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# Effects of CEO turnover on company performance

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Abstract

CEO turnover in listed companies has increased over the past decades. This paper explores whether or not changing CEO has a significant effect on company performance. We use the Strategic Leadership and Strategic Choice perspectives to explain why CEO turnovers could have an effect on company performance and the Population Ecology perspective to explain the contrary. With a quantitative approach complemented with qualitative interviews we then analyze CEO turnover by comparing it to the stock performance of 341 companies listed on the Swedish stock exchange from 1994 to 2009. Our statistical analyses show that CEO turnover has a negative correlation with company stock development. This effect is strongly significant in the short run (0-1 year), and only slightly significant in the long run (0-2 and 0-3 years) but is consistent over all periods. While there are many possible explanations our results indicate that changing CEO does affect company performance and that the Strategic Leadership and Strategic Choice perspectives are better at describing a CEO's effect within a company.

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Key words: CEO turnover, company performance, stock performance, Strategic Leadership perspective, Strategic Choice perspective, Population Ecology perspective.

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# Introduction

CEO turnover is increasing, since 1994 CEO turnover on the Swedish stock exchange has doubled from 8.4% to 16.4% in 2008.[1] Structural changes, globalization, cost-saving programs, reorganizations, higher demand for short term returns, and doing quarterly reports are some of many explanations.[2] We wanted to explore this phenomenon and find out what effects on company performance a change of CEO could have.

Many studies, mainly in the United States, have been conducted on what foregoes a change of CEO. In 2008 Kaplan and Minton[3] conducted a study in the US about how CEO turnover had changed between 1992 and 2005 and how the stock performance had been before the change of CEO. They found that the board is more likely to switch CEO when the firm's stock is performing badly, i.e. high CEO turnover was positively correlated with bad stock performance.

Such previous research indicates that the board is trying to change a negative performance by changing the CEO. So we asked ourselves if that is really possible. How much can a CEO actually affect company performance? Does a change of CEO have any effect on company performance at all? These are questions we would like to answer with our thesis by investigating the correlation between CEO changes and the stock performance *after* the change. We found that there is a gap in the research field as no such studies has been conducted and our objective is to fill this gap.

## Theoretical framework & Method

Previous research indicates that bad performance is positively correlated with a high CEO turnover.[4] One justification for this could be that there is a belief that changing CEO is a remedy for poor performance. Such beliefs are based on the assumption that the CEO has a significant impact on organizational performance, but is this a valid assumption? Could the effect of one person be large enough to turn the whole organization around from a negative to a positive performance? Theories such as the Strategic Leadership Perspective[5] and the Strategic Choice perspective[6] suggest that this is true, while other theories such as the Population Ecology perspective[7] state the opposite. These theories will help us guide our choice of variables and interpret the results from the statistical analysis that follows.

Our method is of quantitative nature, but is complemented with qualitative interviews. By collecting data on CEO turnovers and stock performance of 341 companies listed on the Swedish stock market during the period between 1994 and 2009 together with a set of control variables, we have a profound database

[1] (Fristedt & Sundqvist, 2005-2009)
[2] (Sjölund, 2006)
[3] (Kaplan & Minton, 2008)
[4] (Kaplan & Minton, 2008)
[5] (Finkelstein & Hambrick, 1996)
[6] (Child, 1972)
[7] (Hannan & Freeman, 1977)

for statistical analyses. We perform various correlation and regression analyses to see how CEO changes affect company performance. With our theoretical perspectives along with interviews of industry experts we will try to interpret the results.

## Objective & Hypothesis

Our objective is to contribute to the research by analyzing if there is any effect on company performance after a change of CEO. The answer to this question will also indicate which of the two sets of theories, the Strategic Leadership and the Strategic Choice perspectives or the Population Ecology perspective, is right regarding whether or not a CEO can affect company performance. Our theoretical model mostly takes inspiration from the former meaning that we believe that changing CEO will affect company performance.

**($H_1$):** CEO changes have a significant effect on company performance.

**($H_0$):** CEO changes do not have a significant effect on company performance.

## Limitations

We have limited our study to the Swedish market, partly for practical reasons but also because there hasn't been much research done on this topic with Swedish companies. We have also limited our time frame to the years between 1994 and 2009. We believe 15 years is a sufficiently long time period to enable a valid analysis. During these years most companies have made a couple of CEO changes and there has been both economical up- and downturns. We do not examine the reason for changing the CEO. Our purpose is to study the effect on company performance when the CEO is changed, and so we do not take into account whether the previous CEO has retired, been fired, or if other circumstances prompted the change. It should however be noted that our control variables should help control for some outside effects such as overall stock performance.

## Research contribution

With this thesis we try to contribute to academia by exploring the relationship between CEO turnover and company performance in a different way than previous research. Therefore we focus on how company performance is affected *after* a change of CEO and we analyze only Swedish companies. We also want to see if our results could indicate which of the theories is right about whether or not a CEO has an effect on company performance.

In favor of the Strategic Leadership and the Strategic Choice perspectives our statistical analyses show that CEO changes do indeed have a significant effect on company performance. We also find that the effect of a change of CEO is negative and significant at the 1 % level in the 0-1 year time span for all our models. The coefficients still point the same way for the longer time periods albeit with less significance which indicates that CEO turnover mainly has a negative effect on stock performance in the short run. Possible

explanations for the negative effect are; that it takes longer time than three years for a new CEO to have a positive effect, that restructuring costs the first years when a new CEO enters a company pressures the results, and that a new CEO often "cleans the company" by bringing to light all bad investments.[8]

## Outline

In the following chapter we present relevant previous research together with our theoretical framework. This is followed with a chapter where our chosen method is described as well as which variables we use in the analysis and why they are considered to be relevant. We then discuss our statistical analyses and present our results. The paper is finished with a discussion of our findings and followed by a summary and suggestions for further research.

[8] (Interviews, 2010)

# Theoretical framework

We base our analysis on a theoretical framework in order to understand if and to what extent the CEO can affect company performance. This theoretical framework consists of existing theories on what affects company performance, substantiated and illustrated with what our interviewees believes and what previous research has found.

# Previous research

CEO turnover and its relationship with company performance is not a novel subject of research interest. Although most studies have been conducted in the US, their findings are interesting and relevant for our study as they provide insights into how CEO turnover and company performance might be related as well as suggesting relevant variables to use, different methods of analysis, reasons for changing CEO, and when the CEO turnover should be considered high. Some of the most relevant articles are summarized below and their findings are used as a means to explain the results from our statistical analyses.

## How has CEO turnover changed?

Kaplan and Minton's study on how CEO turnover has changed and how it is correlated with stock performance was based on CEO turnover and stock performance of all Fortune 500 firms in the US. Their findings indicate that high CEO turnover has increased and is correlated with poor stock performance.[9] They further divide stock performance into three components:

- Stock performance relative to the firm's industry
- Stock performance relative to the stock market
- Performance of overall stock market

Kaplan and Minton found that CEO turnover is increasing on an overall basis, but also that CEO turnover is negatively correlated to bad stock performance in *all three* components. The conclusion they made from these findings is that the board is changing CEO more often when the firm's stock is performing poorly without regard to how the industry or overall stock market is performing.

## CEO and director turnover in failing firms: an illusion of change?

In this article Daily and Dalton examined how CEO and director turnover are accompanied by changes in board composition and leadership structure.[10] They had several hypotheses of which one is of interest for our thesis:

Hypothesis 1: CEO turnover in the 5-year period immediately prior to bankruptcy will be greater than for the control group of non-bankrupt firms for the same period.

[9] (Kaplan & Minton, 2008)
[10] (Daily & Dalton, 1995)

They chose filing for bankruptcy as a measure since it is less subject to criticism and it is a certain indicator of poor performance. They argue that most management would prefer to resolve financial problems through other means than bankruptcy if they were able to do so. They used two samples with a matched group of control firms for each. The first sample was comprised of 57 companies filing for bankruptcy during 1973 and 1982 and a matched group of control firms that did not file for bankruptcy during the same period. The second sample was comprised of 50 firms which filed for bankruptcy during 1990 together with a control group of 50 companies that did not file for bankruptcy during 1990.

Their hypothesis was supported by their results which showed that in sample one, CEO turnover was significantly ($p<0.001$) higher for the firms filing for bankruptcy (70.17%) than for the control group of firms that did not file for bankruptcy (33.3%) and the results were the same for sample two, although with a lower significance value ($p<0.05$) where 42.0% of the bankruptcy firms changed CEO and only 22.0% in the control group did. The authors discuss whether it might be a part of many financially distressed companies' turnaround strategies to remove persons in the top management.

### Stock prices and top management changes

This study investigates the association between a firm's stock returns and top management changes. They define top management change as when either the CEO or the chairman of the board is replaced. Their hypothesis is that there is an inverse relationship between the probability of top management changes and stock price performance. They also study stock price reaction to announcement of management change. [11]

Warner, Watts, and Wruck used a random sample of 269 firms listed on New York and American Stock Exchanges in 1962. They recorded every top management change from 1963-1978. They also investigated the reason for change and found that retirement was the most common reason but argued that it might be forced departures in reality. The second most common reason was other position in firm. They used logit regression to estimate the relation between the probability of top management change and various measures of stock performance (stock return, lagged stock return, market return and lagged market return).

Their analysis confirmed their hypothesis, i.e. there was an inverse relation between the probability of top management changes and stock price performance. They also found that share performance relative to market performance is a better predictor of management changes than the firm's stock return. This suggests that management is not held accountable for some factors outside its control, which is the opposite of what Kaplan and Minton found in 2008. They also found that any response to stock performance is immediate and lagged share performance of up to two years helped predict current-calendar-year management changes. They also noted that the stock performance had to be relatively extreme to have a predictive ability. Regarding stock price reaction to announcement of management change, they found that it was very small and the average effect was zero.

[11] (Warner, Watts, & Wruck, 1988)

### Corporate performance and CEO turnover: The role of performance expectations

This study was done to explain inconsistencies in previous research about CEO turnover and stock performance. The authors believe these inconsistencies are due to insufficient attention to the types of performance indicators used by the individuals responsible for making CEO turnover decisions, namely the board of directors. [12]

They argue that boards develop expectations on the company performance and they use these expectations when they evaluate the CEO. To test this, the authors use financial analysts' forecasts of company performance as a surrogate for board expectations because much of the information analysts work with comes from executive officers of the firm who are members of the board. They used a sample of 480 large publicly owned companies traded at the New York and American Stock Exchange.

In the first test they excluded companies in which the departing CEOs were under 63 years old and thus had below retirement age. Their principal finding in this test was that CEO turnover occurs when reported annual earnings per share fall short of expectations, but they also found a systematic relationship between high CEO turnover, the length of CEO tenure, and a declining market share.

In the second test they analyzed companies with CEOs over 63 years old and thus had reached retirement age. What they now found was that turnover of CEOs in retirement age tended to be associated with positive corporate performance rather than negative. The authors argue that this might be because the CEO has some influence on when to retire and that he or she will retire after good stock performance years since that will maximize his or her retirement benefits. This would also mean that turnover due to retirement may be affected by the interest of the CEO rather than merely the interest of the board of directors.

## Existing theories

Of the existing theories we have chosen to combine the Strategic Leadership and the Strategic Choice perspectives with the Population Ecology perspective. This is because they offer contradictory views in regards to whether CEOs exhibit a large effect on company performance or not. With two such differential point of views, we try to create a research model to test our research question and allow us to suggest that one of these theories are predominantly salient as regards to the performance implications of CEO changes.

### Strategic Leadership & Strategic Choice Perspectives

Within existing theories there are two which argue in favor of the CEO having a large effect on company performance. These are the Strategic Leadership perspective and the Strategic Choice perspective, both of which emerged from contingency theory. The Strategic Leadership perspective is more psychological and less situationally deterministic compared to pure contingency theory. This perspective holds that the

[12] (Puffer & Weintrop, 1991)

company is a reflection of the management and their perceptions because the Strategic Choices they make will to a large extent consist of the cognitive perceptions they have as individuals. The decision maker brings a cognitive base and values to decisions, which create a screen between the situation and his or her final perception. According to this perspective, changing CEO should have an impact on firm performance since a new CEO will have new cognitive perceptions and make different decisions. Thus the firm will change to be to some extent as a reflection of the new CEO and his or her new cognitive perceptions.[13]

The Strategic Choice perspective states that the top management can determine the structure of the organization by selecting from a range of possible structural configurations to fit with the business environment. Since the top management can affect the company's fit with the business environment they can enhance or deteriorate performance. The conclusion is that these two perspectives argue that the top management has an important and influencing role in organizational performance, and that change in the top management, in which the CEO plays the most important role, should affect company performance.[14]

According to these perspectives the CEO has the power to change the internal factors of a company. Since different CEOs can vary in their strategic decisions and are willing to pursue different strategic paths, changing CEO should have an impact on company performance. An example could be that a new CEO, due to his or her cognitive perceptions, might be more willing compared to the old CEO to make the strategic decision to enter or exit a specific market, or making the company focus on a particular product. Since such decisions can have a significant effect on company performance, a change of CEO can have a large impact.

### Population Ecology Perspective

The Population Ecology perspective[15] argues that CEOs cannot affect company performance in a significant way. This perspective was proposed as an alternative to the dominant adaptation perspectives like contingency theory. It claims that there are a number of limitations on an organization's ability to adapt to the environment, and that there are a number of processes that generate structural inertia. Inertial pressure arises from both internal structural arrangements and environmental constraints. Examples of constraints from internal structure arrangements include:

- Investments in fixed assets such as factories, equipment and specialized personnel that cannot easily be transferred to other functions or tasks.
- Informational constraints as top managers cannot have all the information concerning all activities in the organization and the environment.

[13] (Finkelstein & Hambrick, 1996)
[14] (Child, 1972)
[15] (Hannan & Freeman, 1977)

- Internal political constraints as reorganizations alter the structure and disturb the political status quo. Negative political responses to adaption tend to generate short-run costs that are high enough to make organizational leaders forego the planned reorganization.
- Constraints generated by the organization's history such as standards of procedure, allocation of tasks, and authority have become subject to normative agreement, changes are difficult to implement and the cost of change has increased.

