The Link between CEO Compensation and Performance

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ABSTRACT

In this paper, CEO compensation of selected firms listed on the NASDAQ OMX Nordic Exchange Stockholm is examined to evaluate if CEOs are compensated according to their performance. An agency theory approach is taken to explain why good incentive contracts are important and why it matters to shareholders. In order to obtain a reliable performance measure, we use a relative performance evaluation approach to filter out macroeconomic factors affecting company performance. When evaluating compensation levels and performance using our relative performance measure we find a negative relationship. Instead of using a relative performance measure, companies tend to use accounting measures to evaluate CEO performance. This indicates a weak link to agency theory in regards to CEO performance evaluation. The lack of filtering when compensation levels are set and the lack of aligned incentives between shareholders and CEOs lead to faltering contracts and is not in the best interest of the shareholders.

Keywords: CEO compensation, agency theory, relative performance, filtering, incentives

Contents

1 Introduction

> In sports, the best-paid players are also the most skilled. The same can't always be said about business. Are business CEOs highly paid because they are skilled, because they capture the board of directors, because they set their own pay, or because they are just plain lucky?
>
> Daines, Nair and Kornhauser (2005, p. 41)

The subject of executive compensation in a corporate governance setting has been one of the most discussed subjects during the recent financial crisis that plagued the global economy. The debate has focused mainly on large bonus payouts and if those bonus programs should at all exist as a part of the CEOs compensation schemes or be cancelled completely. One of the most important aspects of the debate is how the short term variable compensation is determined. Critics point to the fact that macroeconomic factors determine the size of the bonus rather than how well the company is actually performing (Aktiespararna, 2011). This highlights the important issue of how the CEO compensation is set and how the CEO performance is evaluated.

Recent articles in the newspapers reports of an increase in compensation levels during 2010 after a status quo in 2009. Median compensation level for the 350 biggest companies in the USA rose by 11 percent to 9.3 million dollars in 2010, while average variable compensation levels surged by 20 percent due to large profit increases (Dagens Industri, 2011). Generally, during the latest decades, CEO compensation has increased dramatically, both internationally and in Sweden (Bång and Waldenström, 2009). The median cash compensation to S&P 500 CEOs has more than doubled between 1970 and 2000, while the median realized compensation has nearly quadrupled (Murphy, 1998).

In this paper we examine the link between CEO compensation and company performance rather than focusing on absolute compensation levels. The question whether the CEO is compensated according to the firm's performance is of central importance, especially to the shareholders. Companies choose different pay structures in order to maximize the value of the firm (Bång and Waldenström, 2009) which is the ultimate concern for the owners. Because the owners of the company is the shareholders, it is ultimately the shareholders that set the compensation level of the CEO – even if this in practice is decided by the representatives in the board of directors (Bång and Waldenström, 2009). Full disclosure of CEO compensation

levels is regulated by law and must be reported in the company's annual report[1]. This implies that compensation levels are observable to outside investors and thereby affects the value of the firm. As previously stated, maximization of firm value is the main goal for the company's shareholders, and consequently, the link to the agent-principal theory is a natural approach to investigate optimal compensation structures. The approach is not surprisingly the dominant theory in the research field, and has been labeled in previous papers as the "the official story" on executive pay (Otten, 2007, p. 12).

1.1 Literature Overview

The research area of executive compensation is well covered. From 1985 and onwards there has been a steady increase in the number of published papers. Most early papers examine whether pay is more closely tied to company size or to company profits (Murphy, 1998). The dominating theory in the studies is the agency theory approach developed by Jensen and Meckling (1976). This theory is based on the separation between ownership and control within the firm, and the central issue is to align incentives between management and the owners of the firm - in our case the shareholders. The shareholders main objective is to set the compensation so that the CEO acts in their best interest, i.e. to maximize the value of the firm. By making a part of the compensation variable and dependent on performance, the shareholders can partially solve the issue, and the incentives between shareholders and the CEO can be aligned (Bång and Waldenström, 2009).

A question then naturally arises, how should the company's performance, the main objective for the shareholders, be measured. A dominant theory developed by Holmstrom (1982) is the relative performance evaluation (RPE) in incentive contracts. An implication of this theory when determining CEO compensation is that common factors affecting the performance should be filtered out. In this way, a measure that is as close to the true performance as possible can be obtained (Murphy, 1998).

Not surprisingly, one of the most studied relationships in the executive compensation literature is the pay performance relationship. The outcome of those articles displays very mixed results (Otten, 2007). Several famous articles within the field, e.g. Jensen and Murphy (1990) and Kaplan (1994), examines this relationship by measuring performance as both pure accounting measures and annual stock returns.

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[1] Årsredovisningslagen (1995:1554), §20, regulates the disclosure of compensation levels in annual reports.

1.2 Purpose

In our paper we take a somewhat different approach from most of the previous research in the field. Based on the RPE and the agency theory, we argue that performance is best measured as annual returns compared to industry sector returns. In this way we obtain a more precise measure of performance, in which we have filtered out the performance not attributable to company specific actions. To compensate for different risk levels that the shareholders are exposed to, we weight each performance measure relative to each firm's systematic risk.

No previous studies have been conducted on relative performance measures on Swedish data. Furthermore, most of the previous research examining the pay performance relationship has been done on American data which could make comparisons difficult due to cultural and institutional differences (Bång and Waldenström, 2009). In the light of this, we consider our study of Swedish firms an important addition to the previous literature on the field of executive compensation.

1.3 Delimitations and Outline

For our study, we collected data from the 29 most traded firms on the NASDAQ OMX Stockholm Exchange. The time periods covered is five years, ranging from 2005 to 2009. All of the compensation data are handpicked from each company's annual report. An implication of this is that we at an early stage sought to limit the number of companies included in the report. With 29 companies examined over five time periods, we obtained 145 observations which we consider to be a satisfactory number.

Performance is measured individually each year for the 29 companies and we evaluate this number versus industry performance, thereby obtaining a relative performance measure i.e. the excess return for every company and year. Further, a number of additional variables that are important in explaining the relationship between compensation and performance is collected and explained. To examine the link between CEO pay and performance, we run panel data regressions and presents the results. Finally, these results are discussed in the light of related economic theory.

