

Industrial and Financial Economics

Master Thesis No 2003:42

**CEO Compensation and Company Performance**

An Empirical Study of the situation in Sweden's Listed Companies

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ISSN 1403-851X

Printed by Elanders Novum

## **Abstract**

This Master Thesis attempts to explain the relationship between CEO compensation and company performance in Sweden's Listed Companies. The data collected for this study is from the years 1999, 2000, 2001, and 2002. The main purpose of this study is to see whether the CEO's bonus is affected by the company performance or whether the opposite relationship exists, the CEO's bonus itself has a positive influence on company performance. The study involves a general examination of companies from all lists on the Stockholm Stock Exchange, and it also involves separate tests on companies of various sizes as well as from different industry sectors.

The results obtained in this Master Thesis clearly indicate that there is no relationship between CEO bonus and company performance among Sweden's Listed Companies. However, certain incentive variables have been identified as important performance boosters among companies in certain sectors. We have also been able to establish that some of the previous theories regarding incentive contracts hold true among companies of certain sizes, and among companies from certain sectors.

**Key words:** CEO Compensation, Company Performance, Incentive Contracts, Principal-Agency Problem

## **Acknowledgement**

We would like to take this opportunity to thank certain people that have been important during the progress of this Master Thesis. Without their support, knowledge, and encouragement the completion of this study would have been hard to accomplish.

First we would like to thank our advisor Lars-Göran Larsson, Senior Lecturer in economics at the Gothenburg School of Economics and Commercial Law for his valuable help, advice, and encouragement throughout the duration of our Master Thesis. We would especially like to thank him for the many hours that he has spent with us in his office when we have needed guidance and advice, on how to attack certain obstacles.

Additionally, we would like to direct special thanks to Professor Lennart Flood at the economics department at Gothenburg School of Economics and Commercial Law for his help in guiding and advising us on how to treat certain statistical matters during our study. Out of kindness he set aside time for us on several occasions when we really needed it the most. His kindness and help is something that we greatly appreciate and will always remember.

Finally we would like to thank our fellow peer and classmate Andreas Nyberg for valuable computer assistance in times when we have needed some extra guidance.

Gothenburg 2004-01-10

Johan Grunditz

Johan Lindqvist



***“Make your top managers rich and they will make you rich”***

Robert W. Johnson

## **Abbreviations**

B.L.U.E = Best Linear Unbiased Estimator

CEO = Chief Executive Officer

EPS = Earnings Per Share

EVA = Economic Value Added

NOPAT = Net Operating Profit After Taxes

OLS = Ordinary Least Square

ROA = Return On Assets

ROE = Return On Equity

WACC = Weighted Average Cost of Capital

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# 1 Introduction

## 1.1 Background

Executive compensation has been a topic of significant debate for a long period. A lot of this attention has been on Chief Executive Officer (CEO) compensation, and its relationship to company performance. Stockholders seem to be more convinced than ever that there is no connection between executive pay and company performance. This criticism has its foundation in growing salaries and bonuses, in times of poor financial conditions and results. According to agency theory, an agency problem exists when an agent, such as a CEO has established an agenda which conflicts with the interests of the stockholders. The occurrence of a principal agency problem is most likely to happen when an executive has no personal financial interest in the outcomes and decisions made (Boyd 1994). Hence, a solution to the problem of principal agency conflict can be avoided by rewarding the executives on the basis of financial returns to the stockholders.

Executives, like most individuals, are characterized as being risk-averse. The implications of such a behavior explain that most executives would want their compensation structured in such a way that they bear less personal risk. In order to reduce their “personal” risk, executives may engage in activities that reduce the firm’s risk. These activities may adversely affect shareholder’s wealth.<sup>1</sup> Previous research done by Holmstrom (1979); Harris and Raviv (1979); Grossman and Hart (1983), suggests that tying executive compensation to firm performance will motivate the executive to make more value-maximizing decisions for the stockholders.

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<sup>1</sup> See Section 2: Principal – Agency Problem – A Description

Examples of studies performed in the area of executive compensation have been conducted by researchers such as Murthy and Salter (1975); Aupperle, Figler, and Lutz (1991); Veliyath and Bishop (1995); Akhigbe, Madura, and Tucker (1995). Only the study performed by Veliyath and Bishop (1995) found a strong relationship between CEO compensation and company performance. It is important to recognize what parameters that can be used in order to evaluate CEO performance. Defining compensation as salary and bonus has the advantage of providing comparability with other studies of executive compensation, as the largest percentage of the prior studies that we have examined have defined executive compensation to include only direct cash payments. Our previous studies have focused mainly on the return on equity (ROE) for the related companies and evaluated the actual cash payments to the CEO. Hence, the base salary as well as cash bonuses will be evaluated in this study.

Since there has been dispersion in previous studies regarding the connection between CEO compensation and firm performance, we believe it is of great interest to perform this Master Thesis in the area of CEO compensation and firm performance among companies listed on the Stockholm Stock Exchange.

## **1.2 Purpose**

The principal purpose of this Master Thesis is to examine empirically if there is a relationship between CEO compensation and firm performance among companies listed on the Most traded list, Other A-List, Attract 40, or the other O-List on the Stockholm Stock Exchange.

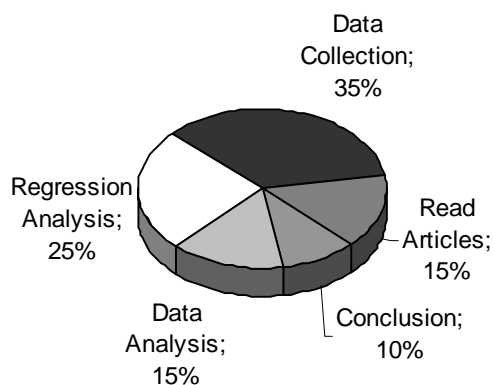
The purpose of this study includes examining the following:

- Is there a correlation between CEO compensation and company performance among Sweden's listed companies traded on the Most traded List, Other A-List, Attract 40, or the other O-List?
- Are there any other variables other than company performance that are of greater importance when evaluating the CEO compensation?
- Does bonus or any other CEO related variables enhance company performance?
- Is CEO compensation and company performance affected differently depending on the size of the company?
- Is CEO compensation and company performance affected differently depending on which industry sector it belongs to?

We hope that this study will offer a significant contribution to the existing literature, since it involves the exploring of Sweden's Listed Companies, an area that has not been previously researched to its full extent.

### 1.3 Delimitation

The first and most obvious limitation to this Master Thesis is the time limit



imposed on the study. For this Master Thesis 20 weeks have been set aside to conduct and complete the study. A more detailed presentation of the time distribution for various parts is illustrated in figure 1:

Figure 1: Time distribution of Master Thesis

A second limitation is that the CEO compensation is measured solely by the cash compensation. Hence, pension plans, insurance contracts, and severance pay is completely omitted from the study. This decision is based on the complexity of how to make a fair judgment, and comparison between two separate companies. Another cause for this exemption is that many companies chose not to publicize this information in their annual reports, which creates complications for us when gathering this specific data.

Another limitation is that the content of this study revolves around the CEO's compensation and the company performance. One needs to note that the board of directors and other top executives have much to say regarding the overall performance of the company. However, in this study all this additional information is omitted, and the focus revolves around the CEO alone.

Finally, it is important to note that in some cases where the company performance data has not been available in independent databases we have gathered this data from annual reports. We are aware that these measures may involve some bias, since they are presented by the board to the stockholders. However, these annual reports go through thorough investigation by accredited accountants, and therefore these figures are believed to be accurate and not imposing a bias effect on this study.

## **1.4 Method**

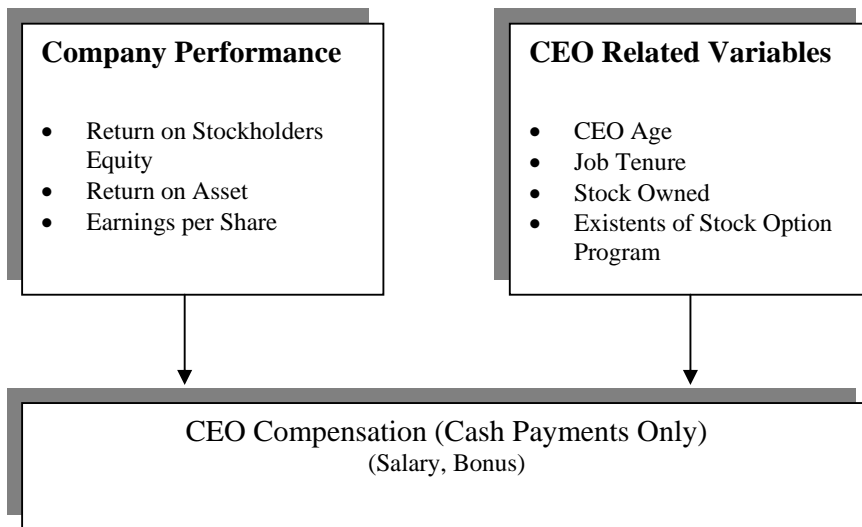
### 1.4.1 Courses of Action

Our interest in the area of CEO compensation and company performance was established after heavy media coverage in the previous year (2002). To further enhance our knowledge of the subject matter we have read numerous articles, books, and previous research studies in order to gain the knowledge necessary to

perform a similar study on our own. Throughout our search for knowledge we have been exposed to research models that other scholars have applied when performing their studies in this area. We have applied a similar model as a stepping-stone for our study.<sup>2</sup> The next step was to collect the data necessary for analysis.<sup>3</sup> After the sample selection procedure was completed, and the data set was in order, we applied the ordinary least squares (OLS) method in order to run our regression models. Before applying the appropriate model for each individual test, we tested for econometric problems in our data to secure a data set that will lead to valuable results. After the regression models were tested we analyzed the results obtained from the econometric models and came up with a conclusion.

#### 1.4.2 Research Model

In order to start our data collection process we have used a model that has been



applied in previous studies by Attaway (2000); Murthy and Salter (1975); Aupperle, Figler, and Lutz (1991); Akhigbe, Madura, and Tucker (1995); Madura, Martin, and Jessel (1996);

*Figure 2: Research Model*

and Hall, and Liebman (1998). These researchers have applied a similar model to their studies, and we have made a few modifications to this model, and come up with the research model presented in Figure 2.

<sup>2</sup> See Section 1.4.2: Research Model

<sup>3</sup> See Section 1.4.3: Sample Sampling Procedure

This is the extended model that we have used as a stepping-stone for the data collection in our research project. As mentioned earlier ROE is the measurement used in the previous studies performed. Attaway (2000) notes that ROE as a measurement of company performance can be criticized as it may not indicate the true underlying performance of the CEO, since this figure can be easily manipulated to make the CEO look good. Therefore, we have extended the model by including return on asset (ROA), and earnings per share (EPS). Earlier studies performed by Murthy and Salter (1975); Aupperle, Figler, and Lutz (1991); and Madura, Martin, and Jessel (1996) found no significant relationship between CEO compensation, and changes in ROE. However, Veliyath and Bishop (1995) were able to distinguish that companies with high ROE reward their CEOs with higher cash compensation. These results inspired us to see whether we could test additional variables such as ROA, and EPS to see whether they had some significant role in the cash compensations for company CEOs.

#### 1.4.3 Sample Selection Procedure

As previously mentioned, our original sample consists of all companies listed on the Most traded List, Other A-List, Attract 40, and other O-List. This entails a sample of 286 companies. The second constraint of our study requires the companies to have had the same CEO appointed for a four-year period (1999-2002). The application of this constraint has been set forth in order to make sure that a CEO has not been employed primarily to “save” a company under harsh financial conditions. Hiring a CEO primarily to “save” a company will most likely involve higher remuneration even in times of “bad” company performance. Therefore, a company that has gone through executive changes during our sample period has been eliminated.

Another important feature of this study is that it involves data from both small firms, as well as large multinational firms. Moreover, it provides the variation necessary to conduct statistical tests (Mehran 1995). Another feature of our study that might be questioned is the time-period selected. People might argue that it is considered a period of large financial distress, and that the results cannot be relied upon. However, we believe that the sample period selected will work to our

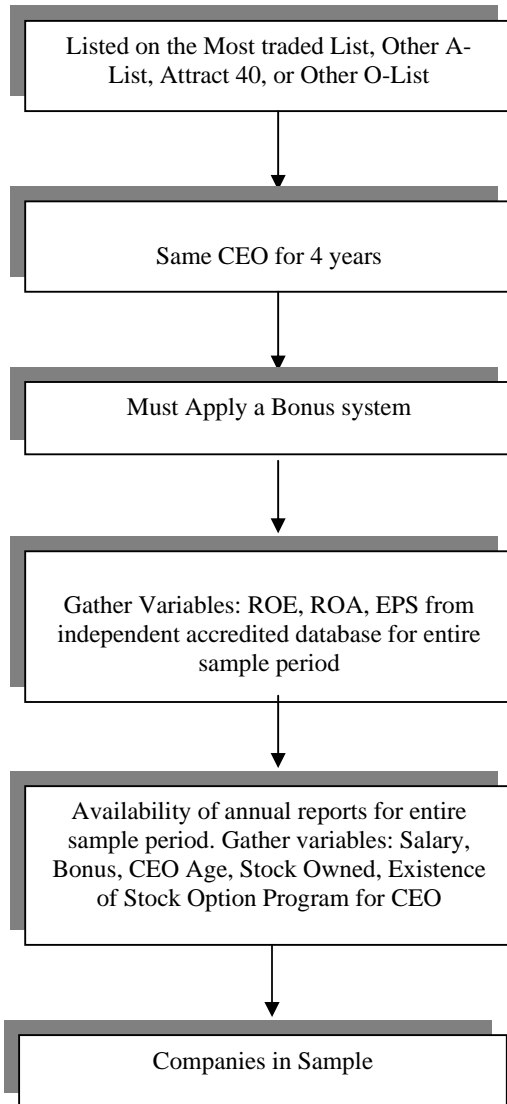


Figure 3: Data Sampling Procedure

selection procedure is illustrated in figure 3. After these criteria have been applied we have arrived at a total sample comprised of 65 companies.

advantage, since it involves both large ups and downs in the economy. According to Gomez-Meija, Tosi, and Hinkin (1987), “Pooling performance data into a four or five year average reduces variability, provides a better long term indicator, and provides a more reliable and valid measure of firm performance than annual measures”. The next action taken was to collect the data for each of our variables.<sup>4</sup> The data applicable for our study was found in the annual reports for each respective company, as well as in independent accredited databases. The annual reports were used primarily to collect the CEO specific variables, whereas independent accredited databases were used for company specific variables. All variable data during the four-year period is calculated on an annual basis. The complete sample

<sup>4</sup> For Explanation of each Variable, see Section 1.4.5.

#### 1.4.4 Reliability and Validity of Study

We believe that the reliability and validity of this study is high, and there are a few reasons for this statement. Firstly, all articles and books used for this study have been written by what we believe to be highly competent and knowledgeable scholars. All articles and books also go through very detailed screening before publication, which will further enhance their reliability and validity.

Moreover, the data collected for the analyses of the study is believed to be of high quality since it is gathered from sources that are argued to be reliable. A more detailed section regarding the reliability and validity of the data set is presented in section 4.3.