Examples of external pressures toward inertia include:

- Numerous legal and fiscal barriers to entry and exit from markets limit the breadth of adaptation possibilities.
- Information constraints since acquisition of information about relevant environments are costly particularly in situations when the environment is turbulent and the information is most valuable.
- To the extent adaption violates the foundations on which organizational legitimacy is built it will constrain adaption since it would be very costly to rebuild the legitimacy.
- Rationality can also be a constraint. It is not necessarily so that a strategy that is rational for a single decision maker will be rational if adopted by a large number of decision makers. This means that if one can find the optimal strategy in a competitive market, it does not necessarily follow that there is a general equilibrium once all players start trading.

It is claimed that organizations in the business environment functions as individuals in the nature. Only the strongest survives and your strength is decided by your characteristics at birth. This means that only the organizations which at birth have the right characteristics to meet the requirements of the environment will survive. Since adaption is not a viable process due to inertia pressure, managers have no possibility to affect performance within this perspective.

## Interviewees perspectives

In addition to the predictions offered by our two competing theoretical perspectives, we also decided to strengthen and nuance these by outlining some non-theoretical but empirically grounded views from industry experts in regards to the performance implications of CEO changes.

There is some skepticism about how one person, the CEO, can have such a large impact on an organization that changing CEO will affect its performance. Is it really possible that performance can be affected by changing one man or woman? As this is a valid question, changing CEO does often not only mean changing only one person. As mentioned by one of our interviewees a CEO change is often followed by other changes in the management team. The new CEO replaces part of the top management team which in turn replaces middle and lower management. The CEO's purpose is to get people in the management with whom he or she is comfortable working with, and to get a structure which he or she

believes is more efficient. As an example, one of the largest telecom operators in Sweden changed their CEO, and two years later more than half of all managers in the company had been replaced.[16]

One person we interviewed argued that the effect of changing CEO on company performance might be limited because organizational culture and established behavior are difficult for a CEO to change. Another perspective was that changing CEO can have a positive effect when the company enters a new phase, such as transitioning from being a national company to become a multinational company when a new CEO with experience from leading multinational companies might be needed.[17]

## Theoretical model

With the theories, interviews and the findings of earlier research we have found several arguments in favor and against that a change of CEO can affect company performance. The relationship between our dependent variable (CEO turnover) which is an internal factor, our selected control variables (OMXAFGX, real and nominal GDP, industry average, inflation and exchange rate SEK/USD) which are external factors, and our dependent variable (company performance) is shown in figure 1.

The Strategic Leadership perspective and the Strategic Choice perspective argue that the CEO has an effect on company performance and that changing CEO should thus have an impact as well. Another argument in favor of the effect of changing CEO is the fact that new CEOs often change other people in the management, and therefore changing CEO does not only mean changing one person. These arguments do not neglect the effect of the external factors described by our control variables, and therefore both the independent variable CEO turnover and the control variables should have an effect on company performance.

On the other side there is the Population Ecology perspective which argues that company performance is not affected by changing the CEO, since organizational inertia disables the organizations possibility to change to conform to the environment.

[16] (Interviews, 2010)
[17] (Interviews, 2010)

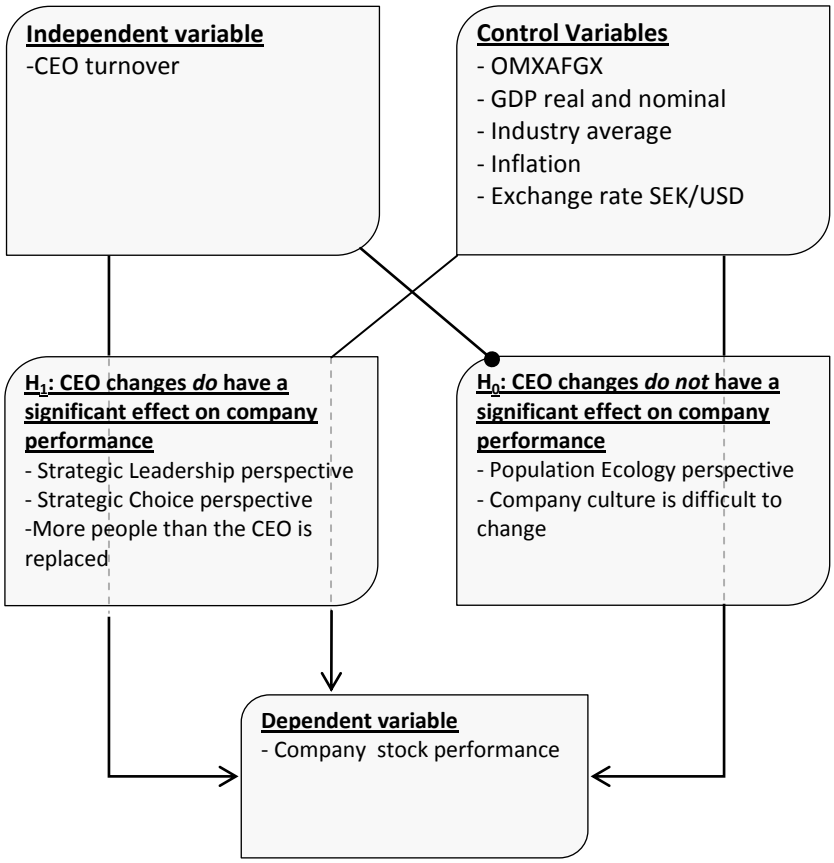



**Figure 1: The theoretical model showing our hypothesis and how variables are related**

## Hypothesis development

It is the CEO who is responsible for the operations of the company, and it is the CEO who makes most strategic decisions, even if approval from the board is sometimes needed. Such strategic decisions could include entering a new market, launching a new product, or reorganizing the company's structure. It seems logical that such decisions should have an impact on company performance. The fact that a change of CEO often leads to many other managerial changes within a company further supports the argument that CEO turnover has an impact on company performance. Also, as we found during our interviews, board members spend a large amount of time and effort when selecting the CEO, and they argue that hiring and firing the CEO is the most important task for the board. Why would that be, if the CEO cannot affect company performance? Therefore we feel that the theories that better describe CEO turnover are the Strategic Leadership and the Strategic Choice as opposed to the Population Ecology perspective. This leads us to the following hypothesis:

**($H_1$):** CEO changes do have a significant effect on company performance.

**($H_0$):** CEO changes do not have a significant effect on company performance.

According to the Strategic Leadership perspective the company will change to be a reflection of the new CEO's cognitive base, and whether or not this will be positive or negative for the company will thus depend on which individual is selected as the CEO. Therefore we do not formulate any hypothesis regarding if CEO changes have positive or negative effect.

# Method

## Data sample

This study uses publicly available information on CEO turnover and stock prices to explore the idea that changing the CEO will in some way affect company performance. The approach is mainly quantitative in nature but is complemented with interviews. We created a database of 341 companies listed on the Swedish stock exchange between 1994 and 2009. For each company data was logged by year and by variable (stock market performance, CEO turnover, the Swedish stock market index OMXAFGX, GDP development, industry averages, inflation and the exchange rate SEK/USD) to form panel data.

## Company selection

When creating the database we decided to try to include as many relevant companies as possible of those listed on the Swedish stock exchange between 1994 and 2009. One thing to note about this is that since the time span covers such a significant amount of time, many companies changed structure during the time period studied; some became unlisted and thus information access was reduced, new companies arrived and so forth. In order to make it a reasonable study we set a few limitations when creating the database:

- Companies needed to be listed for at least 3 years on the Swedish stock exchange since anything less would make any data analysis insignificant. As a consequence companies that disappeared before 1997 and companies that were listed after 2006 are not a part of this study.
- Very small companies with a stock market value of <50 MSEK were not included in the study
- Only companies listed on "A-listan", "O-listan", and "OTC-listan" later rename to Small, Mid, and Large Cap were included in the study.[18]
- In the few cases that there was not any available financial data for a company, it was excluded from the study. This was because the lack of such data rendered comparison impossible.

## Database variables

We have entered numerous variables into our database to use in our analysis. While we think this can be expanded upon in future work, we believe they provide a good sample of the most important variables. The variables selected were:

- **CEO turnover** measured on a yearly basis with 0 indicating no change and 1 indicating a change in CEO.[19]

[18] This was to make the number of companies manageable
[19] (Sundin & Sven-Ivan, 1994-2004) (Fristedt & Sundqvist, 2005-2009)

- **Company performance** measured in terms of the stock price by taking the stock value each year and comparing this to last year's to gain a percentage increase or decrease. We then add the stock dividends to achieve total stock performance.[20]
- **Stock market performance** is measured by taking the yearly change in OMXAFGX[21]
- **GDP (real and nominal)** taken from Swedish Statistics Bureau[22]
- **Industry average** which is derived from our database by calculating the average stock performance of all companies by industry type which we created based on the division made by Dagens Industri[23] with a couple addendums where we separated *real-estate* from *finance* and *transport* from *others*. [24]
- **Yearly Inflation** from March each year. [25]
- **Exchange rate between the US dollar and Swedish crown,** measures as monthly average of March each year. [26]

## Dependent variables

### Company performance on the stock market

As a measure of organizational performance we will use stock prices derived from "The Stock market's Guide"[27] (Börsguide) where the stock price for every company on the Stockholm stock exchange is listed. The stock prices in "The Stock Market's Guide" are not logged exactly the same date every year but all stock prices are noted between the 11/3 and the 29/4 which means they are fairly representative when analyzing year-long changes.[28] In order to get total stock development dividends are added to each individual firm's stock development. We have also taken splits and reverse splits into account to get real stock development. However issuing of new shares, hiving-offs and redemptions of shares are not adjusted for since it would complicate the data collection to unrealistic proportions without adding much to the validity of the database. Those can be a source of error but as we take dividend and splits into account, we adjust for the most influential factors and achieve a sufficiently valid stock development over time.

Stock prices as a measure of performance could be subject to discussion about whether or not it is representative of company performance. It is however a common measure used for instance by Kaplan and Minton 2008 and Warner, Watts and Wruck 1987. Stock price as a measure of company performance also has several advantages. First of all it is an easily accessible data which means that the transparency of

[20] (Delphi Economics, 1994-2003) (Avanza, 2004-2006) (Placera Media, 2007-2009)
[21] (Affärsvärlden, 2010)
[22] (Statistiska Centralbyrån, 2010)
[23] The leading Swedish daily business newspaper
[24] A list of all industry types can be found in Appendix A.
[25] (Statistiska Centralbyrån (2), 2010)
[26] (Riksbanken, 2010)
[27] Börsguide (Delphi Economics, 1994-2003; Avanza, 2004-2006; Placera Media, 2007-2009)
[28] A detailed list of each year's stock price date can be found in Appendix B

our findings increases since they can be easily verified. Second, we believe that since we have grouped the companies into industries, stock market performance over such an extended period of time is an excellent measure of performance. Thirdly, the market has already adjusted for company risk, meaning that stock price changes are comparable between companies with different risk levels, which is especially important when comparing companies in different industries. Finally, it enabled us to include far more companies than an analysis based on, for instance, return on equity since such measures require more financial numbers which are less available from the mid 1990's. Other potential measures we chose between were accounted economic profit and return on equity/assets/capital employed/net assets but due to changing accounting standards and the practical difficulty of collecting the numbers required they were not possible to use, and they would not be more representative for company performance than stock prices. Also, such measures do not take company risk into consideration.

To enable us to analyze the effect on company performance in different time perspectives, we made three different dependent variables out of the company stock performance measure. We measured company performance over the three time periods, 0-1 years, 0-2 years and 0-3 years and created one dependent variable for each time period.

## Independent variable

The purpose of our thesis is to see if there is any effect on company performance when the company changes CEO. Therefore CEO turnover is our independent variable in our statistical analysis. What we will analyze is if this variable will be able to explain the changes in stock performance in a significant way. CEO turnover is an internal factor and according to the Population Ecology perspective it cannot affect company performance, in contrast to the Strategic Leadership perspective and the Strategic Choice perspective which argues that it can.

### CEO turnover

CEO changes are taken from "Owners and the Power" (Ägarna och Makten) where each calendar-year's CEO changes on the Stockholm exchange market are published.[29] In 2004 the book was rearranged and ceased to include CEO turnover. Instead we switched to the book "Boards and Auditors"[30] published by the same company which included all CEO changes between the first of January in 2004 and the last of May in 2005. The following years (2005-2008) they included CEO changes from the first of June till the last of May. Since the date of the CEO changes was not published, we could not properly assign the CEO changes to each calendar year so we chose to not take into consideration that some of the CEO changes published in the book of 2004 might actually have happened in January to May in 2005. This could present a source of error in our studies but since it spans such a large amount of time and since it really only affects one year we believe the impact is minor. The effect of a CEO change is assumed not to be immediate, and as we try to analyze the effect of a CEO change on the company stock performance we

[29] (Sundin & Sven-Ivan, 1994-2004)
[30] "Styrelser och Revisorer"

will look at stock performance in the longer run. It should therefore be of minor importance that some of the CEO changes are skewed in time by a couple of months.

## Control variables

To make sure that any correlation found between CEO turnover and stock performance is not already explained by some other endogenous variable, we decided to include a number of control variables in our analyses. If CEO turnover has a significant impact on stock performance after controlling for these variables we can say that CEO turnover by itself can help explain stock performance. When we selected the control variables we chose external variables since according to the Population Ecology perspective affect company performance in contrast to the internal variable CEO turnover. These variables are also commonly used in statistical analyses found in various previous studies.[31]

### Stock market performance

To see if company stock performance is more dependent on the stock market performance as a whole than on CEO turnover we include a broad index of the Swedish stock market called OMXAFGX. OMXAFGX as a measure of general stock market development is considered as a valid measure since it is a broad index measuring the average stock development at the Stockholm exchange market. The index is market value weighted which means that the company with the highest market value has the largest impact on the index, which is necessary if the index is to provide an average development indication. The index is also adding back dividends to the stock prices to get the actual performance of the stock market[32].