1.4 Main Finding

In our paper we show that a relative performance measure is not used when CEO compensation levels are determined. Instead, performance seems to be evaluated using accounting measures while other factors such as market capitalization, bonus ratio and P/E are important in explaining differences in compensation levels. This result contradicts the famous agency theory in regards to the CEO compensation level setting.

2 Theoretical Background

2.1 Agent-Principal Theory

The foundation of the agent-principal theory is the separation of ownership and control in the framework of a corporation. This separation creates a situation where moral hazard is present, i.e. the management of the firm may not act in the best interest of the owners (Jensen and Meckling, 1976). Studies have shown that non maximizing behavior from managers is a frequent problem in corporations (Shleifer and Vishny, 1988, p. 8). Instead of maximizing firm value the management act in their own best interest e.g. they put low effort into their work; they consume perks; they engage in empire building. To try to solve this issue the owners try to create incentives for the management to act in accordance to the owner's interests. There are two types of incentives for the management, implicit[2] and monetary (Tirole, 2006, p. 16-27). The classical example of monetary incentives is ownership in the form of shares or stock options (Shleifer and Vishny, 1988, p. 9). When the management also is an owner, the management and the owners have the same incentives in theory. In real life, the management often owns very small parts of the firm; therefore they have small incentives to maximize the owner's interest compared to the benefits available from the moral hazard situation (Bertrand and Mullainathan, 2001, p. 901). In our data set, large companies are studied which makes explicit incentive contracts linked to performance very important.

In our study the agent is the CEO and the principal is the shareholders of the firm. The shareholders want to assure themselves that the CEO act in their best interest. To do that, they use monetary incentives, i.e. fixed and variable compensation. Especially the variable compensation works as an incentive because of the relationship between performance and the size of the bonus. The shareholders can set targets of their choice, which need to be reached for the variable salary to be triggered. With the selection of a performance target, they align their incentives with the CEO.

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[2] Implicit incentives are non-contractual incentives (Tirole, 2006, p. 25-27).

2.2 Free Cash Flow Theory

The idea behind the free cash flow[3] theory is that large amounts of free cash flow increases the moral hazard for the managers because they have more free cash flow under their control. They can spend it as they choose, e.g. they can increase their perks, raise compensation, make non profitable investments or enlarge the size of the firm beyond the optimal one. To reduce the moral hazard present with free cash flow, the firm can make a promise to the market about payouts today and in the future, e.g. dividend payouts, stock repurchase programs or, the most common solution; increasing the debt ratio. The problem with dividends and stock repurchase programs is that the management can choose if they want to make the payout or not, e.g. if the company makes large non profitable investments, the profit decreases and the ability to pay out free cash flow is reduced. This is not the case with debt, because if the firm doesn't make the debt payments, there is a risk of bankruptcy. When the debt increases, the free cash flow reduces because of the amortization and rent payments. In this case, debt works as a control function and it disciplines the management's spending (Jensen, 1986, p. 323-328).

2.3 Shareholder Control

Large minority shareholders have incentives to govern and monitor the management and thereby solve the free-rider problem.[4] When large shareholders are present in the ownership structure the moral hazard from the management is reduced by the aforementioned monitoring and by the control the large shareholders can exercise (Shleifer and Vishny, 1997, p. 753-758).

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[3] Free cash flow is the after tax cash flow that the firm generates from its operation plus net investments and change in net working capital (Bodie, Kane and Marcus, 2009, p. 612).

[4] The problem is that small shareholders don't have incentives to monitor the management. That is because they lack resources and it is more profitable for every individual shareholder to free ride on another shareholder monitoring the management. The result is that no one monitors the management (Shleifer and Vishny, 1997, p. 753-755).

2.4 Filtering

When the principal is designing the incentive contract it is important to filter the result so that the agent is not rewarded for observable factors beyond their control, e.g. macroeconomic factors such as exchange rate movement, commodity prices and so forth (Bertrand and Mullainathan, 2001). Bertrand and Mullainathan (2001) have developed a model for optimal compensation to the CEO after filtering:

$$(2.1) \qquad s = \alpha + \beta(p - \delta o)$$

Where s = CEO salary, α = the intercept, β = the strength of the pay performance relationship, p = performance of the firm and o = observable factors beyond CEO control. The model states that the CEO should only be compensated for the performance that is left after detracting the observable factors. This creates the optimal incentive contract from the principal's point of view. A way to practically deal with the problem of filtering is to use relative performance evaluation (RPE) which has proven to be successful when measuring the outcome in incentive contracts (Holmstrom, 1982, Murphy, 1998).

2.5 Risk and Compensation

A fundamental theory in both finance and economics is that a higher risk should lead to a higher reward (Berk and DeMarzo, 2007, p. 67-72). Variable compensation is more risky than fixed compensation because of the uncertainty regarding the payouts. The variable compensation typically depends on some sort of performance measure that needs to be triggered for the variable compensation to be paid out. Because of the uncertainty regarding the variable compensation payments from the CEOs point of view, a higher ratio of variable compensation should lead to a higher expected total compensation.

3 Empirical methodology

To study the relationship between CEO compensation and firm performance we base our regression on the agent-principal framework and on the model developed by Bertrand and Mullainathan (2001) which was illustrated in section 2.4. To filter out factors that are out of the CEO's control, we use a relative performance measure that is explained in the subsequent chapter. Every firm in the data set has most likely some firm characteristics that are more or less constant through the time periods. We allow for this fixed effect in our regressions by running a least squares dummy variable regression (LSDV) on our panel data (Wooldridge, 2009, p. 485-486). Thereby, each firm is allowed to have one specific slope. Further, we control for fixed yearly effects, e.g. yearly specific macro factors, by including dummy variables for each year.

3.1 Performance measure

The performance measure is calculated using weekly observations on industry indices, composed by Nasdaq OMX, and the individual stock prices. To obtain the beta measure for the single stocks, weekly stock prices were regressed on weekly observations of the OMX Stockholm Benchmark CAP PI. Every company, except Nokia, has been listed on the Nasdaq OMX Nordic Exchange Stockholm for the whole time period 2005-2009. For Nokia we have used stock data from the Nasdaq OMX Nordic Exchange Helsinki.