Finally, the OLS method used for the statistical portion of this study is a method that has been applied in many similar research studies.

#### 1.4.5 Chosen Variables

##### *Company Performance Variables*

The primary focus of this study is on the relationship between CEO compensation and company performance, although other factors are included in the model as control variables. For this study the performance measures ROE, ROA, and EPS are applied. Even though these are very commonly used performance measures it is important not to neglect the vitality of other performance measures, and the criticism that can be imposed on our study. Two of these highly applicable performance measures are Economic Value Added (EVA) and Tobin's Q.<sup>5</sup> This study is using traditional performance measures as an attempt to measure the impact of investment decisions relative to the firm's invested capital.

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<sup>5</sup> See Appendix 1 for further explanation of these performance measures.



*ROE.* The company ROE is equal to the return from investments relative to the equity invested.<sup>6</sup> ROE represents the return the company is making on shareholders' funds in the company. It reflects how much the company has earned on the funds invested by the shareholders, and is, therefore, an important ratio when interpreting a company's performance. It is important to note that ROE can be calculated in various ways. The formula presented in this Master Thesis is the formula applied by Ecovision AB who supplied the data for Dagens Industri.

*ROA.* ROA measures the return to shareholders relative to the total assets of the firm. The firm's ROA is affected by the financing decisions of the firm, since net income includes the impact of after-tax interest payments to debt holders.<sup>7</sup> ROA indicates how efficient the company is in generating profits with the assets it holds. The rate of return provides information on management's efficiency in using available resources to make profits. As well as ROE there are different ways of calculating ROA, and the formula presented here is the one applied by Ecovision AB.

*EPS*<sup>8</sup>. EPS is probably one of the most popular performance measures. By nature it is very straightforward since you add up all the money a company earns, and divide it by the number of shares outstanding.<sup>9</sup>

### *CEO Related Variables*

The CEO's remuneration may be dependent on each individual's characteristics as well as the specific factors of each company. Certain specific characteristics of a CEO including their development of human capital, knowledge, or degree of

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<sup>6</sup> ROE = Net Result / Average Equity

<sup>7</sup> ROA = Net Result / Average Assets

<sup>8</sup> EPS = Amount of Net Income / Total Number of Outstanding Shares

<sup>9</sup> <http://news.morningstar.com/news/MS/Stocks101/neweps.html>

control and interest in the firm may affect their perceived value to the firm (Madura, Martin, and Jessell 1996). Four CEO specific factors have been identified in this study.

*CEO age.* The compensation of the CEO may be positively correlated to the amount of human capital that has been accumulated throughout their employment period. Older CEOs have more years of experience and hence, a longer period of accumulation of this specific human capital. It is, therefore, hypothesized that older CEOs are rewarded for this particular characteristic (IBID).

*CEO Tenure.* In our study CEO tenure is the constraint that the CEO must have held his present position for the entire sample period (1999-2002)<sup>10</sup>.

*Stock Ownership.* A CEO with a higher proportion of ownership is believed to act different than a CEO with no personal interest in the company. A CEO with a larger stake in the firm has more incentive to perform, since part of his own wealth is affected.<sup>11</sup>

*Existence of Stock Option Program for CEO.* It is argued that one specific way to motivate a CEO to make more value maximizing decisions is to reward the CEO a greater portion of his remuneration as equity based, through incentive stock options (Jensen, and Murphy 1990).

#### *CEO Compensation Variables*

*Base Salary.* The fixed amount paid out to the CEO during the course of the year. The base salary is paid out independently of any results achieved over the year.

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<sup>10</sup> The CEO Tenure was further explained in Section 1.4.3: Sample Selection Procedure

<sup>11</sup> See Section 2: Principal – Agency Problem – A Description

*Bonus.* A bonus is the variable cash compensation paid out to the CEO during the year. The bonus will be paid out at the end of the year and it is not fixed before the year has started. The bonus will most likely be paid out after certain barriers have been broken or specific results have been accomplished.

#### 1.4.6 Statistical Method

The statistical method chosen for this study is the Ordinary Least Square (OLS) method in order to test our hypotheses. The OLS method serves as the best linear unbiased estimator (B.L.U.E.) between two or more variables. Since our study involves more than one independent variable, we have applied multiple regression analysis. In multiple regression analysis two or more independent variables serves to explain variations in the dependent variable, Y (Ogden 2003 p.29). By performing multiple regression analysis one can obtain exact figures representing the statistical significance between the different relationships among the various variables. For the implementation of the OLS method we have applied Microsoft Excel computer software.



## **2 Principal – Agency Problem – A Description**

### **2.1 Introduction**

“The relationship of agency is one of the oldest and commonest codified modes of social interaction. We will say that an agency relationship has arisen between two (or more) parties when one, designated as the agent, acts for, on behalf of, or as representative for the other, designated the principal, in a particular domain of decision problems” (Ross 1973). The core of the theory of the principal and the agent derives from one of the major concerns of incentive theory. The basic idea of this theory focuses on the cost of performing a certain task, executed by the agent (in this study, the CEO). The agent is hired by the principal (in this study, the stockholders) based on his knowledge and skills, in order to execute certain decisions in the “best” interest of the principal. The central concern in this theory can be found in the question regarding how the principal can motivate the agent to perform at the top of his ability, in order to satisfy the principal. The difficulties of this “monitoring” of the agent can be explained in that an agent tends to engage in a high level of self-interest activities. Therefore, it is of great importance that the principal can motivate, and reward the agent to perform, as the principal would prefer (Sappington 1991).

The theory of the principal agency problem is highly related to this research study of the correlation of CEO compensation and company performance, since the CEO might not always act in the best interest of the stockholders. The bonus system applied in many of the companies listed on the Stockholm Stock Exchange, is an action imposed by the stockholders in order to motivate the CEOs, and also a way to try to convert a generally risk adverse CEO to become more risk neutral. An executive is reluctant to make risky decisions since he is always exposed to the risk of getting laid off when an action is taken that does

not satisfy the principals. Hence, the executive tends to act in a risk adverse manner, whereas a stockholder is more risk neutral since they have the possibility to diversify their portfolios (Mehran 1995).

One of the main issues in a principal agency relationship is the construction of a contract. The procedure followed when a contract is created is that the principal will design the terms of the contract. The contract will contain, and specify the rules and engagements whereby the agent is expected to obey, as well as the remuneration that will be paid out upon completion of the conditions of the contract. After the offer to the agent has been made, the agent will decide whether he will accept or reject the conditions of the contract set forth. Upon rejection the contract is terminated, whereas an acceptance by the agent will begin his “employment”. The final procedure of the contract is the observance of the agent’s performance, and the payments of the remuneration will be paid out as stipulated in the contract (Sappington 1991).

## **2.2 Ownership**

An agency problem may arise whenever the CEO does not own 100% of the shares of the company. This can be explained by the fact that one does not feel the same motivation to perform well at any time when it is not ones own wealth that is at stake. According to Hart (1995 p. 127), the fact that the CEO does not own all the outstanding stock creates two new issues. First, those who own the company, the shareholders, are too small, and too numerous, to be able to perform and engage in day-to-day activities. In order to cope with this dilemma, control is given to the Board of Directors, which in turn, delegates the responsibility to the executives. Hence, separation of control and ownership is created. Secondly, dispersed shareholders have little or no incentive to take part in the day-to-day monitoring activities. This can be explained by the fact that

monitoring is very costly and the creation of wealth will be shared between all shareholders. The idea of this creation of wealth gives birth to a free rider problem where shareholders try to take advantage of the situation at no individual cost. The solution to this free rider problem can be solved when one person or institution acquires a large stake in order to be in charge of the monitoring. In order to apply the problem of ownership, and its effect on CEO performance in this study, the percentage of outstanding stock owned by the CEO has been considered. The reason for the addition of this variable is to see whether a CEO with a larger stake in the company tends to perform better than a CEO with a small or non-existing stake in the company.

### **2.3 Managerial Opportunistic Behavior- “Empire Building”**

Managerial opportunistic behavior is a phenomenon that is grounded in the egocentric behavior of human nature. It can be explained as the actions taken by an executive who does not act in the best interest of the shareholders, but rather tries to expand the firm, and its entity at any price. According to Ross, Westerfield, and Jaffe (2002 p.15), an executive left alone would rather try to maximize the corporate wealth instead of the shareholder wealth, unless the right incentives are presented. This “Empire Building”, where an executive is only acting in the best interest of himself in order to make ones own name immortal, is a common problem in large companies. According to principal agency theory, one of the toughest issues to deal with is the separation between ownership and control. Hart (1995 p. 128) presents a possible solution to this issue by suggesting that managers put on the right incentive scheme will reorganize their priorities. However, an incentive scheme might work as a motivating force and boost the overall effort of the executive, but it will be less effective in getting executives to cut back on the “Empire building”. This can be explained by the fact that

executives with high “personal” ambitions, are not willing to give up these extra perquisites, and benefits at a low cost for the shareholders.

## **2.4 Managerial Entrenchment**

Managerial Entrenchment is a concept that involves the decision whether a firm should be liquidated or not. It is a typical principal agent problem since the best interest of the stockholders and the executives might be different. Under certain conditions the optimal decision for the stockholders might be to liquidate the firm in order to yield a certain pay-off. The executive might realize his limitations and not see any possibilities for expanding his enterprise. Hence, his only goal is to avoid liquidation (Hart 1995 p.131). As one can understand, liquidation would result in a more efficient solution for the shareholders since it would accommodate a positive pay-off before an eventual bankruptcy. However, a manager acts on behalf of his own best interest, in order to hold on to his position and be rewarded his remuneration. He is not willing to sacrifice his job, and remuneration to bear the risk of being unemployed, even though it would be the better solution for the stockholders.



### **3 Incentive Contracts**

As mentioned previously, one of the major complications in a firm involves the separation of ownership and control. This complication will occur any time the CEO does not own 100 % of the outstanding shares, hence does not have the same self interest in the performance of the firm as the rest of the stockholders. So what can be done in order to motivate the CEO to perform well, and become more risk-neutral? This problem can be solved through the implication of different incentive programs. According to a study conducted by Nordic Investor Services there are currently nine different types of employee incentive programs in Sweden's Listed Companies (Nordic Investor Services 2003). Implicit incentive schemes represent highly incomplete contracts. This is grounded in two significant factors: the difficulty in determining desirable performance prior to the activity performed, and the difficulty of measuring the actual performance once it is completed (Milgrom and Roberts 1992 p. 402). Part of the problem involving the contracts and the incompleteness thereof, can be explained by the asymmetric information, and moral hazard separating the CEO, and the stockholders. Yet this problem of defining performance in advance can be prevented through the application of an explicit incentive contract, since there may be a proxy for good overall performance. From a stockholders point of view, the stock price performance might be a very good indication of the CEO's performance, and serve as a quite adequate "summary statistic" of the same (IBID p. 403).

#### **3.1 Types of Incentive Contracts**

There are some points regarding the characteristics of the incentive contracts and such contracts that are considered more or less favorable in certain situations. As stated by Mehran (1995), Jensen and Murphy suggest that making a greater

percentage of the CEO's compensation equity based, such as through stock-options, will motivate the CEO to take on more risk. Consequently, the CEO will abandon his natural risk-aversity and become more risk-neutral. Moreover, Mehran (1995) himself regressed CEO age towards different types of compensation and found a significant result for the application of cash compensation. He further explains this result that older CEO's may prefer cash compensation because of their shorter employment horizon. The following CEO incentive programs have been identified by Milgrom and Roberts (1992 p.425):

*Salary.* Fixed amount paid over the course of the year. The salary can be changed from year to year based on length of service, previous performance, years of tenure, cost of living (inflation), or other considerations.

*Bonus.* A variable amount often paid as a lump sum at the end of the year, or the following year. The bonus is based on performance and is often tied to a certain performance criteria. A bonus is normally paid out if certain performance criteria or boundaries have been exceeded.

*Stock Options.* A stock option gives the CEO the right to purchase stock in the firm at a pre-set price that is at or above the current price of the stock. This offer is valid for a certain time period and will encourage the CEO to increase the stock price in order to earn the difference between the pre-set stock price and the future stock price.

*(Restricted) Stock Awards.* Restricted stock awards are shares given to the CEO, or sold to the CEO at a deep discount. Certain restrictions are tied to these stocks. These restrictions may imply that the stocks cannot be sold within a certain time horizon, or they cannot be sold until certain performance criteria have been met.

Past performance may serve as a determinant of the number of stocks awarded to the CEO.

*Phantom Stock Plans.* Phantom stock plans are stocks that carry no ownership claims, since it entitles the CEO to receive the stock price appreciation, and dividends that would have been collected on actual stock.

*Stock Appreciation Rights.* Right to collect appreciation on stock for a pre-determined number of stocks, for a certain time period.

### **3.2 Motivating Risk Taking**

Perhaps the most congruent way for a middle level executive to climb the corporate hierarchy is through a promotion tournament. This possibility of promotion is non-existent for a CEO since he has already “won” the promotion tournament. Therefore, it is of great importance not to forget that since there are no more promotions to win, the CEO has become very risk adverse since he does not want to be removed from his top position. This implies that there are no more financial incentives for the CEO to perform well.

Because of the obvious problem that the CEO has no incentive to advance in the hierarchy, since he is now in the “drivers seat”, and therefore does not want to take on any additional risk, and bear the possibility of being laid off from this golden seat, incentive programs imposed by the stockholders will eliminate some of this risk adversity. It is important that these incentive programs involve great benefits, and perquisites, since the position earned by the CEO is not one that he is willing to give up easily. According to Milgrom and Roberts (1992 p. 431) incentive programs are meant to serve as an insurance policy, since their main purpose is to reward the CEO for good performance, without having them bear

the costs of an eventual failure. It is important to recognize that punishing them for failure would emphasize the risk they already face, and impose an even more risk adverse attitude towards project recommendations. One of the most prevalent actions imposed by the stockholders in order to boost the risk taking by the CEO is the implementation of severance pay. Severance pay serves as insurance for the CEO, since he will be paid this severance pay in a case of involuntary unemployment, caused by bad performance.

### **3.3 Performance Pay for CEOs**

People argue about the huge amounts of remuneration paid out to company CEOs. Some CEOs are paid immense amounts, which creates lots of criticism. However, the amounts paid out are normally only a small fraction of the earnings of the entire firm. Hence, the argument should not circulate around the amount the CEOs are paid, rather it should be investigated whether these large amounts provide the right incentives for the CEO to engage in value maximizing decisions. Milgrom and Roberts (1992 p. 433) note that various observers have concluded that the growing salary gap between CEOs and average workers is destructive to company morale, and complicates the efficiency of a firm to run daily activities smoothly. If this is the case, large increases in CEO compensation during times when workers are laid off, will be considered destructive and not result in value maximization of the shareholder value. “Yet the overwhelming evidence is that, on average, CEOs’ pay and wealth are responsive to company performance. The issue is whether they are appropriately so” (IBID p. 433).

## **4 Model Design and Development**

Before implementing the econometric models it is important to illustrate the selected data, and the econometric complications that may occur when performing these tests. In this section we will present the different variables, the testing models, as well as the justifications that have been made in order to avoid econometric problems.