### GDP

Sweden's GDP is chosen as a measure since it indicates the performance of the Swedish economy as a whole, and Swedish companies are assumed to be at least to some extent affected by the development of the economy. We use both real and nominal GDP so that any effect of the difference between them is not missed.

### Industry average stock performance

The industry averages will be calculated on the companies in our database. Since a very large share of all companies at the stock market is included in our database, industry averages derived from our database should be valid as an industry average measure. This control variable is of large importance since stock performance in relation to other companies in the same industry is a very good measure of success. Companies in the same industry face pretty much the same conditions and are affected by the same external factors. Therefore it is assumed that industry average is a significant explanatory variable and important to include when analyzing stock performance.

[31] (Steven & Banning, 2009) (Ben Naceur & Ghazouani, 2004) (Maskay, 2007) (Hatemi–J & Irandoust, 2002) (Zaring & Eriksson, 2009 vol 18)
[32] (Affärsvärlden (2), 2010)

### Inflation

We use the Swedish inflation as a control variable since it affects the purchasing power of both individuals and companies, which in turn can affect company performance. The effect of the inflation is therefore considered to be relevant enough to be included as a control variable in the analysis.

### Swedish crown measured against the dollar

Our final control variable is the exchange rate for the Swedish crown and the US dollar. Many Swedish companies are export driven and a large part of the international trade for Swedish companies is made with US dollars. This exchange rate affects these companies' performance as an expensive dollar increase the revenues for those Swedish companies charging dollars for their goods, and a cheaper dollar will reduce the revenues. Swedish companies dependent on importing goods and services will also be affected in the opposite way as the exchange rate will affect their costs. For the reasons stated above, this control variable may have a significant effect on company stock performance, and consequently it is included in the analysis. We decided to limit ourselves to one exchange rate and settled on the dollar since it has been relatively stable and has existed throughout the whole time period as opposed to the euro.

### Time periods when comparing variables

We test the effects of CEO turnover over a period of one, two, and three years after the change. As we have not logged the exact date of the CEO changes, and the stock prices are from around the end of March each year, the tests will not be on a precisely year-long basis. Due to the layout of our data the test periods will instead be three to fifteen months each year. For example, when analyzing the effect of the CEO changes in 1994, which could have happened from the 1st of January till the 31st of December, we use the stock price from the end of March in 1995. Thus, the shortest possible period, if the CEO change happened in the end of December in 1994, is three months. The longest possible period, if the CEO change happened in the beginning of January in 1994, is fifteen months. This effect is consistent with a 12 month lag when we test the effect after two years (15 to 27 months) and consequently the three-year lagged test will be on the effect after 27 to 39 months.

In 2004 the book "Owners and Power" (Ägarna och Makten) was changed and we switched to "Boards and Auditors" (Styrelser och Revisorer) to log CEO turnover. Due to the new books layout the time period got slightly skewed by a period of 5 months. CEO changes in 2004 will be compared to the stock price in March 2005 which gives an average time period of -2 to 15 months. The -2 months is because the CEO changes in April and May in 2005 will be compared to the stock price in the end of March in 2005, two months before the latest possible CEO change. In the same way the tests on CEO changes in 2005, 2006, 2007 and 2008 differ as they will be compared to the stock price after -2 to 10 months. This could have an impact on our results which means we should include more robust tests of our data in addition to the pooled simple linear regression (OLS).

Another potential source of error can be when we use GDP in our multiple regression analysis. This measure is over calendar-year periods but the change in stock price will be from end of March each year. However, GDP is generally considered to have a lagged effect on stock market performance meaning that this should not present a big problem for our analyses. Changes in OMXAFGX, industry averages, inflation and the exchange rate SEK to USD are calculated over the same periods as the stock prices and there will therefore be no time-period inaccuracies for those variables.

## Interviews

To analyze our findings and to create a basis for our theoretical model we interviewed people with different experiences on CEO turnover including; present and former CEOs for listed Swedish companies, board members in listed Swedish companies, and other experts in the field. The interviews were mostly conducted in person and in one case over the phone. We had some standard questions about CEO turnover and its effect on company performance but also tried to promote an unbiased discussion to enable more personal opinions. By the interviewees request[33] we will not cite which individual said what in the text, but refer to them collectively as "Interviews" and present a list of the interviewed persons in the references section.

## Generalization

Our choice to only analyze Swedish companies does have an impact on the ability to generalize our findings since the Swedish structure of corporate governance differs from many other countries'. Corporate governance impacts a CEO's power, which in turn affects how much of an effect a change of CEO could have. Considerable care should therefore be taken when generalizing our findings to countries with a dissimilar structure of corporate governance. An example could be done with the differences between the structure of corporate governance in the US and Sweden. In the US the CEO is allowed to also be the Chairman of the board which is a position of considerable power. There are also often a multitude of small owners with no significant control in the company, as compared to the owners of Swedish companies who generally wield considerable power. This means that in general the power of a CEO is larger in the US than in Sweden, and the effects of changing the CEO in such countries could therefore be different.[34]

[33] CEO turnover can be a very sensitive topic and opinions can easily be taken out of context.
[34] (Interviews, 2010)

## Statistical analyses

Our database was created as a matrix where each column was a separate company and each row was a separate variable and year. In order to analyze this data while taking into account the time span we used Stata for our analysis. We shaped all our panel data into long variables to run our analysis. We let the variables Company Name and Year take the place of our i, j variables, and also created a separate variable Company Code where each company name in string formats converted into a number so as to be able to perform Fixed Effect Regression analyses. In the beginning we experimented a bit with lagged effects on stock performance but in the end we decided that it was more relevant to look at a longer period from each CEO change as opposed to looking at lagged one year effects.[35]

## Variable Analysis

As some companies have had extreme up- and downturns during the time period we studied, the analyses could be negatively affected since such extreme outliers might distort the data. We therefore performed a variable analysis on our dependent variable stock performance to see if it deviated from the normal distributional assumptions. This analysis showed significant levels of both skewness and kurtosis which got worse as the time period increased (i.e. more for 0-3 years than 0-1 year). This is fairly common when using such a large database and should be expected. Nonetheless we decided that creating a new set of variables controlling for this was appropriate. These variables could then be used to perform the same analyses as on the original variables to see if there was a significant difference. To create these variables we excluded all extreme outliers by dropping the top 5% and the bottom 5% creating our new adjusted variables.[36] We then performed a further analysis of these newly created variables and found that both the kurtosis and the skewness had been reduced to a very good level.

## Correlation analyses

As with any scientific effort we started off with a bit of experimentation with our different variables to look for patterns in the data. The first step in our analysis was to look for correlations between stock performance and our independent variables. Since we are interested in both positive and negative effects on stock performance we decided to perform a two-tailed correlation analysis. While this analysis in itself is not enough to establish whether or not CEO turnover is significant it proved a helpful start in our analysis indicating that we were on to something and that we should dig a little deeper. In fact we managed to find significant correlations for all our control variables in relation to our dependant variable for all years. It also showed that CEO turnover (ceoto), inflation (inflation) and the USD exchange rate had a negative correlation while the other variables Industry average (indav), real (chgdpr) and nominal (chgdnom) GDP and OMXAFGX (changeafgx) had a positive correlation. With this information we were

[35] 0-1 years, 0-2 years, and 0-3 years instead of 0-1 years, 1-2 years and 2-3 years
[36] In the rest of the paper we will refer to these variables as our adjusted variables

able to ascertain that our chosen control variables were relevant for further analysis and that CEO turnover and stock performance have a correlation worthy of further analysis.

## Regression analyses

When considering regression analysis to test our variables in a joint model, we quickly noticed that when we were performing multiple regression analyses including the variable industry average (indav), said variable took over completely[37] rendering all other control variables meaningless. While it did not have much effect on our independent variable we still felt that it was in our best interest to create two separate base models; one including all control variables and one where industry average was omitted.

### Linear Regression analysis

As a first test of our theoretical model we decided to start with simple pooled linear regression (OLS). While this may not be the strongest possible test we felt it was a good starting point for our regression analyses since it is a well-known and much used method. We performed the analyses by time frame and made separate analyses with our base and full models to see significant changes. We also performed additional analyses for the adjusted variables to control for possible divergence from the normal distribution assumption.

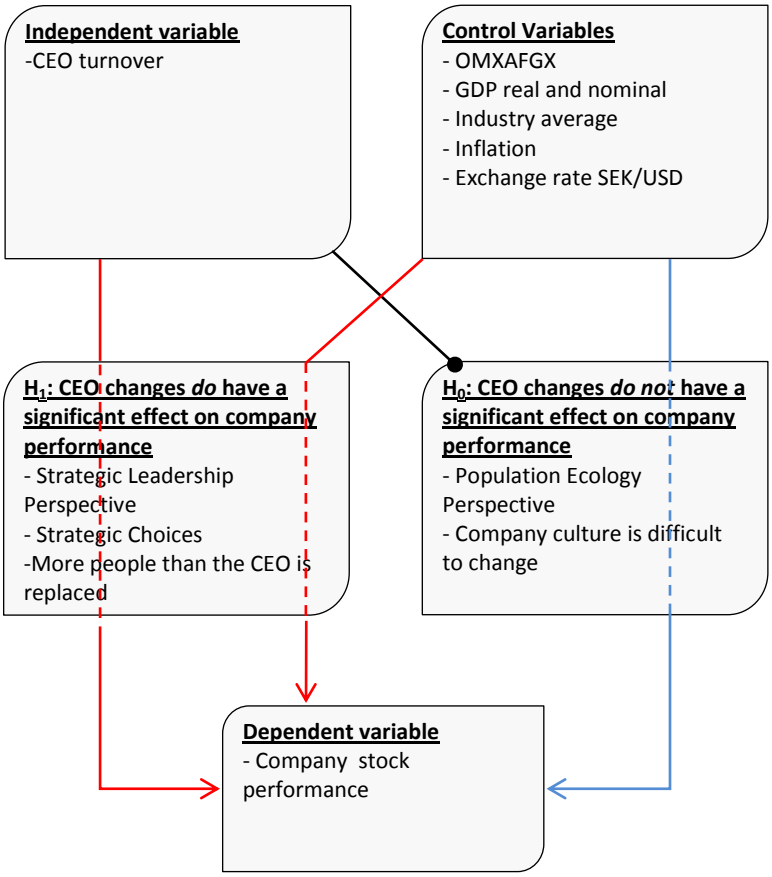



**Figure 2: Our theoretical model where the blue line represents our base model where the independent variable CEO turnover is excluded and the red line represents our full model where both the independent variable CEO turnover and the control variables are included.**

### Likelihood-ratio test

Though it was interesting to see that CEO turnover had a statistically significant impact on stock performance in our analyses we also wanted to find out if an inclusion of CEO turnover in our full model provided a significantly better fit. In order to do so we did a likelihood-ratio test for each of our analyses, where we nested our stored results within the base model to find out if it was a significant improvement by considering the CHI-2 value. This is because prior to this step we might know that there are

[37] This happened less with our adjusted variables

correlations between the variables, but unless we test whether they actually improve the model that we are proposing, the results might not be meaningfully large.

### Fixed and Random Effects models

While we were fairly satisfied with our results from the linear regression analysis we decided that a more robust analysis should be done in order to reduce the risk of false positives or false effects. This felt especially important since our t-values for CEO turnover, while sufficient, were not overly assertive. In addition to the simple pooled linear regression (OLS) analysis, we therefore decided to take advantage of the panel structure of our data to conduct panel data analyses. These analyses are either specified as models with random or fixed effects where the latter essentially includes separate intercepts for each individual firm.[38] This is important if we suspect that some unobserved effects might be correlated with both our explanatory variables (independent and control) and the dependent variable (stock performance). An additional advantage of both the random and fixed effects models is that they measure performance within and between companies taking into account that certain firms might gain an undue weight in the model due to their extreme numbers, meaning that they more accurately portrays the situation in a balanced light.

In general the random effects model is appropriate over fixed effects if the assumptions of uncorrelated unobservable errors are satisfied. To investigate this we first estimated our model with random effects, then with fixed effects, and then ran a Hausman specification test. If the test rejects the null hypothesis of uncorrelated (i.e. is significant), then random effects is biased and fixed effects is the correct estimation procedure.

