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CEO compensation and its relation to firm performance

- Evidence from Sweden -

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Summary

Title:	**CEO Compensation and its relation to firm performance**
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Key words:	Pay-performance, Performance measures, Agency theory, Regression analysis
Purpose:	The purpose of the thesis is to examine how the pay-performance relationship behaves for firms listed on the Stockholm Stock Exchange large cap list and attempt to draw inferences about how nation-specific aspects characterizing listed Swedish firms affect the relationship.
Theoretical framework:	Principal agency theory, econometrics, Swedish stock specifics, the pay-performance relationship, management incentive programs.
Method:	The method is a regression analysis using regressing performance on pay along with the control variables firm size and leverage. Data quality testing procedures are carried out in order to secure the credibility of the data and the inferences.
Empirical analysis	A significant relationship between pay and performance is found with the performance proxy return on assets (ROA) when lagged one period, where the relationship is negative. Positive significance is found with the performance proxy share development when lagged one period. Salary regressed on ROA lagged one period along with leverage and market cap only resulted in significance for market cap on a 95% α-level.
Conclusion:	Since share development only have a marginal impact on the level of executive pay and the since ROA is negatively aligned with the remuneration levels we find weak support for bonus being an effect mechanism for aligning the interest of principals and agents among Swedish large cap firms.

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1 Introduction

This introductory chapter introduces the reader to the background and problem as well as the purpose and related research questions used in the study. The section is ended with delimitations and a disposition of the paper.

1.1 Background

Top management compensation has been subject to much debate in media as well as in academic literature. Whenever executive salaries, and bonuses in particular, are mentioned in the daily press, it is almost exclusively in relation to a recent scandal in which the top management of a company has usurped huge bonuses. The often negative portrayal of compensations packages for top executives in the popular press has lead to a general perception of top management compensation largely being the result of greed and maximizing personal gains. A number of scandals have fuelled the negative view, where the Skandia-scandal, in which the top-management had unjustifiably appropriated huge bonuses (BBC News, 2003), is one the most notorious. Thus, much of the criticism directed against top-management compensation stems from a belief that the high salaries and bonuses are not justified with respect to enhanced firm performance. Some critic is also concerned with the sometimes extreme difference in pay between top executives and workers which many critics argue are far from reasonable (Shim & Lee, 2003).

Agency theory states that an agency problem exists when an agent, such as a CEO or a top executive, acts in a manner that is not necessarily in line with the interest of the shareholders which, needless to say, is to maximize share value, but instead aims at maximizing personal wealth (Attaway, 2000). According to Boyd (1994) such conflicts of interest are most likely to exist when the agent has little or no personal financial interest in the outcomes of his/her decisions. Consequently, one way to reduce conflicts of this kind is to align the interest of the principal (the shareholders) and the agent (the CEO) by tying the compensation to the financial performance of the firm, thus creating an incentive for the agent to maximize firm performance and ultimately share value. Academic theory therefore expects a positive relation between executive compensation and firm performance. However, designing a contract that perfectly aligns the interests of the management with the shareholders is next to impossible in all cases when the CEO does not own 100% of the shares. Thus, the degree of efficiency of contracts in

terms of aligning the interest of the CEO by tying the compensation with that of the shareholders can vary significantly among firms, industries and countries. Due to that the relationship between executive compensation and firm performance exhibits varying degrees of relation depending on the context, and sometimes even a negative relationship, the subject has been widely researched over the years.

In Sweden, the executive compensation debate escalated after the ABB CEO, Percy Barnevik, $54m compensation, which was unveiled the same day that the company announced a loss of $691m along with a cost-cutting measure of reducing the workforce with 12,000 employees, (BBC News, 2002)[1]. A study conducted by the Nordic Investor Services has further intensified the public debate of management compensation levels (SVT, 2008-05-23). Using a sample of 100 firms of which 50 used equity based incentive programs for their top-executives and the remaining half did not, the report concludes that when measuring the two sub-samples against their respective indices over a period of eight years, the firms that had implemented a management incentive program did not, on average, perform better. In fact, less than 50% of the firms with equity based incentive programs outperformed their indices, whereas more than 60% of the firms not using such reward systems had.

1.2 Problem discussion

The subject of top-management compensation and how it relates to firm performance is widely researched (Baum, Sarver & Strickland, 2004). The most influential article on the subject is written by Jensen and Murphy (1990). The paper examines the pay-performance sensitivities in an extensive study of over 1000 firms and 7000 observations between 1974 and 1986. The authors find, in line with theory, a significant positive relationship between pay and performance. The authors however, also detect large differences between large and small firms where the latter have considerably higher sensitivities. Since then, several studies have further investigated the topic, although with somewhat different focuses and methods where primarily measures for firm performance and industries of interest differ. For instance, Shim and Lee (2003), use a canonical regression model when they research the pay-performance relationship on the American service sector. The authors, who combine a number of accounting and market based performance variables to construct a proxy for firm performance, find a positive relationship between

[1] More than half of the pension/benefit package was repaid in 2002

performance and total management compensation. Another study, conducted by Baum, Sarver and Strickland (2004) analyzes 355 American firms' pay-performance relationship using Economic Value Added (EVA) and/or Market Value Added (MVA) as indicators for firm performance. The authors only find a significant relationship between MVA and executive compensation, whereas no conclusive evidence supports a corresponding relationship for EVA. Yet another American study takes a different approach as it takes into account, along with firm performance as measured by accounting- and market based variables, CEO specific factors such as age and education when explaining CEO compensation and the pay-performance relationship. The study finds a positive pay-performance relation for all factors save for education (Attaway, 2000).

Concerning non-American studies, most researches have focused on British companies. One study, conducted by Paul Gregg, Sarah Jewell and Ian Tonks (2005) examine the relationship between cash compensation and firm performance for UK firms over the period 1994-2002. The authors find an asymmetrical relationship between pay and performance as it is concluded that in times of high stock returns, the pay-performance sensitivity is high, implying higher compensation as a result of improved firm performance, but during periods of low stock returns the executive pay is less sensitive, indicating that worsened firm performance is not followed by lower compensation. Based on the asymmetrical relationship, the authors conclude that there is little relationship between pay and performance for UK firms.

Outside US and UK the number of studies on compensation packages and the pay-performance relationship are limited (Zhou, 2000; Duffhues & Kabir, 2007). Zhou (2000), analyzed firms listed on the Toronto Stock Exchange which, he reasons, provides additional insights to the research area as the Canadian market compared to the American has a different industry structure thus allowing for documenting the effects of industry heterogeneity. Moreover, Canadian firms are generally smaller than American, which provides an opportunity to ascertain whether any differences exist in pay-performance between large and small firms. Zhou finds that the compensation is indeed related to firm performance and that CEO pay rises with firm size.

Two Asian studies on pay-performance are performed by Kato and Kubo (2006) and Firth, Fung and Rui (2006) respectively, where the former researched Japanese firms and the latter Chinese. Both Japanese and Chinese firms have somewhat unique properties in that the stock market has

limited influence on the two nations' companies, although for different reasons. In China, the state exerts an exceptionally high influence (Firth et al. 2006) and in Japan, firms are under, relative to other markets, considerably higher pressure of stakeholders other than shareholders. The most influential group is debt holders, which in Japan constitute a more effective corporate control mechanism than the stock market. Consequently, weaker pay-performance relationships can be expected for both Japanese and Chinese firms as neither banks, in the case of Japan, nor the state in the case of China, does not necessarily have agendas that translate into maximizing shareholder value. Kato and Kubo (2006) find a positive pay-performance relationship for the Japanese firms, particularly when performance is measured with accounting measures. The results are less conclusive regarding stock based performance, indicating a lower sensitivity between executive compensation and stock performance. For the Chinese companies, the findings are inconclusive, i.e. no significant relationship between firm performance and management compensation.

One article written by Duffhues and Kabir (2008) research the pay-performance relationship for firms listed on the Dutch stock exchange by using accounting- and market based measures as a proxy for firm performance. The authors argue that the Dutch case is of special interest due to ill-functioning mechanisms for corporate control caused by anti-takeover devices and block holder ownership. In addition, ordinary shareholders have no authority in deciding remuneration to top executives since this is the exclusive right of the supervisory board of non-executive directors. The paper finds, contrary to what academic theory suggests, no systematic evidence of significant positive relationship between pay-performance, but does on the other hand find statistically significant negative relationship for some of the analyzed factors. The theory-contradicting finding is explained with management having the ability to influence its own compensation schemes along with management entrenchment which is likely to occur in situations of inferior corporate control mechanisms.

As the above mentioned studies suggest, the pay-performance relationship differs between contexts due to differences in terms of firm size, legislation and culture. Thus, provided that a market exhibits some unique characteristic, conducting a study can yield additional insights into the factors affecting the pay-performance relationship. Sweden can be considered to be such a case since a few, but exceptionally powerful groups, own a large share of many Swedish corporations. The Swedish firms can in that sense arguably be said to be akin to the Dutch which

also have a block holder ownership structure in many companies. However, the Swedish case also has an additional special feature; the existence of A and B shares which distorts the voting allocation among the shareholder with the consequence being that having the class of shares with higher voting power a can render a mere 1% ownership stake in the firm to a 10% of the voting power. Most of the powerful groups' power resides in their significant holdings of shares with higher voting power. The way the Swedish case of high ownership and voting concentration among a small number of groups might affect the pay-performance relationship poses an interesting context to research as it may be able to capture unique aspects that can yield additional insights into the subject. Furthermore, the study can also potentially contribute with additional knowledge regarding differences in the pay-performance relationship for small and large companies since Swedish firms are on average smaller than the American and British. Due to the ample amount of studies conducted on these two markets, it could be possible to carry out an analysis on how the pay-performance varies with firm size by comparing the results from the Swedish market with inferences drawn from the American and British research.

1.3 Purpose

The purpose of the thesis is to examine how the pay-performance relationship behaves for firms listed on the Stockholm Stock Exchange large cap list and attempt to draw inferences about how nation-specific aspects characterizing listed Swedish firms affect the relationship.

1.4 Research questions

Considering the issues that have been raised in the previous sections, the research questions are as follows:

- Is the relationship between CEO compensation and firm performance different depending on how firm performance is defined?
- How do the findings relate do academic theory on principal-agency problems?
- Are size and leverage significant in determining CEO compensation also on the Swedish market?
- Are there any pay-performance relationship characteristics that can be related to Sweden specific aspects such as block holder ownership, dual class voting shares and stock market size

1.5 Delimitations

In order to provide a reliable estimate of the current pay-performance relationship while at the same time limit the influence of short term deviations and provide a large enough sample to assume normal distribution, the authors have decided to limit the study to the period 2004-2007. Limiting the study to this period will also allow the authors to avoid drawing inferences from a period where stock prices deviated from that of economic fundamentals (Koller, Goedhart & Wessels, 2005).

1.6 Disposition

Chapter 2 – Theoretical framework – presents the reader with relevant theories in order to provide valuable knowledge on primarily principal agent theory and statistical testing and to help the reader in making conclusions from this particular study. The third chapter – Method – presents and evaluates the chosen model in terms of validity and reliability. In chapter 4 – Descriptive statistics – the gathered data is presented. Chapter 5 – Statistical analysis - provides a statistical analysis of the data. Lastly, chapter 6 – Conclusion – concludes the study by emphasizing the most important inferences as well as presents a few suggestions for future research.

2 Theoretical framework

This section defines important concepts and presents the most relevant theories in order to facilitate the readers understanding of the findings of the thesis. The theories include the agency theory and econometric test procedures. The chapter also describes how the Swedish stock market differs from that of other countries and what executive compensation programs generally looks like.

2.1 Agency theory

The separation between ownership and control in modern corporations is a basic tenet of a free-market society as it allows for specialization. It is therefore prevalent in virtually any economy (Ogden, Jen & O'Connor, 2002). It is based on the notion that some individuals on the one hand have capital but lacks time or expertise whereas others lack funds but on the other hand have the expertise to undertake profitable investments. The corporation assembles these two factors of capital and labor under a formal efficient structure.

Financial economic theory posits that all shareholders, given perfect market conditions, agree that managers should take all projects until the marginal rate of return equals the market determined discount rate, i.e. maximize shareholder wealth (Copeland, Weston & Shastri, 2005). The motives of the shareholders and the management do not always conform though, as the latter evaluates his/her private gains when considering a project, which may lead to decisions that maximizes the wealth of the manager rather than that of shareholders (Jensen & Murphy, 1990). Consequently, shareholders must, without incurring any costs, be able monitor every action the managers take in order to certify that the management team indeed work towards shareholder wealth maximization. Unfortunately, monitoring *does* come at a cost, hence heavily restricting the control owners can exert on management actions (Ogden et al. 2002). In fact, due to the often highly diffuse ownership structure of corporations, no individual has an ownership stake large enough to justify spending time and resources to control or monitor the firm's operations. For these reasons, the importance of designing a contract that optimally aligns the interest of the principal (owners) and the agent (management) is of outmost importance. Tying the compensation policy so that management's welfare is dependent on shareholder wealth helps aligning the interests of agents and principals (Jensen & Murphy, 1990). There are a number of contracting mechanisms through which alignment of interests between agents and principals in a corporate setting can be improved. Performance based bonuses, salary revisions and stock option

plans are three common examples. The details as well as the pros and cons of various executive compensations schemes will be discussed in section 2.3 below. However, efficiently implementing such devices in a contract is difficult as contracting costs varies over time and between sectors (Core, Guay & Larcker, 2003). Moreover, some scholars reason that even though a firm manages to create an optimal contract, transaction costs associated with revising the contract in accordance with changes in the firm environment prohibit continuous recontracting, which causes a gradual deterioration of the contract efficiency, (Core et al. 2003). Due to the suboptimal contract arrangements between principal and agent, conflicting interests arise, including management wealth increasing at the expense of the shareholders and unwarranted company risk reduction to enhance management employment security (Ogden et al. 2002). Examples of such actions are:

- **Excessive consumption of perquisites -** Managers use firm money to make expenditures that come at their personal benefits like for instance purchase jets for more comfortable travel**.**
- **Manipulating earnings -** If the bonus is tied to for example return on equity, management has an incentive to distort earnings upwards to receive larger bonuses.
- **Maximize firm size rather than firm value -** Generally, the larger the company, the higher the compensation, leading to an incentive for managers to maximize size. This may lead to actions that do not necessarily increase firm value like acquisitions that fail to generate synergies.
- **Management entrenchment -** CEOs can make themselves irreplaceable by steering the company into a course reflecting the unique talents of the CEO, which impede the possibilities for shareholders to remove him/her even under inadequate performance.