Compensation policy that ties shareholders wealth to the CEO's wealth provides the best incentives for CEOs to take decisions in the interest of the shareholders (Jensen and Murphy, 1990). Further, according to simple contracting models, pay should not be tied to pure luck. In the study by Bertrand and Mullainathan (2001), the authors conclude that better governed firms pay their CEOs less for luck. To filter out for factors that affect many or all firms, and that are out of the manager's control such as a general increase in the oil price, we must evaluate firms in their respective industry group. By evaluating firms against their industry peer group a good measure of the performance related to the individual skill of the CEO is obtained. This method is in line with the RPE theory developed by Holmstrom (1982) and the theory used by Bertrand and Mullainathan (2001), in that we want to filter out for factors that are not the result of the individual skill of the CEO. We focus on the share price together with the dividends for the period as a proxy for shareholder wealth that in turn function as a proxy for performance. We are ultimately dealing with an agency-principal problem, where the shareholders (agents) main concern is a future increase in the stock price and dividend

payouts which corresponds to an increase in their wealth. That is, to align incentives, CEO compensation should be directly linked to the yearly stock return.

Thereby, for each firm, the relative performance is calculated as the individual stock return[5] minus the industry return[6] using yearly returns. In this way, we filter out factors that are not directly linked to the performance of the CEO.

$$(3.1) \qquad stock\ return_{it} - industry\ return_{\ at}$$

However, the measure we obtain in this first stage is not satisfactory due to the fact that we are not taking risk levels for specific firms into account. To compensate for the differences in volatility for the individual firms relative to the market[7], we introduce the well-known beta measure. Beta is calculated as the regression coefficient in the regression of the stock on a broad index, both measures calculated minus the risk-free interest rate. The beta measure captures the systematic risk[8] of the individual stocks and is valid under the condition that the index is sufficiently broad and thereby a proxy for the market (Bodie, Kane and Marcus, 2009, p. 247).

$$(3.2) \qquad stock\_return_{it} = \alpha_i + \beta_i * market\_return_t + u_{it}$$

Finally, to construct the relative performance measure we divide our measure obtained in equation (3.1) with the individual beta measures obtained in equation (3.2). This way, we obtain a performance measure similar to the Treynor ratio (Bodie, Kane and Marcus, 2009, p. 826). Our final measure is both filtering out the industry wide factors that are beyond the manager's control, and compensating for the individual risk characteristics of the companies.

$$(3.3) \qquad Relative\ Performance_{it} = \frac{(stock\ return_{it} - industry\ return_{\ at})}{\beta_i}$$

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[5] Stock return is defined as the percentage increase or decrease of the share price between the first and last trading day each year.
[6] Industry return is defined as the percentage increase or decrease of the index between the first and last trading day each year.
[7] OMX Stockholm Benchmark Cap PI is used as the market index.
[8] Systematic risk is also known as market risk and it is the net of firm specific risk, i.e. the inbuilt market risk (Bodie, Kane and Marcus, 2009, p. 248).

3.2 Additional independent variables

Market capitalization is used to measure the size of the firm and the relationship between firm size and compensation. Because of our shareholder focus we use market capitalization because it measures the firm size from the shareholders perspective. Generally, we expect the size to be an important factor in determining the absolute levels of compensation in the data set. The relationship between pay level and size has been shown in previous studies (Murphy, 1998, p. 54).

Independence indicator is the BvD Independence Indicator[9]; this is used to measure the amount of shareholder control over the firm. The grades are transposed from letters (A-D) to numbers (A=4, B=3, C=2, D=1), so an increase with one point in the regression is equal to an increase from e.g. C to B. A higher number corresponds to less shareholder control.

Equity-ratio measures the ratio of equity compared to total assets, and as a result it measures the amount of debt compared to total assets. We use equity ratio to approximate the amount of debt in the capital structure i.e. the free cash flow available.

P/E is an accounting based performance measure.[10] This measure is included because a higher number corresponds to a market consensus that the firm has strong growth opportunities, i.e. the firm is expensive with respect to current earnings (Berk and DeMarzo, 2007, p. 30-31).

Bonus-ratio measures the amount of variable compensation compared to the total compensation. According to the agent-principal theory, shareholders can create monetary incentives by changing the variable part of the CEO compensation. Due to stickiness, this is not as easily done when a firm only pays fixed salary. Therefore, we should expect firms with a high fraction of variable compensation to pay out more in total compensation in good years and less in bad years. Thus, the variable part should not according to the agent-principal theory be a determinant of the absolute level of compensation, and it should rather work as a tool of setting a compensation that reflects the performance of the company. However, the variable is of interest in our regressions to test if the higher salary risk for the CEO induced by a higher bonus ratio is rewarded in the total compensation. Should this be the case, overall compensation levels should be higher in firms with high bonus ratios and we can expect a positive coefficient.

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[9] The BvD Independence Indicator is a measure of the independence of the companies in regard to their shareholders. The highest grade A is given to companies with the most independence and the grade D is given to the ones with the lowest independence (Bureau van Dijk, 2011).

[10] P/E is defined as stock price divided by total earnings (Berk and DeMarzo, 2007, p. 30-31).