### **4.1 Population assumptions**

Our sample includes 65 companies listed on the Stockholm Stock Exchange on the Most Traded List, Other A-List, Attract 40, and Other O-List. The companies are from all nine sectors identified by Affärsvärlden<sup>12</sup>. These nine sectors are further grouped into four groups consisting of companies in related sectors. The complete company selection procedure was previously explained in section 1.4.3.

### **4.2 Data Collected**

The following data was collected for the years 1999, 2000, 2001, and 2002

- CEO Age
- Fixed Salary
- Bonus
- Percentage of stock owned by CEO
- ROE
- ROA
- EPS
- Existence of Stock Option Program
- Company Sector
- Market Value of Shares

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<sup>12</sup> See Appendix 2 for more detailed Industry Sector explanation

### **4.3 Reliability and Validity of Raw Data**

The raw data is the heart of the analysis. Therefore, it is vital that one proceed with all necessary precautions when collecting the data in order to avoid unreliability and invalidity.

In this paper the focus has been on the reliability and validity of the secondary data collected. The reliability and validity of the data is believed to be high since most of the data regarding salaries, bonuses, stock-option programs, and ownership was collected from annual reports which go through careful screening by accredited accountants before publication. By law, companies are required to specify the salary paid out to the CEO, and chairman of the board. Additionally, any bonus, or *tantiem*, paid out to the CEO needs to be presented separately. As far as the performance variables, ROE, ROA, and EPS they are predominately collected from Dagens Industri, which is an independent source. To further complete missing data we have used annual reports, as well as Affärsdata.

### **4.4 Qualitative Variables with Several Categories (Dummy Variables)**

Many qualitative factors have more than two categories. In our study we have added dummy variables in order to account for qualitative factors. A dummy variable take on two values, 0 or 1, in order to indicate the presence or absence of the related variable. In our study we have added dummy variables in order to indicate the existence of a stock option program for the CEO, industry sector, and company size.

The dummies are defined as follow:

$$D_0 = \begin{cases} 1 & \text{Existence of stock option program} \\ 0 & \text{Otherwise} \end{cases}$$

Industry sector dummies

$$D_1 = \begin{cases} 1 & \text{Consumer goods, Pharmaceuticals and Service} \\ 0 & \text{Otherwise} \end{cases} \quad D_2 = \begin{cases} 1 & \text{Raw Materials and Industrial} \\ 0 & \text{Otherwise} \end{cases}$$
$$D_3 = \begin{cases} 1 & \text{Telecommunication, IT, Media \& Entertainment} \\ 0 & \text{Otherwise} \end{cases} \quad D_4 = \begin{cases} 1 & \text{Financial} \\ 0 & \text{Otherwise} \end{cases}$$

Company size dummies

$$D_5 = \begin{cases} 1 & \text{Small Size} \\ 0 & \text{Otherwise} \end{cases} \quad D_6 = \begin{cases} 1 & \text{Medium Size} \\ 0 & \text{Otherwise} \end{cases}$$
$$D_7 = \begin{cases} 1 & \text{Large Size} \\ 0 & \text{Otherwise} \end{cases}$$

It is important to notice that in section 5, when we applied our econometric model, one dummy variable for industry sector, and one dummy variable for company size has been omitted. Failure to omit one variable would create a model containing exact collinearity. This error is usually referred to as falling into the dummy variable trap (Hill, Griffiths, and Judge 2001 p.207).

Technically it does not matter which dummy variable is omitted, so for this study, we have chosen to omit the industry sector dummy  $D_1$ , and company size dummy  $D_5$ .

#### **4.5 Econometric Models Applied for Research Study**

In order to test our selected variables, dependent and explanatory, it is important to construct an appropriate econometric model so that one gets a clear picture of the testing procedure. Since CEO compensation and company performance is a

situation that can be looked at from a counter-cyclical perspective, it is very important not to neglect the possibility that company performance may affect the CEO bonus, in the same way that a CEO bonus might be a reason for increased performance by the CEO. Therefore, different econometric models need to be applied in order to capture the different possible relationships between the company performance and CEO compensation. Furthermore, we have created separate models in order to test the possibility of varying results within different industry sectors in the economy, as well as if companies of different sizes behave differently resulting in other outcomes.

The econometric models constructed in order to fulfill the purpose of this study are presented as follows:

*Does company performance or any other variables affect CEO bonus?*

$$\text{BONUS} = \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{ROE} + \beta_6 \text{ROA} + \beta_7 \text{EPS} + \delta_0 D_0 + \delta_1 D_1 + \delta_2 D_2 + \delta_3 D_3 + \delta_4 D_4 + \delta_5 D_5 + \delta_6 D_6 + \delta_7 D_7 + e$$

*Econometric Model 1: Bonus as dependent variable*

*Does bonus or any other variables affect company performance?*

$$\text{ROE} = \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{BONUS} + \delta_0 D_0 + \delta_1 D_1 + \delta_2 D_2 + \delta_3 D_3 + \delta_4 D_4 + \delta_5 D_5 + \delta_6 D_6 + \delta_7 D_7 + e$$

*Econometric Model 2: ROE as dependent variable*

$$\text{ROA} = \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{BONUS} + \delta_0 D_0 + \delta_1 D_1 + \delta_2 D_2 + \delta_3 D_3 + \delta_4 D_4 + \delta_5 D_5 + \delta_6 D_6 + \delta_7 D_7 + e$$

*Econometric Model 3: ROA as dependent variable*

$$\text{EPS} = \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{BONUS} + \delta_0 D_0 + \delta_1 D_1 + \delta_2 D_2 + \delta_3 D_3 + \delta_4 D_4 + \delta_5 D_5 + \delta_6 D_6 + \delta_7 D_7 + e$$

*Econometric Model 4: EPS as dependent variable*



*Is CEO compensation and company performance affected differently depending on the size of the company?*

In order to test the difference in compensation structures between companies of different sizes we have divided our sample into three groups, small, medium, and large, depending on the market share value. After the sample was divided into these various groups we applied the following regression models:

$$\begin{aligned} \text{BONUS} &= \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{ROE} + \beta_6 \text{ROA} + \beta_7 \text{EPS} + \delta_0 D_0 + e \\ \text{ROE} &= \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{BONUS} + \delta_0 D_0 + e \\ \text{ROA} &= \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{BONUS} + \delta_0 D_0 + e \\ \text{EPS} &= \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{BONUS} + \delta_0 D_0 + e \end{aligned}$$

*Econometric Model 5: Effect of each variable for respective company size*

*Is CEO compensation and company performance affected differently depending on which industry sector it belongs to?*

The first step in order to test the significance of our respective variables in each industry sector was to divide the sample into groups containing similar sectors. As previously mentioned we have nine different sectors. Some sectors include a very low number of companies. Therefore, we have grouped similar sectors together and we have obtained four different industry groups. We are aware that some industry groups consist of a very low number of observations, but we still believe that performing regression analysis on each industry group could lead to some valuable information that we do not want to lose out on. The following regression model was applied for this test:

$$\begin{aligned} \text{BONUS} &= \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{ROE} + \beta_6 \text{ROA} + \beta_7 \text{EPS} + \delta_0 D_0 + e \\ \text{ROE} &= \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{BONUS} + \delta_0 D_0 + e \\ \text{ROA} &= \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{BONUS} + \delta_0 D_0 + e \\ \text{EPS} &= \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{BONUS} + \delta_0 D_0 + e \end{aligned}$$

*Econometric Model 6: Effect of each variable for respective industry group*

## **4.6 Econometric Problems and Actions Taken**

When analyzing data involving time-series data, and cross sectional data using econometric models it is important to recognize some of the problems that may occur. Since this study involves both of these types of data we are aware of some of the complications that we might face. These involve autocorrelation, heteroskedasticity, as well as multicollinearity.

### **4.6.1 Autocorrelation**

Autocorrelation exists when the current error term contains not only the effects of current shocks, but also the carryover from previous shocks. When circumstances such as these lead to error terms that are correlated, autocorrelation exists. Therefore, anytime that one is dealing with time-series data the possibility of autocorrelation should be considered (Hill, Griffiths, and Judge 2001 p.258). We are aware that the inertia in the state of the market may be apparent in an upcoming year and not only affect the current year. However, since our study takes place over a four year period the testing for autocorrelation would result in two degrees of freedom, which is a very low number to base any assumptions on. Therefore, our judgment has been not to test for autocorrelation since we believe that the inertia in the state of the market would not result in any evidence of autocorrelation. Rather, the only action imposed by us in order to enhance the quality of our testing was to place the bonus in the year that it was earned, rather than when it was realized.

### **4.6.2 Heteroskedasticity**

Heteroskedasticity exists when the variances for all observations are not the same. The existence of heteroskedasticity is often encountered when one is using

cross-sectional data.<sup>13</sup> When testing for heteroskedasticity one can either plot the residuals or perform a Goldfeld-Quant test. The Goldfeldt-Quant test is considered the standard procedure since it compares the linear specification of a model to a ratio model wherein some proxy for size deflates all variables (Ciscel, and Carroll 1980). We decided to plot the residuals and look for a pattern in the graph. A pattern indicates heteroskedasticity, whereas a graph showing no pattern is a sign of homoskedasticity.

#### 4.6.3 Multicollinearity

According to Hill, Griffiths, and Judge (2001 p.180), data that is the result of an uncontrolled experiment may cause many of the different variables to move together in systematic ways. When this is the case the variables are said to be collinear, or multicollinear when several variables are involved in the econometric testing. This will impose a problematic stage when trying to evaluate the results since it may not be possible to capture the economic relationship or the parameters of interest. This is highly applicable to our study since it involves a number of different variables. “To eliminate multicollinearity, some transformation of the data is necessary. Unfortunately, such transformed variables often bear only the faintest relationship to the hypothesis being tested” (Ciscel, and Carroll 1980). One simple way to detect collinear relationships is to test for the correlation coefficient between pairs of variables. If the correlation coefficient between any of these different pairs of explanatory variables is greater than 0.8 or 0.9 in absolute value, it is argued that it would serve as an indication of a strong linear relationship, and cause potential harm to the analysis (Hill, Griffiths, and

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<sup>13</sup> If we have a linear regression model with heteroskedasticity, and we use the least squares estimator to estimate the unknown coefficients, the least squares estimator is still a linear and unbiased estimator. However, it is no longer the Best Linear Unbiased Estimator. (B.L.U.E). This will also cause the standard errors computed for the least squares estimators to be incorrect, and the confidence intervals and hypothesis tests to be misleading. (Hill, Griffiths, and Judge 2001 p. 238)

Judge 2001 p.190). In order to cope with this problem of multicollinearity a correlation matrix has been constructed.<sup>14</sup>

#### 4.6.4 F-Test: Test of Significance

We have also applied a multiple restriction F-test, and run an F-distribution test. The F-test will distinguish whether we can reject our null hypotheses and determine if one or more of our variables is of significance. The way we have performed the F-test was by splitting our data into two groups, one including large companies, and one including small companies. In order to split the data into small and large companies we looked at the market share value for respective company (Fristedt, Sundin, and Sundqvist 2003), and split the sample into two equal halves. The following formula has been applied for the F-test (Hill, Griffiths, and Judge 2001 p.209):

$$F = \frac{(SSE_R - SSE_U) / J}{SSE_U / (T - K)}$$

When determining between sums of squares restricted and sums of squares unrestricted two different regression models were applied. The models applied are as follow:

$\text{BONUS} = \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{ROE} + \beta_6 \text{ROA} + \beta_7 \text{EPS} + e$ $\text{ROE} = \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{BONUS} + e$ $\text{ROA} = \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{BONUS} + e$ $\text{EPS} = \beta_1 + \beta_2 \text{AGE} + \beta_3 \text{SALARY} + \beta_4 \text{OWNERSHIP} + \beta_5 \text{BONUS} + e$
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*Econometric Model 7: Restricted model for F-test*

The model applied for the unrestricted sums of squares F-test is identical to the econometric models 1-4 presented in section 4.5.

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<sup>14</sup> See Section 5.2

## 4.7 Quick Overview of Year by Year Numbers for each Variable

This section will serve as a quick presentation of our sample variables. Each variable will be presented separately in a four year table illustrating the minimum values, maximum values, standard deviation, etc. Even though it cannot be seen as a result of this study per se, it gives a quick and interesting overview of the situation in Sweden's Listed Companies. Each table is presented separately below:

### *Year by Year Presentation of Bonus Variable*

% Bonus of Base Salary				
	1999	2000	2001	2002
Max	142	288	154	129
Min	0	0	0	0
Mean	27	28	22	19
Median	20	7	7	4
Stdev	35	47	35	28

*Table 1: Bonus Variable*

As illustrated above, one can clearly see that average bonuses hit their peak in 2000, which also was a year with good overall financial results. After this peak it is clear that there has been a decrease in the bonuses among our selected companies. This may be a result of either poor performance or a decrease in the general market.

### *Year by Year Presentation of Base Salary Variable*

CEO Base Salary (000,s SEK)				
	1999	2000	2001	2002
Max	8800	9240	9598	10418
Min	467	466	611	630
Mean	1962	2256	2504	2693
Median	1403	1558	1890	1938
Stdev	1675	1859	2050	2270

*Table 2: Base Salary Variable*

Base salary among CEO's has increased each year during our study. An increase in salary is probably a reflection of both longer tenure held by the CEO, as well as increased cost of living imposed by yearly inflation.

*Year by Year Presentation of Age Variable*

CEO Age				
	1999	2000	2001	2002
Max	58	59	60	61
Min	37	38	39	40
Mean	48.1	49.1	50.1	51.1
Median	49	50	51	52
Stdev	6.1	6.1	6.1	6.1

*Table 3: Age Variable*

The age table obviously illustrates a one year increase in age since the same CEO is presented for the duration of our study. What is interesting to note is average age of the CEO, as well as the standard deviation of the same since this is an indication of the general age group of CEOs as well as the dispersion of age among the CEOs.

*Year by Year Presentation of Ownership Variable*

% of Outstanding Share Owned by CEO				
	1999	2000	2001	2002
Max	52.17	46.84	47.22	51.89
Min	0.00	0.00	0.00	0.00
Mean	6.38	5.72	5.46	5.38
Median	0.13	0.15	0.19	0.19
Stdev	12.52	11.49	10.96	11.01

*Table 4: Ownership Variable*

The table above representing the percentage of ownership held by the CEO during this four year period shows a decrease in the amount of ownership held by the CEO. It is hard to determine the cause of these figures. However, one explanation might be that a CEO is sitting on a lot of valuable information, and in times of harsh financial distress he may be able to observe this situation before many of the stockholders, and in order to save his own wealth he may sell off

some of his personal stake in the company, and thereby decrease his personal loss.

*Year by Year Presentation of ROE Variable*

ROE (in %)				
	1999	2000	2001	2002
Max	53.80	51.00	47.20	41.60
Min	-60.47	-73.82	-134.30	-176.10
Mean	12.61	12.89	2.36	0.79
Median	16.80	15.20	10.95	8.15
Stdev	19.84	19.26	31.35	30.19

*Table 5: ROE Variable*

The table above indicate the trend of a continuous decrease in the performance variable ROE. One might argue that this trend is quite obvious since the market has experienced a harsh environment over the past few years, and a performance variable like ROE will serve as a strong indication of this. Yet another indication of the great fluctuation in the market can be seen in the increasing standard deviation for this variable.