[38] (Wooldridge, 2003)

# Results

## Variable analysis

| Variable detail for 0-1 Year performance | | | | | Variable detail for 0-2 Year performance | | | | | Variable detail for 0-3 Year performance | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Percentiles | Smallest | | | | Percentiles | Smallest | | | | Percentiles | Smallest | | |
| 1% | -0.881 | -1.000 | | | 1% | -0.948 | -1.000 | | | 1% | -0.977 | -0.999 | | |
| 5% | -0.700 | -1.000 | | | 5% | -0.815 | -0.997 | | | 5% | -0.849 | -0.998 | | |
| 10% | -0.558 | -0.969 | Obs | 2882 | 10% | -0.669 | -0.994 | Obs | 2552 | 10% | -0.693 | -0.997 | Obs | 2223 |
| 25% | -0.272 | -0.953 | Sum of Wgt. | 2882 | 25% | -0.331 | -0.992 | Sum of Wgt. | 2552 | 25% | -0.320 | -0.996 | Sum of Wgt. | 2223 |
| 50% | 0.029 | | Mean | 0.1484 | 50% | 0.102 | | Mean | 0.3213 | 50% | 0.180 | | Mean | 0.5904 |
| | | Largest | Std. Dev. | 0.8154 | | | Largest | Std. Dev. | 1.1764 | | | Largest | Std. Dev. | 1.9337 |
| 75% | 0.385 | 8.115 | | | 75% | 0.652 | 11.333 | | | 75% | 0.881 | 18.403 | | |
| 90% | 0.816 | 10.551 | Variance | 0.6648 | 90% | 1.397 | 11.692 | Variance | 1.3840 | 90% | 2.075 | 18.848 | Variance | 3.7391 |
| 95% | 1.254 | 12.205 | Skewness | 5.5295 | 95% | 2.024 | 16.656 | Skewness | 5.3600 | 95% | 3.308 | 28.265 | Skewness | 8.1968 |
| 99% | 3.032 | 14.000 | Kurtosis | 67.2201 | 99% | 4.256 | 20.617 | Kurtosis | 64.1583 | 99% | 8.062 | 42.371 | Kurtosis | 131.9041 |

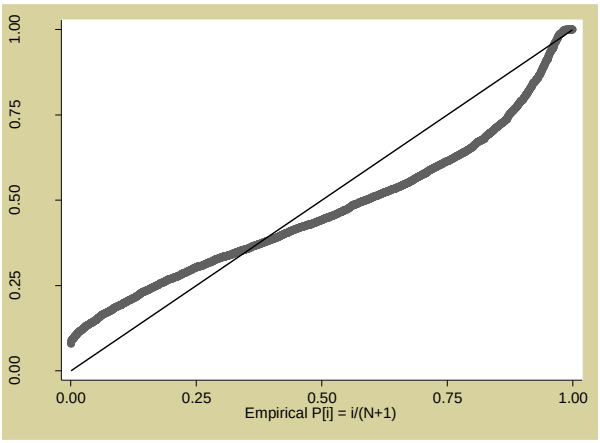
**Table 1: Variable analyses for the dependent variable stock performance.**

The first variable analyses included all observations of the dependent variables stock performance over all three time periods. The skewness and kurtosis for the first period was 5.53 and 67.22 respectively which represents a significant deviation from the normality assumption. The second period took on similar values while the third period tended to the even more extreme. Part of this can be accounted to the extreme values for largest positive stock performance.[39] As mentioned previously this is a common occurrence when using such a large dataset and doesn't by itself hurt the analysis. It could however be one error source which is why it is important to control for it. Our adjusted variables on the other hand conformed much better to the normality assumption with time periods one and two falling well within the +/- 1 range and time period three falling just outside it.[40] This gave us two separate sets of variables to perform analyses on, one which conformed well to the normality assumption and one that did not.

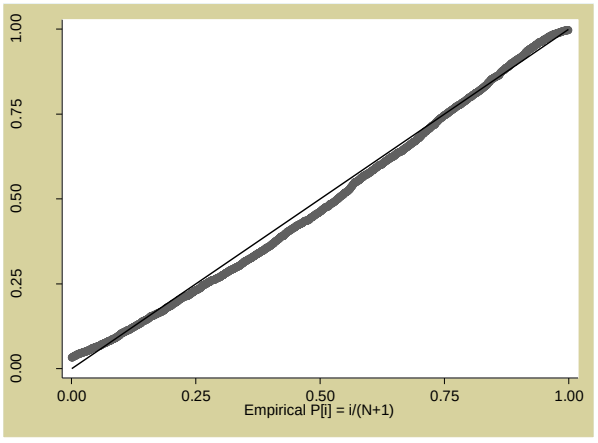
| Adjusted Variable detail for 0-1 Year performance | | | | | Adjusted Variable detail for 0-2 Year performance | | | | | Adjusted Variable detail for 0-3 Year performance | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Percentiles | Smallest | | | | Percentiles | Smallest | | | | Percentiles | Smallest | | |
| 1% | -0.669 | -0.700 | | | 1% | -0.793 | -0.815 | | | 1% | -0.821 | -0.846 | | |
| 5% | -0.568 | -0.700 | | | 5% | -0.688 | -0.814 | | | 5% | -0.713 | -0.843 | | |
| 10% | -0.458 | -0.700 | Obs | 2594 | 10% | -0.558 | -0.813 | Obs | 2297 | 10% | -0.582 | -0.842 | Obs | 2000 |
| 25% | -0.240 | -0.700 | Sum of Wgt. | 2594 | 25% | -0.288 | -0.813 | Sum of Wgt. | 2297 | 25% | -0.274 | -0.842 | Sum of Wgt. | 2000 |
| 50% | 0.029 | | Mean | 0.0683 | 50% | 0.102 | | Mean | 0.1967 | 50% | 0.180 | | Mean | 0.3568 |
| | | Largest | Std. Dev. | 0.4186 | | | Largest | Std. Dev. | 0.6333 | | | Largest | Std. Dev. | 0.8598 |
| 75% | 0.346 | 1.246 | | | 75% | 0.574 | 1.987 | | | 75% | 0.774 | 3.279 | | |
| 90% | 0.638 | 1.246 | Variance | 0.1753 | 90% | 1.103 | 1.988 | Variance | 0.4010 | 90% | 1.559 | 3.288 | Variance | 0.7393 |
| 95% | 0.845 | 1.249 | Skewness | 0.4308 | 95% | 1.429 | 2.007 | Skewness | 0.6480 | 95% | 2.175 | 3.300 | Skewness | 1.0852 |
| 99% | 1.135 | 1.252 | Kurtosis | 2.7192 | 99% | 1.860 | 2.016 | Kurtosis | 2.8678 | 99% | 3.024 | 3.308 | Kurtosis | 3.9606 |

**Table 2: Variable analysis for the adjusted (without top and bottom %) dependent variable stock performance**

[39] The largest stock increases for the time periods were: 14.00 = Telelogic 2000 during the IT bubble, 20.62 = Betsson 2004-2006 when their gambling sites took off, 42,37 = Enea Data highpoint in 2000 during the IT bubble.
[40] For a perfectly normal distribution skewness = 0 and kurtosis = 3.0




**Graph 1: Normality fit for the unadjusted dependent variable.**




**Graph 2: Normality fit for the adjusted dependent variable.**

## Hausman test

When comparing our random effects model to our fixed effects model we were able to reject the null hypothesis that the difference in coefficients is not systematic. This means that the fixed effects model is the better estimator for all our regression analyses (with the possible exception of 0-3 year with industrial average where we can only reject the null hypothesis at the 10% level of significance[41]). While this does not render the results from the other analyses irrelevant it is important to note that it does limit their interpretation when the fixed effects model fails to show significance. Since this is the case we will focus more on the fixed effects model when presenting our results while the full range of analyses performed can be found in the appendices.

| Hausman tests | CHI-2 | P>CHI-2 |
|---|---|---|
| Original variables | | |
| 0-1 Year | 17.97 | 0.0063 |
| 0-1 Year w. IndAv | 22.14 | 0.0024 |
| 0-2 Year | 18.94 | 0.0043 |
| 0-2 Year w. IndAv | 42.52 | 0.0000 |
| 0-3 Year | 16.79 | 0.0101 |
| 0-3 Year w. IndAv | 12.18 | 0.0947 |
| | | |
| Adjusted Variables | | |
| 0-1 Year | 14.70 | 0.0227 |
| 0-1 Year w. IndAv | 22.28 | 0.0023 |
| 0-2 Year | 64.74 | 0.0000 |
| 0-2 Year w. IndAv | 77.79 | 0.0000 |
| 0-3 Year | 33.76 | 0.0000 |
| 0-3 Year w. IndAv | 40.21 | 0.0000 |

**Table 3: Hausman test showing that the Fixed Effect model is the better estimator for our regression analyses.**

[41] This has little effect on our analysis since our model fails to show good levels of significance both for random and fixed effects in the 3 year time frame when including industry average.

## Correlation analysis

The first correlation analysis including all observations showed that our independent and control variables have a significant correlation with the dependent variable stock performance at the 5% level for the first two periods 0-1year and 0-2 years. In the third period, 0-3 years, all control variables still have a significant correlation while CEO turnover has lost its significant correlation at the 5% level only managing the 10%. The interesting finding of the CEO turnover is that its correlation with stock performance is negative for all three periods with a correlation of -0.0471, -0.0413 and -0.0400 respectively. The variables positively correlated with stock performance are industry average, real and nominal GDP and AFGX of which industry average is the most correlated variable with a positive correlation of 0.5966, 0.5196 and 0.4844 respectively for the three time periods. The variables with a negative correlation with stock performance, except from CEO turnover, are inflation and the exchange rate between USD and SEK.

| Two-tailed correlation matrix | | | | | Stock | CEO | Industry | Inflation | Real | Nom. | AFGX |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 Year Correlation | Mean | Std. Dev. | Min | Max | Performanc | Turnover | average | | GDP | GDP | Change |
| Stock Performance | 0.148 | 0.815 | -1.00 | 14.00 | | | | | | | |
| CEO Turnover | 0.182 | 0.402 | 0.00 | 2.00 | -0.047* | | | | | | |
| Industry average | 0.150 | 0.486 | -0.77 | 2.71 | 0.597* | -0.004 | | | | | |
| Inflation | 0.016 | 0.009 | 0.00 | 0.03 | -0.311* | -0.017 | -0.512* | | | | |
| Real GDP Change | 0.026 | 0.014 | 0.00 | 0.05 | 0.057* | -0.006 | 0.085* | -0.058* | | | |
| Nom. GDP Change | 0.029 | 0.014 | 0.00 | 0.05 | 0.108* | 0.013 | 0.172* | -0.150* | 0.917* | | |
| AFGX Change | 0.109 | 0.349 | -0.40 | 0.78 | 0.455* | -0.011 | 0.759* | -0.573* | 0.155* | 0.247* | |
| SEK to Dollar change | 0.014 | 0.148 | -0.18 | 0.41 | -0.060* | -0.036 | -0.103* | -0.172* | -0.426* | -0.374* | -0.084* |
| | | | | | Stock | CEO | Industry | Inflation | Real | Nom. | AFGX |
| 0-2 Year Correlation | Mean | Std. Dev. | Min | Max | Performanc | Turnover | average | | GDP | GDP | Change |
| Stock Performance | 0.321 | 1.176 | -1.00 | 20.62 | | | | | | | |
| CEO Turnover | 0.185 | 0.406 | 0.00 | 2.00 | -0.041* | | | | | | |
| Industry average | 0.343 | 0.642 | -0.93 | 4.29 | 0.520* | -0.026 | | | | | |
| Inflation | 0.031 | 0.014 | 0.01 | 0.06 | -0.333* | 0.001 | -0.638* | | | | |
| Real GDP Change | 0.054 | 0.020 | 0.02 | 0.09 | 0.126* | -0.035 | 0.249* | -0.236* | | | |
| Nom. GDP Change | 0.061 | 0.020 | 0.02 | 0.09 | 0.166* | -0.011 | 0.347* | -0.319* | 0.883* | | |
| AFGX Change | 0.247 | 0.483 | -0.50 | 0.90 | 0.373* | -0.033 | 0.713* | -0.745* | 0.415* | 0.491* | |
| SEK to Dollar change | 0.001 | 0.170 | -0.27 | 0.22 | -0.051* | -0.025 | -0.061* | -0.092* | -0.00 | 0.075* | 0.041* |
| | | | | | Stock | CEO | Industry | Inflation | Real | Nom. | AFGX |
| 0-3 Year Correlation | Mean | Std. Dev. | Min | Max | Performanc | Turnover | average | | GDP | GDP | Change |
| Stock Performance | 0.590 | 1.934 | -1.00 | 42.37 | | | | | | | |
| CEO Turnover | 0.182 | 0.402 | 0.00 | 2.00 | -0.04 | | | | | | |
| Industry average | 0.613 | 0.931 | -0.96 | 8.62 | 0.484* | -0.021 | | | | | |
| Inflation | 0.045 | 0.016 | 0.02 | 0.08 | -0.283* | 0.004 | -0.596* | | | | |
| Real GDP Change | 0.081 | 0.022 | 0.04 | 0.11 | 0.114* | -0.024 | 0.236* | -0.414* | | | |
| Nom. GDP Change | 0.093 | 0.021 | 0.05 | 0.13 | 0.1077* | -0.004 | 0.252* | -0.389* | 0.864* | | |
| AFGX Change | 0.440 | 0.673 | -0.63 | 1.45 | 0.3216* | -0.033 | 0.684* | -0.764* | 0.399* | 0.357* | |
| SEK to Dollar change | -0.003 | 0.183 | -0.34 | 0.26 | -0.0456* | -0.054* | -0.074* | -0.007 | 0.334* | 0.378* | 0.126* |

**Table 4: Two-tailed correlation analysis showing significant correlation for all our variables. (* p< 0.05)**

The second correlation analysis was done with our adjusted variables and showed that all our control variables still have a significant correlation with stock performance for all three time periods. CEO turnover however loses its significance at the 5% level, in fact only showing any significance in the 1 year time period at 10% indicating a weak correlation. All variables are still correlated with stock performance in the same way i.e. no negative correlations turned positive or vice versa.