3.2.1 Regression with relative measure of performance

We start out with running the regression on total compensation[11] of the CEO (pay) as the dependent variable on the relative performance measure and a number of control variables and industry dummy variables. The regression is run in two specifications. The first specification includes all variables in level format, and the second specification includes a logged form of pay and market capitalization. χ_i in the regression represents firm fixed effects, and γ_t represents time fixed effects.

$$(3.4) \quad pay_{it} = \beta_0 + \beta_1 * relativeperformance_{it} + \beta_2 * marketcap_{it} + \beta_3 * independenceindicator_i + \beta_4 * equityratio_{it} + \beta_5 * pe_{it} + \beta_6 * bonusratio_{it} + \chi_i + \gamma_t + u_{it}$$

$$(3.5) \quad \ln(pay_{it}) = \beta_0 + \beta_1 * relativeperformance_{it} + \beta_2 * \ln(marketcap_{it}) + \beta_3 * independenceindicator_i + \beta_4 * equityratio_{it} + \beta_5 * pe_{it} + \beta_6 * bonusratio_{it} + \chi_i + \gamma_t + u_{it}$$

3.2.2 Regression with accounting measure of performance

A number of previous studies have focused on accounting measures of performance (Kaplan, 1994, p. 24) and it is probably a very convenient measure to use when the board is deciding on compensation levels. We introduce earnings per Share[12] (EPS) and yearly sales increase in percent[13] (Sales) as two performance measures and run the regressions below.

$$(3.6) \quad pay_{it} = \beta_0 + \beta_1 * EPS_{it} + \beta_2 * marketcap_{it} + \beta_3 * independenceindicator_i + \beta_4 * equityratio_{it} + \beta_5 * pe_{it} + \beta_6 * bonusratio_{it} + \chi_i + \gamma_t + u_{it}$$

$$(3.7) \quad pay_{it} = \beta_0 + \beta_1 * sales_{it} + \beta_2 * marketcap_{it} + \beta_3 * independenceindicator_i + \beta_4 * equityratio_{it} + \beta_5 * pe_{it} + \beta_6 * bonusratio_{it} + \chi_i + \gamma_t + u_{it}$$

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[11] Total compensation is defined as fixed pay including benefits plus variable salary.
[12] Earnings per share are defined as total earnings divided by the number of outstanding shares (Berk and DeMarzo, 2007, p. 28).
[13] Percentage increase in total sales from the previous year measured in SEK.

3.2.3 Regression including all of the performance variables

The last regression we test includes the complete set of performance variables, except absolute stock returns. This specification allows for an internal comparison between statistical strength among the included performance measures.

$$(3.8) \quad pay_{it} = \beta_0 + \beta_1 * relative performance_{it} + \beta_2 * sales_{it} + \beta_3 * EPS_{it} + \beta_4 * marketcap_{it} + \beta_5 * independence indicator_i + \beta_6 * equity ratio_{it} + \beta_7 * pe_{it} + \beta_8 * bonus ratio_{it} + \chi_i + \gamma_t + u_{it}$$

4 Data

The data consists of the 29 companies on the OMX Stockholm 30 index (OMXS30)[14] during the years 2005 to 2009, organized as panel data (strongly balanced). The market capitalization from 2005-2009 (measured in million SEK) and the BvD Independence Indicator is collected from the MINT Global Database (2011). From Thomson Reuters Datastream (2011) we collected yearly observations of the P/E ratio for the 29 companies (2005-2009), yearly observations of earnings per share for the 29 companies (2005-2009), yearly observations of sales figures from the 29 companies (2004-2009), yearly observations of the equity ratio for the 29 companies (2005-2009), yearly observations of the spot rates for the Swedish krona (SEK), the U.S. Dollar (USD), the Euro (EUR) and the Swiss Franc (CHF) (2005-2009), weekly observations of the stock prices for the 29 companies (2005-2009), yearly observations of dividends, including extra dividends, for the 29 companies, weekly observations from OMX Stockholm Benchmark CAP_PI[15] and weekly observations (2005-2009) of all the sector indices.[16]

The compensation data is hand collected for each year (2005-2009) from the annual reports for every given company and year. The data is collected in two parts, fixed pay and variable compensation. The fixed pay is the fixed cash salary for the year and additional benefits given[17] to the CEO. The variable compensation is defined as short term cash incentives given to the CEO based on a performance measure for the individual companies. Long term incentives and incentives given as financial instruments are not included in the data.

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[14] Atlas Copco was listed twice as Atlas Copco A and Atlas Copco B. We used Atlas Copco A because it has a higher trading volume then Atlas Copco B.

[15] The OMX Stockholm Benchmark CAP_PI is a weighted price index of the 80-100 largest and most traded companies on OMX Nordic Exchange Stockholm, with a base date of 12-30-1995. The index is weighted according to market capitalization and adjusted for free floating (Nasdaq OMX, 2011).

[16] We used sector indices for the following sectors, according to the GICS-standard: industrials, health care, materials, consumer discretionary, information technology, financials, energy, consumer staples and telecommunication. The indices include all of the listed companies that belong to the specific sector. All the indices are weighted price indices with the start date of 12-31-1995 (Nasdaq OMX, 2011).

[17] Yearly benefits e.g company car, housing and children's education.

4.1 Description of Data

In table 1 summary statistics of the data set is presented. One implication of that all of the firms are constituents of the OMX Stockholm 30 index is that all firms are fairly large. The average market capitalization, which we use as a measure of size, is 123,327 MSEK. However, the variation is substantial in the data with a standard deviation of market capitalization of 153,726 MSEK. The largest company has a market capitalization of 986,261 MSEK and the smallest 4,868 MSEK. As we have previously noted, explicit incentive contracts linked to performance become especially important when dealing with very large companies in terms of market capitalization. This is due to the fact that the CEOs are not likely to have a substantial stake of the total number of shares in the company and are thereby not substantially directly affected by a change in shareholder wealth.

TABLE I

SUMMARY STATISTICS OF SELECTED VARIABLES

Variable		Mean	Std. Dev.	Min	Max
Market Capitalization	Overall	123327	153726	4868	986261
	Between		146012		
	Within		53892		
Pay	Overall	13900000	7016126	3970000	42400000
	Between		6358374		
	Within		3149623		
Equity Ratio	Overall	64.5031	24.32392	7.59	100
	Between		22.27755		
	Within		10.44747		
PE	Overall	18.75357	17.56636	1.3	194.3
	Between		8.70872		
	Within		15.31368		
Bonus Ratio	Overall	.270046	.1718898	0	.693601
	Between		.1268322		
	Within		.117926		
Performance	Overall	.0858508	.336592	-.4494407	2.410268
	Between		.1583059		
	Within		.2982106		

The CEOs in our data sample earned on average a total compensation of 13 MSEK in 2005. For the following years in our data set the figure was 13.6 MSEK 2006, 14.5 MSEK 2007, 13.5 MSEK 2008 and 14.6 MSEK 2009. Total compensation has been trended higher over the sample time period with a dip in 2008, most likely as a result due to the economic turbulence in that year. The lowest amount paid to a CEO during the whole period was the total compensation of 3,970,000 SEK paid in 2005 to the CEO of Lundin Petroleum. In contrast, the highest compensation figure was 42,427,181 SEK paid in 2005 to the CEO of Nokia.