*Year by Year Presentation of ROA Variable*

ROA (in %)				
	1999	2000	2001	2002
Max	78.40	52.00	55.20	56.50
Min	-48.46	-50.50	-78.10	-100.90
Mean	14.95	13.01	2.22	1.44
Median	12.90	12.90	7.90	5.20
Stdev	17.20	15.01	21.83	20.10

*Table 6: ROA Variable*

Just like the previous table, the table above indicates a decreasing trend in the ROA. Since both ROE and ROA are traditional accounting measurements one might think that they tend to follow similar trends and the tables above indicate just that.

### *Year by Year Presentation of EPS Variable*

EPS (in SEK)				
	1999	2000	2001	2002
Max	97.49	57.31	41.78	20.54
Min	-7.57	-6.66	-37.74	-15.23
Mean	6.67	6.82	3.53	2.62
Median	3.75	4.93	3.80	3.28
Stdev	14.16	9.37	9.85	7.43

*Table 7: EPS Variable*

EPS has shown a decreasing trend after its peak year in 2000. What can be seen is the decrease in variation that is visible in the standard deviation presented over the sample period.

### *Four Year Average for each Variable*

4 Yr. Avg.	CEO Age	CEO Base Salary (in 000's SEK)	% Bonus of Base Salary	% of Outstanding Shares Owned by CEO	ROE (in %)	ROA (in %)	EPS (in SEK)
Max	59.5	9514	178	49.53	48.40	60.53	54.28
Min	38.5	544	0	0.00	-111.17	-69.49	-16.80
Mean	49.6	2354	24	5.73	7.16	7.90	4.91
Median	50.5	1697	16	0.17	12.78	9.73	3.94
Stdev	6.1	1964	36	11.50	25.16	18.53	10.20

*Table 8: Four Year Average*

The table above serves as a complete overview of the entire sample period presenting the average number for each variable. It may serve as an interesting benchmark in an eventual comparison to an individual year.

## **4.8 Final Thought**

We now turn to share the findings of our study. We hope you observe the findings of our work carefully as they may serve as valuable knowledge enhancing information. But, at the same time we hope you think critically and objectively as you read. We would rather that you read with great caution, and



impartial objectivity, than that you blindly and unquestioningly accept our results.



## **5 Empirical Findings and Result**

This section will present the findings of our study, and present the results obtained from our econometric models illustrated in section 4. The first step before performing our multiple regressions was to test for some of the complications mentioned in sections, 4.6.2, and 4.6.3. After this procedure was completed and no complications were detected, we moved on to the core analyses, which will serve as the empirical findings of our study.

### **5.1 Testing for heteroskedasticity**

The first problem with heteroskedasticity was dealt with by plotting the residuals from the initial regression analyses. The residuals from each of the econometrics models 1-4 were plotted in order to decide if any pattern was present. A pattern indicates heteroskedasticity, and as one can see in Appendix 3 we were not able to detect a pattern in any of the four residual plots, hence the presence of homoskedasticity is observed. This indicates that our data does not contain any differences in the variance and no additional precautions are necessary in order to avoid heteroskedasticity.

### **5.2 Multicollinearity**

As mentioned in section 4.6.3, we concluded that a correlation between two variables that exceed 0.8 or 0.9 indicates a strong linear relationship that could cause eventual harm to the final results. In order to test for multicollinearity we constructed a correlation matrix.<sup>15</sup> As indicated by the correlation matrix none of our variables are highly correlated, since neither of them show a correlation of above 0.8, between any two pairs of variables.

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<sup>15</sup> See Appendix 4

### **5.3 F-Test: Test of Significance**

The next step was to perform an F-test in order to see whether we can reject our null hypotheses, and conclude that one or more of our variables are of significance. We can conclude that we can reject our null hypotheses for all four F-tests performed, since all of our F-distribution values are above the Right-Tail Critical Values for the F-Distribution.<sup>16</sup> Moreover, at least one of our variables is of significance.

### **5.4 Brief explanation of Summary Statistics**

The  $R^2$  is a descriptive measure of the goodness of fit. It measures the proportion of the variation in the dependent variable that is explained by variation in the explanatory variable. However,  $R^2$  itself does not measure the quality of the regression model. When using a regression model the objective is not to look at the model resulting in the highest  $R^2$ . Although the  $R^2$  in our regression models are very low, they can be viewed as sufficient, since regression studies using cross-sectional data normally record very low values of  $R^2$  (Hill, Griffiths, and Judge 2001 p.125).

A relatively high standard error in comparison to the value of the coefficient indicates that the result cannot be considered relevant. This is because in comparison to the coefficient, the standard error is too large. The t-stat value equals the coefficient value divided by the standard error. The P-value of a test is calculated by finding the probability that the t-distribution can have a value that is greater than or equal to the absolute sample value of the test statistics (IBID p.104). The majority of the previous research studies have selected a significance level of 0.05 Therefore, we have selected a significance level of 0.05 for our study.

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<sup>16</sup> See Appendix 5

## 5.5 Does company performance or any other variables affect CEO bonus?

When testing whether company performance or any other variables had any significant effect on CEO bonus we applied econometric model 1, presented in section 4.5. The result obtained from this model is illustrated below:

<b>Regression statistics</b>	
<b>Multiple-R</b>	0.438285
<b>R<sup>2</sup></b>	0.192093
<b>R<sup>2</sup> adjusted</b>	0.152843
<b>Standard Error</b>	33.95531
<b>Observations</b>	260

	<b>Coefficient</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	38.6119	20.7517	1.8607	0.0640
<b>CEO Age</b>	-0.3034	0.3892	-0.7795	0.4365
<b>CEO Base Salary</b>	0.0000	0.0000	0.5264	0.5991
<b>% of outstanding shares owned by CEO</b>	-0.7009	0.2049	-3.4203	0.0007
<b>Stock option program</b>	-2.8639	4.7417	-0.6040	0.5464
<b>Raw materials and Industrials</b>	-8.4522	6.0724	-1.3919	0.1652
<b>Financial sector</b>	-2.6491	6.7486	-0.3925	0.6950
<b>IT-sector, Telecommunication and Media &amp; Entertainment</b>	-13.2240	7.8470	-1.6852	0.0932
<b>Medium sized firms</b>	10.1582	5.7098	1.7791	0.0765
<b>Large sized firms</b>	21.7623	7.7197	2.8190	0.0052
<b>ROE</b>	0.1498	0.1938	0.7727	0.4405
<b>ROA</b>	-0.1138	0.2585	-0.4404	0.6600
<b>EPS</b>	-0.0189	0.2338	-0.0807	0.9358

Table 22: Bonus as dependent variable

The table above clearly indicates that none of the performance variables, ROE, ROA, or EPS, are of any significance for the dependent bonus variable since they do not fall within the 0.05 significance level. This indicates that the performance of the company does not affect the amount of the bonus paid out to the CEO. This finding supports the conclusions made by previous research studies performed by Murthy and Salter (1975); Aupperle, Figler, and Lutz (1991); and Madura, Martin, and Jessel (1996).

However, we have been able to identify other variables that are of significance for the bonus variable. The percentage of outstanding shares owned by the CEO indicates a negative relationship to the bonus. This result is something that one can expect since a high percentage of ownership will motivate the CEO, and create an incentive to perform well, since an increase in stock price will lead to an increase in wealth for the CEO. Therefore, a high percentage of ownership itself will serve as a good enough incentive for the CEO, and a bonus might not be considered necessary in this situation. An additional hypothesis to this negative relationship between bonus and equity based compensation may be explained by the different tax conditions for cash compensation, and equity based earnings. A CEO that is paid in cash will most likely pay tax for this bonus based on a tax-bracket that is substantially higher than the 30% tax rate for earnings on equity. Therefore, a CEO that is on the border of a higher tax-bracket will view equity based compensation as more favorable than cash compensation since it will prevent him from being taxed at a higher rate. Obviously it is important to consider the higher risk involved in equity based compensation compared to cash bonuses.

Secondly, we have discovered that large firms tend to have a positive relationship to bonuses. One might think of a few possible explanations as to why bonuses are significant in large firms. One obvious explanation might be that a CEO for a large firm is sort of “sitting on top of the world”, and the risks involved in such a position are rather large. A bad performance will lead to unemployment and the possibility of obtaining a similar position might be very hard to accomplish, because of a shattered track record. However, the most plausible explanation might be that a CEO’s ownership in a large firm is considerably lower in comparison to a CEO in a smaller firm. Therefore, the argument in the previous paragraph that the ownership itself will serve as sufficient payoff, will no longer be accepted by the CEO. Jensen and Murphy (1990) found that CEOs in large

firms were compensated \$1.85 per \$1000 change in shareholder wealth, compared to CEOs in smaller firms that were compensated \$8.05 per \$1000 change in shareholder wealth. These figures strengthen the argument for a bonus payment for a CEO in a large firm since the individual pay-off from stock ownership is not sufficient remuneration.

## 5.6 Does bonus or any other variables affect company performance?

The next test performed in this research study was to test whether bonus or any of the other explanatory variables had any significant effect on the performance of the company. As mentioned we have three performance variables and they have been tested separately in econometric models 2, 3, and 4<sup>17</sup>. The results obtained are as follow:

*ROE as dependent variable*

<b>Regression statistics</b>	
<b>Multiple-R</b>	0.4365558
<b>R<sup>2</sup></b>	0.190581
<b>Adjusted R<sup>2</sup></b>	0.1580742
<b>Standard Error</b>	24.305433
<b>Observations</b>	260

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	-11.779688	14.812333	-0.795262	0.427218
<b>% Bonus of Base Salary</b>	0.036663	0.045467	0.806358	0.420806
<b>CEO Age</b>	0.279715	0.276880	1.010239	0.313361
<b>CEO Base Salary</b>	-0.000002	0.000001	-1.922988	0.055622
<b>% of outstanding shares owned by CEO</b>	0.005282	0.149483	0.035332	0.971843
<b>Stock option program</b>	-3.635189	3.375791	-1.076841	0.282594
<b>Raw materials and Industrials</b>	3.017164	4.302742	0.701219	0.483821
<b>Financial sector</b>	-7.201031	4.708413	-1.529397	0.127435
<b>IT-sector, Telecommunication and Media &amp; Entertainment</b>	-12.281174	5.469409	-2.245430	0.025618
<b>Medium sized firms</b>	18.297189	3.938846	4.645318	0.000006
<b>Large sized firms</b>	24.454476	5.339846	4.579622	0.000007

*Table 23: ROE as dependent variable*

<sup>17</sup> See Section 4.5

The previous table does not indicate that bonus should have any impact on the ROE for a company. Neither does any of the other explanatory variables fall within the significance level of this study. It might be important to note that CEO base salary falls just short of indicating a negative relationship with the performance variable ROE. One might argue that a high base salary does not serve as a good enough incentive for the CEO, since he will just sit on his position and collect his salary. However, it is hard to draw any conclusions based on this table since the significance levels are not completely fulfilled. Moreover, one can see that a few of the dummy variables fall within our 0.05 significance level. But, we believe that it would be too speculative to try to analyze it further in order to explain why they do fall within this range. Therefore, we believe that the tests performed in sections 5.6, and 5.7, where we test each size, and each industry sector individually will serve as a better indicator for the importance of industry sector, and size for ROE.

*ROA as dependent variable*

<b>Regression statistics</b>	
<b>Multiple-R</b>	0.41406643
<b>R<sup>2</sup></b>	0.17145101
<b>Adjusted R<sup>2</sup></b>	0.13817595
<b>Standard Error</b>	18.1889007
<b>Observations</b>	260

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	2.708713	11.084767	0.244364	0.807150
<b>% Bonus of Base Salary</b>	0.017302	0.034025	0.508512	0.611545
<b>CEO Age</b>	0.031613	0.207202	0.152569	0.878862
<b>CEO Base Salary</b>	-0.000002	0.000001	-2.525378	0.012179
<b>% of outstanding shares owned by CEO</b>	0.002467	0.111865	0.022055	0.982422
<b>Stock option program</b>	-3.479795	2.526263	-1.377447	0.169611
<b>Raw materials and Industrials</b>	4.548681	3.219945	1.412658	0.159005
<b>Financial sector</b>	-7.867555	3.523527	-2.232864	0.026447
<b>IT-sector, Telecommunication and Media &amp; Entertainment</b>	-1.762446	4.093016	-0.430598	0.667133
<b>Medium sized firms</b>	13.392119	2.947624	4.543361	0.000009
<b>Large sized firms</b>	19.918503	3.996058	4.984538	0.000001

Table 24: ROA as dependent variable



Table 24 presents the impact of bonus and other explanatory variables on the performance variable ROA. One can clearly see that the bonus has no effect on the ROA, since the significance level is nowhere near the required level of 0.05. However, it is clear that the CEO base salary shows a weak negative significance to the ROA. The explanation to this may be derived from the idea of promotion tournaments explained in section 3.2. Since the CEO has no more possibilities to improve his title and position, he will sit and collect his salary, without any performance incentives to take on any additional risk. The results obtained in this study strengthen the arguments put forward by many previous researchers that a variable portion of the salary might be the only way to motivate the CEO to take on additional risk.

Once again some of the dummy variables show indications that they are of significance. However, as mentioned in the previous test, we believe it would be more sufficient to draw conclusions from the specific tests performed later on. The explanation for this is that the addition of these dummy variables are added to this econometric model in order to take up some of the shocks, and create a cleaner measure of our explanatory variables.

#### *EPS as dependent variable*

The results obtained from econometric model 4<sup>18</sup> when testing EPS as the dependent variable indicate no relationship between either bonus, or any of the other explanatory variables. These results are further presented in table 25 in Appendix 6. It is interesting to note that the variables are nowhere near a significant relationship. The reason for this result is hard to explain, and it is difficult to draw any valuable conclusions as to why this result has been obtained. However, it is obvious that using EPS as a performance measure for

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<sup>18</sup> See Section 4.5

remuneration among Sweden's Listed companies does not result in a very good explanation. EPS differs from the other two performance measures, ROE and ROA, since it is not considered a traditional accounting measure, and one might think that a CEO remuneration system is more likely to be based on an accounting measurement.

### **5.7 Is CEO compensation and company performance affected differently depending on the size of the company?**

When performing our analysis on the size effect among Sweden's Listed companies we have applied econometric model 5 presented in section 4.5. Each regression has been tested for each size category, small, medium, and large sized companies.

#### **5.7.1 Small Sized Companies**

The first tests performed were in the category containing small firms. The regression results are presented in Appendix 7. We had expected to find a negative relationship between outstanding shares owned by the CEO, and bonuses. This hypothesis derives from the theory of ownership incentives, and its counter-cyclical relationship to bonus, since an increase in share value will lead to increase in wealth for the CEO, and a bonus would not be necessary. However, the regression model for small firms did not indicate this relationship. In fact, none of the variables presented in our model seemed to be significant. We found no significance between any of our variables, neither with bonus as a dependent variable, nor with any of our performance variables as dependent variables.