Due to that company managements in many cases have the possibility to influence their compensation as a result of inferior contracts, increased salaries and bonuses are not always preceded by improved firm performance. It is therefore of interest for researchers to measure how well compensation relates to firm performance, the so called pay-performance relationship, in order to make inferences about the level of efficiency of existing executive compensation schemes when it comes to maximize shareholder value.

2.2 Common methods for researching the pay-performance relationship

The pay-performance relationship has been widely examined in academic literature. The most common practice for testing the relationship is through regression analysis where executive compensation is held as the dependant variable and firm performance, as measured by various variables, as the independent. However, the specification of the regression model is subject to much debate where particularly the choice of variables representing firm performance is the most controversial. Although most researchers agree on the definition of executive remuneration being constituted by cash compensation and stock plans, the parameters used to proxy firm performance ranges from one single accounting- or market based performance metric to combinations of several. In addition, some researchers (Jensen & Murphy, 1990; Zhou, 2005) prefer an arithmetic specification whereas others have used an elasticity or semi-elasticity specification model (Duffhues & Kabir, 2007).

2.2.1 Defining executive compensation

Regarding the definition the dependent variable, i.e. the executive compensation, most researchers agree that is it constituted by short term incentive awards including salary and bonus, long term incentive rewards, which is primarily comprised of options, and benefits (Zhou, 2000). Despite recognizing the long-term incentive rewards as a component of executive compensation, most researchers chose to only include the direct cash payments, (Agarwal, 1981) i.e. the short term rewards and do as such omit the long term compensations. This is due to the problems of obtaining adequate estimates of the value of executive options plans as many companies do not publish such information. However, Lewellen and Huntsman (1970) inferred based on a regression analysis, that using salary and bonus is a sufficient substitute for a more comprehensive measure for compensation that takes into account for example pension benefits and stock options, hence suggesting that studies omitting long-term compensation nevertheless can produce valid inferences. One should though, include all components of executive compensations to the extent the empirical data can allow for.

2.2.2 Defining firm-performance

Concerning the measure of firm-performance, many models include a set of both accounting based- as well as market based variables (Duffhues & Kabir, 2008). The most widely used accounting performance measures are:

Return on assets, ROA - Defined as the operating earnings (EBIT) over the book value of total assets and measures a firm's operating efficiency in generating profits from its assets prior to the effects of financing (Damodaran, 2002)

$$ROA = \frac{Operating\ Income}{Total\ Assets}$$

Return on Sales, ROS – Defined as the operating income (EBIT) over total sales.

$$ROS = \frac{Operating\ Income}{Sales}$$

Annual Stock Return – A pure capital market based performance measure which will take the annual return for the stock the year immediately preceding the annual report.

Earnings per share, EPS – Net earnings over number of shares outstanding.

$$EPS = \frac{Net\ Earnings}{Outstanding\ Shares}$$

In addition to the above mentioned performance indicators, some scholars include a hybrid variable that combines both accounting- and market based factors. The most commonly used is Tobin's Q which is defined as the ratio of the sum of market value of common shares, including liquidation value of preferred stock, and book value of debt to book value of total assets. A Q ratio below 1 indicates a low valuation of the market and correspondingly, a ratio above 1 indicates an overvaluation (Shim , 2000).

$$Tobin's\ Q = \frac{MVE + PS + Debt}{Total\ Assets}$$

Where:

MVE = Market Value of Equity [Firm's closing stock price x number of common stock]
PS = Liquidating value of firms outstanding preferred stock
DEBT = Value of firm's short term liabilities net of its short term assets

Some researchers argue that the most appropriate proxy for firm performance is to solely rely on stock value since it is a reflection of shareholder wealth whereas other reason that accounting performance measures are more useful since these are less susceptible to the general market environment which are beyond managerial control (Zhou, 2000). However, accounting based performance measures also have a number of disadvantages, primarily the management's possibilities of manipulating results. According to Stewart (1994), there are as many as 164

proprietary adjustments than can be made to GAAP inputs. These include, among others, manipulating the depreciation policy (accelerated vis-à-vis straight-line), changing inventory valuation procedures (changing from FIFO to LIFO) and holding borrowed money as cash till the end of the year in order to temporarily improve the balance sheet (Gomez-Mejia, Tosi & Hinkin, 1987). Due to the drawbacks associated with both market- and accounting based performance indicators, many researchers incorporates both types since the combination of the two provides a more comprehensive measure. Moreover, one without the other cannot fully explain the level of executive compensation, which is why both are needed to accurately capture the complex pay-performance relationship (Shim, 2003).

One issue with the type of regression analysis that explains executive compensation with firm performance is that it neglects the possibility that, which some scholars theorize, the relationship is the opposite, i.e. that the compensation precedes the performance of the firm (Shim, 2003). If that is the case, testing the pay-performance relationship in the conventional manner may not be possible as the problem of endogeneity, i.e. the chosen performance proxies are not determined exogenously to the equation, lead to inconsistent and biased results (Brooks, 2002). The problem with the phenomena, and how to solve it is discussed in section 2.4.4.

2.3 Management compensation programs

As discussed in section 2.1, the compensation program is the primary device at the shareholders disposal by which the interests of the management team can be aligned with that of shareholders (Jensen & Murphy, 1990). Many firms employ a combination of short term cash compensation such as salary and bonus and long term incentive rewards including stocks and options and other benefits like pension when designing their compensation packages. The components target the principal agent problem in different ways. Beginning with salary, it is considered fixed due to it being only limitedly dependant on firm performance. Hence it serves as a relatively secure income for the management, and the amount is usually set to be aligned with the salary levels in the market in which the executive in question is employed (e.g. Saab annual report, 2007; Skanska annual report, 2007; SSAB annual report, 2007; TeliaSonera annual report, 2007). Thus, salary is the primary mean by which qualified executives are recruited which as such should ensure that the company is managed by executives that have the required skills and competence to improve firm performance. It is as such not primarily an incentive program for executives as

much as it is a device for attracting qualified persons. However, the salary can be revised to either punish or reward depending on how well the management has performed and can in that respect be seen as a short term incentive device. The variable part of the short term incentive program, the bonus, is most often paid out annually and is tied to accounting measures such as earnings, earnings per share, return on equity and return on operating assets (Ogden et al., 2002). However, some companies such as Ericsson and Eniro also take into account non-financial metrics in addition to the financial counterparts. For example, in Ericsson's annual report (2007) it can be read that employee motivation and customer satisfaction influenced the bonus and Eniro states in its annual report (2007) that the realization of synergy effects in the organization and the success of general cost-cutting activities constitute a part of the executive bonus. Even in these companies though, the majority of the bonus is tied to financial performance as measured by accounting based metrics. The main drawback with annual bonuses is due to its short-term nature, management can be too fixated with short term earnings which might lead to decisions that negatively affects the firm's long-term earnings which is what the share value ultimately depends on. However, this particular drawback is to some extent offset by having a concurrent long-term incentive plan in place which stimulates actions to enhance long-term shareholder value. An additional problem with bonuses is that since they are largely dependent on accounting based measures which can be manipulated by for example changing depreciation methods or delaying revenues, the bonus might not be caused by an actual improvement of firm performance (Ogden et al., 2002).

Long-term incentive programs are usually in the form of stock options, restricted shares and long-term incentive plan payouts (Zhou, 2000). Stock options provide the executives with the option to purchase the stock at the exercise price stipulated in the options contract at a certain time in the future, thus creating a long term incentive to increase share value as the difference between the exercise price of the option and the market value of the stock is pure profit at the time when the option expires. Restricted stock is either given or sold at a discount to the CEO with the restriction that they cannot be sold over a certain time period or until some specified performance criteria has been met.

A major problem shared among all such devices is that due to that such a large part of the executives' compensation is dependent on the welfare of the firm, the personal portfolio of the manager is not well diversified (Ogden et al, 2002). Thus, a manager is exposed to the total risk

of the firm as oppose to a diversified shareholder who is only concerned with the systematic risk. Consequently, a manager will, if risk averse, therefore be inclined to reduce firm risk by for instance reducing the operating leverage to suboptimal levels or only take on low-risk projects which will not maximize share value (Ogden et al., 2002). Such behavior would be even worse though if incentive programs did not exist at all.

2.4 Econometrics

In order to determine how well the regression model explains the relationship between the included variables, there are a number of econometrics tests at the researcher's disposal. In this section, normality testing of the sample data, heteroscedasticity testing, multicollinearity between the explanatory variables and endogeneity are presented.

2.4.1 Bera-Jarque normality test

The Bera-Jarque test tests whether the coefficient of skewness and coefficient of excess kurtosis of the normality distribution curve are jointly zero (Brooks, 2002). The skewness measures the extent to which the distribution is not symmetric about its mean value. Kurtosis measures the fatness of the tails of the distribution curve. For normality to hold, the skewness must be zero and the kurtosis coefficient have the value of 3. The equations for the two coefficients respectively are:

$$b_1 = \frac{E[u^3]}{(\sigma^2)^2}$$

$$b_2 = \frac{E[u^4]}{(\sigma^2)^2}$$

Where :

b_1 = Coefficient of skewness

b_2 = Coefficient of kurtosis

u = mean of errors

σ^2 = variance of errors.

The Bera-Jarque statistic in given by:

$$W = T\left(\frac{b_1^2}{6} + \frac{(b_2 - 3)^2}{24}\right)$$

Where:

T = sample size

The two coefficients b_1 and b_2 can be estimated using the residuals from the OLS regression. The Bera-Jarque statistic follows a $\chi 2$ (2) with the null hypothesis being a symmetrical and mesokurtic distribution.

2.4.2 Heteroscedasticity

Ordinary least squares, OLS, regression assumes that the variance of the errors are constant, in which case the errors are said to be homoscedastic (Brooks, 2002). If the errors do not have constant variance, they are heteroscedastic. The consequence of heteroscedasticity in the data when running an OLS regression is that the coefficients will no longer be efficient, i.e. they will not have the minimum variance possible among the class of unbiased estimators. There are a number of methods for detecting heteroscedasticity. One is to simply plot the residuals in a graph and visually determine whether the variance is constant or not. The method is limited though since one rarely knows either the cause or the form of the heteroscedasticity. A more formal test is White's which by not making many assumptions about the form of heteroscedasticity is particularly useful (Brooks, 2002).

2.4.3 Multicollinearity

When using standard ordinary least square, OLS, regression, one implicitly assumes that the explanatory variables are not correlated, in which case they are said to be orthogonal to one another (Brooks, 2002). If orthogonality holds, the coefficients for the explanatory variables in the regression model will not change if one or more are removed from the equation. In practice though, there most often exist some degree of correlation between the variables. Fortunately, a low extent of association between variables does not constitute a significant problem as it will not give rise to too much loss of precision of the regression model. However, if the correlation between the explanatory variables is high, the problem of multicollinearity arises. If it is prevalent in a regression, the "goodness of fit" measure, R^2, would be high but the standard errors of the individual variables would also be high, which would make the model to appear as good as a whole but where the individual variables are not significant. This is the case when the explanatory variables are closely related and therefore makes it difficult to separate each individual variable's contribution to the fit of the model. A negative effect of this is that adding

or removing one variable has large impact on the coefficient values of the other variables. Multicollinearity will hence make the conclusion from significance tests of the variables inappropriate, thus making it difficult to draw sharp inferences (Brook, 2002).

There are a number of solutions to dealing with multicollinearity. One is to simply ignore it if the model is otherwise plausible, i.e. being statistically significant and having coefficients of reasonable magnitude and having appropriate sign. Another is to omit one of the collinear variables which will make the problem disappear, although it might potentially bias the results. A third option is to, if possible, collect more data as the multicollinearity might be a result of insufficient information in the sample (Brook, 2002).

One method for detecting multicollinearity is to look at the matrix of correlations between the variables. If any of the pair-wise correlations exhibits a high correlation, then a problem of multicollinearity could be existent (Brooks, 2002).

2.4.4 Endogeneity

In the event that any of the explanatory variables are not determined by factors outside of the regression equation, the model suffers from endogeneity which for example could be prevalent in pay-performance regression models as the performance could, in part, be determined by executive compensation. In order for the ordinary least square, OLS, estimation technique to be applicable, the independent variables must be uncorrelated with the errors of the regression (Brooks, 2002). Endogeneity is a violation of that assumption and if present in the regression equation it causes the coefficient estimates to be biased, a problem referred to as simultaneity bias. The consequence of the bias is that the OLS estimator becomes inconsistent despite extending the number of observations infinitely. Consequently, running a regression analysis with an equation suffering from endogeneity would produce invalid inferences. Fortunately, the problem can both be tested for and, in the event of it being prevalent in the regression model, also be solved. The most common way for both testing and solving the endogeneity is to use instrumental variables that are correlated with endogenous variables but not with the error term in the regression equation, so called instruments (Brooks, 2002). Detecting endogeneity using the instrument method can be done with a Hausman test, which is carried out in two steps. The first step involves regressing the suspected endogenous variable(s) on its (their) instruments along with, if the original equation is a multivariate, all exogenous variables. In the second step, the

residuals from the instrument regression are then used as an additional explanatory parameter in the original equation, along with, if any, all exogenous ones. If the coefficient for the residuals is significant in explaining the dependant variable, endogeneity exists. Then, one would have to use the predicted values of the endogenous variable obtained from instrument regression in the first step when running the original regression. These coefficients will be unbiased and consistent. The crucial step is of course to find appropriate instrument variables, i.e. having a significant correlation with the endogenous variable but not with the error term in the regression equation (Brooks, 2002). In time series data, adequate instruments can often be found by simply using the lagged values of the potentially endogenous variable since the lagged observation is most often correlated with the current but not with the current residuals since these have been realized after the lagged observation has been materialized (Kapinos, 2006).