If we break down the numbers into a variable part (bonus) and a fixed part, we observe that two firms in the data sample did not pay any variable compensation as a part of the total compensation package to the CEO. The average bonus for the whole period was 4,419,765 SEK per year with a standard deviation of 4,589,173 SEK, and the mean bonus ratio - bonus divided by total compensation - was 27 percent. Overall across the firms, the bonus does not exhibit such a clear upward trend as the fixed part in our data set. The average fixed pay over the sample period was 9,431,315 SEK with a standard deviation of 3,882,614 SEK.

FIGURE I

LINE CHART OVER AVERAGE FIXED PAY COMPENSATION FOR ALL FIRMS IN THE DATA SET. A TREND LINE IS
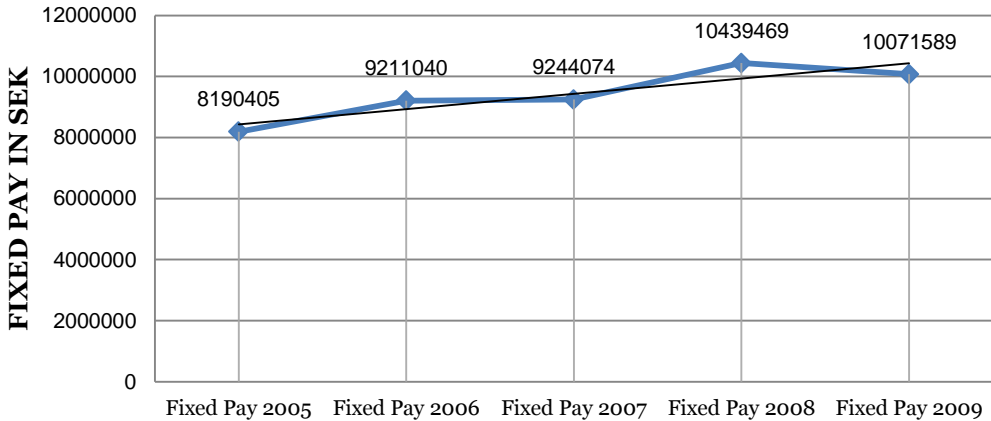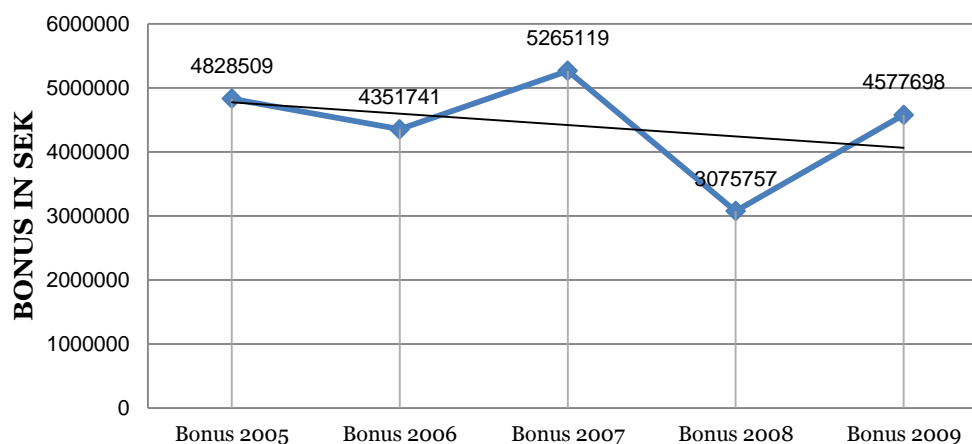ADDED TO THE GRAPH SHOWING A CLEAR UPWARD TREND IN FIXED PAY LEVELS.

FIGURE II

LINE CHART OVER AVERAGE VARIABLE COMPENSATION (BONUS) FOR ALL FIRMS IN THE DATA SET.

Across the firms, the mean equity ratio is 64.5 percent with a standard deviation of 24.3 percent. Generally, the equity ratio remains fairly stable for each firm in the data set between the years 2005 to 2009. The standard deviation of each firm equity ratio is only 9.62 percent. The lowest equity ratio in the data set is 7.6 percent and one firm has 100 percent across the whole time period.

The mean of the P/E ratio in the data set is 18.75 with a standard deviation of 17.57. The P/E ratio peaked in 2007 with 26.19, while the lowest ratio was 9.84 in 2009.

In general, the companies in our data set performed relatively well compared to their respective industries during the time period. In average the performance was plus 8.59 percent with a standard deviation of 33.66 percent. The range of the performance was from -44.94 percent to 241.03 percent. The average performance among the companies was highest in 2007 with 12.72 percent and lowest in 2006 with 5.82 percent. Breaking down the numbers into different sectors, the energy sector stands out as the only negative performing sector in our data set. In contrast, Materials is the best performing sector with an average relative performance of plus 30 percent.