## 5.7.2 Medium Sized Companies

The next step was to apply our regression model on medium sized firms in order to test whether we could establish some significance for any of our variables.

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	83.0378	32.4125	2.5619	0.0123
<b>CEO Age</b>	-0.7182	0.6335	-1.1337	0.2603
<b>CEO Base Salary</b>	0.0000	0.0000	-1.0118	0.3147
<b>% of outstanding shares owned by CEO</b>	-1.1774	0.5248	-2.2434	0.0276
<b>Stock option program</b>	-11.1904	8.5004	-1.3165	0.1918
<b>ROE</b>	0.2265	0.2818	0.8037	0.4239
<b>ROA</b>	-0.6716	0.3554	-1.8898	0.0624
<b>EPS</b>	0.7967	0.5766	1.3817	0.1709

*Table 30: Medium Size: Bonus as dependent variable*

The complete results are illustrated in appendix 8. As the table above indicates, our expected theory regarding CEO ownership's negative relationship with bonus turned out to be significant for medium sized firms. We believe that a CEO in a medium sized company may be more exposed to the impacts of a cash bonus and how it will affect his tax situation. A CEO for a large firm has compensation high enough that he is already in the highest tax-bracket, whereas a CEO in a medium sized firm may experience a substantial tax jump depending on the size of his bonus. Hence, equity based compensation that will be taxed at a much lower rate might be viewed as much more favorable.

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	-52.2531	23.7168	-2.2032	0.0304
<b>% Bonus of Base Salary</b>	-0.0106	0.0836	-0.1270	0.8992
<b>CEO Age</b>	1.4423	0.4539	3.1776	0.0806
<b>CEO Base Salary</b>	0.0000	0.0000	-0.6532	0.5155
<b>% of outstanding shares owned by CEO</b>	0.8957	0.3946	2.2699	0.0258
<b>Stock option program</b>	-9.5753	6.4922	-1.4749	0.1441

*Table 31: Medium Size: ROE as dependent variable*

Furthermore, as presented above we can conclude that a positive relationship exists between outstanding shares owned by the CEO, and the performance

variable ROE. This significance follows the theories presented by Mehran (1995), where Jensen and Murphy conclude that a higher rate of ownership will create incentives to boost performance, since it will promote greater willingness towards risk taking.

### 5.7.3 Large Sized Companies

Finally, we have applied our econometric models on large firms, and the result is further presented in appendix 9. When testing the regression model towards the performance variables ROE, and ROA we find a significant negative relationship for CEO base salary. Milgrom and Roberts (1992 p. 428) illustrate how a CEO in a company that has won “his” promotion tournament may sit and collect his salary with no more incentive to climb the corporate ladder. The negative relationship between CEO base salary and company performance in our sample further strengthens these theories. Therefore, a high salary alone may increase the CEO’s unwillingness to take on additional risk and thereby decrease the execution of value maximizing decisions for the stockholders.

## **5.8 Is CEO compensation and company performance affected differently depending on which industry sector it belongs to?**

In this section of our Master Thesis we are trying to find any empirical evidence about what variables are of significance within certain industry sectors of the economy. Is there any sufficient evidence among Sweden’s Listed companies that the predicted theories involving principal agency problems and incentive contracts presented by previous research, influence CEO compensation and company performance?

### 5.8.1 Raw Material and Industrial Sector

For our first test we implemented econometric model 6<sup>19</sup>, and the result is presented in appendix 10. The raw material and industrial sector follows the theories explained previously in this empirical study since outstanding shares owned by the CEO, and the existence of a stock option program show a significant negative relationship with bonuses.

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	-23.351542	47.608094	-0.490495	0.625004
<b>CEO Age</b>	0.971198	0.880282	1.103280	0.272914
<b>CEO Base Salary</b>	0.000003	0.000002	1.503707	0.136237
<b>% of outstanding shares owned by CEO</b>	-1.211949	0.345917	-3.503587	0.000724
<b>Stock option program</b>	-29.867316	7.399387	-4.036458	0.000115
<b>ROE</b>	1.268955	0.679187	1.868344	0.065042
<b>ROA</b>	-0.318896	0.672674	-0.474072	0.636623
<b>EPS</b>	0.034762	0.542167	0.064117	0.949023

*Table 38: Raw material and industrial sector: bonus as dependent variable*

This follows the ideas presented previously that both of these incentive programs will work independently of a paid bonus, since the CEO will experience a sufficient payoff in times of good company performance, since his stock ownership will result in increased individual wealth.

Moreover, when evaluating the performance variables as dependent variables, the expected result is once again achieved, since both bonus and existence of stock-option program indicate a significant positive relationship to the overall performance of the company. This clearly indicates that within this sector of the economy, incentive contracts will accomplish increased company performance, hence, serve the purpose they have been created for, by the stockholders, in the first place.

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<sup>19</sup> See Section 4.5

Furthermore, base salary indicates a negative significance when evaluating ROA. Once again this is evidence that a high salary does not lead to increased performance since the CEO will sit on his position and collect his high salary, with no fear of losing his title.

One explanation as to why this particular industry sector follows the traditional theories and ideas regarding principal agency theories and incentive contracts, might be that it is considered as a fairly solid industry, that has not gone through any significant ups and downs over the past few years. Traditionally Sweden has a long history within this particular sector and this might be an explanation for its solidity, and stability. Another explanation might be that there have not been any significant technological changes over the past few years, which would impose ambiguity on the present CEO.

### 5.8.2 Financial Sector

The next sector of evaluation is the financial sector. The results obtained for this sector are presented in more detail in appendix 11. The financial sector displays the same tendencies as the raw material and industrial sector, since the existence of a stock-option program shows a significant positive relationship to ROE, and ROA. This indicates that the financial sector follows the ideas regarding stock-options as a sufficient incentive for increased performance. The first thought might be that the financial sector has gone through rough times and an indication of this should be mirrored in our regression analysis. However, what one might fail to remember is that many of the companies in the financial sector are highly active within real estate which has proved to be extremely solid during this four year period. The real estate market has a tendency to move counter-cyclical to the stock-market, and therefore many of these companies have been able to perform

fairly well. Moreover, the idea of awarding the CEO in equity based remuneration serves as a plausible incentive.

### 5.8.3 Consumer Goods, Pharmaceuticals, and Service Sector

Within the industry sector, which includes companies specialized in consumer goods, pharmaceuticals, and services, we have found a result that is rather controversial compared to the two previous sectors, and previous theories. The results of our regression model are presented in appendix 12. The reason for this controversy is further explained because of the fact that the existence of a stock-option program is positively related to the bonus. It is hard to explain this situation but one idea might be that the volatility of this sector requires an extremely high variable remuneration. Since the volatility regarding new and untested products may lead to a failure and no variable payoff, it is important that the CEO feels that the possibility of a very high payoff exists if things turn out successfully.

Secondly, we have found that the existence of a stock-option program has a significant negative relationship to all three performance variables. Additionally, base salary indicates a positive relationship to ROE.

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	24.26566921	28.15574698	0.8618372	0.3932478
<b>% Bonus of Base Salary</b>	0.087763208	0.096041164	0.9138083	0.3655827
<b>CEO Age</b>	-0.275319613	0.536095675	-0.5135643	0.6100147
<b>CEO Base Salary</b>	3.38365E-06	1.48052E-06	2.2854442	0.0269439
<b>% of outstanding shares owned by CEO</b>	0.325469569	0.393527669	0.8270564	0.4124749
<b>Stock option program</b>	-25.19191887	7.768488436	-3.2428341	0.0022057

Table 47: Consumer goods, pharmaceuticals, and service sector: ROE as dependent variable

It is interesting to evaluate the cause for these results. One explanation might be grounded in the high volatility in this sector. With volatility one may note the

insecurity regarding the launch of new and untested products within the consumer goods, and pharmaceutical sector. Even in the service sector new and entrepreneurial ideas may cause insecurity and ambiguity regarding the companies' future presence. All these factors serve as an explanation for the significant levels obtained in the regression model, since a CEO in this sector might prefer a high base salary, instead of a more risky variable portion of remuneration. A high base salary itself will serve as sufficient security, and insurance, independent of performance of new products, or services. This security regarding his remuneration will serve as sufficient incentive to boost performance.

#### 5.8.4 IT, Telecommunication, and Media & Entertainment

The final sector under evaluation for this Master Thesis includes companies involved in IT, telecommunication, and media & entertainment. An important note is that this part of the economy has gone through particular financial distress over the years involved in this study. The table illustrated in appendix 13 is also a reflection of these tough conditions, since the existence of a stock-option program shows a significant negative relationship to ROE, and ROA. Unlike the sector involving consumer goods, pharmaceuticals, and services, which goes through volatility regarding new products, this industry sector has suffered from very harsh overall conditions which may imply that a remuneration paid out as equity is based too much on the general tendencies of the market, and thereby responsible for a situation where the CEO feels like he has no possibility to influence the company stock performance. This will obviously lead to a situation where the incentive of stock options no longer work as an incentive, since there is no possibility that it will create additional individual wealth for the CEO.



One highly speculative thought might be that during times of harsh financial distress for an entire sector, where the CEO himself might not be able to influence the performance of the company stock price much, the presence of a high base salary may serve as a better incentive for performance, since he will feel like there is no possible way to increase personal wealth through equity based compensation.

#### 5.8.5 Additional Thought

In addition to the findings presented above regarding the different industry sectors, it is important to note that each sector index is not included as a variable in our econometric models. One thought may be that a CEO bonus is linked to a general industry sector index and company performance exceeding the general index will result in a bonus. However, since the companies are not obligated to reveal information regarding the constraints and criteria of the remuneration system in the annual reports, this is just a hypothesis. The decision not to include the sector index in the study is based on the grouping of two or three sectors in each of our sector variables. Since we have grouped companies from similar sectors together in order to receive a larger sample we believe that an average index over the four year period may lead to a skewed index since our groupings do not contain the same amount of companies from each sector.

### **5.9 Conclusion of Empirical Findings**

It is clear that we have not found any relationship between CEO bonus and company performance among Sweden's Listed companies. This finding further strengthens the results presented by previous researchers such as Murthy and Salter (1975); Aupperle, Figler, and Lutz (1991); and Akhigbe, Madura, and Tucker (1995). Additionally, we were not able to find any evidence that a paid bonus has any significant impact on company performance. However, it is

important to note that our study is of a general nature and we therefore cannot neglect the possibility that there may exist a strong relationship between CEO compensation and company performance in some companies. Thus, since our study is of general nature we have not been able to detect any significance for any one company in particular.

We can also conclude that EPS is not a very good measurement when testing the relationship between CEO and company performance. We base this conclusion on the fact that we were not able to detect any significance when using EPS as a dependent variable. Furthermore, the CEO age variable did not record any significance in any of our tests. This contradicts some of the theories regarding an older CEOs ability to gain experience and specific knowledge, and how it can have a positive impact on company performance.

Since our purpose involved more than just a testing of all the companies on the Stockholm Stock Exchange we divided our sample by size and by industry sector in order to find the impact of certain variables and their effect on CEO compensation and company performance. Here we were able to discover that within certain company sizes and industry sectors the results followed the presented theories regarding principal-agency problem, and incentive contracts. We were expecting to find that high ownership by the CEO would serve as sufficient payoff since it would lead to increased wealth when the stock price increased. This was only true for medium size companies, which is something that was a little bit surprising. Within large companies we found that ownership itself does not lead to increased performance since it is impossible for the CEO to have a large enough piece of the ownership to feel compensated enough for good performance. Instead our data indicates that some form of variable compensation serves as the right incentive to boost CEO performance.

Moreover, we found that in industry sectors that are of a more solid nature, such as raw material and industrial companies that do not go through much volatility regarding new product launching, either an equity based compensation through option-programs or a bonus will serve as sufficient compensation, since it will lead to increased personal wealth in times of good company performance. In more volatile sectors that go through continuous technological changes and that are heavily dependent on research results such as IT, telecommunication, pharmaceuticals and consumer goods, etc., a better solution would be to reward the CEO with a higher base salary, or the possibility of an extremely high variable payoff, through bonuses and stock-options.

A final thought would be that during times of very harsh financial distress within a specific industry sector, a high base salary would serve as the most favorable form of compensation. This can be explained by the existing market conditions that will have a negative effect on the stock prices for a majority of the companies within a certain sector which in turn will lead to external stress for the CEO. This is because he feels that there is no possible way for him to achieve a positive result, and thereby he cannot increase his personal wealth through equity based compensation.



## **6 Conclusion and Suggestions for Further Research**

### **6.1 Conclusion**

The relationship between CEO compensation and company performance is a topic that has recently received a great amount of media attention. Many previous researchers have studied this topic and tried to identify certain CEO, and incentive variables that are of greater importance than others. The principal-agency problem is an issue that has been of great concern when determining sufficient remuneration for the CEO, and how to create the right incentives to perform in the best interest of the shareholders.

In order to test the relationship between CEO compensation and company performance among companies listed on the Stockholm Stock Exchange we have used the OLS method to perform our regression analyses and created different models that will help us test the existence of such a relationship. We have tested whether the company performance impacts the CEO bonus or if the counter-cyclical relationship exists where the bonus itself affects the company performance. Additionally, we have tested whether any of our other variables have any significant impact on the bonus or company performance.

The result obtained from our econometric models clearly indicates that company performance does not affect CEO bonus. Neither does CEO bonus affect company performance.

Additionally to the findings presented above we have been able to identify that within certain company sizes and industry sectors the theories regarding principal agency problem and incentive contracts are strictly followed, whereas in

companies from certain sizes and industry sectors these relationships are not present.

## **6.2 Suggestions for Further Research**

Throughout the duration of this Master Thesis we have encountered different ideas and interesting views on other possible areas to study within CEO compensation and company performance. This section serves as a starting point for future research studies that may be performed in the same subject area.

Since our study revolves around cash compensation solely for the CEO it would be of great interest to include additional compensation variables for the CEO, such as pension plans, value of stock-option plans, and amount and conditions of severance pay. This would give a better overall and more complete overview of the entire remuneration paid out to the CEO.

Secondly it could be of great interest to perform a study on all the companies within a certain sector in order to see how the compensation plans are structured, and see whether the incentive programs enhance the performance of the CEO. One could investigate whether the CEO bonus is linked to the company performance in comparison to the general index for that specific sector.

Another interesting angle would be to use different denominations for company performance. As mentioned previously in this study it could be of great interest to look at Tobin's Q, and EVA as potential variables for company performance. However, since we believe that it would be beyond the scope of our study we have decided not to include them as performance variables.

A final suggestion for future research projects could be to include more executives or board members in order to see whether someone other than the CEO is of greater importance for the performance of the company, and thereby investigate whether the payment scheme should be reorganized and someone other than the CEO should be compensated with the highest remuneration.





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Available (Online): (17 September 2003)

Home page for respective company in order to find Annual Report

# Appendix 1

## Company Performance Measures

According to Peterson and Peterson performance evaluation measures should fulfill the following requirements:

- Not be sensitive to accounting choices and methods
- Evaluate current management decisions in conjunction with expected future results
- Consider the risk of investment decisions
- Not penalize managers for circumstances that are beyond their control

As mentioned previously, the performance measure applied for this research study is considered as a traditional evaluation. These traditional performance measures do not meet the requirements posted above, since most of them do not control for risk. Moreover, they are very sensitive to accounting choices.