## 1 year time period

The one year time period was the one showing the highest degree of significance for CEO turnover. With our original variable CEO turnover showed significance at the 0.5% or 1%, both with and without the control variable for industry average stock return. This should be considered a strong relationship. It should also be noted that R-squared is better for the model including industry average which makes sense since overall industry performance tends to have a lot of impact on individual stock performance. The LR-tests also showed that including CEO turnover in our full model created a considerably better model fit than a model with only the control variables included. A very interesting thing to note is that industry average is so strong in the analyses of our original variable that CEO turnover is the only other variable showing any significance whatsoever, indicating that what industry you operate in takes precedence over most other things but that CEO turnover still has an effect on individual company performance.

| 0-1 Year performance with industry average | | | |
|---|---|---|---|
| Variable | Base Model | Full model (OLS) | Fixed Effects |
| Industry average | 0.99****(0.04) | 0.99****(0.04) | 1.00****(0.04) |
| CEO Turnover | | -0.10***(0.03) | -0.08***(0.03) |
| Inflation | -0.49(1.80) | -0.70(1.80) | -0.31(1.83) |
| Real GDP Change | 0.48(2.23) | 0.10(2.23) | -0.24(2.33) |
| Nom. GDP Change | -0.08(2.33) | 0.27(2.32) | 0.89(2.43) |
| AFGX Change | 0.00(0.06) | -0.00(0.06) | -0.00(0.06) |
| SEK to Dollar change | 0.02(0.10) | 0.00(0.10) | 0.05(0.48) |
| | | | |
| R-squared Within | N/A | N/A | 0.3785 |
| R-squared Between | N/A | N/A | 0.2802 |
| R-squared Overall | 0.3559 | 0.3579 | 0.3579 |
| ΔLR | N/A | 8.90*** | 7.77*** |
| Observations | 2882 | 2882 | 2882 |
| Firms | 341 | 341 | 341 |

| 0-1 Year performance | | | |
|---|---|---|---|
| Variable | Base Model | Full model (OLS) | Fixed Effects |
| CEO Turnover | | -0.10***(0.03) | -0.10***(0.04) |
| Inflation | -8.28****(1.96) | -8.49****(1.96) | -7.64****(2.01) |
| Real GDP Change | -4.17*(2.46) | -4.56*(2.46) | -3.98(2.58) |
| Nom. GDP Change | 2.47(2.57) | 2.84(2.57) | 2.62(2.70) |
| AFGX Change | 0.93****(0.05) | 0.93****(0.05) | 0.95****(0.05) |
| SEK to Dollar change | -0.32***(-3.03) | -0.34****(0.11) | -0.27**(0.11) |
| | | | |
| R-squared Within | N/A | N/A | 0.2329 |
| R-squared Between | N/A | N/A | 0.1372 |
| R-squared Overall | 0.2136 | 0.2158 | 0.2157 |
| ΔLR | N/A | 8.15*** | 8.47*** |
| Observations | 2882 | 2882 | 2882 |
| Firms | 341 | 341 | 341 |

**Table 5: Regression analyses with and without industry average for the time period 0-1 years.**

****** p<0.001, *** p<0.01, ** p<0.05, * p<0.10, Standard errors in parentheses.**

Moving on to analyze our data set trimmed from the highest 5% and lowest 5% outliers in stock performance, the results are slightly less promising. OLS still shows a very high degree of significance rejecting the null hypothesis of CEO turnover having no effect at very low levels of significance as well as having very strong LR-tests. The random effects model also shows significance rejecting the null hypothesis at the 5% and 0.5% (with industrial average), levels. The fixed effects model on the other hand fails to show significance at any reasonable level. This could partly be due to the fact that fixed effects mainly measures effects within companies and that this becomes difficult when the outliers are removed since it reduces variance within companies. R-squared values meanwhile increases for our model without industrial average and decreases for models with industrial average. This essentially means that most of our control variables have an easier time explaining stock performance without the extreme outliers but that it becomes more difficult for industrial average since it is weighted by the extreme values.[42] Also worth noting is that in our adjusted model, inflation and overall stock market performance start having a significant effect due to the reduced effect of the industrial average.

[42] Take for instance IT stock performance around 2000, since a lot of the extreme values where dropped the industrial average becomes unduly weighted the wrong way.

## 2 year time period

As the time period increases we see the results get slightly less significant. CEO turnover manages to show significance at 5% when industrial average is omitted in the OLS model, but fails to show significance in any of the other models when using our original variable. Still the direction of the coefficient remains the same and the significance levels are close to 10%. R-squared also decreases in every model indicating that our variables are better at modeling short term performance than long term performance. The significance level however is actually higher for many control variables indicating that while they can't explain our dependent variable as well before, there is less chance that the correlation is a coincidence. In general the random effects model shows better values for CEO turnover than the fixed effects model but still only manages to show significance at the 10% level. However since the direction of the coefficient for CEO turnover remains the same throughout all models this doesn't carry too much weight.

| 0-2 Year performance with industry average | | | |
|---|---|---|---|
| Variable | Base Model | Full model (OLS) | Fixed Effects |
| Industry average | 0.95*****(0.05) | 0.94*****(0.05) | 0.94(0.05) |
| CEO Turnover | | -0.08(0.05) | -0.05(0.05) |
| | -0.21(2.15) | 0.05(2.15) | 1.27(2.17) |
| Real GDP Change | 2.15(2.16) | 1.94(2.17) | 0.95(2.19) |
| Nom. GDP Change | -3.11(2.3) | -2.90(2.30) | -1.99(2.34) |
| AFGX Change | 0.03(0.07) | 0.03(0.07) | 0.07(0.08) |
| SEK to Dollar change | -0.11(0.12) | -0.12(0.12) | -0.03(0.12) |
| | | | |
| R-squared Within | N/A | N/A | 0.3026 |
| R-squared Between | N/A | N/A | 0.2743 |
| R-squared Overall | 0.2709 | 0.2716 | 0.2711 |
| ΔLR | N/A | 2.6 | 1.11 |
| Observations | 2552 | 2552 | 2552 |
| Firms | 338 | 338 | 338 |

| 0-2 Year performance | | | |
|---|---|---|---|
| Variable | Base Model | Full model (OLS) | Fixed Effects |
| CEO Turnover | | -0.10**(0.05) | -0.08(0.05) |
| Inflation | -10.44****(2.26) | -10.59****(2.26) | -8.26****(2.29) |
| Real GDP Change | -4.12*(2.31) | -4.38*(2.31) | -5.01**(2.13) |
| Nom. GDP Change | 3.25(2.46) | 3.51(2.46) | 3.67(2.52) |
| AFGX Change | 0.69****(0.07) | 0.68****(0.07) | 0.76****(0.08) |
| SEK to Dollar change | -0.54****(0.13) | -0.55****(0.13) | -0.43****(0.13) |
| | | | |
| R-squared Within | N/A | N/A | 0.1803 |
| R-squared Between | N/A | N/A | 0.1008 |
| R-squared Overall | 0.1523 | 0.1536 | 0.1528 |
| ΔLR | N/A | 3.88** | 2.25 |
| Observations | 2552 | 2552 | 2552 |
| Firms | 338 | 338 | 338 |

**Table 6: Regression analyses with and without industry average for the time period 0-2 years.**

****** p<0.001, *** p<0.01, ** p<0.05, * p<0.10, Standard errors in parentheses.**

For our adjusted variable the results were similar although CEO turnover manages to show significance at the 5% level both with and without industry average when using simple pooled regression analysis. R-squared decreases in all models when compared to the 1 year time span but the effects are not quite as pronounced as for our original variable; it is also higher for the adjusted variable than any comparable model using the original variable. GDP starts showing significance for the first time in the models without industrial average and does so at very good levels of significance indicating that GDP was a good control variable to include but that its effect is better over longer periods of time and that it is less good at modeling extreme outliers. Both the random and fixed effects models fail to show significance that CEO turnover has any effect on stock performance over a 2 year period. [43]

## 3 year time period

The longest time period fails to yield any truly significant results but is nonetheless still interesting. The R-squared values decrease across the board just like over the 2 year period. CEO turnover fails to clear the

[43] The coefficient actually changes to positive for the fixed effects models but at extremely low levels of significance

5% significance level for any model when using the original variables but actually manages the 10% level for all tests when industry average is omitted. These results should be considered inconclusive as to the long term effect on CEO turnover but do provide some support for the short term interpretations.

| 0-3 Year performance with industry average | | | |
|---|---|---|---|
| Variable | Base Model | Full model (OLS) | Fixed Effects |
| Industry average | 1.04****(0.06) | 1.04****(0.06) | 1.08****(0.06) |
| CEO Turnover | | -0.14(0.09) | -0.12(0.09) |
| Inflation | -0.55(3.62) | -0.68(3.62) | 2.20(3.53) |
| Real GDP Change | 4.88(3.40) | 4.69(3.40 | 2.77(3.35) |
| Nom. GDP Change | -5.20(3.45) | -4.96(3.45) | -3.27(3.39) |
| AFGX Change | -0.07(0.10) | -0.08(0.10) | -0.07(0.10) |
| SEK to Dollar change | -0.02(0.22) | -0.04(0.22) | 0.17(0.22) |
| | | | |
| R-squared Within | N/A | N/A | 0.2773 |
| R-squared Between | N/A | N/A | 0.2235 |
| R-squared Overall | 0.2357 | 0.2366 | 0.2357 |
| ΔLR | N/A | 2.55 | 2.12 |
| Observations | 2223 | 2223 | 2223 |
| Firms | 323 | 323 | 323 |

| 0-3 Year performance | | | |
|---|---|---|---|
| Variable | Base Model | Full model (OLS) | Fixed Effects |
| CEO Turnover | | -0.17*(0.10) | -0.16*(0.10) |
| Inflation | -8.27**(3.87) | -8.42**(3.87) | -4.21(3.83) |
| Real GDP Change | -3.07(3.63) | -3.29(3.64) | -4.62(3.62) |
| Nom. GDP Change | 3.95(3.67) | 4.22(3.68) | 4.26(3.67) |
| AFGX Change | 0.80****(0.09) | 0.79****(0.09) | 0.92****(0.09) |
| SEK to Dollar change | -0.91****(0.23) | -0.93****(0.23) | -0.69***(0.23) |
| | | | |
| R-squared Within | N/A | N/A | 0.1432 |
| R-squared Between | N/A | N/A | 0.0459 |
| R-squared Overall | 0.1137 | 0.1149 | 0.1135 |
| ΔLR | N/A | 3.24* | 3.23* |
| Observations | 2223 | 2223 | 2223 |
| Firms | 323 | 323 | 323 |

**Table 7: Regression analyses with and without industry average for the time period 0-3 years.**

****** p<0.001, *** p<0.01, ** p<0.05, * p<0.10, Standard errors in parentheses.**

For the adjusted variables the results are also inconclusive. CEO turnover shows significance at the 5% level when performing OLS analysis but fails to show any significance when using random and fixed effects models. The LR-tests are showing significance at the 5% level when using OLS indicating that including CEO turnover does improve our base model when using OLS.

## Discussion

Our intention with this paper was to explore whether CEO turnover had an effect on company performance by conducting a quantitative study of Swedish companies. By looking at previous research and different theoretical models, we hypothesized that changing the CEO of a company would have an effect on company performance which we modeled as the company's development on the stock market plus direct dividends. In order to test our hypothesis we collected data from 341 firms listed on the Swedish stock market between 1994 and 2009 with regards to stock market performance, CEO turnover and direct dividends. We perform a variety of statistical tests over different time spans to test our hypothesis that changing CEO has an effect on company stock performance. We find that CEO turnover tends to have a negative effect on stock performance especially in the short run where our significance levels are especially good.

There are a number of things which favor rejecting our null hypothesis that CEO turnover has no effect on company performance. First of all we can see that when using our original unadjusted variable the coefficients for CEO turnover are consistently negative over all time periods even if the significance varies a bit over time and whether we include industry average or not. We can also note that the fixed effects model indicate a strong correlation over a one year period and a weak one over a two and three year periods. Since the fixed effects model is a very robust test that measures effects within companies, it indicates that there is a very small chance that the results are flawed. If we contrast the fixed effects model against our more simple OLS models we see a somewhat stronger correlation for OLS throughout, but also that the two models tend to have strong correlation at the same time. This helps our conclusions since the simple OLS strength, while not sufficient to draw any conclusions by itself, supports all our other findings. Another strong argument in favor of using CEO turnover to model company stock performance is that it is the only variable that can help explain performance when industry average is included in the model; all other variables fail to show significance when we include industry average in our analyses. Finally, through the use of LR-tests we find that including CEO turnover in our full model does significantly improve the base model, creating a better estimation of company stock performance.

We also performed all our analyses with an adjusted variable where we dropped the top and bottom 5 % to control for outliers and to create a variable that was more strongly normally distributed. In general it can be said that our findings were not quite as strong when using the adjusted variable and especially the fixed effects model failed to show significance throughout the analyses. While it would have been gratifying to see strong correlations for the fixed effects model with our adjusted variable we believe that a fair amount of the lost significance can be attributed to the fact that the fixed effects model is partly made to analyze extreme outliers and effects within companies which becomes difficult when removing extreme values. That said, the OLS model actually shows a stronger significance when using our adjusted variable at 5% significance or more for all three years both with and without industrial average. Overall the

adjusted variable indicate that extreme outliers have had an effect on our findings, but if we assume that a new CEO can have both a very large positive or negative effect, then this is a natural occurrence.

### Theoretical explanation

As mentioned previously, we chose the Strategic Leadership and the Strategic Choice perspectives together with the Population Ecology perspective because they offer contradictory views in regards to whether CEOs exhibit a large effect on company performance or not. Our analyses show that CEO turnover is significantly correlated with stock performance and the LR-test showed that our models' level of explanation increased significantly when CEO turnover was included as a variable. This suggests that CEO turnover in fact *do* affect company performance. This finding is in line with the Strategic Leadership and the Strategic Choice perspectives' theorizing that a new CEO will have a new cognitive base which through strategic decisions will be reflected in the organization. From our interviews we have understood that this is common behavior for a new CEO. He or she makes Strategic Choices and change the company according to what he or she believes is the best based on his or her cognitive base.

From our analyses and our interviews it seems like the Strategic Leadership and the Strategic Choice perspectives are right in that CEOs can affect company performance. The next question to discuss is therefore why the effect of changing the CEO is negative. We find several reasons for why this might be the case.

An explanation that would be consistent with the Strategic Leadership perspective is that a new CEO will have a different cognitive base that might not fit as well with the company's environment as the previous CEO's. Thus if the new CEO's cognitive base makes the company's characteristics conform *less* to the environment, the company's performance would be worse. Therefore the negative effects on company performance could simply be that the boards have chosen CEOs with inappropriate characteristics.

Previous research has shown that it is more common that companies change CEO when they are performing badly than when they are performing well. One reason for the negative effect could therefore be that the new CEO's results are negatively affected by bad performance before the change and that the new CEO has not yet been able to turn the company around from bad to good performance. To investigate this we perform fixed effects regression analyses, which measure the effect of CEO changes within each company. Despite this we still have a significant negative effect for the short time period of 0-1 years, with the effect on the longer time periods of 0-2 and 0-3 years also negative albeit not as significant. This could be interpreted in two ways. One is that boards have a tendency to switch CEO at the wrong time further worsening performance of the company, or that the effect of the new CEO is more long-term than the three year period we analyze in this thesis. From our interviews we are able to assume that the effects from a new CEO's strategic decisions often are long-term, and since our analyses do not cover the effect for a longer time period than three years, we cannot know if the effect will turn positive after a period of say four or five years.