2.5 The Swedish stock market

Outside US and UK there tend to be a separation between cash flow rights and control rights and voting power tend to be limited to a few, most often one or two, main shareholders but according to Henrekson and Jakobsson (2006) the large difference in Sweden is unique. In 1998, for instance, the largest shareholder owned, on average, 37.7% of the voting rights among the 304 listed firms, indicating a very high intercompany ownership concentration also when compared internationally (Agnbald, Berglöf, Högfeld & Svancar, 2001).

The most important control measure for Swedish owners is the dual-share class system allowing voting rights and dividends to vary between different classes of shares. From the 1960s and forward the use of dual-shares increased heavily. Between 1968 and 1992 the percentage of listed companies using different classes of shares increased from 32% to 87% (Henrekson & Jakobsson, 2006). Earlier this dual-share class system allowed for as large differences in voting power as 1:1000 but today the largest allowed difference is 1:10 (Aktiebolagslagen, Paragraph 5). Lately the dual-share system has caused anger among international investors which has lead several firms to stop using dual classes of shares (Agnbald et al., 2001). The system has also been under inspection from the EU commission but today it seems that dual-shares, at least currently, are unthreatened (Affärsvärlden, 2007-05-31).

In addition to a higher intercompany ownership concentration the Swedish stock market is different from other (European) countries for two different reasons. Firstly, a substantial share of

the *total* stock market is in control of a few main shareholders. Secondly, this concentrated allocation is generally a result of a smaller investment than is necessary in other countries (Henreksson & Jakonsson, 2006). The disproportionate concentration of share ownership evolved after the Second World War when 6-7% of the shareholders owned as much as 65-70 % of all shares on the Stockholm Stock Exchange and in almost 60% of the listed companies a single investor held the majority vote (Lindgren, 1953 in Henreksson & Jakobsson, 2006). The system is largely a result of tax policies, for instance capital levy and the profit tax, favoring debt financing and as a result is more appealing to large corporations with a close relationship to banks or financial institutions (Henrekson & Jakobson, 2006). Agnbald et al. (2001) also stress the importance of large banks and their large blocks in client firms through affiliated investment funds, for instance SEB and Investor.

Roe (2003) argues that there is a strong relationship between concentrated ownership and a left wing focused political agenda, meaning that ownership is generally more concentrated in social democratic countries. In Sweden the Social democrats have almost exclusively been in office since 1920 and according to Henrekson and Jakobson (2006) the party long regarded large corporations as most important since these, in the long run, should be transformed into public companies without an owner. Promoting a concentrated ownership through legislation and taxes would thus facilitate the ultimate goal of publicly owned enterprises.

Today firms in Sweden are required by law to specify information about compensation, salary and other forms, to board members and CEO or its equivalent, in its annual report (Årsredovisningslag 1995:1554) but compensation is also regulated in what is usually referred to as the *Swedish code of corporate governance* (The Swedish Corporate Governance Board, 2008) which purpose is to secure that companies, from a shareholder perspective, are run as efficiently as possible and thereby promote investments. When introduced July 1 2005, the code was applicable for listed companies with a market cap. larger than 3B SEK only - for 2008 approximately 100 companies - but as of July 1 2008 the code must be followed by all listed companies (T). In terms of compensations the 2nd generation of the code states that listed companies should have a remuneration committee that proposes compensations and compensation principles before the annual meeting (SCGB, 2008). The chairman can be head of the committee but otherwise the committee should be independent of the company and board. The highest policy-making organ, the annual meeting, then decides the compensation to the

board and on share related compensation and participation in incentive programs for (top) management as stated in the companies act (Aktiebolagslag 2005:551) and the Swedish code (SCGB, 2008).

3 Method

This section presents the chosen method, raises issues on reliability and validity and explains how the quantitative results are derived. Lastly some criticism of the chosen method is discussed.

3.1 The thesis method of choice

Given the discussion about the common practice for researching the pay-performance relationship, this thesis adopts a regression model where total compensation for top-management will be held as the dependent variable and a combination of accounting- and market based variables are the independent variables. The study spans over a period of four years from 2004 to 2007, and therefore captures past as well as present performance. The sample is constructed using companies listed on the Large Cap list on the Stockholm stock exchange. The methodology largely follows that of Duffhues' and Kabir's (2008), who by studying the Dutch stock market which arguably can be said to hold some resemblance to the Swedish. Both countries are a part of the EU and have a company compositions consisting of many multinational corporations despite having a relatively small population. The study is therefore especially applicable to the Swedish context as oppose to studies conducted on the Japanese and American markets. However, a wide array of various articles is consulted throughout the study in order to provide a multi-faceted picture of the subject of investigation. These articles also serve as a basis for comparing results and differences with the intention to pinpoint whether the findings in this study can be related to Swedish specifics.

3.1.1 Specifying the chosen variables

The dependent variables are salary and bonus which are regressed separately. Data regarding these is readily obtainable from company annual reports, where both CEO and top management salaries and bonuses are disclosed.

The explanatory variable which measures the firm performance is comprised of two factors, one accounting based and one market based due to, briefly reiterating the main arguments in the section "Defining firm performance", that one type alone cannot fully explain the level of compensation. In addition, the authors would like to argue that the combination of the two to some extent offset each other's disadvantages as, for instance, pure window dressing of the accounting statements should according to corporate finance theory not be reflected in the stock value, which would justify a non-changing executive compensation despite what the accounting

figures imply. Conversely, a rise in the company stock caused by general stock market fluctuations should not appear as improved figures on the company income statement and balance sheet, thus not warranting increased executive pay despite increased stock value.

The chosen variables are inspired by those chosen by Duffhues and Kabir (2007) and include the following:

- Return on Assets, ROA
- Annual stock return

The above mentioned variables are chosen since they are widely used to proxy firm performance (Duffhues & Kabir, 2007), and also simplifies comparison with the Dutch study, which uses the same ones. In addition to these, one variable that controls for size as measured by market capitalization and one that accounts for leverage, defined as total book value of debt over book value of total assets, are also employed in the regression model. Size is important to consider since it is usually believed that larger firms generally have higher executive compensation (Duffhues & Kabir, 2007). Leverage may have a confounding effect on executive compensation since debt-holders, depending on their exposure to the firm, may have an incentive to monitor managerial activities which can result in reduced excess compensation to top management. On the other hand though, a highly-leveraged firm can be more risky which might justify higher executive pay (Duffhues & Kabir, 2007).

As salary is considered as fixed, it should not fluctuate with firm performance in the short run which is why it is not tested against the firm performance for the same year, but instead only against one period lagged firm performance. For bonus on the other hand, both contemporaneous and one period lagged firm performance is of interest.

Formulating the above mentioned variables into a regression equation yields the following models:

$$Pay_b = \alpha + \alpha_1 Perf + \alpha_2 Size + \alpha_3 Lev + \varepsilon$$

$$Pay_s = \alpha + \alpha_1 Perf_{it-1} + \alpha_2 Size + \alpha_3 Lev + \varepsilon$$

Where:
Pay_b = Bonus.
Pay_s = Salary.
$Perf_{it}$ = Firm performance variable i at time t.

Size = Market value of equity.
Lev = Book value total of debt over book value of total assets

Regressions are carried out on one of the firm performance proxies at a time as well as including both simultaneously. For bonus, it also tests each of the performance variables, both in contemporaneous and lagged states, whereas for salary, only lagged firm performance are used. The lagged period proxy regressions, which measure the current year executive remuneration with the previous year's firm performance, can be argued to be a more appropriate reflection of reality.

3.1.2 Sampling

As the findings should allow for generalizations to all firms on the Stockholm stock exchange large cap list, a sample that adequately reflects the defined population, contemporarily as well as over time, must be constructed by drawing random observations of firms from the entire stock exchange over a representative amount of years. The sampling in this thesis draws all its observations from firms listed on the large cap list on the Stockholm stock exchange for a period of four years. As more than half of the large cap. companies are included in the sample, the applicability of the findings to all large cap firms can be made with ease in a contemporaneous context. The randomness is slightly violated though as some banks and holding companies are manually excluded from the sample due to problems obtaining the necessary data needed to construct the regression model variables. Thus, non-financial firms are slightly overrepresented in the sample. As far as extending the findings to periods other than the years included in the sample, some caution is warranted since due to the period of choice, 2004-2007, being characterized of a business boom, the sample does not encompass fluctuating business cycles thus restricting the ability of extending the findings to years with unfavorable business climate.

To a limited extent it is possible, although not necessary with respect to the thesis's purpose, to generalize the findings to firms listed on the other lists on the Stockholm stock exchange as a wide array of industries are represented in the sample.

The final sample consists of 179 firm year observations collected over the period 2004-2007. For year 2007, data for 47 companies is collected. For the years 2006, 2005 and 2004, data for 48, 44 and 40 firms respectively are gathered.

3.1.3 Data gathering

The chosen variables need data concerning a number of firm specifics. These include:

Table 3-1 Data gathering

Type of data	Source
Operating earnings, NOPLAT	Annual reports
Book value of total assets	Annual reports
Market value of common stock	e24.se and di.se
Market capitalization	Annual reports
Executive remunerations	Annual reports

3.1.4 Descriptive statistics

In order to provide a picture of the various variable characteristics in terms of means, medians maximum and minimum values and standard deviations, calculations on these are performed, presented and analyzed. This provides with information regarding the breadth and spread of the data constituting the variables.

3.1.5 Data quality testing

In order to ascertain that the data is of adequate quality, a number of statistical tests are performed. The assumption of normal distribution of the data is crucial for making valid inferences, thus a Bera-Jarque test for normality testing is carried out. In the event of non-normality, tests on the data when transformed by natural logarithm are performed. If adjusting for non-normality by taking the natural log does not induce normality in the data, the thesis relies on the central limit theorem. In order to test whether heteroscedasticity is prevalent in errors, a White's test will be performed.

Correlation between the explanatory variables, i.e. multicollinearity can also pose a problem since it can be difficult to observe the individual contribution of each of the variables included in the multiple regression. This can give rise to significance or non-significance where it otherwise should not exist (Brooks, 2002). Multicollinearity is tested using a correlation matrix in which the correlations between concerned variables in each regression equation are plotted. If any

extraordinarily high correlation is detected between any of the included variables in the matrix, necessary adjustments will be made involving the exclusion of concerned variables.

A Hausman test for endogeneity is also performed since one cannot without formal testing reject its existence in the regression model employed in the thesis as it can be argued that executive compensation may influence the performance of the firm, at least in a contemporaneous context. It seems likely, at least for some firms, that the CEO would be more inclined, due to e.g. gratitude, increased loyalty etc. to maximize firm performance if he/she *has* (as oppose to *will*) received a high compensation, thus reversing the pay-performance relationship. If executive compensation does influence the firm performance, the proxies for firm performance, ROA and stock performance, would not be determined outside (exogenously) of the equation and would therefore be correlated with the error term and as such violate an OLS assumption leading to biased and inconsistent results. As explained in section 2.4.4, a Hausman test requires instruments for the potentially endogenous variables which in this paper are chosen to be, despite not having time series data per se, the lagged values of the firm performance proxies since the same reasoning for using lagged values as instruments in pure time series can be applied in this thesis as the sample spans over a four year period rendering it possible to lag variables up to three periods. Unfortunately, lagging variables severely reduces the sample as each lag involves a loss of approximately 25% of the observations in the original sample. However, lagging once or twice leave at least 80 observations which are, if not optimal, adequate for carrying out the research. In the event of endogeneity, affected regressions are completely discarded.

3.2 Critique of the chosen method

This section will discuss the potential issues with the chosen method that can potentially distort the results and how these are handled in the thesis. The problems will be analyzed on the basis on to what extent the findings can be considered reliable and valid.

In general terms, a study's findings are valid if they correspond to what the researchers actually sought for (Ghauri & Grønhaug, 2005). Stated otherwise, the true measure should equal the observed, which should be the case if one conducts the study by employing the appropriate methodology correctly. An example of what can potentially lower the validity of a study is if a respondent of a questionnaire misinterprets the questions. Reliability of a study is defined as the

extent to which the same findings can be found irrespective of whom is carrying out the research. It is as such concerned with the stability of the measures (Ghauri & Grønhaug, 2005).

Since this paper solely relies on secondary data collected from various sources, it is not subject to the misinterpretations of individuals as in the case of a methodology using questionnaires or focus groups where misunderstandings regarding the researched subject or questions might occur, hence having a potentially negative effect on the validity. On the other hand, the study's findings are heavily dependent on the credibility of the sources from which the data is collected. Fortunately, since figures regarding CEO and top management remuneration and the inputs needed to construct the variables for measuring firm performance is obtained from company annual reports, which are reviewed and certified to be correct by third-party accountants, there is little reason to believe that the credibility of the data is compromised. However, one must be cautious if one chooses to use the included income statement and balance sheet figures for years prior to the year corresponding to the release of the annual report as companies have a tendency to adjust historical income- and balance sheet numbers to facilitate comparison between years when for example new accounting practices are implemented. Thus, in order to ensure that this thesis uses the company results that correspond to the same year's executive compensation, only the company results for the year of the annual report are used, thus securing the level of reliability. Historical stock prices are collected from E24.se's database which are subsequently crosschecked with DI.se's counterpart to ensure the correctness of the figures. Due to the high credibility of the sources from which the data is obtained, the authors feel confident that the data can generate valid as well reliable inferences.

The misspecification of the regression model can harm the validity of the results. In this thesis, the executive compensation is measured by annual salary and annual bonus whereas return on assets and annual stock return together create a proxy for firm performance. If the chosen variables are not able to capture the relationship this paper intends to investigate, the findings will not reflect the true relationship and will as such be useless as regards to what the thesis actually intends to study. The main concern with the chosen regression model in this paper is that is does not take into account long-term incentive programs such as executive stock options. It might be the case that the findings are different if these are accounted for. However, due to the wide use of the regression model adopted in this thesis in previous academic papers studying the same relation (Duffhues & Kabir, 2007), and that Lewellen and Huntsman (1970) conclude that

only using salary and bonus are sufficient to produce valid inferences regarding the pay-performance relationship, the chosen regression model is nevertheless judged to be appropriate, albeit restricted to short term incentive rewards influence on firm performance.