Other measurements applied when researching company performance are EVA, and Tobin's Q.

*EVA*. "EVA represents the economic profit of the firm and is computed by subtracting the firm's cost of capital from the firm's adjusted operating profit, net operating profit after taxes (NOPAT). Positive levels of EVA indicate that management has been "adding value" through previous investments."<sup>20</sup>

EVA is calculated through the application of the following formula:

$$EVA = NOPAT - (WACC)(Capital)$$

---

<sup>20</sup> Peterson and Peterson (Website)

*Tobin's Q*. Tobin's Q is classified as a traditional performance measure. However, it is fundamentally different from other traditional performance measures since it does not use accounting data. When calculating Tobin's Q, one estimates future investment opportunities, market power, and management quality.

Tobin's Q is calculated through the application of the following formula:

$$\text{Tobin's Q} = \frac{\text{Market Value of Assets}}{\text{Replacement Value of Assets}}$$

The application of these two additional performance measures would involve a procedure too complicated for this research study. The sample size is so numerous that the time constraint imposed for this study works as a limitation as to what can be done. Therefore, since it would be beyond the scope of this study we have chosen to apply the more traditional measurements. Another important reason for the application of ROA, ROE, and EPS is that in order to make a better comparison to previous studies which have used these measurements, we believe it is necessary for us to apply similar performance measurements.

## Appendix 2

Industry Sectors as denominated by Affärsvärlden

Raw Materials	3 companies	}
Industrial Sector	21 companies	
Consumer Goods	7 companies	}
Pharmaceuticals	5 companies	
Service Sector	1 company	
Financial Sector	16 companies	
IT- Sector	8 companies	}
Telecommunication	2 companies	
Media and Entertainment	2 companies	

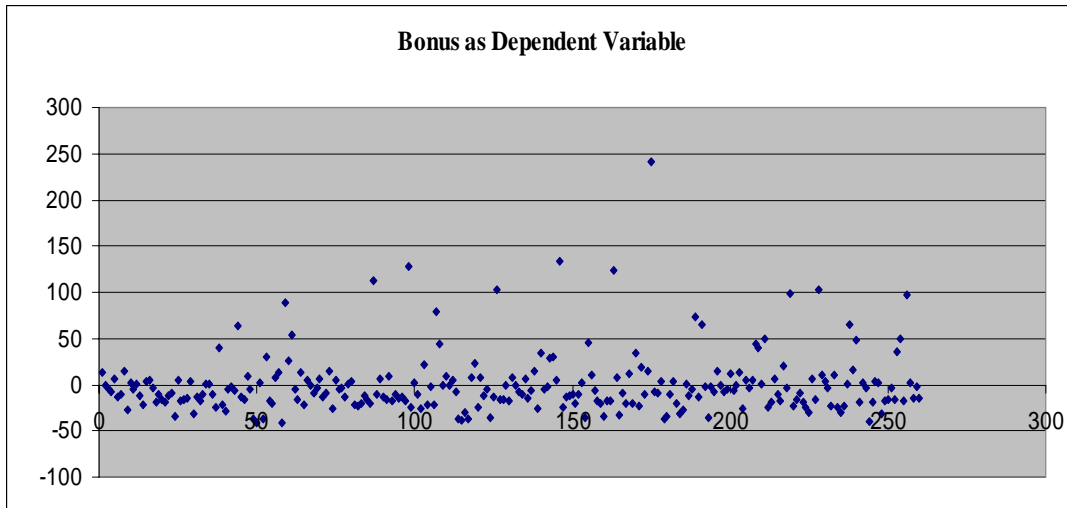




## Appendix 3

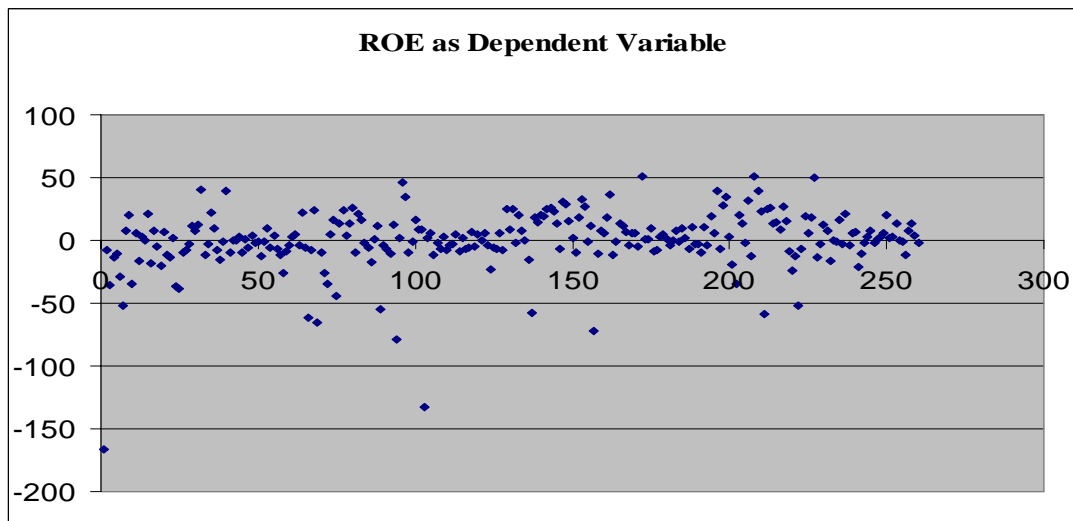
**Residual plots in order to test for heteroskedasticity.**

*Bonus as dependent variable:*



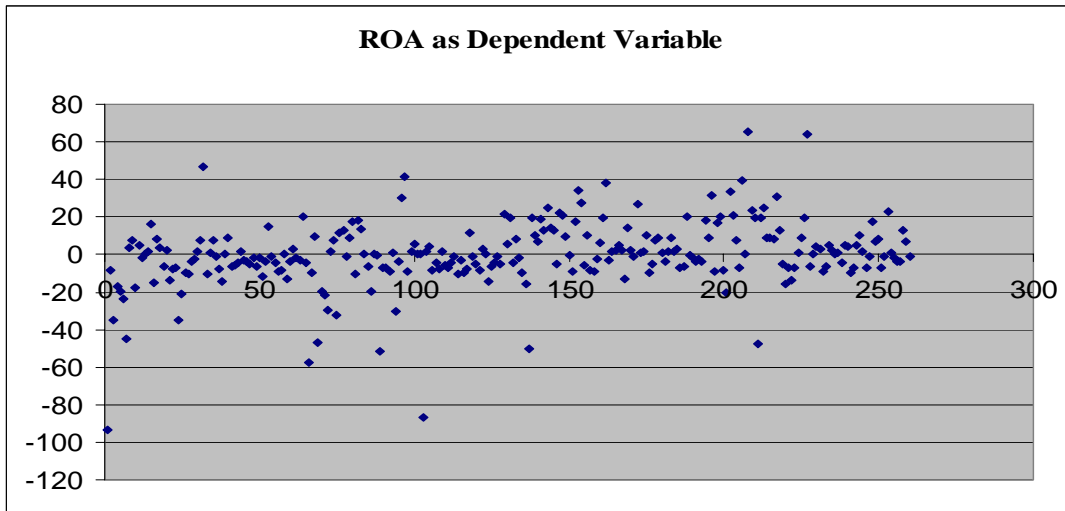
*Graph 1: Residual Plot Bonus as Dependent Variable*

*ROE as dependent variable:*



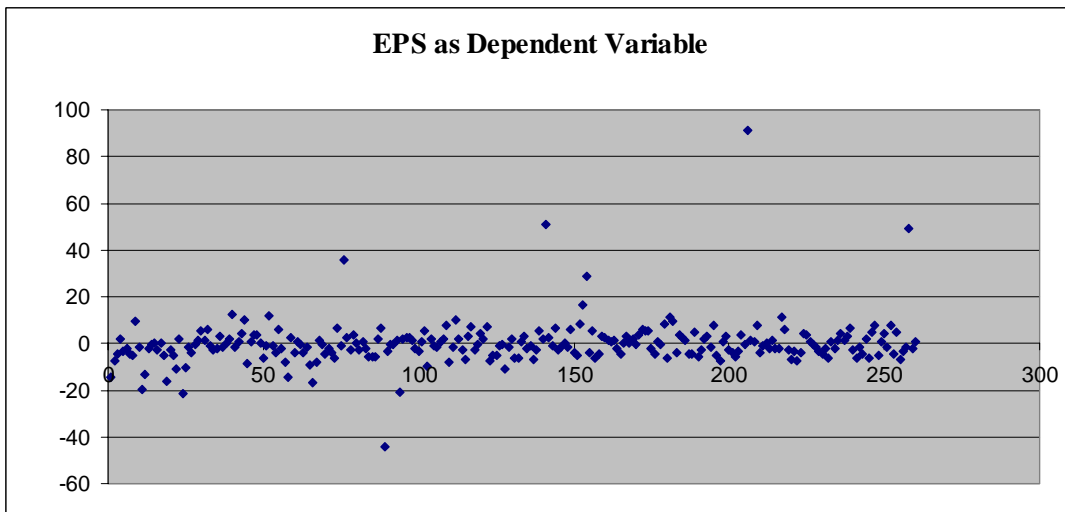
*Graph 2: Residual Plot ROE as Dependent Variable*

*Residual plot ROA as dependent variable:*



*Graph 3: Residual Plot ROA as Dependent Variable*

*Residual plot EPS as dependent variable:*



*Graph 4: Residual Plot EPS as Dependent Variable*

## Appendix 4

Correlation Matrix															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	0.03	0.27	-0.29	0.02	-0.01	0.08	0.08	-0.17	-0.30	-0.02	0.32	0.16	0.11	0.08
2	0.03	1	0.20	-0.16	0.02	0.34	-0.17	0.08	-0.31	-0.02	-0.03	0.05	0.14	0.06	0.07
3	0.27	0.20	1	-0.31	0.31	0.19	-0.01	0.00	-0.23	-0.43	-0.24	0.68	0.11	0.04	0.11
4	-0.29	-0.16	-0.31	1	-0.18	-0.09	0.13	-0.03	0.00	0.33	-0.13	-0.20	-0.11	-0.10	0.04
5	0.02	0.02	0.31	-0.18	1	0.06	-0.17	-0.04	0.17	-0.11	-0.03	0.14	-0.07	-0.06	-0.11
6	-0.01	0.34	0.19	-0.09	0.06	1	-0.44	-0.38	-0.36	-0.08	-0.01	0.08	0.19	0.19	0.15
7	0.08	-0.17	-0.01	0.13	-0.17	-0.44	1	-0.29	-0.27	-0.11	-0.03	0.14	-0.04	-0.14	0.14
8	0.08	0.08	0.00	-0.03	-0.04	-0.38	-0.29	1	-0.24	0.13	-0.20	0.07	0.03	-0.01	-0.09
9	-0.17	-0.31	-0.23	0.00	0.17	-0.36	-0.27	-0.24	1	0.08	0.25	-0.33	-0.23	-0.08	-0.24
10	-0.30	-0.02	-0.43	0.33	-0.11	-0.08	-0.11	0.13	0.08	1	-0.51	-0.49	-0.32	-0.30	-0.18
11	-0.02	-0.03	-0.24	-0.13	-0.03	-0.01	-0.03	-0.20	0.25	-0.51	1	-0.49	0.11	0.14	-0.05
12	0.32	0.05	0.68	-0.20	0.14	0.08	0.14	0.07	-0.33	-0.49	-0.49	1	0.22	0.16	0.23
13	0.16	0.14	0.11	-0.11	-0.07	0.19	-0.04	0.03	-0.23	-0.32	0.11	0.22	1	0.79	0.45
14	0.11	0.06	0.04	-0.10	-0.06	0.19	-0.14	-0.01	-0.08	-0.30	0.14	0.16	0.79	1	0.42
15	0.08	0.07	0.11	0.04	-0.11	0.15	0.14	-0.09	-0.24	-0.18	-0.05	0.23	0.45	0.42	1

Table 9: Correlation Matrix

- |   |         |
|---|---------|
| 1. % Bonus of Base Salary                           | 13. ROE |
| 2. CEO Age  | 14. ROA |
| 3. CEO Base salary                                  | 15. EPS |
| 4. % of Outstanding Shares Owned by CEO             |         |
| 5. Stock Option Program                             |         |
| 6. Raw Materials and Industrials                    |         |
| 7. Financial  |         |
| 8. Consumer Goods, Pharmaceuticals and Service      |         |
| 9. IT, Telecommunication, and Media & Entertainment |         |
| 10. Small Sized Firms                               |         |
| 11. Medium Sized Firms                              |         |
| 12. Large Sized Firms                               |         |



## Appendix 5

### F-test in order to test for significance

Bonus as dependent variable

#### *Restricted Sums of Square*

	<i>df</i>	<i>SS</i>
<b>Regression</b>	6	49404,807
<b>Residual</b>	253	303088,9
<b>Total</b>	259	352493,71

Table 10: All companies Restricted

#### *Unrestricted Sums of Square*

	<i>df</i>	<i>SS</i>
<b>Regression</b>	10	17717,923
<b>Residual</b>	121	113691,54
<b>Total</b>	131	131409,46

Table 11: Small companies Unrestricted

	<i>df</i>	<i>SS</i>
<b>Regression</b>	10	31730,911
<b>Residual</b>	117	156463,36
<b>Total</b>	127	188194,27

Table 12: Large companies Unrestricted

$$H_0: \beta_2=0, \beta_3=0, \beta_4=0, \beta_5=0, \beta_6=0, \beta_7=0, \delta_0=0, \delta_1=0, \delta_2=0, \delta_3=0, \delta_4=0$$

$$H_1: \beta_2 \neq 0, \beta_3 \neq 0, \beta_4 \neq 0, \beta_5 \neq 0, \beta_6 \neq 0, \beta_7 \neq 0, \delta_0 \neq 0, \delta_1 \neq 0, \delta_2 \neq 0, \delta_3 \neq 0, \delta_4 \neq 0$$

$$F = \frac{(303088.9 - (11369.54 + 156463.36))/10}{(11369.54 + 156463.36)/(260 - 11)}$$

$$F = 3,036$$

(size dummies are omitted since sample is divided by size, one sector dummy is omitted in test)

$$\text{Critical Value} = 1.83$$

Reject  $H_0$

One or more of our Variables is of significance

ROE as dependent variable

*Restricted Sums of Square*

	<b>df</b>	<b>SS</b>
<b>Regression</b>	4	8612,7164
<b>Residual</b>	255	173119,81
<b>Total</b>	259	181732,53

*Table 13: All companies Restricted*

*Unrestricted Sums of Square*

	<b>df</b>	<b>SS</b>
<b>Regression</b>	8	16884,321
<b>Residual</b>	123	114700,76
<b>Total</b>	131	131585,08

*Table 14: Small companies Unrestricted*

	<b>df</b>	<b>SS</b>
<b>Regression</b>	8	7917,9725
<b>Residual</b>	119	28729,852
<b>Total</b>	127	36647,824