Another reason for the negative short term effect could be that it is common for new CEOs to want to start with a clean slate. This means that when new CEO enter he or she wants to get rid of all postponed expenses, write down the values of overvalued assets to more realistic figures, and reveal uncomfortable news that have been hidden from the public by the old CEO. By doing this the new CEO can show decisiveness and at the same time blame the bad result in the first year on the previous management, consequently making it easier to show positive results later on.[44] This is however something that is really only done the first year of a new CEOs tenure and does not explain why the effect is still negative after two and three years. Perhaps the negative effects of starting with a clean slate the first year is larger than the accumulated positive results in year two and three, which then would give a total effect after three years which is negative even though it has started to turn positive. While our analyses don't prove that this is the case, there are indications that this is so since the negative effect is weaker over the two and three year periods.

Another common action for a new CEO to take is strategic and organizational restructuring. The new CEO is changing the company to conform to his/hers belief of what is best for the company, and large strategic and organizational decisions are made. Such changes are often very costly, and the costs could span several years before the potentially positive effects of the changes occur. This could be another reason why the stock performance is negative the first three years, and especially the first year, after a change of CEO.[45]

The reasoning above assumes that changing CEO does have an impact on company performance, and focuses on explaining why the effect is negative. If we bring the Population Ecology perspective into the discussion, a potential explanation could be found in that CEOs *do not* have an effect on company performance and that all we see is a continuation of bad performance. We know that companies performing badly are changing CEOs more often than companies that are performing well. Then, as this perspective argues, organizational inertia disables these companies' ability to change in accordance to the environment if the company does not have the right characteristics to begin with. Thus it would be impossible for a new CEO to turn around from bad performance to good performance. However it should be noted that the fixed effects model take effects within companies into account which weakens this argument significantly since a company performing badly would still have an *increased* negative effect from a CEO change.

The argument in favor of the Population Ecology perspective, which theorizes that top managers cannot affect company performance, is that the effect the first years after a change of CEO is negative. This implies that a new CEO will fail at improving company performance. However, our statistical analyses showed that CEO changes indeed do have a significant effect on company performance even though it is negative the first years. We have also found several plausible explanations for why this happens. We would

[44] (Interviews, 2010)
[45] (Interviews, 2010)

therefore like to emphasize the Strategic Leadership and the Strategic Choice perspectives as those theories argue that the CEO in fact can affect company performance, which is in line with our findings. A good way to further verify our hypothesis would be to analyze the effect of CEO changes over even longer time periods than three years, since we have got indications that a new CEO's actions are initially negative but potentially positive in the long run.

It should finally be noted that since the study has been done only with Swedish companies it is not certain that the effects observed would be the same in other countries. It could instead be an effect that is an expression of Swedish cultural norms and values (employees taking a long time to adjust to a new CEO for instance) or the way Swedish business is structured with strong owners and independent boards. A comparative study between countries would need to be done to prove that the results are valid internationally.

# Conclusions

In this paper we study the effects of CEO turnover on company performance. We present different theories for whether or not changing CEO affects company performance. Based on the theoretical framework and previous research along with our findings from our preliminary interviews we show a theoretical model that includes CEO turnover as a factor for measuring company performance. This means that our hypothesis is that CEOs do have an effect on company performance and that changing a CEO could have a negative or positive effect. As a measure for company performance we use their performance on the stock market coupled with dividend payout to shareholders. There are some weaknesses inherent in doing this since stock market performance is not always equal to company performance, but since the study spans so many years these problems should be overcome.

To test our theoretical model we use a quantitative approach where we include 341 Swedish firms over a time span of 15 years. We analyze this data by performing a series of statistical analyses, the first of which is pooled linear regression (OLS) which is a well-known method for finding a correlation. Using OLS we manage to find significant correlations with very strong values for 0-1 year, and with decreasing strength for longer time periods. Since the correlation coefficients all point the same way OLS proves a good indicator that we are on to something. OLS is not the strongest possible test we can do however and will on occasion show false or irrelevant positives when using very large databases. We therefore use the more robust random and fixed effects models to reduce the risk that we are registering a false positive. The results prove to be significant at the 1 % level in the 0-1 year time span even though we are using the stronger fixed effects model while the coefficients still point the same way for the longer time periods albeit with less significance, which indicates that CEO turnover mainly has a negative effect on stock performance in the short run. We also perform LR-tests which establish that including CEO turnover significantly improves our base model and is an important part in explaining company performance.

In order to explain the reasons for this negative effect on stock performance we draw on the knowledge acquired during our interviews coupled with what theory says about CEO turnover. We establish that CEO turnover does not actually have to be negative for company performance but that certain things a CEO does when he/she enters a job can have a negative short term impact on company stock performance. There could also be many other explanations for the negative performance including the fact that CEO turnover in some cases can be a negative indicator on company performance (i.e. a company doing badly is more likely to change CEO).

While there are many possible interpretations of our data we believe that they strongly indicate (if not prove) that CEO turnover does have an effect of company performance. This effect can in turn be negative or positive depending on the circumstances but that it most often tends towards the negative in the short run. Considerable care should therefore be taken before changing CEO and when it is necessary

to do so, change should be done for good reasons, something that perhaps is not always observed by the boards of Swedish stock companies.

## Further research

We chose stock performance as a measure of company performance since it is the one of the most appropriate measures when dealing with this amount of companies over such a long time period. It does however have some deficiencies since the stock price is decided by the stock market, which might not always be as rational as theory suggests. Therefore using other measures for company performance such as earnings per share or risk adjusted return on equity could be better indicators on company performance and suitable for studies in smaller scale.[46]

Our study has a limited set of control variables, and a higher level of understanding could be achieved if more control variables could be included. Suggestions on control variables in addition to those included in this thesis could be other exchange rates as between Swedish crowns and the Euro or the Swedish crown and the Chinese Yuan or the Japanese Yen. For countries with significant international trades such control variables could be very useful. Due to the globalization other external control variables of importance could be global, European and/or American business cycle indexes. In addition to external control variables, internal control variables such as company size, key figures like D/E ratios, liquidity and number of employees could be used to improve the model.

A related topic could be to investigate the effect of changing board members in companies, and then especially how changing the Chairman of the board affects company performance. Such a study would not be suitable in all countries since in some countries it is common, that the Chairman of the board is also the CEO. In countries where it is not allowed, as in Sweden, it could be interesting to see how the company performance is affected when the Chairman is replaced. Since the Chairman is the head of the board which together with the CEO makes the company's major strategic decisions, the Chairman ought to have some effect on how the company is performing.

It could also be interesting to study if and how the effects of CEO turnover differ between industries, and also between small, medium, and large companies. Does CEO turnover in stable industries have a larger effect than CEO changes in turbulent industries or vice versa? Do CEO changes in smaller companies have a larger effect on company performance than in larger companies? A theory could be that CEO changes in smaller companies could have a larger impact than in larger companies since they might be more flexible than large companies with an established culture, reputation and way of doing business.

Further experimentation with more exact dates could also be used to validate our findings, perhaps following specific companies more closely and taking different performance measures from the exact date of CEO change could shed more light on what the actual reasons for the negative effects are. Also, measuring the effects over even longer time periods than three years would be of interest since strategic

[46] The sheer amount of work necessary for calculating various financial ratios over a long time period makes it impractical for use in larger studies

changes of a new CEO seem to yield bad results in the short term and the potential positive effects are in the longer run. Further qualitative studies of companies which have shown a negative development after changing CEO could also be helpful in achieving this.

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# Appendix A – Companies

Aarhus Karlshamn
ABB /ASEA
Acando fd AcandoFrontec fd Frontec
A-Com
Acrimo
Active Biotech
Active Capital
Addnode fd Adera
Addtech
Affärsstrategerna
Aga
Alfa Laval
Alfaskop
Allgon
Althin Medical
Anoto Group fd C Technologies
Argonaut
Array fd. Array Printers
Artema Medical
Artimplant
ASG
Aspiro
Assa Abloy
AssiDomän
AstraZeneca
Atlantica
Atlas Copco
Atle
AudioDev
Autoliv
Avesta Sheffield --> Outukumpu
Axfood fd. Hemköp
Axis
BE Group
Beijer Electronics
Beijer&Alma fd. Alma Industri
Bergman&Beving
Bergs Timber fd. CF Berg
Biacore
Bilia fd. Catena
Billerud
BioGaia fd. BioGaia Biologics
Bioinvent International
BioPhausia, fd Medisan
Biora
biotage fd Pyrosequencing Scandinavia Online
Biovitrum
Boliden
Bong Ljungdahl
Borås Wäfveri
Boss Media
BPA
Brinova
Brio
Broströms
BT Industries
BTL fd. Bilspedition
BTS Group
Bulten, fd Errce
Bure Equity fd. Bure
Capio
Home Properties fd Capona
Caran
Cardo
Carl Lamm
Cash Guard
Castellum
Catena
Celsius
Celtica
Betsson fd Cherryföretagen
Clas Ohlson
Cloetta Fazer fd. Cloetta
Concordia
Connecta
Consilium
Custos
Cyber Com
CynCrona
D. Carnegie
Dahl
Daydream
Diamyd Medical fd Biosyn Holding
Diffchamb
Digital Vision fd. DV Sweden
Diligentia
Diös
Drott

Duroc
Elanders
Eldon
Electrolux
Elekta fd. Elekta Instrument
Enea fd. Enea Data
Eniro
Enlight fd. Enlight Interactive
Entra Data
Ericsson
Esselte
Europolitan fd NordicTel
Evidentia fd. arcona
Expanda, fd R-vik Industrigrupp
Fabege
Fabege fd Wihlborgs
Wihlborgs
Fagerhult
Fagerlid Industrier AB
Fast Partner fd. Fastighetspartner
FB Industri
Fingerprint Cards
Finnveden
LBI International fd Framfab
Frango
Frontline
Föreningsbanken
Getinge Industrier
Geveko
Glocalnet
Gotlandsbolaget
Graningeverken
Gränges
Gullspång
Gylling Optima fd Optima batteries
H&M
Hakon Invest
Haldex fd. Garphyttan Industrier
Heba
Hebi Healthcare fd. Dala Hebi
Hemtex
Hexagon fd. Eken
HiQ International
HL Display
Hoist international
Holmen fd Modo
Hufvudstaden
Human Care
Husqvarna
Höganäs
IAR Systems
IBS
ICB Shipping
IMS Data
Industrivärden
Indutrade fd Invik & Co
Intentia
Intrum Justitia
Investor
IRO
J&W
Jabo träprodukter fd. Rörvik Timber
JC
Jeeves
JLT Mobile Computers fd Gandalf
JM
JP Bank
Kalmar Industrier
Kanthal
KappAhl
Karo Bio
Klippan
Klövern
Klövern fd. Adcore fd. Information Highway
Kungsleden
Labs2 Group fd ConNova
Lagercrantz Group
Latour
Ledstiernan fd. The Empire
lgp allgon holding fd. LGP Telecom Holding
LifeAssays
Lindab
Lindex
Linjebuss
LinkMed
LjungbergGruppen
Lundberg
Lundin Petroleum fd Lundin Oil
M2 Fastigheter fd. Exab
Malmbergs Elektriska
Mandamus
Mandator fd Cell Network fd. Mandator

Marieberg
Matteus
Meda
Medivir
Mekonomen
Micronic Laser Systems
Midway Holding
Minidoc fd Araccel fd. Minidoc
Modul 1
Monark Stiga
MSC
Munksjö
Munters
NAN Resources
NCC
Nea
Nefab
NeoNet
Net Insight
NetOnNet
Netwise
Nibe Industrier
Nilörngruppen
Nobel Biocare fd. Nobelpharma
Nobia
Nocom
Nolato
Nordea fd. Nordbanken
Nordifa
Nordiska Holding
Nordnet fd. TeleTrade
Nordström&Thulin
Note
Novestra
Novotek
Observer fd. Sifo Group
OMX fd. OM HEX fd. OM fd. OM Gruppen
Opcon
Optimail fd CityMail
Orc Software
Orexo
Ortivus fd Medical Invest
PA Resources
Pandox
PartnerTech
Peab fd. Tre Byggare
Perbio Science
Pergo
Perstorp
Platzer
PLM
Poolia
Prevas
Pricer
PriFast
Proffice
Provobis
Q-Med
Qualisys
Ratos
Readsoft
Realia
Resco
Retail and Brands
Rezido Hotel Group
RKS
Rottneros
SAAB
SalusAnsvar, fd. Salus Holding
Sandblom&Stohne
Sandvik
Sardus
SAS fd. Sila
SCA
Scancem fd. Euroc
Scandiaconsult
Scandic hotels
Scandinavian PC Systems
Scania
ScanMining
Scribona
SEB
Seco Tools
Sectra
Securitas
Segerström & Svensson
Semcon
Senea
Sensys Traffic
SHB
Siab
Sifab

Sigma
Sintercast
Skandia
Skanditek fd Skandigen
Skanska fd. Skandia Group
SKF
SkiStar fd. SälenStjärnan fd Lindvallen
Skoogs
Softronic
Solitair
Song Networks Holding fd. Tele1 Europé
Spectra Physics
Spendrups
Spira Invest
SSAB
Stadshypotek
Stena Line
Stora
Strålfors
Studsvik
Sweco fd. FFNS Gruppen
Svedala
Svedbergs
Swedish Match
Svenska Brand
Svenska Koppar
Svenska Orient Linien
Svithoid Tankers
Svolder
Sydkraft
SäkI
Tele 2 fd. Netcom Systems
Teleca fd. Sigma
Telelogic
TeliaSonera
Teligent
Thalamus Networks
Ticket
Tieto fd Enator
Tilgin
Tornet
TradeDoubler
Trelleborg
Trio
DinBostad fd Tripep
Trygg Hansa
TurnIt
TV 4
Uniflex
United Tankers
Utfors
Wallenstam
VBB Gruppen
VBG
Vencap
Verimation
Phonera fd Viking Telecom
Midelfart Sonesson fd Wilh Sonesson
Vitrolife
VLT
WM-Data
Volvo
XANO industri fd Itab
XPonCard Group fd. Graphium
Zeteco fd. Zetterbergs
Zodiak television fd MTV Produktion
ÅF
Öresund
Östgöta Enskilda Bank