4 Results

In this chapter the data is described in terms of size and difference. In addition statistical test are performed in order to ascertain that it will be possible to draw valid and reliable inferences from the following regression analysis.

4.1 Descriptive statistics

The final sample consists of 48 firms (see *Appendix 1* for complete list) spanning over the period 2004-2007 which yields a total of 179 firm years of data. Below is a table presenting the maximum amount, mean, median and minimum amount paid out in salary and bonus respectively for the 48 firms for each year. The corresponding averages for the entire sample period are also included.

Table 4-1 Descriptive statistics for CEO compensation

	MAX	MEAN	MEDIAN	MIN	STD. DEV.
CEO Salary in SEK					
2004	19 714 299	6 319 856	5 689 031	1 658 000	3 541 577
2005	14 572 219	6 340 987	6 008 984	1 654 000	3 171 777
2006	15 271 483	6 620 465	6 150 774	1 472 000	3 434 891
2007	16 122 000	7 122 496	6 100 000	1 313 000	3 848 119
2004-2007	19 714 299	6 616 410	6 000 000	1 313 000	3 496 665
CEO Bonus in SEK					
2004	10 306 600	2 512 859	1 827 500	0	2 601 199
2005	17 140 614	3 118 027	2 051 500	0	3 506 914
2006	14 085 248	3 632 873	2 495 000	0	3 402 014
2007	12 893 805	3 524 787	2 350 000	0	3 445 231
2004-2007	17 140 614	3 227 656	2 103 000	0	3 280 586

As can be seen in the table above, the mean CEO salary has been increasing at a relatively stable rate for each year, from around SEK 6.4 millions to SEK 7.1 millions. The spread between the highest and the lowest salary is remarkably high for all years. The large difference might be explained with the huge spread in firm sizes, which, as can be seen in the table below in row "Market cap." spans over a SEK 1240 millions to SEK 600 556 millions (the potential

disturbances the high spread might have on the sample are discussed below). However, the significance of firm size, as measured by market capitalization, for CEO salary is tested for in the section regression analysis where the importance of size as regards to compensation is statistically documented. The bonus has been, as would be expected due to its, by definition, varying nature, fluctuating over the years where the mean increased during the period 2004-2006 but decreased in 2007. It is not surprising either, that the bonus for some firms is 0, as indicated by the "Min" column, as the bonus should only be paid out if the company has met certain performance criteria established by the company board or the remuneration committee.

The table below shows a number of firm characteristics for the companies included in the sample. There is a considerable difference between high and low for all values which might, due to the rather small amount of firms included in the sample, give rise to distortions as certain extremely large firm observations might single handedly affect the sample as a whole, thus potentially biasing the sample to reflect the characteristics of a few firms rather than all included observations, hence limiting the generalizing abilities of the sample. The effect on this on the firm performance proxies is not a concern as these are expressed either as a ratio as in the case of ROA or percentage change as in stock development. For firm size though, which is expressed in terms of "level of" rather than ratio or percentage change, it could constitute a problem. Taking the natural logarithm lowers the effect of the high spread as it artificially contracts it. Logging might also adjust for non-normality in the market cap. distribution. For this reason, market cap observations are expressed in natural logarithms.

Table 4-2 Descriptive statistics for firm size and operations

Millions of SEK	Max	Mean	Median	Min	Std. dev.
Market capatlization	600 556	66 172	25 857	1 240	104 451
EBIT	35 828	4 950	1 973	-1 623	6 678
Total assets	321 647	53 847	28 649	470	66 193
Debt / Assets	95.61%	56.71%	58.97%	4.81%	51.04%

Below the variables representing firm performance are presented averaged over the entire sample of 179 firm years. On average, return on assets is 12.29% and the mean share price change is 27.47%. The negative returns for the minimum column are explained with the negative earnings which some of the firms had for some of the periods.

Table 4-3 Descriptive statistics for firm performance

	Max	Mean	Median	Min	Std. dev.
ROA	44.05%	12.29%	10.28%	-2.45%	8.73%
Share development	223.61%	27.47%	20.54%	-49.98%	43.12%

4.2 Data quality tests

This section tests whether the data meets the criteria for running OLS regressions and include tests on normality, multicollinearity, heteroscedasticity and endogeneity.

4.2.1 Normality testing

The first test that is carried out is Bera-Jarque normality tests for each of the variables included in the regression equation. Each test can be found in *Appendix 2*. Unfortunately, the tests indicate that none of the variables are normally distributed, i.e. having a skewness of zero and kurtosis of three as the Bera-Jarque statistic cannot be rejected on any level for any of the regression variables. Thus, not even the transformed variable, market cap., is normal despite being logged. The non-normality decreases the quality of the inferences since the statistics are calculated assuming normal distribution. Due to the absence of normality, attempts involving the removal of outliers and taking the natural logarithm on the remaining variables too, are performed since these are common methods for dealing with the problem (Brooks, 2002). Beginning with outlier removal, as can be seen in *Appendix 4*, where each of the non-normal variables' observations are plotted against total CEO cash compensation, there are unfortunately no immediate candidates among the outliers that can be easily erased since there are no single or just a few. Thus, adjusting for non-normality by removing outliers is not feasible as it would involve having to delete too many observations which would entail an information loss difficult to justify.

The Jarque-Bera tests for the natural logarithm adjusted data are presented in *Appendix 3*. This procedure cannot be feasibly applied on the share development data due to the many negative return observations that disappear as a result of the transformation (taking the natural log on a negative value is not possible). As for the other regression parameters, the results are disappointing. Transforming the data by taking the natural logarithm does not induce normality in any of the two variables although improving it for ROA in terms of lowering the kurtosis and skewness. Regarding leverage, the transformation of data actually has the opposite effect as the

departure from normality becomes even more severe. Since it is not possible to achieve a normal distribution among either ROA or leverage by taking the natural logarithm, its use is rather limited in terms of improving the inferences drawn from the regressions. However, according to Brooks (2002), for sufficiently large sample sizes effects of non-normality will be more or less inconsequential due to the central limit theorem which implies that test statistics asymptotically follow the normal distribution even in the event of non-normality of the errors, thus justifying regressions using non-adjusted data since the inferences drawn can be statistically valid nonetheless. Due to the failing attempts to induce normality by either removing outliers or taking the natural logarithm, the authors rely on the central limit theorem, hence no adjustments are performed on data prior to the regressions.

4.2.2 Multicollinearity

The correlation matrix showing the correlation between all variables in the regression model is shown in *Appendix 3*. As can be seen, none of the included variables exhibits alarmingly high correlations, the highest is between ROA and leverage of -0.23. Due to the low correlation, it is decided that no further tests are required like for example a variance inflation test, VIF.

4.2.3 Heteroscedasticity

Testing for heteroscedasticity in the data for the various parameters in the regression models are made with White's tests. Since one White's test is needed for every variation of the regression equation, there are a total of 6 tests. The results of the tests are presented in *Appendix 6*.

Heteroscedasticity is prevalent in the data if the F-statistic is larger than the critical value.

$$H_0: \alpha_{ij} = 0 \rightarrow homoscedastic$$

$$H_A: \alpha_{ij} \neq 0 \rightarrow heteroscedastic$$

As can be seen in *Appendix 6*, all tests when bonus are held as dependant have p-values lower than 0.05 thus rejecting the null hypothesis of homoscedasticity at a 95% significance level. When salary is held as dependent, the p-values are larger than 0,05 making it impossible to reject the null of homoscedasticity. Thus, running OLS regressions having bonus a dependent does not generate BLUE estimates since the assumption of constant variance is violated, which is of course unfortunate for the research. One possible explanation for the heteroscedasticity is the transformation of the market cap data into natural logarithms which could have altered the

characteristics, or more importantly with respect to the heteroscedasticity problem, the variance of the data. For this reason, a new series of White's tests are carried out having the market cap non-logged. The results of these are presented in *Appendix 7*.

As revealed by the results, all p-values are above 0.05 thus the null hypothesis of homoscedasticity cannot be rejected. Since heteroscedasticity is no longer prevalent when market cap is not transformed by taking the natural logarithm, it is decided that no transformation of the market cap data is performed. This means however, that the high dispersion in the market cap observations is not adjusted which was the reason for transforming market cap in the first place.

4.2.4 Endogeneity

As stated in the method section, endogeneity in the performance proxies cannot be excluded without formal testing. Consequently, a number of Hausman tests are carried out. The results of the tests are presented in *Appendix 8*. The variable determining whether the equation is endogenous or not is if the residuals obtained from the instrument regression (called resid_xxx) is statistically significant from zero. The null hypothesis therefore is:

H_0: $Resid_x = 0$ → No endogeneity

H_A: $resid_x \neq 0$ → Endogeneity

4.2.4.1 Endogeneity among the performance proxies when bonus is dependent

The first test is whether ROA is endogenous to bonus in a contemporaneous context, i.e. where bonus is regressed on ROA for the same year along with market cap. and leverage. The instrument for ROA is its lagged value.

As can be seen in *Appendix 8* the p-value for the resid roa is 0.0621, meaning that the null hypothesis cannot be rejected on a 95% significance level, indicating no problem of endogeneity. Therefore, regressing bonus on ROA can be carried out in a contemporaneous context. Analogously, it can safely be assumed that the lagged value of ROA is also exogenous thus allowing for tests on how prior year ROA relates to bonus. A Hausman test for ROA lagged one period is nevertheless included in order to show that the one period lagged ROA is adequate to serve as an instrument for the contemporaneous ROA. The result of the test is a p-value of 0.5861, thus, as expected, no indication of endogeneity.

The second Hausman test is if share development is endogenous to the equation. Results of the tests are presented in *Appendix 8* under "Bonus regressed on share development and share development residuals".

As the p value for the share development residuals is 0.0001, the null hypothesis is rejected at a 95% significance level; hence the problem of endogeneity is prevalent in the equation rendering it impossible to run a regression using share development as an explanatory variable.

Due to the endogeneity problem with share development and bonus in a contemporaneous context, share development lagged one period is tested for endogeneity with two period lagged share development as instrument. The test results can be seen in *Appendix 8* under "Bonus regressed on one period lagged share development and lagged share development residuals".

The p-value for the residual parameter is 0.8630; hence no rejection of the null hypothesis of no endogeneity on any significance level thus enabling regressions using one period lagged share development as an explanatory variable. This also confirms the validity of one period lagged share development as an instrument for its contemporaneous equivalent.

4.2.4.2 Endogeneity among the performance proxies when salary is dependent

The tests if the performance proxies are endogenous when salary is held as dependant are presented in *Appendix 8*.

The result of the Hausman test for one period lagged ROA can be seen in *Appendix 8* under "Salary regressed on one period lagged ROA and lagged ROA residuals". The p-value of 0.4808 for the ROA residuals implies no rejection of the null hypothesis of no endogeneity at any significance level. Therefore, one period lagged ROA can be used as an explanatory variable for CEO salary.

The result of the Hausman test for one period lagged share development can be seen in *Appendix 8* under "Salary regressed on one period lagged share development and lagged share development residuals". The p-value of 0.3206 does not support a rejection of the null on any significance level, thus no endogeneity.

Summarizing the Hausman tests:

- Bonus regressed on ROA can be run in a contemporaneous context and therefore also with lagged ROA.

- Bonus regressed on share development cannot be made in a contemporaneous setting as it is possible to reject null hypothesis of the residuals parameter having zero explanatory power on bonus. Conversely, the share development residuals can explain variations in the bonus, and share development is as such not determined exogenously to the equation.
- Bonus regressed on one period lagged share development can be performed.
- Salary can be regressed on one period lagged ROA as well as one period lagged share development as the endogeneity tests indicate no problems.

5 Regression analysis on the pay-performance relationship

In this chapter the regressions are presented and their implications and causes are discussed. In the end a concluding analysis and a comparison with previous studies is provided.

In this section, all regressions are performed and the results of these can be seen in its entirety in *Appendix 9*. The parameters of most interest are included directly in the text though, followed by a, with respect to the purpose of the thesis, thorough analysis of the regression results.

The first regression that is carried out is bonus regressed on ROA in a contemporary context, or put algebraically:

$$Bonus = \alpha_0 + \beta_1 ROA + \beta_2 Size + \beta_3 Lev + \varepsilon$$

Table 5-1 Bonus on ROA, contemporary

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.184520	0.945448	-0.195167	0.8455
ROA	-2.517312	2.486170	-1.012526	0.3128
MARKET_CAP	1.70E-05	1.96E-06	8.715242	0.0000
LEV	4.579003	1.348877	3.394676	0.0009
R-squared	0.329759			
Adjusted R-squared	0.317718			

ROA is not significant in explaining variations in the executive bonus as the p-value is above 0.05. The two control variables are significantly different from zero for all significance levels with p-values of 0 for market cap and 0.0009 for leverage. The magnitude of the coefficient for size, $1.7*10^5$ reveals the high influence that size has over the bonus amount as for every billion SEK the firm increases in market cap, the bonus increases by 17 400. Leverage is also highly influential on the bonus levels with a coefficient of 4.57, i.e. a one percentage unit change in leverage renders, on average, a corresponding rise of SEK 45 700 in bonus. The influence of leverage becomes even more substantial if one takes into account how easily this component can be affected by the management.

This result suggests that irrespective of how well the company has performed during the year as measured by ROA, the bonus is not affected, thus in conflict with the principal agency theory. The bonus is on the other hand positively related to market cap as well as leverage, implying that that a Swedish CEO can increase the bonus by increasing the size of the firm. The positive relationship between leverage and bonus does not lend support to the notion that high debt is

associated with increased monitoring of the management by the suppliers of debt. Therefore, it might be argued that the management is being compensated for the increased risk a high leverage position involves. The finding is in line with the Dutch study by Duffhues and Kabir, (2007), who also find a positive relation between bonus and market cap and leverage. They however, also find a significant negative relation between compensation and firm performance.

