to prevent the presence of collinearity. Table 4 shows the nine different industries that are used. A majority of the companies from the sample are from the capital intensive industries, like construction or manufacturing. Agriculture, forestry and fishing only makes a small part of the sample since it is only 0,38%. The same percentage accrues to nonclassifiable establishments. Financial institutions are excluded from my research.

Table 4 Sample industry divisions

Different industries	# of observations	% of sample
<i>Agriculture, forestry, and fishing</i>	26	0.43
<i>Mining</i>	396	6.57
<i>Construction</i>	1066	17.69
<i>Manufacturing</i>	1878	31.17
<i>Transportation, communications, and utilities</i>	771	12.80
<i>Wholesale trade</i>	837	13.89
<i>Retail trade</i>	792	13.15
<i>Public administration (government)</i>	234	3.88
<i>Nonclassifiable establishments</i>	25	0.41
Total	6025	100%

4. Empirical results

This chapter presents the empirical results on the relationship between the total compensation of executives and company performance, and about the relationship between EBC and company performance. Since the part of compensation of the variable in hypothesis 1, is also the independent variable in hypothesis 2, they will likely correlate with each other. Therefore I choose to run the regressions separately from each other.

4.1. Results hypothesis 1

Table 5 shows the ordinary least-squares estimates of regressing company performance on total compensation, to test if there is a relationship between the two variables. Models 1 and 2 do not show significant results on the 0.10 level, while model 3 and 4 are significant at 0.01.

Table 5 Regression of firm performance on total compensation

Table 5 show the ordinary least-squares estimates of regressing company performance on total compensation, to test if there is a positive relationship between the two variables. Model 1 and 2 use ROA to measure for firm performance and model 3 and 4 use Tobin's Q. The sample consists of 6853 observations across the survey years 1999-2006 for the selected companies.

	Dependent variable: ROA		Dependant variable: Tobin's Q	
	(1)	(2)	(3)	(4)
<i>Independent variables</i>				
<i>Total compensation</i>	-1.16-07	-1.37e-07	1.53e-04	1.29e-05
<i>t</i>	(-0.76)	(-0.90)	(10.73)	(9.21)
<i>p(t)</i>	(0,450)	(0.369)	(0.000)***	(0.000)***
<i>Log of total assets</i>	0.010	0.011	-0.217	-0.1428
<i>t</i>	(-5.67)	(10.99)	(-24.34)	(-14.55)
<i>p(t)</i>	(0.000)***	(0.000)***	(0.000)***	(0.000)***
<i>Adjusted R² (%)</i>	1.57	5.10	8.30	14.02
<i>α</i>	-0.041	-0.082	3.142	2.093
<i>F-Statistic</i>	55.50	22.66	311.04	66.74
<i>N</i>	6025	6025	6025	6025
<i>Industry and year effects</i>	N	Y	N	Y

Note: the adjusted R² shows which percentage of the variation in ROA an Tobin's Q is explained by the model. Asterisks indicate significance at 0.01(***), 0.05(**) and 0.10 (*) levels.

In the first two models the total compensation shows a negative relation with ROA, however since the results are not significant I can not say with certainty that this is indeed the case. In

the fourth model 14.02% of the variation in company performance can be explained by the variables. Even though the beta is relatively low, the results provide evidence for a positive relation between total compensation and company performance, as measured by Tobin's Q.

This result supports hypothesis 1, and shows that total compensation affects firm value. It shows that the tournament theory holds and that an increase in compensation positively affects company performance. However the beta of total compensation in this regression is so small, that we can hardly speak of any economic significance, which is in accordance with the results of Mehran (1995). A reason that the results from ROA and Tobin's Q differ is that the way these variables are calculated are not orthogonal. The omitted variables bias and therefore affect my estimates. The findings further support John M. Abowd (1990) who shows in his study that when he used accounting based measures of performance it yield weak evidence of an association between total managerial compensation and firm performance.