FIGURE III

COLUMN CHART OVER AVERAGE RELATIVE PERFORMANCE IN DIFFERENT SECTORS.
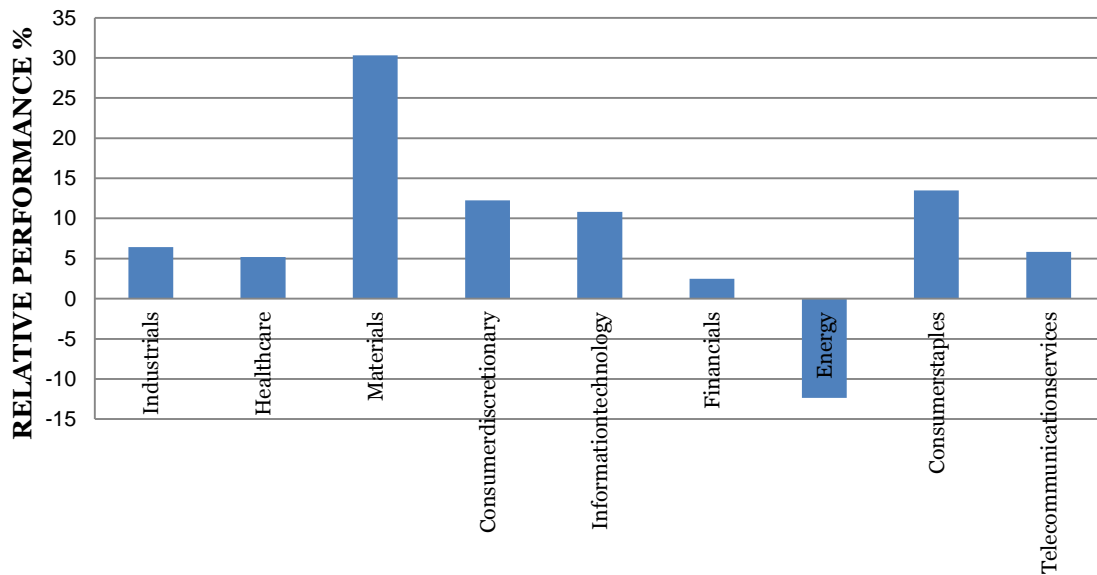
NOTE – Each company's relative performance measure in a specific sector has been added and then divided by the total number of firms belonging to the sector in the data set. No consideration has been made to weight the firms according to size.

4.2   Heteroskedasticity and Serial Correlation

A potential issue in the data set is the presence of heteroskedasticity. If heteroskedasticity is present, an ordinary OLS regression is no longer the best linear unbiased estimator (BLUE) and inference of the coefficients t statistics is no longer valid (Wooldridge, 2009, p. 264-265). Throughout the statistical analysis we therefore run a robust test to correct for heteroskedasticity. A second issue in our panel data set is the likelihood of serial correlation which leads to the same pitfalls as when heteroskedasticity is present. A test developed by Wooldridge (Drukker, 2003) is run to detect potential AR1 serial correlation.

$$H_0 = \text{No first order autocorrelation}$$

When running the test, an F-value of 35.424 is obtained with a corresponding p-value of 0. This result indicates that serial correlation is present and we run Prais-Winsten estimation throughout the paper to control for this in our statistical analysis.

5   Results

Results of the Prais-Winsten (FGLS) estimation of the regression model not including any of the accounting measures of performance (EPS and Sales increase in percent) is found in Table II. A regression model substituting the performance variable with EPS and Sales increase in percent is found in Table III. Finally, a regression of all of the performance variables is estimated and presented in Table III.

5.1   Regression with relative measure of performance

The regression of the first regression model is computed using two specifications. The first specification is straightforward with level variables while the total compensation variable (Pay) and market capitalization are logged in the second specification. Consequently, the second specification can be interpreted as the percentage change in pay when the other variables are altered. The two specifications yield R^2 – values of .8020 and .9940 respectively and the majority of the variables are statistically significant. However, we must consider these R^2 values very carefully due to the large number of variables included in the regressions (Wooldridge, 2009, p. 486).

TABLE II

REGRESSION OF PAY ON PERFORMANCE. DEPENDENT VARIABLE IS PAY IN SPECIFICATION 1 AND LN (PAY) IN SPECIFICATION 2.

Specification:	Level (1)	Log (2)
Relative Performance	-11056.13* (7384.16)	-.0005731 (.0004674)
Market Cap	11.14* (7.63)	.1129690* (.071886)
Independence Indicator	-2207185.00*** (559041.40)	-.2041966*** (.0394221)
Equity Ratio	59157.68*** (27039.88)	.0032697*** (.0011753)
P/E	-22062.59** (11331.52)	-.0011950** (.0006166)
Bonus Ratio	145195.40*** (35675.87)	.0124480*** (.0019314)
Fixed firm effect	Yes	Yes
Fixed year effect	Yes	Yes

*** Significantly different from zero at the 5 percent level.

** Significantly different from zero at the 10 percent level.

* Significantly different from zero at the 15 percent level.

    a.   Base dummy variable for the individual companies is Lundin Petroleum and the base year-dummy is 2005.

    b.   Standard errors are in parentheses.

    c. R^2 for the regression is 0.8020 in specification 1 and 0.9940 in specification 2.

    d.   Number of observations is 145.

The relative performance variable has unexpectedly negative coefficients in both of the regressions. A change in the performance of one unit actually decreases the total compensation received by the CEO of 11,056 SEK according to specification 1. In specification 2 the corresponding interpretation is that a one unit increase in the performance measure decrease the total compensation by .05 percent. In specification 1, the performance variable is statistically significant at the 15 percent level, but the variable is statistically insignificant in specification 2. An interpretation of both results is that a risk adjusted performance measure does not seem to be included when setting the compensation levels for CEOs. This result goes against the agent-principal theory that our model is based on, and in line with this, the shareholders definitely have reasons to be dissatisfied with how the pay is set. Possible explanations for this can be that CEOs are rewarded because the overall business climate is good or that non-firm specific factors play a big part in setting the pay for CEOs.

An example of this is an increase in the oil price that affects the compensation positively in the energy sector firms, a result in line with the study by Bertrand and Mullainathan (2001).

Market capitalization is statistically significant at the 15 percent level in both specifications and seems to be an important variable in explaining differences in compensation levels across the firms. This is in line with our expectations that large firms in general pay their CEO more than smaller firms. However, economically, the result is not as clear cut. An increase in market capitalization with one million increases the CEO pay by only 11.14 SEK. This is explained by the fact that the range of the market capitalizations is from 4,868 MSEK to 986,261 MSEK and the yearly standard deviation within individual firms is 53,891 MSEK. These large fluctuations in market capitalization explain the rather small value on the coefficient and the result is therefore also reasonable economically.