As the executive bonus will increase with firm size combined with ROA's insignificance in explaining bonus, growth does not necessarily have to be value creating for the shareholders in order for the bonus to increase, thus the CEO has an incentive to engage in acquisitions that only serve to increase firm size with no requirement to generate synergies, so called empire building which is of no value for shareholders. In addition, the CEO's have further incentive to finance acquisitions with additional loans as higher leverage increases the bonus even more. This might put the company at an unnecessarily risky position since the increased leveraged are used for investments with poor expected return. Also, if the company is at its optimal debt to equity ratio, the increased leverage could distort the optimum. In conclusion, when ROA is used as proxy for firm performance, the bonus for Swedish large cap companies is ineffective as a mechanism for aligning the interest of the principal with that of the shareholders. It is as such consistent with the proposition that managers have ample of maneuverability in dictating their own remuneration. Conversely, it also shows the inadequacy of the remuneration committee to design an efficient bonus contract and, by extension, the shareholders' inability to identify the weaknesses by not rejecting the bonus proposition.

The second regression is bonus regressed on ROAt-1.

$$Bonus = \alpha_0 + \alpha_1 ROA_{t-1} + \alpha_2 Size + \alpha_3 Lev + \varepsilon$$

Table 5-2 Bonus on ROA, lagged

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.386691	1.074531	0.359870	0.7195
ROAt-1	-6.262651	3.009884	-2.080695	0.0395
MARKET_CAP	1.71E-05	2.17E-06	7.881010	0.0000
LEV	4.578215	1.534572	2.983381	0.0034
R-squared	0.362423			
Adjusted R-squared	0.347362			

The one period lagged ROA is significant at a 95% significance level with a p-value of 0.0395. So too is market cap and leverage.

The negative sign on the lagged ROA is interesting as it actually suggests that the worse the company performs as measured by ROA, the higher the bonus, which is similar to the Dutch study findings. The negative pay performance relationship can be interpreted as evidence for failing, or absent, corporate governance controls in Sweden. This is discussed at greater length later in the thesis. The size of the coefficients confirms the finding in the previous test with a high influence of market cap on the bonus amount. The impact of ROA, which for a given company probably does not change dramatically between years, can be considered to be rather marginal as the bonus changes with approximately SEK 62 000 for every percentage unit change in the ratio.

The third regression has bonus and dependent and share development lagged one period as proxy for firm performance. A regression on contemporaneous share development is not econometrically possible due to the endogeneity problem found in section 4.3.

$$Bonus = \alpha_0 + \alpha_1 Share_{t-1} + \alpha_2 Size + \alpha_3 Lev + \varepsilon$$

Table 5-3 Bonus on share development, lagged

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.890924	0.931929	-2.029043	0.0445
SHARE3	2.458467	0.559894	4.390952	0.0000
MARKET_CAP4	1.82E-05	2.07E-06	8.829753	0.0000
LEV4	5.470632	1.434301	3.814146	0.0002
R-squared	0.427589			
Adjusted R-squared	0.414068			

All the explanatory variables are significant at a 95% level and all coefficients have positive signs.

The test above shows that when share development is used as a proxy for firm performance, the pay performance relationship is positive, hence in line with what principal agency theory suggests. However, the size of the coefficient indicates a minuscule impact in the determination of bonus levels as for every percentage unit increase in the stock price, the CEO is on average rewarded with SEK 24 584. It would therefore require rather extreme fluctuations in the stock

price to have any substantial effect on the total bonus which, as can be seen in the descriptive statistics section, is on average SEK 3.2 millions. As in the two previous regressions, both market cap and leverage are highly influential.

The contradicting findings between the two firm performance proxies are quite surprising as many bonus schemes, according to annual reports, are in part based on ROA. One possible explanation for the conflicting findings can be that in times of a business boom, the bonuses in general increases resulting in that the market rate for bonuses on the managerial labor market become higher. In order for companies to maintain their attractiveness for skilled executives, they may temporarily be forced to increase the bonus amount irrespective of current firm performance, hence explaining how lower ROA can generate higher executive bonus for a short period of time.

Another explanation for the conflicting results may reside in how the two proxies are determined. Any study is subject to the chosen time frame as attitudes, regulations and business cycles vary over time. For this study, as discussed in the method section, the time period of choice more or less captures a business boom in its entirety which naturally makes it mark on the findings. The manner in which the thesis's time frame can have different effects on the chosen proxies could be the following: during the beginning of the boom, it is probable that companies would invest in various projects in order to meet the increased demand. The projects, if assessed positively by the stock market, warrants an increase in stock price as the stock market values the company based on its future performance. Thus, a project with a future potential is immediately reflected in the stock. These projects however, might take time to generate positive cash flows, which would give rise to a temporarily lower return on assets as the company asset base will increase but with no immediate increase in net income. Hence, lower ROA might not imply poor management performance, but merely a reflection of the management's long term focus, hence justifying the higher bonuses despite worsened ROA.

On the other hand, one could argue, as discussed in the method section, that the increase in stock price for some companies in the sample might be caused by the general bull market, thus not due to actual improved firm performance. This may be especially true for large cap companies as it could be argued that when small private investors want to participate in the bull market, they may have a preference towards well-known stocks due to that the familiarity of the stock might

give a sense of security to the investment. Thus, some large cap companies might, with respect to their fundamentals, experience unmotivated high stock price movements due to the bull market and private investors increased level of investment activity. If a firm's stock development increases due to general market movements and not based on enhanced firm performance, stock development is not the best metric to use as a basis for bonus as it would create an upward adjustment of the bonus despite a potentially worsened firm performance as measured by for example ROA. However, it would be highly unrealistic that the entire sample consists of firms with stock performance that move more or less exclusively in tandem with the market's and not according to what is warranted with respect to firm specifics. Therefore, the authors deem this effect to not compromise the adequacy of using of stock development as proxy for firm performance for the sample as whole.

Shim (2003) finds in his study, which focuses on the American service sector, similar results where the accounting based proxies are, although not having negative coefficients, insignificant or only significant on the 90% α-level whereas stock return is strongly significant on all levels. He reasons that this is might be an indication that efforts by stockholders, institutional investors, and other stakeholder rights' groups are able to influence the bonus schemes to better align the management's interests with that of shareholders, thus moving away from short term quarterly performance to a more long term oriented management style (Shim, 2003).

For these reasons, the authors lean towards favoring stock development over ROA as the most appropriate proxy for firm performance as far as this particular thesis is concerned.

The fourth regression that is carried out is salary as dependent variable with ROA lagged one period as proxy for firm performance.

$$Salary = \alpha_0 + \alpha_1 ROA_{t-1} + \alpha_2 Size + \alpha_3 Lev + \varepsilon$$

Table 5-4 Salary on ROA, lagged

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.480690	1.095404	4.090446	0.0001
ROA3	-4.488451	3.068352	-1.462821	0.1460
MARKET_CAP43	1.70E-05	2.21E-06	7.688952	0.0000
LEV43	2.856216	1.564382	1.825779	0.0702
R-squared	0.330907			
Adjusted R-squared	0.315101			

As can be seen in the table above, neither ROA lagged one period nor leverage are not significantly different from zero at a 95% level. Market cap is clearly significantly different from zero which is expected as larger companies, due to the increased complexity of the organizational structure associated with big organizations, need to be able to attract highly skilled executives.

Testing salary against ROA is of lesser value when investigating the pay-performance relationship as the salary to a large extent follows the general salary development with a relatively fixed annual increase, thus independent of firm performance. In addition, salaries generally only move in a positive direction. Nevertheless, determining the salary for a top executive ought to be based on more than the prevailing salary rates on the managerial labor market. It could be expected that CEO salaries, at least partly, are based on accomplishing individual assignments or financial/operational metrics of which share development or ROA can be considered to be likely candidates. It could therefore be of interest to investigate if it is a significant relationship between ROA or Share development and Salary as the latter might move in tandem with finical metrics such as the ones used in this study, in which case the salary could be treated as an additional mechanism for reducing principal agency conflicts. As the regression test reveals though, the insignificance of ROA does not support the idea of salary as an effective instrument for reducing agency problems for Swedish large cap companies.

The fifth and final regression is salary regressed on share development lagged one period:

$$Salary = \alpha_0 + \alpha_1 Share_{t-1} + \alpha_2 Size + \alpha_3 Lev + \varepsilon$$

Table 5-5 Salary on share development, lagged

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.238138	0.998079	4.246296	0.0000
SHARE3	-1.093616	0.599636	-1.823799	0.0705
MARKET_CAP43	1.66E-05	2.21E-06	7.516580	0.0000
LEV43	3.099630	1.536109	2.017845	0.0457
R-squared	0.336998			
Adjusted R-squared	0.321336			

The share development is marginally rejected from being significantly different from zero on a 95% level whereas market cap and leverage both are significant in explaining variations in executive salary. The share development coefficient, although insignificant, nevertheless warrants a short analysis as the sign is negative, implying that worsened stock performance renders higher salaries. One possible explanation could be, which some argues (see Hulbert, 2005) that larger companies, which have the highest salary levels, underperform smaller companies that are more growth oriented, which have lower salaries, during times of a business boom. If the part of the sample with the highest stock movements is represented by smaller companies, it would appear as if the salary diminishes with improved stock performance. However, given the insignificance of the share parameter, as well as ROA, on a 95% α-level, a, for this study, more feasible explanation is that firm performance is simply overlooked when salaries are determined.

5.1 Concluding analysis

The five regressions that have been carried out have indicated:

- Bonus regressed on contemporary ROA with leverage and market cap as control variables resulted in insignificance in the performance proxy but positive significance for the two control variables.
- Bonus regressed on one period lagged ROA with leverage and market cap as control variables resulted in a significant negative coefficient for ROA and positive significance for both control variables.
- Bonus regressed on one period lagged share performance with leverage and market cap as control variables resulted in positive significance for all coefficients.

- Salary regressed on ROA lagged one period along with leverage and market cap only resulted in significance for market cap on a 95% α-level.
- Salary regressed on share performance one period lagged with market cap and leverage resulted in insignificance for share performance but significance for both control variables on a 95% α-level.

As discussed in the previous section, the authors lean towards favoring share performance as the most appropriate proxy for this particular study, which is why the results from the share performance regressions are those that primarily are related to principal-agency theory and previous studies on the subject of pay-performance.

The findings depict a situation where CEOs in Swedish large cap companies are, in line with what principal-agency theory posits, rewarded with higher bonus if they succeed in improving firm performance as measured by stock development which thereby creates an incentive for the CEO to act in the interest of improve firm value. However, the findings also reveal the minuscule importance of firm performance when determining the bonus, hence indicating a low efficiency level of the established bonus programs in terms of aligning interests of principals and agent. On the other hand, the CEO bonus rises considerably with the size of the company, suggesting that size, not actual share value creation, is rewarded more. Consequently, a CEO in Sweden has more incentive to engage in empire building than improving share value, which can be considered as nothing but a major failing from a principal agency theory perspective. It can thus be concluded that as far as this particular study is concerned, the bonus programs in Swedish companies are inadequate as they fail to create enough incentive for CEOs to maximize firm value over personal financial gains. In comparison to other studies though, e.g. Jensen and Murphy (1990), Gregg, Jewell and Tonks (2005) and Duffhues and Kabir (2007) stock performance is somewhat more influential in determining the bonus in Sweden which injects some optimism.

This thesis also intends to ascertain how aspects associated to the Swedish context affect the pay-performance relationship. Given that the method of choice is not suitable for drawing inferences other than describing the current situation, attempts at explaining *why* matters behave the way it does as revealed by the regressions must be carried out with great care. Nevertheless, it is the

expectation of the authors that by looking at similarities and differences with other studies that it is possible to gain some insight into how Swedish aspects affect the relationship.

The aggregate research in the world of academia on the subject has thus far generated mixed results and conclusions as some studies find a positive significant relationship whereas other find the complete opposite. Some researchers fail to discover any relationship at all. It is therefore difficult to make comparative analysis and discuss differences with previous findings since it is hard to pinpoint what potential differences stems from. As an example, this thesis found a significant positive, but rather insubstantial, relationship between stock performance and bonus, which is the same results as that of Jensen and Murphy (1990) who in their study of American companies also found a positive, but weak, significant relationship between bonus and stock performance. However, it is not possible to draw any meaningful conclusions from this similarity with respect to the thesis's research question on how Sweden specifics affect the relationship as American companies are, relative to the Swedish, characterized by a more diluted ownership with primarily a single share system. On the other hand, the Dutch study "Is the pay–performance relationship always positive? Evidence from the Netherlands" by Duffhues and Kabir (2007) is conducted on a market with similar characteristics to that of the Swedish with major block holder ownership, but finds the pay-performance relationship to be negative when stock performance is used as proxy. In light of this it is not possible to draw any inferences about how Swedish specific aspects affect the relationship other than that Sweden does not exhibit any unique properties vis-à-vis other countries .

6 Conclusion

This section summarizes the most important findings from the analysis and answers the research questions as well as the purpose of the study.

The purpose of this study was to investigate the pay-performance relationship on the Stockholm Stock Exchange. It was achieved by running regressions holding the two proxies for pay, bonus and salary, as dependent with a proxy for firm performance along with the two control variables firm size, expressed in market capitalization, and leverage for which debt to equity ratios were used, as independent variables. The proxies for firm performance were chosen to be return on assets, ROA, and share development.

Beginning with the regressions where bonus was held as dependent, a negative significant, relationship was found when ROA lagged one period was the performance proxy. This indicates that principal agency problems as well as poor corporate governance is prevalent in Swedish companies. On the other hand, when bonus was regressed on share development as proxy for firm performance, a significant positive relationship was found, hence in conflict with the previous finding but in line with what principal theory suggests. The contradicting results was explained with that large investments that are positively assessed by the market is immediately reflected in the stock price whereas the effect on actual cash flows might take to materialize, thus temporarily lower the return on assets. The authors favored stock development as the most appropriate proxy for firm performance, thus drawing the conclusion that the pay-performance relationship for Swedish companies conforms with the principal agency theory of that executive bonus is dependent on firm performance. However, the regression analysis showed that the proxies' influence on total pay were minuscule, where the primary determinant for the bonus level was firm size and to a lesser extent, leverage. Therefore, the bonus as an incentive creating mechanism for aligning the interest of agents and principals is rather weak for Swedish companies on the large cap list.