4.2. Results hypothesis 2

By using the part of total compensation that is equity based, I aim to find out whether a more performance-based compensation leads to a higher company performance. In table 6, all of the models show that there is a significant and positive relationship between total compensation and company performance (as measured by Q and ROA). I find an R^2 of 14.65 % to be explained through model 4. This result supports hypothesis 2, that company performance is positively related to the percentage of executive compensation that is equity-based. In contrast to hypothesis 1, the beta of EBC is 0.5894, which suggest that the results are also economically important. This suggests that for companies it is useful to make compensation of CEOs more equity-based. When using ROA as dependant variable the results are significant, but the R^2 explains considerably less then Tobin's Q. Nevertheless the results are significant at the 0.1 level.

5. Conclusions

EBC is nowadays greatly used to compensate CEOs for their proceedings in the company and can be used as a tool to increase firm value. A lot of research has focused on the relationship between executive compensation and company performance, both regarding the level and structure of executive compensation. There are however positive sides and negative sides involved with the use of executive compensation to increase firm value.

Table 6 Regression of firm performance on EBC

Table 6 show the ordinary least-squares estimates of regressing company performance on EBC, to test if there is a positive relationship between the two variables. Model 1 and 2 use ROA to measure for firm performance and model 3 and 4 use Tobin's Q. The sample consists of 6853 observations across the survey years 1999-2006 for the selected companies.

	Dependent variable: ROA		Dependant variable: Tobin's Q	
	(1)	(2)	(3)	(4)
<i>Independent variables</i>				
<i>EBC</i>	0.13	0.0130	0.685	0.5894
<i>t</i>	(-2.45)	(-2.35)	(13.42)	(11.64)
<i>p(t)</i>	(0.014)**	(0.019)**	(0.000)***	(0.000)***
<i>Log of total assets</i>	0.0102	0.0121	-.2156	-.1462
<i>t</i>	(10.77)	(11.37)	(-24.54)	(-15.03)
<i>p(t)</i>	(0.000)***	(0.000)***	(0.000)***	(0.000)***
<i>Adjusted R² (%)</i>	1.67	5.17	9.15	14.65
<i>A</i>	-0.037	-0.083	2.879	2.071
<i>F-Statistic</i>	58.25	22.96	345.88	70.18
<i>N</i>	6025	6025	6025	6025
<i>Industry and year effects</i>	N	Y	N	Y

Note: the adjusted R² shows which percentage of the variation in ROA an Tobin's Q is explained by the model. Asterisks indicate significance at 0.01(***) , 0.05(**) and 0.10 (*) levels.

The theoretical framework in the second chapter shows that executive compensation is commonly used as a tool to increase company performance. According to the tournament theory, the high payment is used to motivate lower-level-executives to perform better and thereby improve company performance. If their effort is rewarded with a possible promotion, managers have an incentive to work harder and focus on the increase of company performance. For CEOs interfirm labour markets provides a valve for CEO promotion and therefore a means of motivating CEOs. This could explain why CEOs try to maximize firm value.

According to the agency theory EBC can be used for executives, so they are more aligned towards their shareholders. Since the firms in this research are typically not run by the people who own the company, managers control the company on behalf of the shareholders. Since shareholders do not have all the information that managers have, it is not possible for shareholders to monitor the actions of the managers of the firm. However since managers tend

to act in their best interest, instead of the interest of the shareholders, an agency problem occurs. This agency problem can turn out to be very costly for the company. By making executive compensation more performance-based, rather than paying only salary, executives have an incentive to act in the best interest of shareholders. If company performance increases, their total compensation will also increase. So maximizing company performance is in the best interest of executives as well. This is commonly done by rewarding CEOs with equity-based compensation, often stock-options, which at a later time can be exercised.

However EBC compensation also has its downside effects, which negatively influence the incentive to use executive compensation to increase firm value. Restricted stocks showed to be relatively inefficient in inducing risk-averse CEOs to accept risky, value-increasing investment projects, due to its linear payoffs (Bryan & Leeseok, 2000). Next, to appease Wall street, executives may be tempted to fool the market by figuring out ways to temporarily prop up their stock prices and then cash out their equity holdings (Hall, 2003). Also since stock options have limited down-side risk it may encourage riskier behavior for CEOs (Sanders, 1999). Also there is always the risk of CEOs manipulating the accounting measures on which they are measured.