*Table 15: Large companies Unrestricted*

$$H_0: \beta_2=0, \beta_3=0, \beta_4=0, \beta_5=0, \delta_0=0, \delta_1=0, \delta_2=0, \delta_3=0, \delta_4=0$$

$$H_1: \beta_2 \neq 0, \beta_3 \neq 0, \beta_4 \neq 0, \beta_5 \neq 0, \delta_0 \neq 0, \delta_1 \neq 0, \delta_2 \neq 0, \delta_3 \neq 0, \delta_4 \neq 0$$

$$F = \frac{(173119.81 - (114700.76 + 28729.852)) / 8}{(114700.76 + 28729.852) / (260 - 9)}$$

$$F = 6.494$$

$$\text{Critical Value} = 1.94$$

Reject  $H_0$

One or more of our Variables is of significance

ROA as dependent variable

*Restricted Sums of Square*

	<b>df</b>	<b>SS</b>
<b>Regression</b>	4	1907,8245
<b>Residual</b>	255	97516,823
<b>Total</b>	259	99424,648

Table 16: All companies Restricted

*Unrestricted Sums of Square*

	<b>df</b>	<b>SS</b>
<b>Regression</b>	8	10795,595
<b>Residual</b>	123	68552,954
<b>Total</b>	131	79348,549

Table 17: Small companies Unrestricted

	<b>df</b>	<b>SS</b>
<b>Regression</b>	8	4827,3418
<b>Residual</b>	119	12534,892
<b>Total</b>	127	17362,234

Table 18: Large companies Unrestricted

$$H_0: \beta_2=0, \beta_3=0, \beta_4=0, \beta_5=0, \delta_0=0, \delta_1=0, \delta_2=0, \delta_3=0, \delta_4=0$$

$$H_1: \beta_2 \neq 0, \beta_3 \neq 0, \beta_4 \neq 0, \beta_5 \neq 0, \delta_0 \neq 0, \delta_1 \neq 0, \delta_2 \neq 0, \delta_3 \neq 0, \delta_4 \neq 0$$

$$F = \frac{(97516.832 - (68552.942 + 12534.892))/8}{(68552.942 + 12534.892)/(260 - 9)}$$

$$F = 6.357$$

Critical value = 1.94

Reject  $H_0$

One or more of our Variables is of significance

EPS as dependent variable

*Restricted Sums of Square*

	<i>df</i>	<i>SS</i>
<b>Regression</b>	4	852,23816
<b>Residual</b>	255	28236,301
<b>Total</b>	259	29088,539

*Table 19: All companies Restricted*

*Unrestricted Sums of Square*

	<i>df</i>	<i>SS</i>
<b>Regression</b>	8	1605,4039
<b>Residual</b>	123	19096,124
<b>Total</b>	131	20701,528

*Table 20: Small companies Unrestricted*

	<i>df</i>	<i>SS</i>
<b>Regression</b>	8	1441,7551
<b>Residual</b>	119	5298,4761
<b>Total</b>	127	6740,2312

*Table 21: Large companies Unrestricted*

$$H_0: \beta_2=0, \beta_3=0, \beta_4=0, \beta_5=0, \delta_0=0, \delta_1=0, \delta_2=0, \delta_3=0, \delta_4=0$$

$$H_1: \beta_2 \neq 0, \beta_3 \neq 0, \beta_4 \neq 0, \beta_5 \neq 0, \delta_0 \neq 0, \delta_1 \neq 0, \delta_2 \neq 0, \delta_3 \neq 0, \delta_4 \neq 0$$

$$F = \frac{(28236.301 - (19096.124 + 5298.4761)) / 8}{(19096.124 + 5298.4761) / (260 - 9)}$$

$$F = 4.941$$

Critical value = 1.94

Reject  $H_0$

One or more of our variables is of significance



## Appendix 6

*EPS as dependent variable*

<b>Regression statistics</b>	
<b>Multiple-R</b>	0.361905003
<b>R<sup>2</sup></b>	0.130975231
<b>Adjusted R<sup>2</sup></b>	0.096074638
<b>Standard Error</b>	10.07560126
<b>Observations</b>	260

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	-1.2889855	6.1403209	-0.2099215	0.8339006
<b>% Bonus of Base Salary</b>	0.0039454	0.0188480	0.2093285	0.8343629
<b>CEO Age</b>	0.0519465	0.1147781	0.4525825	0.6512435
<b>CEO Base Salary</b>	-0.0000003	0.0000005	-0.6494483	0.5166473
<b>% of outstanding shares owned by CEO</b>	0.0833590	0.0619669	1.3452183	0.1797786
<b>Stock option program</b>	-2.0376320	1.3994041	-1.4560712	0.1466326
<b>Raw materials and Industrials</b>	3.8687230	1.7836634	2.1689759	0.0310313
<b>Financial sector</b>	3.3171740	1.9518306	1.6995194	0.0904702
<b>IT-sector, Telecommunication and Media &amp; Entertainment</b>	-1.5706056	2.2672949	-0.6927223	0.4891294
<b>Medium sized firms</b>	2.6032916	1.6328135	1.5943594	0.1121241
<b>Large sized firms</b>	6.6880953	2.2135855	3.0213855	0.0027785

*Table 25: EPS as dependent variable*



## Appendix 7

*Small Size: Bonus as dependent variable*

<b>Regressionstatistics</b>	
Multiple-R	0.349169508
R <sup>2</sup>	0.121919345
Adjusted R <sup>2</sup>	0.045087288
Standard Error	24.28693976
Observations	88

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
Intercept	-26.0765	24.1956	-1.0777	0.2844
CEO Age	0.6429	0.4701	1.3675	0.1753
CEO Base Salary	0.0000	0.0000	0.6832	0.4965
% of outstanding shares owned by CEO	-0.3912	0.2100	-1.8626	0.0662
Stock option program	6.0574	5.4782	1.1057	0.2722
ROE	0.0742	0.2174	0.3413	0.7338
ROA	0.0209	0.2882	0.0724	0.9424
EPS	0.0590	0.2105	0.2802	0.7800

Table 26: *Small Size: Bonus as dependent variable*

*Small Size: ROE as dependent variable*

<b>Regressionstatistics</b>	
Multiple-R	0.2702787
R <sup>2</sup>	0.0730506
Adjusted R <sup>2</sup>	0.0165293
Standard Error	31.904169
Observations	88

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
Intercept	-14.4918	31.5310	-0.4596	0.6470
% Bonus of Base Salary	0.1723	0.1455	1.1841	0.2398
CEO Age	0.5565	0.6180	0.9005	0.3705
CEO Base Salary	0.0000	0.0000	-1.7546	0.0831
% of outstanding shares owned by CEO	-0.2097	0.2784	-0.7533	0.4534
Stock option program	-7.3227	7.0915	-1.0326	0.3048

Table 27: *Small Size: ROE as dependent variable*

*Small Size: ROA as dependent variable*

<b>Regressionstatistics</b>	
<b>Multiple-R</b>	0.2677203
<b>R<sup>2</sup></b>	0.0716742
<b>Adjusted R<sup>2</sup></b>	0.0150689
<b>Standard Error</b>	24.315556
<b>Observations</b>	88

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	3.345465	24.031165	0.139214	0.889623
<b>% Bonus of Base Salary</b>	0.126054	0.110927	1.136365	0.259114
<b>CEO Age</b>	0.221803	0.471011	0.470907	0.638957
<b>CEO Base Salary</b>	-0.000011	0.000005	-2.106662	0.058204
<b>% of outstanding shares owned by CEO</b>	-0.113174	0.212143	-0.533479	0.595145
<b>Stock option program</b>	-3.869187	5.404765	-0.715884	0.476096

*Table 28: Small Size: ROA as dependent variable*

*Small Size: EPS as dependent variable*

<b>Regressionstatistics</b>	
<b>Multiple-R</b>	0.2321503
<b>R<sup>2</sup></b>	0.0538938
<b>Adjusted R<sup>2</sup></b>	-0.0037956
<b>Standard Error</b>	13.66496
<b>Observations</b>	88

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	6.020177	13.505136	0.445769	0.656939
<b>% Bonus of Base Salary</b>	0.042534	0.062339	0.682298	0.496973
<b>CEO Age</b>	-0.032586	0.264701	-0.123104	0.902326
<b>CEO Base Salary</b>	-0.000001	0.000003	-0.287898	0.774151
<b>% of outstanding shares owned by CEO</b>	0.103331	0.119221	0.866720	0.388624
<b>Stock option program</b>	-5.106226	3.037393	-1.681121	0.096545

*Table 29: Small Size: EPS as dependent variable*

## Appendix 8

*Medium Size: Bonus as dependent variable*

<b>Regression statistics</b>	
Multiple-R	0.4107226
R <sup>2</sup>	0.1686931
Adjusted R <sup>2</sup>	0.0959537
Standard Error	33.082674
Observations	88

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
Intercept	83.0378	32.4125	2.5619	0.0123
CEO Age	-0.7182	0.6335	-1.1337	0.2603
CEO Base Salary	0.0000	0.0000	-1.0118	0.3147
% of outstanding shares owned by CEO	-1.1774	0.5248	-2.2434	0.0276
Stock option program	-11.1904	8.5004	-1.3165	0.1918
ROE	0.2265	0.2818	0.8037	0.4239
ROA	-0.6716	0.3554	-1.8898	0.0624
EPS	0.7967	0.5766	1.3817	0.1709

Table 30: Medium Size: Bonus as dependent variable

*Medium Size: ROE as dependent variable*

<b>Regression statistics</b>	
Multiple-R	0.397589
R <sup>2</sup>	0.158077
Adjusted R <sup>2</sup>	0.1067403
Standard Error	25.548511
Observations	88

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
Intercept	-52.2531	23.7168	-2.2032	0.0304
% Bonus of Base Salary	-0.0106	0.0836	-0.1270	0.8992
CEO Age	1.4423	0.4539	3.1776	0.0806
CEO Base Salary	0.0000	0.0000	-0.6532	0.5155
% of outstanding shares owned by CEO	0.8957	0.3946	2.2699	0.0258
Stock option program	-9.5753	6.4922	-1.4749	0.1441

Table 31: Medium Size: ROE as dependent variable

*Medium Size: ROA as dependent variable*

<b>Regressionstatistics</b>	
<b>Multiple-R</b>	0.3150637
<b>R<sup>2</sup></b>	0.0992651
<b>Adjusted R<sup>2</sup></b>	0.0443423
<b>Standard Error</b>	18.526658
<b>Observations</b>	88

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	0.516787	17.198405	0.030049	0.976101
<b>% Bonus of Base Salary</b>	-0.067101	0.060636	-1.106635	0.271688
<b>CEO Age</b>	0.497208	0.329139	1.510633	0.134726
<b>CEO Base Salary</b>	-0.000007	0.000004	-1.784550	0.078033
<b>% of outstanding shares owned by CEO</b>	0.204103	0.286149	0.713274	0.477701
<b>Stock option program</b>	-2.770416	4.707860	-0.588466	0.557837

*Table 32: Medium Size: ROA as dependent variable*

*Medium Size: EPS as dependent variable*

<b>Regressionstatistics</b>	
<b>Multiple-R</b>	0.2170933
<b>R<sup>2</sup></b>	0.0471295
<b>Adjusted R<sup>2</sup></b>	-0.0109724
<b>Standard Error</b>	8.2029131
<b>Observations</b>	88

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	-7.8743420	7.6148124	-1.0340822	0.3041379
<b>% Bonus of Base Salary</b>	0.0244175	0.0268472	0.9094987	0.3657525
<b>CEO Age</b>	0.2308510	0.1457305	1.5840956	0.1170213
<b>CEO Base Salary</b>	0.0000002	0.0000016	0.1534687	0.8784057
<b>% of outstanding shares owned by CEO</b>	0.1576620	0.1266961	1.2444102	0.2168938
<b>Stock option program</b>	-1.4651663	2.0844647	-0.7028981	0.4841100

*Table 33: Medium Size: EPS as dependent variable*

## Appendix 9

### *Large Firms: Bonus as dependent variable*

<b>Regressionstatistics</b>	
Multiple-R	0.3153877
R <sup>2</sup>	0.0994694
Adjusted R <sup>2</sup>	0.0165258
Standard Error	41.721083
Observations	84

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
Intercept	71.168906	41.636172	1.709305	0.091475
CEO Age	-0.833081	0.852086	-0.977696	0.331327
CEO Base Salary	0.000002	0.000002	0.839271	0.403950
% of outstanding shares owned by CEO	-0.629423	0.507878	-1.239319	0.219041
Stock option program	-4.848294	11.802607	-0.410782	0.682389
ROE	1.374594	0.815953	1.684649	0.096159
ROA	-0.509152	0.872604	-0.583485	0.561294
EPS	-0.728601	0.626843	-1.162335	0.248737

Table 34: Large Size: Bonus as dependent variable

### *Large Firms: ROE as dependent variable*

<b>Regressionstatistics</b>	
Multiple-R	0.360795
R <sup>2</sup>	0.130173
Adjusted R <sup>2</sup>	0.0744149
Standard Error	9.5855453
Observations	84

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
Intercept	6.9979880	9.6670774	0.7238990	0.4712933
% Bonus of Base Salary	0.0430014	0.0256293	1.6778216	0.0973848
CEO Age	0.2658959	0.1935007	1.3741337	0.1733360
CEO Base Salary	-0.0000011	0.0000005	-1.9796963	0.0492654
% of outstanding shares owned by CEO	-0.1104927	0.1144082	-0.9657763	0.3371410
Stock option program	-3.2031370	2.6513591	-1.2081114	0.2306546

Table 35: Large Size: ROE as dependent variable

*Large Firms: ROA as dependent variable*

<b>Regressionstatistics</b>	
<b>Multiple-R</b>	0.399414
<b>R<sup>2</sup></b>	0.1595315
<b>Adjusted R<sup>2</sup></b>	0.1056554
<b>Standard Error</b>	8.6984732
<b>Observations</b>	84

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	9.7086052	8.7724601	1.1067141	0.2718191
<b>% Bonus of Base Salary</b>	0.0236222	0.0232575	1.0156796	0.3129222
<b>CEO Age</b>	0.1959871	0.1755937	1.1161401	0.2677888
<b>CEO Base Salary</b>	-0.0000010	0.0000005	-2.1306322	0.0362705
<b>% of outstanding shares owned by CEO</b>	-0.1761890	0.1038205	-1.6970531	0.0936738
<b>Stock option program</b>	-4.5363685	2.4059952	-1.8854437	0.0630935

*Table 36: Large Size: ROA as dependent variable*

*Large Firms: EPS as dependent variable*

<b>Regressionstatistics</b>	
<b>Multiple-R</b>	0.268352
<b>R<sup>2</sup></b>	0.0720128
<b>Adjusted R<sup>2</sup></b>	0.0125265
<b>Standard Error</b>	8.0602263
<b>Observations</b>	84