When salary was held as dependent, none of the proxies were significantly different from zero on a 95% α-level.

As far as relating the study's finding to Sweden specific characteristics, the authors failed at making any conclusions as there were nothing unique about the findings vis-à-vis studies conducted on other countries.

7 Discussion and suggestions for further studies

The final chapter discusses the results and the current debate on the subject. Also some recommendations for further studies are presented.

Despite the rather discouraging finding of a weak influence of firm performance over CEO remuneration levels, there is reason for some optimism. One reason is that studies conducted in other countries have revealed even lower influence, and sometimes even negative, relation between firm performance and executive compensation. A possible explanation for the somewhat stronger relationship in Sweden could be the new company code of corporate governance implemented in 2005. As mentioned in section 2.5 the code is designed to make executives manage companies as efficiently as possible on behalf of the shareholders. It would therefore not be surprising if studies such as this one conducted some years from find a stronger relationship as the code may take time to come into full effect. Another reason for optimism is the intensification of the executive remuneration debate with the former ABB CEO Percy Barnevik's generous pension plans, Skandia's bonus plans, and more recently, the financial crisis as primary drivers, which might gradually increase the awareness of the problem leading to increased efforts by stakeholders that eventually may improve the pay-performance relationship.

Concerning the debate on bonus schemes and incentive plans, the authors would like to argue that it is somewhat skewed in the sense that much focus is on the bonus and not so much on the majority of the cash executive compensation, the salaries. Due to the fixed nature of the salary, it is more or less completely uncorrelated with firm performance, a notion supported by the regression results in section 5.1. The debate should therefore shift the focus from bonus schemes, which in fact ought to be encouraged, to instead criticize the high fixed part of the total compensation, given that the variable part is heavily dependent on firm performance.

This study unfortunately fails at concluding why the pay-performance relationship is of such a weak nature and how the Swedish context affects it. The authors are aware that the chosen method is limited in terms of explaining why, but reasoned that thorough comparison with previous research nevertheless could yield valuable insights. The mixed and inconsistent results of other studies unfortunately restricted such attempts. However, this is not the primary objective of this study, which is to document how the pay-performance relationship behaves in Sweden. Further studies on the subject could be designed to better answer these types of questions by for

example carrying out comparative studies where the companies are pooled into groups depending on the level of owner dilution or share class system, and compare the samples. This could be performed intra- as well as inter country wise. It would also be desirable to conduct a qualitative study on the subject that, by taking different perspectives, internal as well as external, possibly could provide a more in depth analysis.

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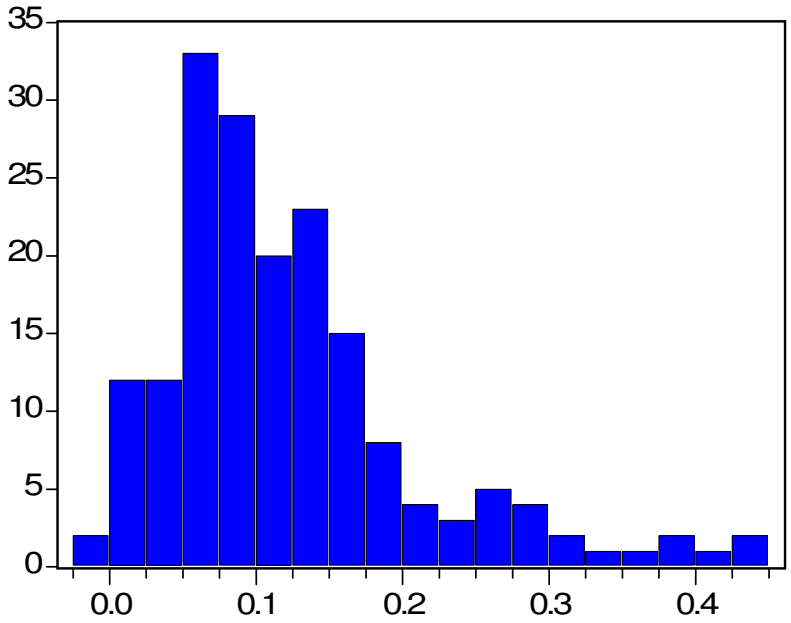
Appendix

Appendix 1 – Included companies

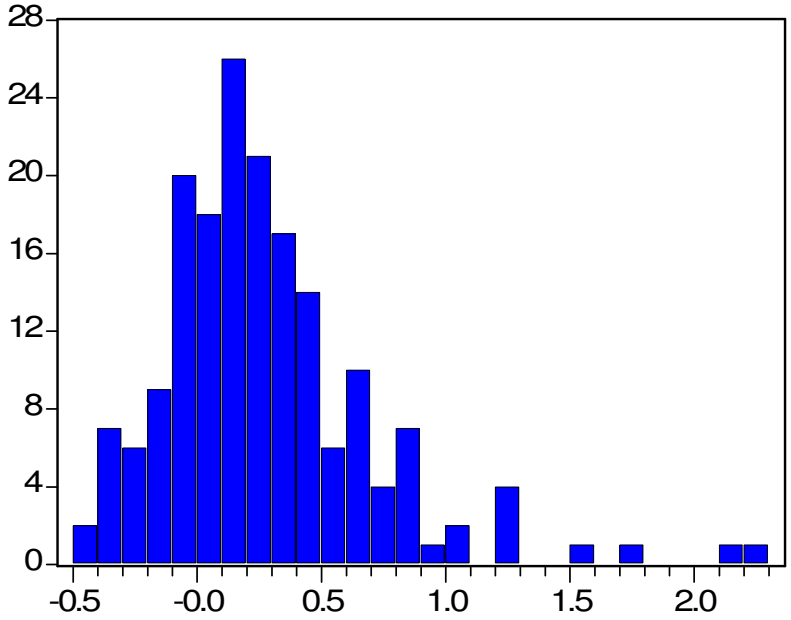
2007	2006	2005	2004
ABB	ABB	ABB	ABB
ALFA LAVAL	ALFA LAVAL	ALFA LAVAL	ALFA LAVAL
ASSA ABLOY	ASSA ABLOY	ASSA ABLOY	ASSA ABLOY
ATLAS COPCO	ATLAS COPCO	ATLAS COPCO	ATLAS COPCO
AXFOOD	AXFOOD	AXFOOD	AXFOOD
AXIS	AXIS	AXIS	AXIS
ASTRA ZENECA	ASTRA ZENECA	ASTRA ZENECA	ASTRA ZENECA
BOLIDEN	BOLIDEN	BOLIDEN	BOLIDEN
ELECTROLUX	ELECTROLUX	ELECTROLUX	ELECTROLUX
ELEKTA	ELEKTA	ELEKTA	ENIRO
ENIRO	ENIRO	ENIRO	ERICSSON
ERICSSON	ERICSSON	ERICSSON	GETINGE
GETINGE	GETINGE	GETINGE	HEXAGON
HAKON	HAKON	HEXAGON	HM
HEXAGON	HEXAGON	HM	HOLMEN
HM	HM	HOLMEN	JM
HOLMEN	HOLMEN	JM	KINNEVIK
HUSQVARNA	HUSQVARNA	KINNEVIK	LATOUR
JM	JM	LATOUR	LUNDBERGS
KINNEVIK	KINNEVIK	LUNDBERGS	LUNDIN PET.
LATOUR	LATOUR	LUNDIN MINING	MEDA
LINDAB	LINDAB	LUNDIN PET.	MILLICOM
LUNDBERGS	LUNDBERGS	MEDA	MTG
LUNDIN PET.	LUNDIN MINING	MILLICOM	NCC

MEDA	LUNDIN PET.	MTG	NOBIA
MILLICOM	MEDA	NCC	SAAB
MTG	MILLICOM	NOBIA	SANDVIK
NCC	MTG	ORIFLAME	SAS
NOBIA	NCC	SAAB	SCA
ORIFLAME	NOBIA	SANDVIK	SCANIA
SAAB	ORIFLAME	SAS	SECO TOOLS
SANDVIK	SAAB	SCA	SECURITAS
SAS	SANDVIK	SCANIA	SKANSKA
SCA	SAS	SECO TOOLS	SKF
SCANIA	SCA	SECURITAS	SSAB
SECO TOOLS	SCANIA	SKANSKA	SWEDISH MATCH
SECURITAS	SECO TOOLS	SKF	TELE2
SKANSKA	SECURITAS	SSAB	TELIA SONERA
SKF	SKANSKA	SWEDISH MATCH	TIETO ENATOR
SSAB	SKF	TELE2	VOLVO
STORA ENSO	SSAB	TELIA SONERA	
SWEDISH MATCH	STORA ENSO	TIETO ENATOR	
TELE2	SWEDISH MATCH	TRELLEBORG	
TELIA SONERA	TELE2	VOLVO	
TIETO ENATOR	TELIA SONERA		
TRELLEBORG	TIETO ENATOR		
VOLVO	TRELLEBORG		
	VOLVO		

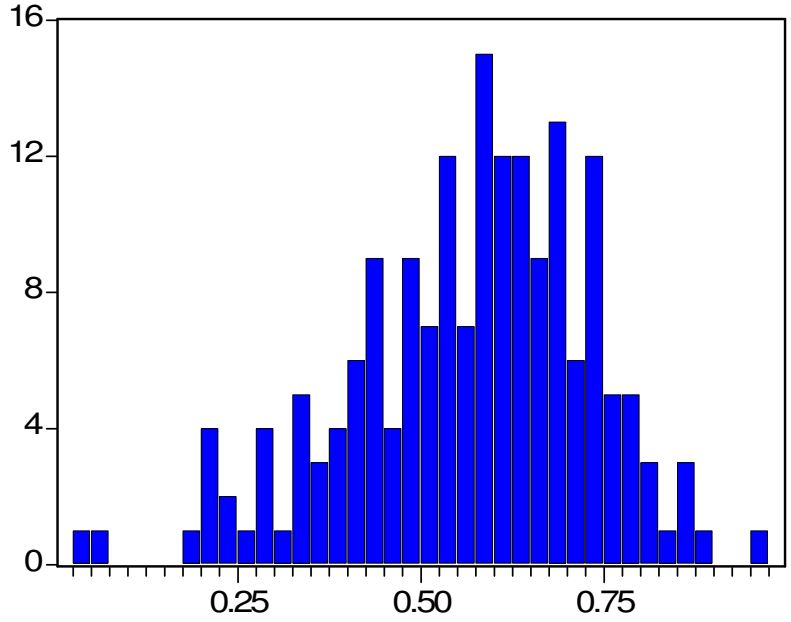
Appendix 2 – Bera-Jarque tests



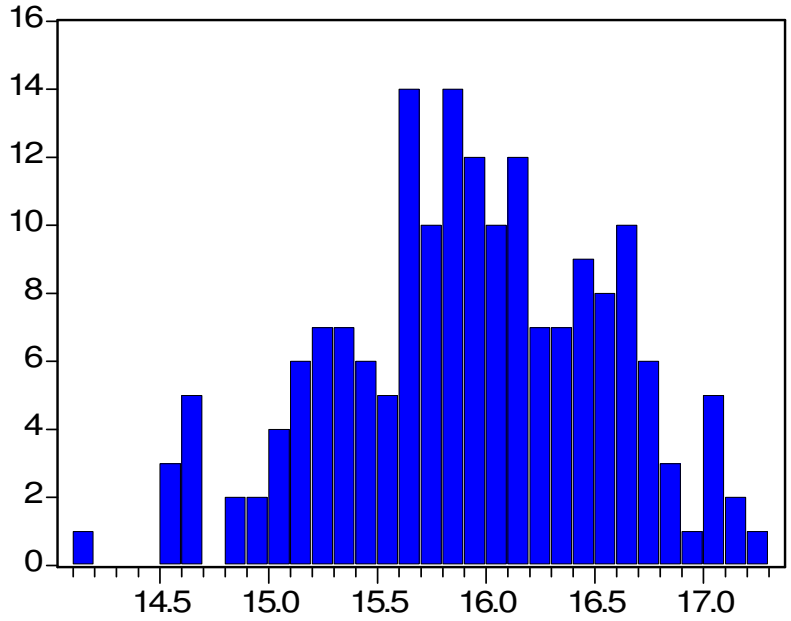
Series: ROA	
Sample 1 179	
Observations 179	
Mean	0.122896
Median	0.102784
Maximum	0.440456
Minimum	-0.024530
Std. Dev.	0.087273
Skewness	1.368927
Kurtosis	5.097152
Jarque-Bera	88.70859
Probability	0.000000



Series: SHARE	
Sample 1 179	
Observations 178	
Mean	0.274655
Median	0.205400
Maximum	2.236100
Minimum	-0.499800
Std. Dev.	0.431194
Skewness	1.514157
Kurtosis	7.064899
Jarque-Bera	190.5645
Probability	0.000000

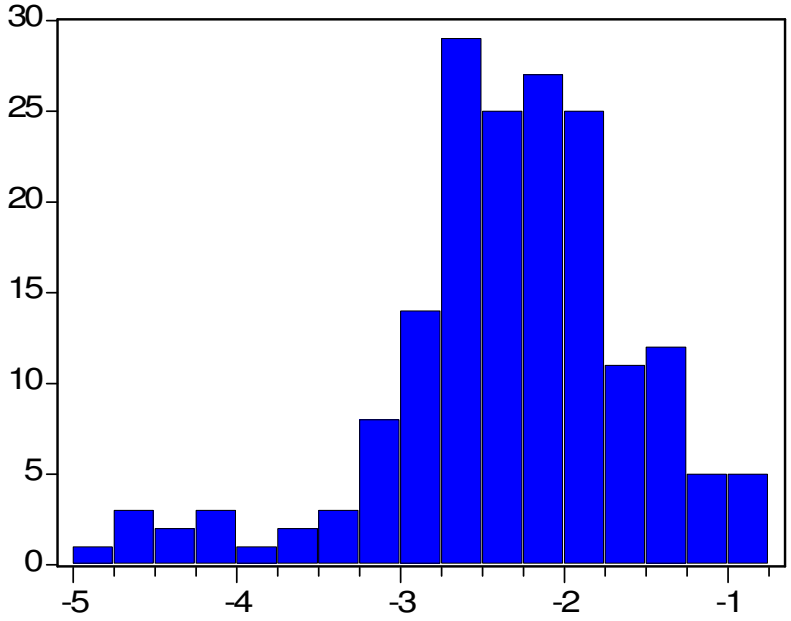


Series: LEV	
Sample 1 179	
Observations 179	
Mean	0.567120
Median	0.589700
Maximum	0.956100
Minimum	0.048100
Std. Dev.	0.165317
Skewness	-0.536477
Kurtosis	3.197586
Jarque-Bera	8.877434
Probability	0.011811