This thesis provides empirical evidence on the relationship between company performance and EBC of a CEO. In this thesis I investigate U.S. companies over a period of six years which led to a dataset of 6025 observations. I find evidence that the level of total compensation positively effects the performance of a company, as measured by Tobin's Q. The relationship between the level of total compensation and company performance (as measured by ROA and Tobin's Q) is slightly positive and is significant at the 0.01 level. However, since the beta is close to zero, I do not find evidence that total compensation also has economic effects on company performance. Further I also find evidence in favour of the hypothesis that the firm performance is positively related to the percentage of executive compensation that is equity-based, as measured by Tobin's Q, and is highly significant at the 0.01 level. The beta of EBC is 0.5894 which implies that compensation does affect CEO incentives in ways that have impact on the performance of a company. The previous results are in accordance with Hamid Mehran (1995), who states that the form rather than the level of compensation is what motivates executives to increase firm value.

An important area for further research is to extend which forms of EBC are the most effective. A comparison between the different forms of EBC has to be made and the most effective forms can be distinguished.

Further, I suspect a more reliable relationship between EBC en company performance when there is a good indication of when stock-options are granted, and in what year they are exercised.

Appendix A. Calculation of Tobin's Q and ROA

$$\text{Tobin's Q: } \frac{\textit{Market value of a firm securities}}{\textit{Replacement cost of capital of a firm}}$$

$$\text{Market Value of the Firm: } MV = CS + PS + DT$$

Common Stocks (CS): Market value for single issue companies is common shares outstanding multiplied by the month-end price that corresponds to the period end date.

Preferred Stocks (PS): There is no price for these securities, hence the Book Value is used as a proxy of the Market Value (however, more detailed estimations use "Total preferred dividends / S&P's preferred stock yield index".)

Debt (DT): Long term debt market value plus short term average debt book value. The Market Value of long term debt is estimated depending on the maturity distribution of the bonds, their coupon rates and the current yield-to-maturity. Simple estimations of Tobin's Q use just the Book Value. See the paper below for details.

Replacement cost of capital: AT

Assets total(AT): Book value of total assets which is obtained from the Standard & Poor's Analyst's Handbook.

$$\text{ROA: } \frac{\textit{Net income to book value}}{\textit{Firm's total assets}}$$

Net income to book value: NI

Net Income(NI): This item represents the fiscal period income or loss reported by a company after subtracting expenses and losses from all revenues and gains.

Firm's total assets: AT

Assets total(AT): Book value of total assets which is obtained from the Standard & Poor's Analyst's Handbook.

Appendix B. Option valuation and the Black-Scholes formula

For an option on a nondividend-paying stock, option value can be calculated directly from the Black-Scholes formula:

$$c(S, X, T-t, r, \sigma) = S_t N(d_1) - e^{-r(T-t)} X N(d_2)$$

where:

$$d_1 = \frac{\ln\left(\frac{S_t}{X}\right) + r(T-t) + \frac{1}{2}\sigma^2(T-t)}{\sigma(T-t)}$$

$$d_2 = d_1 - \sigma(T-t)^{\frac{1}{2}}$$

and:

C = price of option

S = the grant-date stock price

X = the exercise price

(T-t) = the option remaining time to maturity (in years). The term is reduced to amount a 70% of the full term since executives rarely wait until expiration.

σ = the stock's annualized volatility. If the stock has traded for less than one year, Compustat inputs the average volatility value for the S&P 1500.

r = the continuously compounded riskfree rate per year. The approximate average yield that could have been earned in the particular year by investing in a U.S. Treasury bond carrying a seven-year term.

$N(d_1)$ = probability ($X < d_1$), where $X \sim N(0,1)$

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