Independence indicator shows a negative relationship in specification 1, the coefficient is minus 2,207,185. The coefficient is statistically significant on a 5 percent level and it has a strong economic significance. The result implies that firms that have good grades of independence, i.e. the management is more independent towards the shareholders, pays less in compensation. An increase with one grade decreases the CEO compensation with minus 2,207,185 SEK. The conclusion is that controlling shareholders increase the compensation and when strong shareholders are missing the CEO compensation decreases. This is contradicting to the theory of controlling shareholders. In specification 2 the relationship is negative, coefficient is minus 2,041,966, still with a strong statistically and economic significance. But the meaning is a bit different. When the grade increases with one point the CEO compensation decreases with 20.42 percent. The conclusion is the same as in specification 1.

Equity ratio is positive and statistically significant at the 5 percent level. So an increase in equity ratio with 1 percent increases the CEO compensation with 59,158 SEK. Because an increase in equity is the same as a decrease in debt, the relationship can be stated as a decrease in debt raise the CEO compensation. This is expected in regards to the free cash flow theory. In specification 2 the relationship is positive but economically rather weak with a coefficient of .0032697. An increase in equity ratio with 1 percent would increase CEO compensation with 0.3 percent. The conclusion is that the equity ratio shows a less clear relationship with regards to CEO compensation in specification 2. As with specification 1 the variable is statistically significant at the 5 percent level.

From Table II we note that the P/E variable is negative, an increase in the P/E value by one unit decrease total compensation by 22,063 SEK. In general, firms considered to have strong future growth opportunities have a higher P/E value than more mature firms (Berk and DeMarzo, 2007, p. 30-31). In the light of this, one plausible interpretation is that firms with high growth opportunities pay their CEO less than more mature firms due to limitations in the free cash flow available. The variable is statistically significant in both specifications at the 10 percent level.

Bonus ratio shows a positive significant relationship towards compensation. The interpretation is that companies with higher bonus ratios pay out a higher total compensation. This is actually expected because a higher bonus ratio carries a higher risk for the CEO, and the higher risk level needs to be compensated. In specification 1, a one percent increase in bonus ratio increases CEO compensation by 145,195 SEK. In specification 2 the relationship is also positive and significant. The conclusion is that a one percent increase in bonus ratio increases the CEO compensation with 1.24 percent.

In the following sections, all results are compared to specification 1 because of easier comparison and economical interpretation of the variables. Further, the statistical power of independent variables is equally strong in specification 1 and specification 2. Previous research shows no direction in the choice of specification other than the conclusion that no approach dominates the other, which seems to be the case in our data (Murphy, 1998, p. 30).

5.2 Regression with accounting measure of performance

We note several differences when we use accounting measures as performance indicators as opposed to the regression results in Table II. R^2 – values for the regressions are .8691 in the earnings per share (EPS) case and .7698 in the sales increase case.

TABLE III

REGRESSION OF PAY ON PERFORMANCE WHERE PERFORMANCE IS MEASURED AS EARNINGS PER SHARE (EPS) AND SALES INCREASE %.

	EPS	Sales Increase %
EPS/Sales Increase %	26109.43* (16330.81)	4085.94 (5482.35)
Market Cap	10.65** (5.58)	8.47 (8.83)
Independence Indicator	-2461507*** (706413)	-2548008*** (964811)
Equity Ratio	28030** (15622)	53782** (28047)
P/E	-22001*** (5668)	-21425** (10852)
Bonus Ratio	153338*** (13334)	148079*** (35179)
Fixed firm effect	Yes	Yes
Fixed year effect	Yes	Yes

*** Significantly different from zero at the 5 percent level.

** Significantly different from zero at the 10 percent level.

* Significantly different from zero at the 15 percent level.

    a. Base dummy variable for the individual companies is Lundin Petroleum and the base year-dummy is 2005.

    b. Standard errors are in parentheses.

    c. R² for the regression is 0.8691(EPS) and 0.7698 (Sales Increase %).

    d. Number of observations 145.

When EPS is used as the performance measure, the sign turns positive on the performance variable. If EPS increases by one unit, the total compensation increases by 26,109 SEK. The variable is statistically significant at the 15 percent level. The positive relationship between the EPS variable and total compensation marks a completely different picture than the regression presented in Table II and is indicative of a use of this variable in the construction of the compensation packages. The result is similar when we use sales increase as a proxy for performance.

A one percent increase in total sales increases total compensation by 4,086 SEK. However, the variable is not statistically significant at any levels and no further conclusion is worth drawn from the regression including the sales increase variable.

Market capitalization increases in statistical power when EPS is used as performance measure. The coefficient is 10.65 and is statistically significant at the 10 percent level, an improvement from the previous regression.

Independence indicator is now statistically significant on a 5 percent level. The coefficient is still negative, minus 2,461,507, with a strong economic significance.

Equity ratio is still positive, coefficient of 28,030, but somewhat less statistically significant compared to specification 1. The coefficient of the variable still supports the free cash flow theory.

The P/E has still negative sign and the coefficient is now minus 22,001. The value is slightly more significant, now at a 5 percent level.

Bonus ratio shows a significant positive relationship, coefficient of 153,338, as expected from specification 1 and 2. But the variable now shows a stronger economic significance compared to the regression in specification 1.

5.3   Regression including all of the performance variables

In the last regression, all of the performance variables are included. The R^2 value of .8708 is not a dramatic change from the previous two regressions. We expect the value to go up only due to the added number of variables included in the regression, but the increase is small both compared to specification 1 and to the EPS-regression. The signs of the coefficients are identical in regression two and three. However, sales increase is now the only significant performance variable and it absorbs most of the significance of the other performance variables. This result strengthens the conclusion that accounting measures is probably an important measure when the guidelines for the compensation packages of the CEOs are set up.

TABLE IV

REGRESSION OF PAY ON ALL OF THE PERFORMANCE VARIABLES.