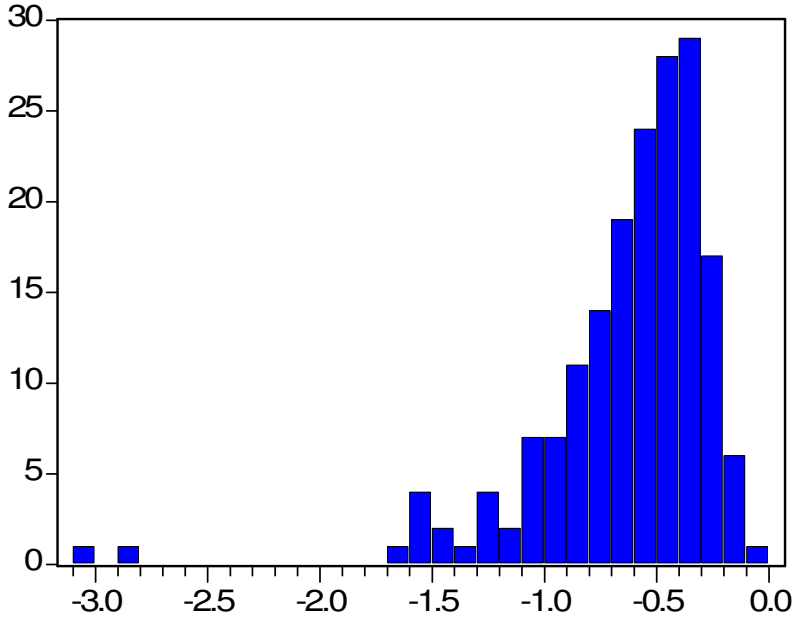


Series: CEO_CC_LN	
Sample 1 179	
Observations 179	
Mean	15.92421
Median	15.93450
Maximum	17.24310
Minimum	14.12590
Std. Dev.	0.617904
Skewness	-0.269805
Kurtosis	2.757679
Jarque-Bera	2.609666
Probability	0.271218

Appendix 3 – Bera-Jarque tests of natural logarithm adjusted data

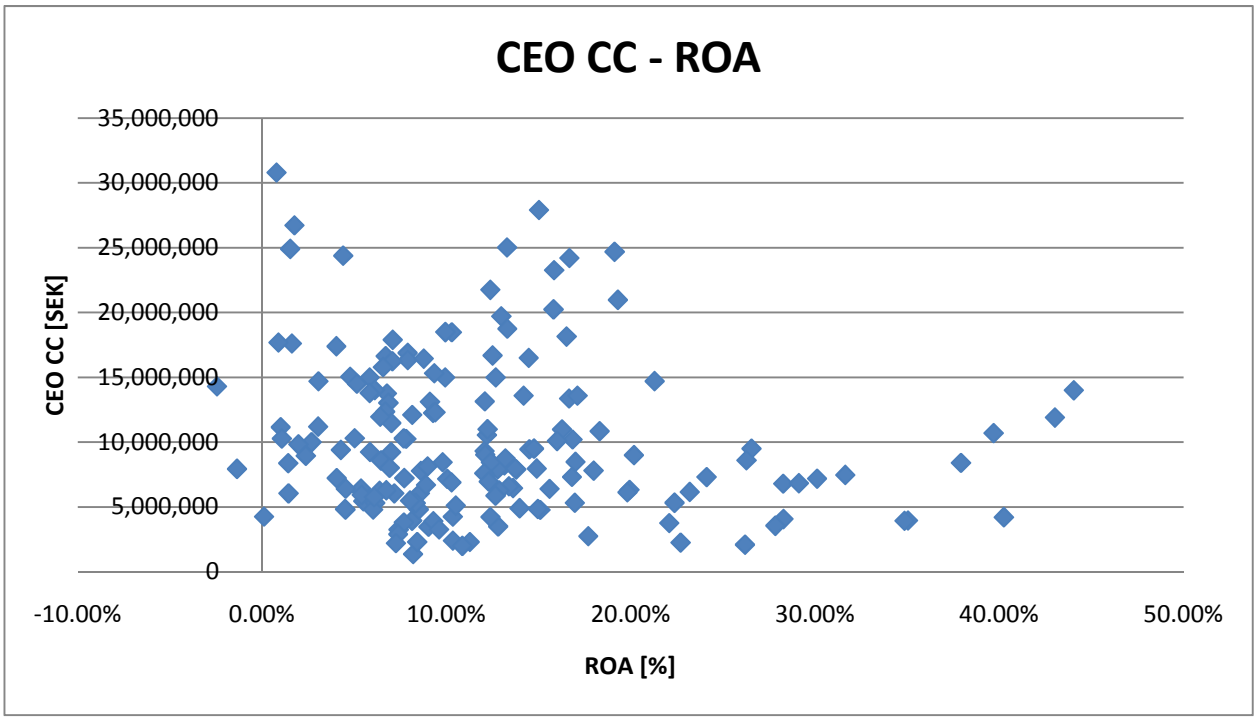


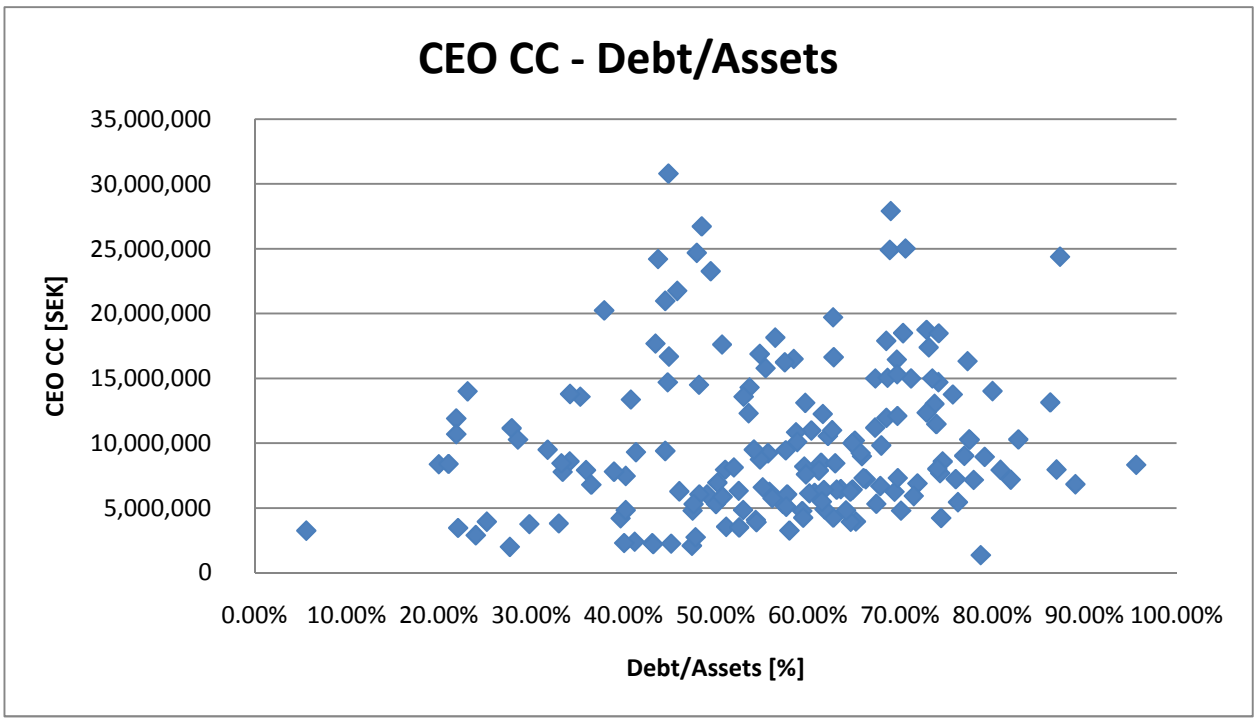
Series: ROA_LN	
Sample 1 179	
Observations 176	
Mean	-2.324048
Median	-2.271674
Maximum	-0.819944
Minimum	-4.857520
Std. Dev.	0.766477
Skewness	-0.826380
Kurtosis	4.248775
Jarque-Bera	31.46776
Probability	0.000000

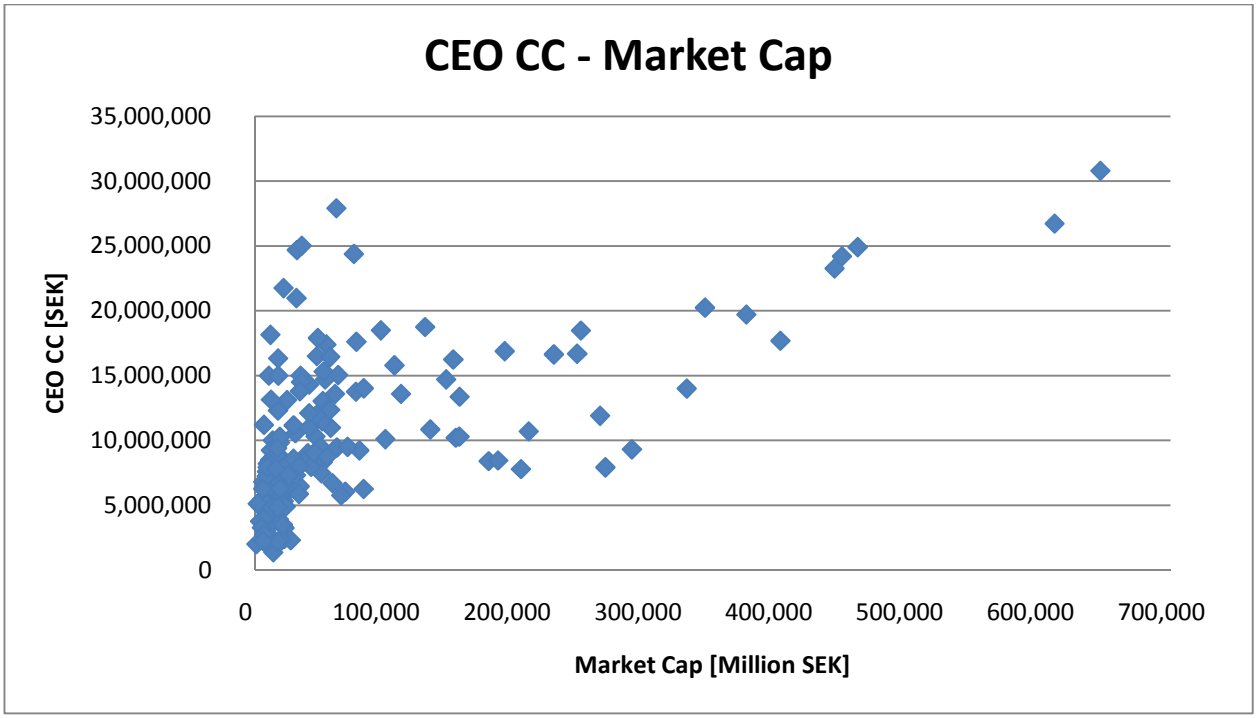


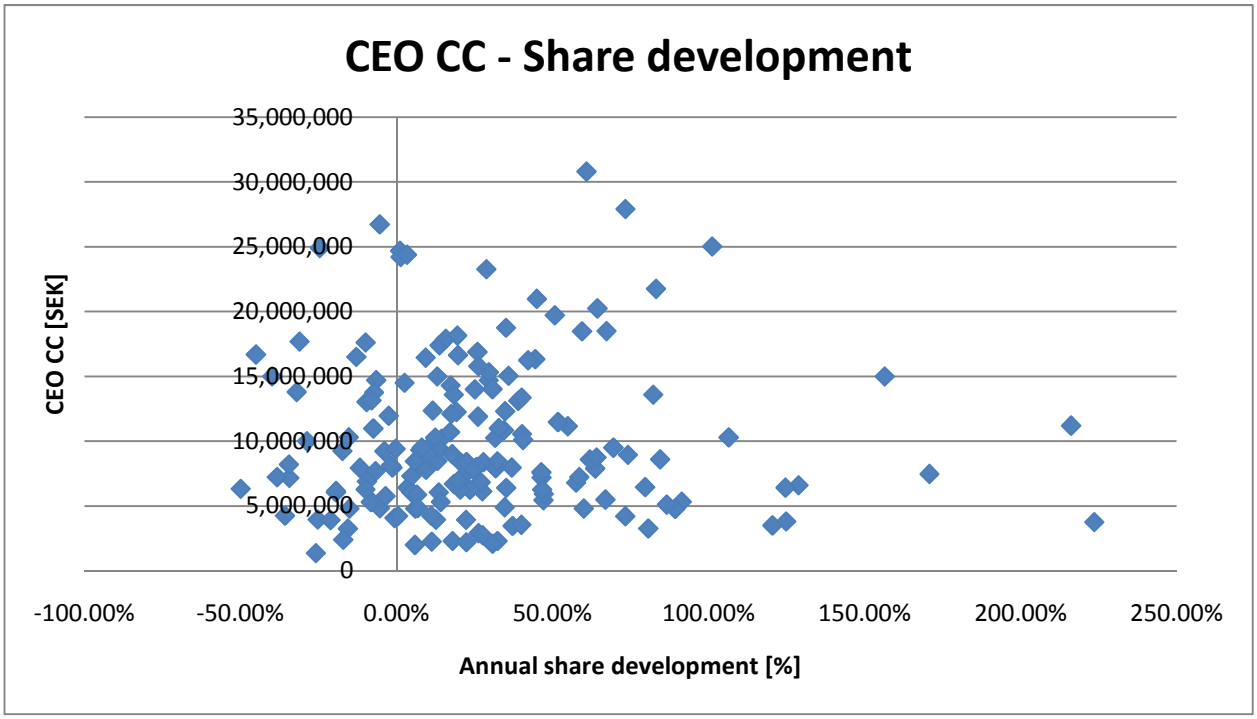
Series: LEV_LN	
Sample 1 179	
Observations 179	
Mean	-0.628396
Median	-0.528200
Maximum	-0.044900
Minimum	-3.034700
Std. Dev.	0.403099
Skewness	-2.612862
Kurtosis	14.12272
Jarque-Bera	1126.381
Probability	0.000000