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	-0.1463454	8.1287845	-0.0180034	0.9856821
<b>% Bonus of Base Salary</b>	-0.0098712	0.0215510	-0.4580412	0.6481964
<b>CEO Age</b>	0.2261777	0.1627095	1.3900701	0.1684619
<b>CEO Base Salary</b>	-0.0000004	0.0000004	-1.0032888	0.3188239
<b>% of outstanding shares owned by CEO</b>	0.0940367	0.0962027	0.9774849	0.3313512
<b>Stock option program</b>	-1.0090573	2.2294563	-0.4526024	0.6520914

*Table 37: Large Size: EPS as dependent variable*



## Appendix 10

### *Raw Materials and Industrial Sector: Bonus as dependent variable*

<b>Regressionstatistics</b>	
Multiple-R	0.5294186
R <sup>2</sup>	0.28028405
Adjusted R <sup>2</sup>	0.22303392
Standard Error	31.1955445
Observations	96

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
Intercept	-23.351542	47.608094	-0.490495	0.625004
CEO Age	0.971198	0.880282	1.103280	0.272914
CEO Base Salary	0.000003	0.000002	1.503707	0.136237
% of outstanding shares owned by CEO	-1.211949	0.345917	-3.503587	0.000724
Stock option program	-29.867316	7.399387	-4.036458	0.000115
ROE	1.268955	0.679187	1.868344	0.065042
ROA	-0.318896	0.672674	-0.474072	0.636623
EPS	0.034762	0.542167	0.064117	0.949023

Table 38: Raw material and industrial sector: bonus as dependent variable

### *Raw Materials and Industrial Sector: ROE as dependent variable*

<b>Regressionstatistics</b>	
Multiple-R	0.4084438
R <sup>2</sup>	0.1668263
Adjusted R <sup>2</sup>	0.1205389
Standard Error	10.455125
Observations	96

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
Intercept	26.7850409	14.7792440	1.8123417	0.0732679
% Bonus of Base Salary	0.1173615	0.0334654	3.5069510	0.0007093
CEO Age	-0.3564801	0.2820207	-1.2640208	0.2094866
CEO Base Salary	-0.0000010	0.0000005	-1.9555518	0.0536200
% of outstanding shares owned by CEO	0.1874132	0.1208101	1.5513041	0.1243384
Stock option program	7.4069307	2.5753292	2.8761103	0.0050258

Table 39: Raw material and industrial sector: ROE as dependent variable

*Raw Materials and Industrial Sector: ROA as dependent variable*

<i>Regressionstatistics</i>	
<b>Multiple-R</b>	0.4239106
<b>R<sup>2</sup></b>	0.1797002
<b>Adjusted R<sup>2</sup></b>	0.1341279
<b>Standard Error</b>	9.8831078
<b>Observations</b>	96

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	45.5631661	13.9706465	3.2613499	0.0015669
<b>% Bonus of Base Salary</b>	0.0881055	0.0316344	2.7851127	0.0065235
<b>CEO Age</b>	-0.6662130	0.2665909	-2.4990086	0.0142683
<b>CEO Base Salary</b>	-0.0000013	0.0000005	-2.6101970	0.0105986
<b>% of outstanding shares owned by CEO</b>	0.1339496	0.1142004	1.1729349	0.2439170
<b>Stock option program</b>	5.1707625	2.4344286	2.1240149	0.0364116

*Table 40: Raw material and industrial sector: ROA as dependent variable*

*Raw Materials and Industrial Sector: EPS as dependent variable*

<i>Regressionstatistics</i>	
<b>Multiple-R</b>	0.3669346
<b>R<sup>2</sup></b>	0.134641
<b>Adjusted R<sup>2</sup></b>	0.0865655
<b>Standard Error</b>	7.4647319
<b>Observations</b>	96

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	2.9792352	10.5520584	0.2823369	0.7783335
<b>% Bonus of Base Salary</b>	0.0507303	0.0238936	2.1231799	0.0364835
<b>CEO Age</b>	-0.0112588	0.2013567	-0.0559146	0.9555338
<b>CEO Base Salary</b>	0.0000006	0.0000004	1.5445188	0.1259718
<b>% of outstanding shares owned by CEO</b>	-0.0171988	0.0862558	-0.1993932	0.8424050
<b>Stock option program</b>	2.7714516	1.8387290	1.5072649	0.1352450

*Table 41: Raw material and industrial sector: EPS as dependent variable*

## Appendix 11

*Financial Sector: Bonus as dependent variable*

<b>Regressionstatistics</b>	
Multiple-R	0.4448646
R <sup>2</sup>	0.1979045
Adjusted R <sup>2</sup>	0.0976426
Standard Error	41.37253
Observations	64

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
Intercept	100.890010	43.246814	2.332889	0.023272
CEO Age	-1.610677	0.891882	-1.805931	0.076304
CEO Base Salary	0.000008	0.000005	1.657717	0.102967
% of outstanding shares owned by CEO	-0.722187	0.377971	-1.910694	0.061169
Stock option program	-15.225925	14.981777	-1.016296	0.313859
ROE	-0.143640	0.546233	-0.262964	0.793544
ROA	0.779507	0.859634	0.906789	0.368404
EPS	-0.288255	0.394961	-0.729832	0.468535

Table 42: Financial Sector: Bonus as dependent variable

*Financial Sector: ROE as dependent variable*

<b>Regressionstatistics</b>	
Multiple-R	0.3815369
R <sup>2</sup>	0.1455704
Adjusted R <sup>2</sup>	0.0719126
Standard Error	28.611845
Observations	64

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
Intercept	-50.041874	30.259547	-1.653755	0.103580
% Bonus of Base Salary	0.137614	0.089844	1.531698	0.131034
CEO Age	1.202188	0.612370	1.963173	0.054427
CEO Base Salary	-0.000006	0.000003	-1.943512	0.056812
% of outstanding shares owned by CEO	-0.121514	0.262921	-0.462172	0.645687
Stock option program	21.409229	9.631820	2.222761	0.030144

Table 43: Financial Sector: ROE as dependent variable

*Financial Sector: ROA as dependent variable*

<b>Regressionstatistics</b>	
<b>Multiple-R</b>	0.3851552
<b>R<sup>2</sup></b>	0.1483446
<b>Adjusted R<sup>2</sup></b>	0.074926
<b>Standard Error</b>	19.594222
<b>Observations</b>	64

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	-37.329102	20.722616	-1.801370	0.076843
<b>% Bonus of Base Salary</b>	0.102660	0.061528	1.668510	0.100605
<b>CEO Age</b>	0.841895	0.419369	2.007530	0.049360
<b>CEO Base Salary</b>	-0.000004	0.000002	-1.850935	0.069273
<b>% of outstanding shares owned by CEO</b>	-0.010714	0.180056	-0.059501	0.952757
<b>Stock option program</b>	15.727362	6.596150	2.384325	0.020402

Table 44: Financial Sector: ROA as dependent variable

*Financial Sector: EPS as dependent variable*

<b>Regressionstatistics</b>	
<b>Multiple-R</b>	0.2533973
<b>R<sup>2</sup></b>	0.0642102
<b>Adjusted R<sup>2</sup></b>	-0.0164614
<b>Standard Error</b>	17.216522
<b>Observations</b>	64

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	-4.8312713	18.2079897	-0.2653380	0.7916899
<b>% Bonus of Base Salary</b>	0.0187283	0.0540615	0.3464265	0.7302759
<b>CEO Age</b>	0.2711737	0.3684794	0.7359264	0.4647414
<b>CEO Base Salary</b>	-0.0000008	0.0000020	-0.4208503	0.6754197
<b>% of outstanding shares owned by CEO</b>	0.2043626	0.1582065	1.2917458	0.2015690
<b>Stock option program</b>	-2.2028983	5.7957269	-0.3800901	0.7052669

Table 45: Financial Sector: EPS as dependent variable

## Appendix 12

*Consumer Goods, Pharmaceuticals, and Service Sector: Bonus as dependent variable*

<b>Regressionstatistics</b>	
Multiple-R	0.6083039
R <sup>2</sup>	0.3700336
Adjusted R <sup>2</sup>	0.2698117
Standard Error	34.837168
Observations	52

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
Intercept	96.393054	52.670541	1.830113	0.074012
CEO Age	-1.649229	0.946054	-1.743272	0.088271
CEO Base Salary	0.000004	0.000002	1.510278	0.138121
% of outstanding shares owned by CEO	-1.731326	0.588233	-2.943268	0.005168
Stock option program	32.353933	12.508855	2.586482	0.013081
ROE	0.186701	0.586709	0.318217	0.751826
ROA	0.207257	0.544140	0.380890	0.705118
EPS	-1.081485	2.237716	-0.483299	0.631280

Table 46: Consumer goods, pharmaceuticals, and service sector: Bonus as dependent variable

*Consumer Goods, Pharmaceuticals, and Service Sector: ROE as dependent variable*

<b>Regressionstatistics</b>	
Multiple-R	0.529762154
R <sup>2</sup>	0.28064794
Adjusted R <sup>2</sup>	0.202457499
Standard Error	22.52443658
Observations	52

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
Intercept	24.26566921	28.15574698	0.8618372	0.3932478
% Bonus of Base Salary	0.087763208	0.096041164	0.9138083	0.3655827
CEO Age	-0.275319613	0.536095675	-0.5135643	0.6100147
CEO Base Salary	3.38365E-06	1.48052E-06	2.2854442	0.0269439
% of outstanding shares owned by CEO	0.325469569	0.393527669	0.8270564	0.4124749
Stock option program	-25.19191887	7.768488436	-3.2428341	0.0022057

Table 47: Consumer goods, pharmaceuticals, and service sector: ROE as dependent variable

*Consumer Goods, Pharmaceuticals, and Service Sector: ROA as dependent variable*

<b>Regressionstatistics</b>	
<b>Multiple-R</b>	0.4860128
<b>R<sup>2</sup></b>	0.2362084
<b>Adjusted R<sup>2</sup></b>	0.1531876
<b>Standard Error</b>	18.995276
<b>Observations</b>	52

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	4.3260443	23.74426526	0.1821932	0.8562316
<b>% Bonus of Base Salary</b>	0.0861616	0.0809933	1.0638115	0.2929668
<b>CEO Age</b>	0.1056325	0.452099456	0.2336487	0.8162944
<b>CEO Base Salary</b>	2.292E-06	1.24855E-06	1.8353643	0.0729217
<b>% of outstanding shares owned by CEO</b>	0.3444586	0.331869205	1.0379347	0.3047258
<b>Stock option program</b>	-21.334726	6.551310829	-3.2565583	0.002121

Table 48: Consumer goods, pharmaceuticals, and service sector: ROA as dependent variable

*Consumer Goods, Pharmaceuticals, and Service Sector: EPS as dependent variable*

<b>Regressionstatistics</b>	
<b>Multiple-R</b>	<b>0.6021045</b>
<b>R<sup>2</sup></b>	<b>0.3625298</b>
<b>Adjusted R<sup>2</sup></b>	<b>0.2932395</b>
<b>Standard Error</b>	<b>3.6916207</b>
<b>Observations</b>	<b>52</b>

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	18.0536979	4.6145589	3.9123345	0.0002995
<b>% Bonus of Base Salary</b>	0.0046953	0.0157406	0.2982925	0.7668232
<b>CEO Age</b>	-0.2721854	0.0878629	-3.0978430	0.0033187
<b>CEO Base Salary</b>	0.0000003	0.0000002	1.0880167	0.2822556
<b>% of outstanding shares owned by CEO</b>	-0.0493256	0.0644968	-0.7647754	0.4483111
<b>Stock option program</b>	-3.1738826	1.2732089	-2.4928216	0.0163352

Table 49: Consumer goods, pharmaceuticals, and service sector: EPS as dependent variable

## Appendix 13

*IT, Telecommunication, and Media & Entertainment: Bonus as dependent variable*

<b>Regressionstatistics</b>	
Multiple-R	0.5723417
R <sup>2</sup>	0.327575
Adjusted R <sup>2</sup>	0.2099006
Standard Error	17.084354
Observations	48

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
Intercept	57.42624	27.18743	2.11223	0.04096
CEO Age	-1.65769	0.74091	-2.23737	0.03090
CEO Base Salary	0.00002	0.00001	2.61246	0.01260
% of outstanding shares owned by CEO	0.16837	0.54341	0.30983	0.75830
Stock option program	8.28592	6.79077	1.22017	0.22954
ROE	0.30674	0.19974	1.53568	0.13249
ROA	-0.36719	0.22436	-1.63665	0.10955
EPS	0.23166	0.69415	0.33374	0.74032

Table 50: IT, Telecommunications, and Media & Entertainment: Bonus as dependent variable

*IT, Telecommunication, and Media & Entertainment: ROE as dependent variable*

<b>Regressionstatistics</b>	
Multiple-R	0.454385343
R <sup>2</sup>	0.20646604
Adjusted R <sup>2</sup>	0.111997712
Standard Error	36.18614506
Observations	48

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
Intercept	-100.50316	47.62538	-2.11029	0.04083
% Bonus of Base Salary	0.37595	0.31669	1.18712	0.24185
CEO Age	3.54026	1.37753	2.57001	0.01381
CEO Base Salary	-0.00003	0.00001	-1.70940	0.09476
% of outstanding shares owned by CEO	-2.12653	1.09945	-1.93417	0.05985
Stock option program	-30.22871	13.82635	-2.18631	0.03442

Table 51: IT, Telecommunications, and Media & Entertainment: ROE as dependent variable

*IT, Telecommunication, and Media & Entertainment: ROA as dependent variable*

<b>Regressionstatistics</b>	
<b>Multiple-R</b>	0.3612169
<b>R<sup>2</sup></b>	0.1304777
<b>Adjusted R<sup>2</sup></b>	0.0269631
<b>Standard Error</b>	27.492222
<b>Observations</b>	48

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	-7.65329	36.18312	-0.21152	0.83351
<b>% Bonus of Base Salary</b>	0.06899	0.24061	0.28673	0.77573
<b>CEO Age</b>	1.07566	1.04657	1.02779	0.30993
<b>CEO Base Salary</b>	-0.00001	0.00001	-0.87484	0.38664
<b>% of outstanding shares owned by CEO</b>	-1.25684	0.83530	-1.50465	0.13990
<b>Stock option program</b>	-21.35605	10.50449	-2.03304	0.04840

Table 52: IT, Telecommunications, and Media & Entertainment: ROA as dependent variable

*IT, Telecommunication, and Media & Entertainment: EPS as dependent variable*

<b>Regressionstatistics</b>	
<b>Multiple-R</b>	0.3984186
<b>R<sup>2</sup></b>	0.1587374
<b>Adjusted R<sup>2</sup></b>	0.0585871
<b>Standard Error</b>	5.5791167
<b>Observations</b>	48

	<b>Coefficients</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>P-value</b>
<b>Intercept</b>	-3.758228	7.342798	-0.511825	0.611454
<b>% Bonus of Base Salary</b>	0.068122	0.048827	1.395172	0.170298
<b>CEO Age</b>	0.228862	0.212385	1.077579	0.287372
<b>CEO Base Salary</b>	-0.000002	0.000002	-0.966972	0.339093
<b>% of outstanding shares owned by CEO</b>	-0.279812	0.169512	-1.650692	0.106261
<b>Stock option program</b>	-4.144288	2.131722	-1.944103	0.058602

Table 53: IT, Telecommunications, and Media & Entertainment: EPS as dependent variable