# Appendix B – Industry Types

| | |
|---|---|
| 1 | Energy |
| 2 | Material |
| 3 | Industry |
| 4 | Durable goods |
| 5 | Everyday commodities |
| 6 | Health |
| 7 | Finance |
| 8 | IT |
| 9 | Telephone Network Operator |
| 10 | Other |
| 11 | Real Estate and Construction |
| 12 | Shipping and transport |

## Appendix C – Date of stock prices

19/4 1994

29/4 1995

23/4 1996

19/3 1997

25/3 1998

19/3 1999

24/3 2000

20/3 2001

5/4 2002

4/4 2003

8/4 2004

11/3 2005

22/3 2006

26/3 2007

2/4 2008

24/3 2009

# Appendix D - Regression analyses

| 0-1 Year performance | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Base Model | Observations | 2882 | Firms | 341 | Full model | Observations | 2882 | ΔLR | 8.15 (P > 0.0043) |
| | R-squared | 0.2136 | | | | R-squared | 0.2158 | | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| Inflation | -8.28 | 1.96 | -4.22 | 0.000 | CEO Turnover | -0.10 | 0.03 | -2.85 | 0.004 |
| Real GDP Change | -4.17 | 2.46 | -1.70 | 0.090 | Inflation | -8.49 | 1.96 | -4.33 | 0.000 |
| Nom. GDP Change | 2.47 | 2.57 | 0.96 | 0.335 | Real GDP Change | -4.56 | 2.46 | -1.86 | 0.064 |
| AFGX Change | 0.93 | 0.05 | 19.03 | 0.000 | Nom. GDP Change | 2.84 | 2.57 | 1.11 | 0.268 |
| SEK to Dollar change | -0.32 | 0.11 | -3.03 | 0.002 | AFGX Change | 0.93 | 0.05 | 18.92 | 0.000 |
| | | | | | SEK to Dollar change | -0.34 | 0.11 | -3.18 | 0.001 |
| Random Effects Model | Observations | 2882 | ΔLR | N/A | Fixed Effects Model | Observations | 2882 | ΔLR | 8.47 (P > 0.0036) |
| | R-squared | Within | 0.2327 | | | R-squared | Within | 0.2329 | |
| | | Between | 0.1391 | | | | Between | 0.1372 | |
| | | Overall | 0.2158 | | | | Overall | 0.2157 | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| CEO Turnover | -0.10 | 0.03 | -2.85 | 0.004 | CEO Turnover | -0.10 | 0.04 | -2.73 | 0.006 |
| Inflation | -8.49 | 1.96 | -4.33 | 0.000 | Inflation | -7.64 | 2.01 | -3.81 | 0.000 |
| Real GDP Change | -4.56 | 2.46 | -1.86 | 0.063 | Real GDP Change | -3.98 | 2.58 | -1.54 | 0.124 |
| Nom. GDP Change | 2.84 | 2.57 | 1.11 | 0.268 | Nom. GDP Change | 2.62 | 2.70 | 0.97 | 0.331 |
| AFGX Change | 0.93 | 0.05 | 18.92 | 0.000 | AFGX Change | 0.95 | 0.05 | 18.84 | 0.000 |
| SEK to Dollar change | -0.34 | 0.11 | -3.18 | 0.001 | SEK to Dollar change | -0.27 | 0.11 | -2.50 | 0.012 |

**Table 8: Regression analyses excluding industry average for the time period 0-1 years.**

| 0-1 Year performance with industry average | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Base Model | Observations | 2882 | Firms | 341 | Full model | Observations | 2882 | ΔLR | 8.90 (P > 0.0029) |
| | R-squared | 0.3559 | | | | R-squared | 0.3579 | | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| Industry average | 0.99 | 0.04 | 25.21 | 0.000 | Industry average | 0.99 | 0.04 | 25.22 | 0.000 |
| Inflation | -0.49 | 1.80 | -0.27 | 0.785 | CEO Turnover | -0.09 | 0.03 | -2.98 | 0.003 |
| Real GDP Change | 0.48 | 2.23 | 0.21 | 0.830 | Inflation | -0.70 | 1.80 | -0.39 | 0.699 |
| Nom. GDP Change | -0.08 | 2.33 | -0.04 | 0.972 | Real GDP Change | 0.10 | 2.23 | 0.05 | 0.964 |
| AFGX Change | 0.00 | 0.06 | 0.06 | 0.954 | Nom. GDP Change | 0.27 | 2.32 | 0.12 | 0.908 |
| SEK to Dollar change | 0.02 | 0.10 | 0.18 | 0.860 | AFGX Change | 0.00 | 0.06 | -0.03 | 0.978 |
| | | | | | SEK to Dollar change | 0.00 | 0.10 | 0.01 | 0.990 |
| Random Effects Model | Observations | 2882 | ΔLR | N/A | Fixed Effects Model | Observations | 2882 | ΔLR | 7.77 (P > 0.0058) |
| | R-squared | Within | 0.3784 | | | R-squared | Within | 0.3785 | |
| | | Between | 0.2808 | | | | Between | 0.2802 | |
| | | Overall | 0.3579 | | | | Overall | 0.3579 | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| Industry average | 0.99 | 0.04 | 25.22 | 0.000 | Industry average | 1.00 | 0.04 | 24.37 | 0.000 |
| CEO Turnover | -0.09 | 0.03 | -2.98 | 0.003 | CEO Turnover | -0.08 | 0.03 | -2.59 | 0.010 |
| Inflation | -0.70 | 1.80 | -0.39 | 0.699 | Inflation | -0.31 | 1.83 | -0.17 | 0.865 |
| Real GDP Change | 0.10 | 2.23 | 0.05 | 0.964 | Real GDP Change | -0.24 | 2.33 | -0.1 | 0.918 |
| Nom. GDP Change | 0.27 | 2.32 | 0.12 | 0.908 | Nom. GDP Change | 0.89 | 2.43 | 0.37 | 0.715 |
| AFGX Change | 0.00 | 0.06 | -0.03 | 0.978 | AFGX Change | 0.00 | 0.06 | -0.08 | 0.938 |
| SEK to Dollar change | 0.00 | 0.10 | 0.01 | 0.990 | SEK to Dollar change | 0.05 | 0.10 | 0.48 | 0.631 |

**Table 9: Regression analyses including industry average for the time period 0-1 years.**

| 0-2 Year performance | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Base Model | Observations | 2552 | Firms | 338 | Full model | Observations | 2552 | ΔLR | 3.88 (P > 0.0489) |
| | R-squared | 0.1523 | | | | R-squared | 0.1536 | | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| Inflation | -10.44 | 2.26 | -4.63 | 0.000 | CEO Turnover | -0.10 | 0.05 | -1.97 | 0.049 |
| Real GDP Change | -4.12 | 2.31 | -1.79 | 0.074 | Inflation | -10.59 | 2.26 | -4.69 | 0.000 |
| Nom. GDP Change | 3.25 | 2.46 | 1.32 | 0.186 | Real GDP Change | -4.38 | 2.31 | -1.90 | 0.058 |
| AFGX Change | 0.69 | 0.07 | 9.46 | 0.000 | Nom. GDP Change | 3.51 | 2.46 | 1.43 | 0.153 |
| SEK to Dollar change | -0.54 | 0.13 | -4.23 | 0.000 | AFGX Change | 0.68 | 0.07 | 9.36 | 0.000 |
| | | | | | SEK to Dollar change | -0.55 | 0.13 | -4.30 | 0.000 |
| Random Effects Model | Observations | 2552 | ΔLR | N/A | Fixed Effects Model | Observations | 2552 | ΔLR | 2.25 (P > 0.1337) |
| | R-squared | Within | 0.1799 | | | R-squared | Within | 0.1803 | |
| | | Between | 0.1054 | | | | Between | 0.1008 | |
| | | Overall | 0.1535 | | | | Overall | 0.1528 | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| CEO Turnover | -0.09 | 0.05 | -1.76 | 0.079 | CEO Turnover | -0.08 | 0.05 | -1.40 | 0.163 |
| Inflation | -9.80 | 2.18 | -4.49 | 0.000 | Inflation | -8.26 | 2.29 | -3.61 | 0.000 |
| Real GDP Change | -4.63 | 2.23 | -2.07 | 0.038 | Real GDP Change | -5.01 | 2.35 | -2.13 | 0.033 |
| Nom. GDP Change | 3.59 | 2.38 | 1.51 | 0.132 | Nom. GDP Change | 3.67 | 2.52 | 1.46 | 0.145 |
| AFGX Change | 0.71 | 0.07 | 9.93 | 0.000 | AFGX Change | 0.76 | 0.08 | 9.94 | 0.000 |
| SEK to Dollar change | -0.52 | 0.12 | -4.20 | 0.000 | SEK to Dollar change | -0.43 | 0.13 | -3.42 | 0.001 |

**Table 10: Regression analyses excluding industry average for the time period 0-2 years.**

| 0-2 Year performance with industry average | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Base Model | Observations | 2552 | Firms | 338 | Full model | Observations | 2552 | ΔLR | 2.60 (P > 0.1067) |
| | R-squared | 0.2709 | | | | R-squared | 0.2716 | | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| Industry average | 0.95 | 0.05 | 20.35 | 0.000 | Industry average | 0.94 | 0.05 | 20.31 | 0.000 |
| Inflation | -0.21 | 2.15 | -0.10 | 0.922 | CEO Turnover | -0.08 | 0.05 | -1.61 | 0.107 |
| Real GDP Change | 2.15 | 2.16 | 0.99 | 0.320 | Inflation | -0.34 | 2.15 | -0.16 | 0.874 |
| Nom. GDP Change | -3.11 | 2.30 | -1.35 | 0.176 | Real GDP Change | 1.94 | 2.17 | 0.90 | 0.370 |
| AFGX Change | 0.03 | 0.07 | 0.47 | 0.641 | Nom. GDP Change | -2.90 | 2.30 | -1.26 | 0.208 |
| SEK to Dollar change | -0.11 | 0.12 | -0.93 | 0.350 | AFGX Change | 0.03 | 0.07 | 0.42 | 0.678 |
| | | | | | SEK to Dollar change | -0.12 | 0.12 | -1.00 | 0.319 |
| Random Effects Model | Observations | 2552 | ΔLR | N/A | Fixed Effects Model | Observations | 2552 | ΔLR | 1.11 (P > 0.2915) |
| | R-squared | Within | 0.30 | | | R-squared | Within | 0.3026 | |
| | | Between | 0.28 | | | | Between | 0.2743 | |
| | | Overall | 0.2716 | | | | Overall | 0.2711 | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| Industry average | 0.95 | 0.05 | 20.91 | 0.000 | Industry average | 0.94 | 0.05 | 19.67 | 0.000 |
| CEO Turnover | -0.07 | 0.05 | -1.39 | 0.163 | CEO Turnover | -0.05 | 0.05 | -0.98 | 0.327 |
| Inflation | 0.17 | 2.08 | 0.08 | 0.934 | Inflation | 1.27 | 2.17 | 0.59 | 0.557 |
| Real GDP Change | 1.60 | 2.09 | 0.76 | 0.445 | Real GDP Change | 0.95 | 2.19 | 0.43 | 0.664 |
| Nom. GDP Change | -2.61 | 2.23 | -1.17 | 0.242 | Nom. GDP Change | -1.99 | 2.34 | -0.85 | 0.395 |
| AFGX Change | 0.04 | 0.07 | 0.53 | 0.595 | AFGX Change | 0.07 | 0.08 | 0.92 | 0.359 |
| SEK to Dollar change | -0.09 | 0.12 | -0.81 | 0.416 | SEK to Dollar change | -0.03 | 0.12 | -0.22 | 0.829 |

**Table 11: Regression analyses including industry average for the time period 0-2 years.**

| 0-3 Year performance | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Base Model | Observations | 2223 | Firms | 323 | Full model | Observations | 2223 | ΔLR | 3.24 (P > 0.0720) |
| | R-squared | 0.1137 | | | | R-squared | 0.1149 | | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| Inflation | -8.27 | 3.87 | -2.14 | 0.033 | CEO Turnover | -0.17 | 0.10 | -1.80 | 0.072 |
| Real GDP Change | -3.07 | 3.63 | -0.84 | 0.399 | Inflation | -8.42 | 3.87 | -2.17 | 0.030 |
| Nom. GDP Change | 3.95 | 3.67 | 1.08 | 0.282 | Real GDP Change | -3.29 | 3.64 | -0.91 | 0.365 |
| AFGX Change | 0.80 | 0.09 | 8.76 | 0.000 | Nom. GDP Change | 4.22 | 3.68 | 1.15 | 0.251 |
| SEK to Dollar change | -0.91 | 0.23 | -3.88 | 0.000 | AFGX Change | 0.79 | 0.09 | 8.70 | 0.000 |
| | | | | | SEK to Dollar change | -0.93 | 0.23 | -3.97 | 0.000 |
| Random Effects Model | Observations | 2223 | ΔLR | N/A | Fixed Effects Model | Observations | 2223 | ΔLR | 3.23 (P > 0.0723) |
| | R-squared | Within | 0.1423 | | | R-squared | Within | 0.1432 | |
| | | Between | 0.055 | | | | Between | 0.0459 | |
| | | Overall | 0.1149 | | | | Overall | 0.1135 | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| CEO Turnover | -0.17 | 0.09 | -1.78 | 0.075 | CEO Turnover | -0.16 | 0.10 | -1.66 | 0.097 |
| Inflation | -7.60 | 3.71 | -2.05 | 0.041 | Inflation | -4.21 | 3.83 | -1.10 | 0.271 |
| Real GDP Change | -3.79 | 3.50 | -1.08 | 0.279 | Real GDP Change | -4.62 | 3.62 | -1.27 | 0.203 |
| Nom. GDP Change | 4.29 | 3.54 | 1.21 | 0.225 | Nom. GDP Change | 4.26 | 3.67 | 1.16 | 0.245 |
| AFGX Change | 0.82 | 0.09 | 9.33 | 0.000 | AFGX Change | 0.92 | 0.09 | 9.98 | 0.000 |
| SEK to Dollar change | -0.88 | 0.23 | -3.88 | 0.000 | SEK to Dollar change | -0.69 | 0.23 | -2.93 | 0.003 |