Appendix 4 – Scatter plots for outlier identification






CEO CC - Market Cap
35,000,000
30,000,000
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
CEO CC [SEK]
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
Market Cap [Million SEK]


CEO CC - Share development
35,000,000
30,000,000
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
CEO CC [SEK]
-100.00%
-50.00%
0.00%
50.00%
100.00%
150.00%
200.00%
250.00%
Annual share development [%]

Appendix 5 – Correlations

	MARKET CAP	SHARE	ROA	LEV
MARKET CAP	1,0000	-0,0663	0,0186	-0,1829
SHARE	-0,0663	1,0000	0,1561	-0,0395
ROA	0,0186	0,1561	1,0000	-0,2310
LEV	-0,1829	-0,0395	-0,2310	1,0000

Appendix 6 – White's tests

Heteroscedasticity test having bonus as dependent and ROA as explanatory

F-statistic	2.416331	Probability	0.028972
Obs*R-squared	13.88898	Probability	0.030901

Heteroscedasticity test having bonus as dependent and ROA_{t-1} as explanatory

F-statistic	2.373268	Probability	0.033248
Obs*R-squared	13.49388	Probability	0.035830

Heteroscedasticity test having bonus as dependent and share development as explanatory

F-statistic	3.154807	Probability	0.005917
Obs*R-squared	17.69448	Probability	0.007043

Heteroscedasticity test having bonus as dependent and share development $_{t-1}$ as explanatory

F-statistic	4.269731	Probability	0.000604
Obs*R-squared	22.43046	Probability	0.001011

Heteroscedasticity test having salary as dependent and ROA $_{t-1}$ as explanatory

F-statistic	1.853243	Probability	0.094152
Obs*R-squared	10.78045	Probability	0.095403

Heteroscedasticity test having salary as dependent and share development $_{t-1}$ as explanatory

F-statistic	1.742284	Probability	0.116626
Obs*R-squared	10.18518	Probability	0.117067

Appendix 7 – White's tests with non-logged market cap.

Heteroscedasticity test having bonus as dependent and ROA as explanatory with non logged market cap.

F-statistic	0.547528	Probability	0.771387
Obs*R-squared	3.358119	Probability	0.762740

Heteroscedasticity test having bonus as dependent and one ROA $_{t-1}$ as explanatory with non logged market cap.

F-statistic	0.423648	Probability	0.862093
Obs*R-squared	2.631440	Probability	0.853477

Heteroscedasticity test having bonus as dependent and share development as explanatory with non logged market cap.

F-statistic	0.812829	Probability	0.561359
Obs*R-squared	4.938284	Probability	0.551753

Heteroscedasticity test having bonus as dependent and share development $_{t-1}$ as explanatory with non logged market cap.

F-statistic	0.489217	Probability	0.815400
Obs*R-squared	3.029294	Probability	0.805161

Heteroscedasticity test having salary as dependent and ROA $_{t-1}$ as explanatory with non logged market cap.

F-statistic	0.526820	Probability	0.787063
Obs*R-squared	3.256352	Probability	0.776052

Heteroscedasticity test having salary as dependent and share development $_{t-1}$ as explanatory with non logged market cap.

F-statistic	0.620856	Probability	0.713292
Obs*R-squared	3.820650	Probability	0.700932

Appendix 8 – Hausman tests

Bonus regressed on ROA and ROA residuals

Dependent Variable: CEO_BONUS
Method: Least Squares
Date: 09/13/08 Time: 14:51
Sample (adjusted): 1 131
Included observations: 131 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.574977	1.121311	0.512772	0.6090
ROA	-6.594548	3.170025	-2.080283	0.0395
RESID_ROA	11.95990	6.353116	1.882525	0.0621
MARKET_CAP	1.71E-05	2.17E-06	7.886522	0.0000
LEV	4.374432	1.554788	2.813523	0.0057

R-squared	0.367193	Mean dependent var	3.549099
Adjusted R-squared	0.347104	S.D. dependent var	3.493968
S.E. of regression	2.823196	Akaike info criterion	4.951037
Sum squared resid	1004.275	Schwarz criterion	5.060777
Log likelihood	-319.2929	F-statistic	18.27818
Durbin-Watson stat	1.591937	Prob(F-statistic)	0.000000

Bonus regressed on ROA_{t-1} and ROA_{t-1} residuals

Dependent Variable: CEO_BONUS
Method: Least Squares
Date: 09/14/08 Time: 16:31
Sample (adjusted): 1 91
Included observations: 83 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.443746	2.502002	2.175756	0.0326
ROA	-12.99562	7.082247	-1.834957	0.0703
RESID_ROA	7.627885	13.94938	0.546826	0.5861
MARKET_CAP	3.20E-05	4.63E-06	6.907815	0.0000
LEV	7.696095	3.457248	2.226076	0.0289

R-squared	0.410160	Mean dependent var	10.94113
Adjusted R-squared	0.379912	S.D. dependent var	6.134629
S.E. of regression	4.830756	Akaike info criterion	6.046233
Sum squared resid	1820.224	Schwarz criterion	6.191946
Log likelihood	-245.9187	F-statistic	13.55981
Durbin-Watson stat	1.666037	Prob(F-statistic)	0.000000

Bonus regressed on share development and share development residuals

Dependent Variable: CEO_BONUS
Method: Least Squares
Date: 09/14/08 Time: 10:42
Sample (adjusted): 1 131
Included observations: 131 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.140130	1.494653	-4.108065	0.0001
SHARE	11.85483	2.642271	4.486605	0.0000
RESID_SHARE	-10.56962	2.689259	-3.930311	0.0001
MARKET_CAP	2.15E-05	2.23E-06	9.668256	0.0000
LEV	7.814819	1.524096	5.127512	0.0000

R-squared	0.456053	Mean dependent var	3.549099
Adjusted R-squared	0.438785	S.D. dependent var	3.493968
S.E. of regression	2.617481	Akaike info criterion	4.799722
Sum squared resid	863.2520	Schwarz criterion	4.909463
Log likelihood	-309.3818	F-statistic	26.41008
Durbin-Watson stat	1.872843	Prob(F-statistic)	0.000000

Bonus regressed on one share development $_{t-1}$ and share development residuals $_{t-1}$

Dependent Variable: CEO_BONUS
Method: Least Squares
Date: 09/14/08 Time: 10:46
Sample (adjusted): 1 91
Included observations: 83 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.214985	3.838359	0.577066	0.5656
SHARE	1.205687	5.061883	0.238189	0.8124
RESID_SHARE	0.901573	5.206091	0.173177	0.8630
MARKET_CAP	3.27E-05	5.33E-06	6.140826	0.0000
LEV	9.440916	3.542853	2.664778	0.0094

R-squared	0.406442	Mean dependent var	10.94113
Adjusted R-squared	0.376003	S.D. dependent var	6.134629
S.E. of regression	4.845957	Akaike info criterion	6.052517
Sum squared resid	1831.697	Schwarz criterion	6.198230
Log likelihood	-246.1794	F-statistic	13.35272
Durbin-Watson stat	1.917349	Prob(F-statistic)	0.000000

Salary regressed on ROA $_{t-1}$ and ROA residuals $_{t-1}$

Dependent Variable: CEO_SALAR
Method: Least Squares
Date: 09/13/08 Time: 16:31
Sample (adjusted): 1 91
Included observations: 83 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.926259	1.572712	3.132333	0.0024
ROA	-3.034436	4.451769	-0.681625	0.4975
RESID_ROA	-6.212093	8.768325	-0.708470	0.4808
MARKET_CAP	1.62E-05	2.91E-06	5.565332	0.0000
LEV	2.137729	2.173162	0.983695	0.3283

R-squared	0.297951	Mean dependent var	7.127771
Adjusted R-squared	0.261949	S.D. dependent var	3.534544
S.E. of regression	3.036524	Akaike info criterion	5.117654
Sum squared resid	719.1971	Schwarz criterion	5.263367
Log likelihood	-207.3826	F-statistic	8.275854
Durbin-Watson stat	1.787288	Prob(F-statistic)	0.000013

Salary regressed on share development $_{t-1}$ and share development residuals $_{t-1}$

Dependent Variable: CEO_SALARY
Method: Least Squares
Date: 09/14/08 Time: 10:50
Sample (adjusted): 1 91
Included observations: 83 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.958788	2.388500	2.913455	0.0047
SHARE	-4.123760	3.149864	-1.309187	0.1943
RESID_SHARE	3.238177	3.239600	0.999561	0.3206
MARKET_CAP	1.41E-05	3.32E-06	4.254092	0.0001
LEV	1.598333	2.204615	0.724994	0.4706

R-squared	0.307640	Mean dependent var	7.127771
Adjusted R-squared	0.272134	S.D. dependent var	3.534544
S.E. of regression	3.015499	Akaike info criterion	5.103758
Sum squared resid	709.2723	Schwarz criterion	5.249471
Log likelihood	-206.8060	F-statistic	8.664518
Durbin-Watson stat	1.755142	Prob(F-statistic)	0.000008

Appendix 9 – Pay-performance regressions

Pay-performance regression having bonus as dependent and ROA as firm performance proxy

Dependent Variable: CEO_BONUS4
Method: Least Squares
Date: 09/13/08 Time: 16:01
Sample: 1 171
Included observations: 171

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.184520	0.945448	-0.195167	0.8455
ROA4	-2.517312	2.486170	-1.012526	0.3128
MARKET_CAP4	1.70E-05	1.96E-06	8.715242	0.0000
LEV4	4.579003	1.348877	3.394676	0.0009

R-squared	0.329759	Mean dependent var	3.306708
Adjusted R-squared	0.317718	S.D. dependent var	3.328848
S.E. of regression	2.749640	Akaike info criterion	4.883931
Sum squared resid	1262.607	Schwarz criterion	4.957420
Log likelihood	-413.5761	F-statistic	27.38800
Durbin-Watson stat	1.658408	Prob(F-statistic)	0.000000

Pay-performance regression having bonus as dependent and ROA $_{t-1}$ as firm performance proxy

Dependent Variable: CEO_BONUS43
Method: Least Squares
Date: 09/14/08 Time: 15:27
Sample (adjusted): 1 131
Included observations: 131 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.386691	1.074531	0.359870	0.7195
ROA3	-6.262651	3.009884	-2.080695	0.0395
MARKET_CAP43	1.71E-05	2.17E-06	7.881010	0.0000
LEV43	4.578215	1.534572	2.983381	0.0034

R-squared	0.362423	Mean dependent var	3.549099
Adjusted R-squared	0.347362	S.D. dependent var	3.493968
S.E. of regression	2.822637	Akaike info criterion	4.943279
Sum squared resid	1011.844	Schwarz criterion	5.031071
Log likelihood	-319.7847	F-statistic	24.06390
Durbin-Watson stat	1.564833	Prob(F-statistic)	0.000000

Pay-performance regression having bonus as dependent and share development $_{t-1}$ as firm performance proxy

Dependent Variable: CEO_BONUS4
Method: Least Squares
Date: 09/13/08 Time: 16:10
Sample (adjusted): 1 131
Included observations: 131 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.890924	0.931929	-2.029043	0.0445
SHARE3	2.458467	0.559894	4.390952	0.0000
MARKET_CAP4	1.82E-05	2.07E-06	8.829753	0.0000
LEV4	5.470632	1.434301	3.814146	0.0002

R-squared	0.427589	Mean dependent var	3.549099
Adjusted R-squared	0.414068	S.D. dependent var	3.493968
S.E. of regression	2.674500	Akaike info criterion	4.835461
Sum squared resid	908.4249	Schwarz criterion	4.923253
Log likelihood	-312.7227	F-statistic	31.62288
Durbin-Watson stat	1.794452	Prob(F-statistic)	0.000000

Pay-performance regression having salary as dependent and ROA $_{t-1}$ as firm performance proxy

Dependent Variable: CEO_SALARY43
Method: Least Squares
Date: 09/13/08 Time: 16:37
Sample (adjusted): 1 131
Included observations: 131 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.480690	1.095404	4.090446	0.0001
ROA3	-4.488451	3.068352	-1.462821	0.1460
MARKET_CAP43	1.70E-05	2.21E-06	7.688952	0.0000
LEV43	2.856216	1.564382	1.825779	0.0702

R-squared	0.330907	Mean dependent var	6.861672
Adjusted R-squared	0.315101	S.D. dependent var	3.476941
S.E. of regression	2.877468	Akaike info criterion	4.981757
Sum squared resid	1051.537	Schwarz criterion	5.069549
Log likelihood	-322.3051	F-statistic	20.93636
Durbin-Watson stat	1.839967	Prob(F-statistic)	0.000000

Pay-performance regression having salary as dependent and share development $_{t-1}$ as firm performance proxy

Dependent Variable: CEO_SALARY43
Method: Least Squares
Date: 09/13/08 Time: 16:38
Sample (adjusted): 1 131
Included observations: 131 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.238138	0.998079	4.246296	0.0000
SHARE3	-1.093616	0.599636	-1.823799	0.0705
MARKET_CAP43	1.66E-05	2.21E-06	7.516580	0.0000
LEV43	3.099630	1.536109	2.017845	0.0457

R-squared	0.336998	Mean dependent var	6.861672
Adjusted R-squared	0.321336	S.D. dependent var	3.476941
S.E. of regression	2.864340	Akaike info criterion	4.972612
Sum squared resid	1041.965	Schwarz criterion	5.060404
Log likelihood	-321.7061	F-statistic	21.51762
Durbin-Watson stat	1.853980	Prob(F-statistic)	0.000000