Relative Performance	-719.45 (4894.57)
EPS	14373.84 (63864.67)
Sales Increase %	6667.99* (4090.01)
Market Cap	10.50** (5.75)
Independence Indicator	-2772247*** (702840)
Equity Ratio	26375*** (16397)
P/E	-22591*** (5457)
Bonus Ratio	155787*** (14373)
Fixed firm effect	Yes
Fixed year effect	Yes

*** Significantly different from zero at the 5 percent level.

** Significantly different from zero at the 10 percent level.

* Significantly different from zero at the 15 percent level.

     a. Base dummy variable for the individual companies is Lundin Petroleum and the base year-dummy is 2005.

     b. Standard errors are in parentheses.

     c. R^2 for the regression is 0.8708.

     d. The performance variable stands for our originally constructed variable please see section 3.1 for a definition.

     e. Number of observations is 145.

Market capitalization is as previously positive with a coefficient of 10.50 which is similar in size as the previous two comparable regressions and as statistically significant as in the regression in section 5.2. Economically, the value is similar to the previous regressions.

Independence indicator is statistically significant and it still shows a negative relationship, similar to the regression in Table III. The coefficient is now minus 2,772,247.

Equity ratio still has a positive relationship, 26,375 towards pay. It is also statistically significant at the 15 percent level.

The P/E variable is still negative and significant at 5 percent. Economically, the value is roughly the same as in the previous regressions.

Bonus ratio is still very significant with a positive relationship, 155,787. This adds to our previous conclusions that it is an important variable in explaining the difference in compensation levels across firms.

In summary, the independent variables excluding performance measures are all economically and statistically similar to the previous regressions. The main difference is the internal relationship between the performance measures. Although none of the performance variables change signs, the relative performance measure now becomes the less statistically significant variable. As previously noted, this implies that accounting measures probably are used when CEO performance is evaluated and the compensation is set.

6 Discussion

6.1 Control variables

We tested our control variables in the five regressions, with a mixed result regarding their statistical and economic significance.

The equity ratio variable that was used to test the free cash flow theory had a strong support in the regressions. All of the regressions supported the theory, delivering positive coefficients to the variable. The implication of this is that a higher share of equity in the capital structure results in higher levels of compensation for the CEOs in our sample. This suggests that there is empirical evidence supporting the free cash flow theory in our data set.

All of the regressions show a negative relation between total compensation and P/E. Firms with high future growth opportunities tend to have higher P/E-ratios and current limitations in the free cash flow available. In contrast, mature firms tend to have more and stable free cash flows available to pay compensation. This result gives more support to the free cash flow theory and its importance in setting compensation levels.

Bonus ratio was statistically significant in Table II, Table III and Table IV, all with a positive coefficient. Supported by the regressions we draw the conclusion that our data set supports the risk compensation theory in regards to compensation.

Independence indicator, our measurement of shareholder control gave an unexpected relationship in all of the regressions. The negative results contradict the shareholder control theory and we conclude that our data set show no support for the shareholder control theory.

6.2 The link between compensation and performance

All of our three regressions give a unison picture of the relationship between relative performance and compensation. None of the regressions showed a positive coefficient for the relative performance measure, instead they showed a negative coefficient, the most statistically significant level is 15 percent. The conclusion we draw from this result is that there is no relationship between the CEO's relative performance and the setting of compensation levels, i.e. the compensation packages are not related to the relative performance measure. To validate this conclusion, we did another regression with accounting measures, trying to test if accounting measures determine compensation. As confirmed by Table III, EPS have a strong positive coefficient in regards to compensation but it is also statistically significant at only 15 percent. At Table IV total sales percentage changes is the

most statistically significant performance variable. It seems like compensation is not correlated with our relative performance measure, i.e. the variable compensation is not dependent on our relative performance measure. The accounting measures seem to have a stronger relationship towards compensation as we can see in Table IV where the accounting measures overshadow our relative performance measure. The sign of the coefficients when using accounting measures is also more economically convincing in that a better performance relates to a higher amount of compensation. From the results, it is reasonable to assume that accounting measures are used when performance is evaluated for the firms in our data set. This is in line with the study by Murphy (1998, p.11), who presents data showing that a majority of the studied firms use accounting measures as a base evaluation criteria for performance.

The other five variables (market capitalization, independence indicator, equity ratio, P/E and bonus ratio) all have as strong, or even stronger, statistical significance as the performance measures, they are also economically significant. That is why it is reasonable to presume that much of the compensation is not based on performance, it is based on the other five variables. Previous research has confirmed the rather weak incentives link between shareholders and the CEO, e.g. Jensen and Murphy (2009) showed that CEO wealth changes by only $3.25 for every $1000 change in shareholder wealth. Further, the regressions are clear on the fact that the compensations are not filtered for market performance. This is an unexpected result and it is not what we expected. Variable compensation, especially, should be determined by some sort of relative performance measure but it seems like compensation is mostly determined by the other variables including accounting measures.

The conclusion we draw from the results is that firms do not seem to determine the size of their short term variable compensation payments according to the theory presented in this paper, i.e. agency theory. Instead, boards seem to use accounting measures when performance is evaluated which is a method that is not in the best interest of the shareholders. An implication of this lack of filtering when compensation levels are set is that macroeconomic factors probably determine compensation more than the individual performance of the CEO. This is not in the best interest of the shareholders.

7 Conclusion

Our main finding from our five regressions is that CEO compensation in our data set is not related to our relative performance measure. We obtain a negative relationship between compensation and the relative performance variable in all of the regressions. It seems like compensation is not determined according to the agent-principal theory, aligning the interest of the shareholders and the CEO. In addition, the compensation is not filtered for macroeconomic affects. Instead accounting measures such as EPS and other factors, e.g. market capitalization and bonus ratio play a vital part in determining the compensation levels for the CEOs studied.

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Appendix

List of included companies

ABB	Sandvik
Alfa Laval	Scania
Assa Abloy	SEB
AstraZeneca	Securitas
Atlas Copco	Skanska
Boliden	SKF
Electrolux	SCA
Ericsson	SSAB
Getinge	Svenska Handelsbanken
H&M	Swedbank
Investor	Swedish Match
Lundin Petroleum	Tele2
MTG	Telia Sonera
Nokia	Volvo Group
Nordea	