**Table 12: Regression analyses excluding industry average for the time period 0-3 years.**

| 0-3 Year performance with industry average | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Base Model | Observations | 2223 | Firms | 323 | Full model | Observations | 2223 | ΔLR | 2.55 (P > 0.1100) |
| | R-squared | 0.2357 | | | | R-squared | 0.2366 | | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| Industry average | 1.04 | 0.06 | 18.81 | 0.000 | Industry average | 1.04 | 0.06 | 18.79 | 0.000 |
| Inflation | -0.55 | 3.62 | -0.15 | 0.880 | CEO Turnover | -0.14 | 0.09 | -1.60 | 0.111 |
| Real GDP Change | 4.88 | 3.40 | 1.44 | 0.151 | Inflation | -0.68 | 3.62 | -0.19 | 0.852 |
| Nom. GDP Change | -5.20 | 3.45 | -1.51 | 0.132 | Real GDP Change | 4.69 | 3.40 | 1.38 | 0.169 |
| AFGX Change | -0.07 | 0.10 | -0.75 | 0.455 | Nom. GDP Change | -4.96 | 3.45 | -1.44 | 0.150 |
| SEK to Dollar change | -0.02 | 0.22 | -0.08 | 0.935 | AFGX Change | -0.08 | 0.10 | -0.78 | 0.435 |
| | | | | | SEK to Dollar change | -0.04 | 0.22 | -0.17 | 0.868 |
| Random Effects Model | Observations | 2223 | ΔLR | N/A | Fixed Effects Model | Observations | 2223 | ΔLR | 2.12 (P > 0.1456) |
| | R-squared | Within | 0.2768 | | | R-squared | Within | 0.2773 | |
| | | Between | 0.2302 | | | | Between | 0.2235 | |
| | | Overall | 0.2365 | | | | Overall | 0.2357 | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| Industry average | 1.05 | 0.05 | 19.52 | 0.000 | Industry average | 1.08 | 0.06 | 18.74 | 0.000 |
| CEO Turnover | -0.14 | 0.09 | -1.56 | 0.118 | CEO Turnover | -0.12 | 0.09 | -1.34 | 0.179 |
| Inflation | -0.10 | 3.46 | -0.03 | 0.976 | Inflation | 2.20 | 3.53 | 0.62 | 0.533 |
| Real GDP Change | 4.11 | 3.27 | 1.26 | 0.209 | Real GDP Change | 2.77 | 3.35 | 0.83 | 0.408 |
| Nom. GDP Change | -4.61 | 3.31 | -1.39 | 0.164 | Nom. GDP Change | -3.27 | 3.39 | -0.96 | 0.335 |
| AFGX Change | -0.08 | 0.09 | -0.83 | 0.409 | AFGX Change | -0.07 | 0.10 | -0.66 | 0.507 |
| SEK to Dollar change | 0.01 | 0.21 | 0.06 | 0.949 | SEK to Dollar change | 0.17 | 0.22 | 0.77 | 0.438 |

**Table 13: Regression analyses including industry average for the time period 0-3 years.**

# Appendix E - Regression analyses with adjusted variable

| 0-1 Year performance for the adjusted variable | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Base Model | Observations | 2594 | Firms | 339 | Full model | Observations | 2594 | ΔLR | 7.99 (P > 0.0047) |
| | R-squared | 0.2577 | | | | R-squared | 0.2600 | | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| Inflation | -5.83 | 1.04 | -5.62 | 0.000 | CEO Turnover | -0.05 | 0.02 | -2.83 | 0.005 |
| Real GDP Change | -1.41 | 1.29 | -1.09 | 0.276 | Inflation | -5.95 | 1.04 | -5.74 | 0.000 |
| Nom. GDP Change | -0.27 | 1.36 | -0.20 | 0.845 | Real GDP Change | -1.61 | 1.30 | -1.24 | 0.214 |
| AFGX Change | 0.53 | 0.03 | 20.29 | 0.000 | Nom. GDP Change | -0.10 | 1.36 | -0.07 | 0.943 |
| SEK to Dollar change | -0.20 | 0.06 | -3.53 | 0.000 | AFGX Change | 0.53 | 0.03 | 20.24 | 0.000 |
| | | | | | SEK to Dollar change | -0.21 | 0.06 | -3.68 | 0.000 |
| Random Effects Model | Observations | 2594 | ΔLR | N/A | Fixed Effects Model | Observations | 2594 | ΔLR | 1.91 (P > 0.1671) |
| | R-squared | Within | 0.2784 | | | R-squared | Within | 0.2788 | |
| | | Between | 0.1813 | | | | Between | 0.1749 | |
| | | Overall | 0.2600 | | | | Overall | 0.2593 | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| CEO Turnover | -0.04 | 0.02 | -2.49 | 0.013 | CEO Turnover | -0.02 | 0.02 | -1.29 | 0.198 |
| Inflation | -5.94 | 1.03 | -5.79 | 0.000 | Inflation | -5.93 | 1.06 | -5.59 | 0.000 |
| Real GDP Change | -1.56 | 1.29 | -1.21 | 0.225 | Real GDP Change | -1.10 | 1.35 | -0.81 | 0.418 |
| Nom. GDP Change | -0.12 | 1.35 | -0.09 | 0.931 | Nom. GDP Change | -0.44 | 1.42 | -0.31 | 0.758 |
| AFGX Change | 0.53 | 0.03 | 20.39 | 0.000 | AFGX Change | 0.53 | 0.03 | 19.69 | 0.000 |
| SEK to Dollar change | -0.20 | 0.06 | -3.65 | 0.000 | SEK to Dollar change | -0.18 | 0.06 | -3.05 | 0.002 |

**Table 14: Regression analyses for the adjusted variable, time period 0-1years and industry average is excluded.**

| 0-1 Year performance with industry average for the adjusted variable | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Base Model | Observations | 2594 | Firms | 339 | Full model | Observations | 2594 | ΔLR | 9.96 (P > 0.0016) |
| | R-squared | 0.3253 | | | | R-squared | 0.3279 | | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| Industry average | 0.41 | 0.03 | 16.09 | 0.000 | Industry average | 0.41 | 0.03 | 16.15 | 0.000 |
| Inflation | -2.48 | 1.01 | -2.45 | 0.014 | CEO Turnover | -0.05 | 0.02 | -3.15 | 0.002 |
| Real GDP Change | 0.14 | 1.24 | 0.11 | 0.911 | Inflation | -2.60 | 1.01 | -2.57 | 0.010 |
| Nom. GDP Change | -0.75 | 1.30 | -0.58 | 0.565 | Real GDP Change | -0.07 | 1.24 | -0.06 | 0.954 |
| AFGX Change | 0.20 | 0.03 | 6.00 | 0.000 | Nom. GDP Change | -0.57 | 1.30 | -0.44 | 0.661 |
| SEK to Dollar change | -0.05 | 0.05 | -0.90 | 0.366 | AFGX Change | 0.19 | 0.03 | 5.92 | 0.000 |
| | | | | | SEK to Dollar change | -0.06 | 0.05 | -1.07 | 0.285 |
| Random Effects Model | Observations | 2594 | ΔLR | N/A | Fixed Effects Model | Observations | 2594 | ΔLR | 2.62 (P > 0.1053) |
| | R-squared | Within | 0.3439 | | | R-squared | Within | 0.3444 | |
| | | Between | 0.2954 | | | | Between | 0.2881 | |
| | | Overall | 0.3278 | | | | Overall | 0.3272 | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| Industry average | 0.41 | 0.03 | 16.2 | 0.000 | Industry average | 0.40 | 0.03 | 15 | 0.000 |
| CEO Turnover | -0.05 | 0.02 | -2.92 | 0.004 | CEO Turnover | -0.03 | 0.02 | -1.51 | 0.132 |
| Inflation | -2.61 | 1.00 | -2.6 | 0.009 | Inflation | -2.78 | 1.03 | -2.7 | 0.007 |
| Real GDP Change | -0.07 | 1.23 | -0.06 | 0.956 | Real GDP Change | 0.12 | 1.29 | 0.09 | 0.928 |
| Nom. GDP Change | -0.56 | 1.29 | -0.43 | 0.666 | Nom. GDP Change | -0.66 | 1.36 | -0.48 | 0.629 |
| AFGX Change | 0.19 | 0.03 | 5.94 | 0.000 | AFGX Change | 0.20 | 0.03 | 5.8 | 0.000 |
| SEK to Dollar change | -0.06 | 0.05 | -1.04 | 0.298 | SEK to Dollar change | -0.03 | 0.06 | -0.63 | 0.531 |

**Table 15: Regression analyses for the adjusted variable, time period 0-1years and industry average is included.**

| 0-2 Year performance for the adjusted variable | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Base Model | Observations | 2297 | Firms | 332 | Full model | Observations | 2297 | ΔLR | 4.03 (P > 0.0448) |
| | R-squared | 0.2092 | | | | R-squared | 0.2106 | | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| Inflation | -4.22 | 1.25 | -3.37 | 0.001 | CEO Turnover | -0.06 | 0.03 | -2.00 | 0.045 |
| Real GDP Change | -5.36 | 1.26 | -4.25 | 0.000 | Inflation | -4.36 | 1.25 | -3.47 | 0.001 |
| Nom. GDP Change | 4.49 | 1.33 | 3.38 | 0.001 | Real GDP Change | -5.46 | 1.26 | -4.33 | 0.000 |
| AFGX Change | 0.50 | 0.04 | 12.57 | 0.000 | Nom. GDP Change | 4.60 | 1.33 | 3.46 | 0.001 |
| SEK to Dollar change | -0.38 | 0.07 | -5.33 | 0.000 | AFGX Change | 0.49 | 0.04 | 12.47 | 0.000 |
| | | | | | SEK to Dollar change | -0.38 | 0.07 | -5.40 | 0.000 |
| Random Effects Model | Observations | 2297 | ΔLR | N/A | Fixed Effects Model | Observations | 2297 | ΔLR | 0.35 (P > 0.5543) |
| | R-squared | Within | 0.2566 | | | R-squared | Within | 0.2582 | |
| | | Between | 0.0828 | | | | Between | 0.0744 | |
| | | Overall | 0.2104 | | | | Overall | 0.208 | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| |
| CEO Turnover | -0.04 | 0.03 | -1.26 | 0.209 | CEO Turnover | 0.02 | 0.03 | 0.55 | 0.585 |
| Inflation | -4.30 | 1.24 | -3.48 | 0.001 | Inflation | -3.82 | 1.31 | -2.92 | 0.004 |
| Real GDP Change | -5.47 | 1.24 | -4.41 | 0.000 | Real GDP Change | -5.36 | 1.31 | -4.09 | 0.000 |
| Nom. GDP Change | 4.61 | 1.31 | 3.52 | 0.000 | Nom. GDP Change | 4.48 | 1.39 | 3.22 | 0.001 |
| AFGX Change | 0.50 | 0.04 | 12.85 | 0.000 | AFGX Change | 0.55 | 0.04 | 12.92 | 0.000 |
| SEK to Dollar change | -0.38 | 0.07 | -5.44 | 0.000 | SEK to Dollar change | -0.33 | 0.07 | -4.64 | 0.000 |

**Table 16: Regression analyses for the adjusted variable, time period 0-2years and industry average is excluded.**

| 0-2 Year performance with industry average for the adjusted variable | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Base Model | Observations | 2297 | Firms | 332 | Full model | Observations | 2297 | ΔLR | 4.09 (P > 0.0432) | |
| | R-squared | 0.3034 | | | | R-squared | 0.3046 | | | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| | |
| Industry average | 0.50 | 0.03 | 17.59 | 0.000 | Industry average | 0.50 | 0.03 | 17.59 | 0.000 | |
| Inflation | 0.33 | 1.21 | 0.27 | 0.787 | CEO Turnover | -0.06 | 0.03 | -2.02 | 0.044 | |
| Real GDP Change | -1.43 | 1.20 | -1.19 | 0.235 | Inflation | 0.20 | 1.21 | 0.16 | 0.870 | |
| Nom. GDP Change | 0.56 | 1.27 | 0.44 | 0.659 | Real GDP Change | -1.53 | 1.20 | -1.27 | 0.204 | |
| AFGX Change | 0.17 | 0.04 | 4.13 | 0.000 | Nom. GDP Change | 0.67 | 1.27 | 0.53 | 0.599 | |
| SEK to Dollar change | -0.16 | 0.07 | -2.33 | 0.020 | AFGX Change | 0.17 | 0.04 | 4.05 | 0.000 | |
| | | | | | SEK to Dollar change | -0.16 | 0.07 | -2.40 | 0.016 | |
| Random Effects Model | Observations | 2297 | ΔLR | N/A | Fixed Effects Model | Observations | 2297 | ΔLR | 0.59 (P > 0.4415) | |
| | R-squared | Within | 0.3595 | | | R-squared | Within | 0.3607 | | |
| | | Between | 0.1648 | | | | Between | 0.1564 | | |
| | | Overall | 0.3043 | | | | Overall | 0.3022 | | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| | |
| Industry average | 0.51 | 0.03 | 18.12 | 0.000 | Industry average | 0.53 | 0.03 | 17.72 | 0.000 | |
| CEO Turnover | -0.03 | 0.03 | -1.09 | 0.277 | CEO Turnover | 0.02 | 0.03 | 0.71 | 0.477 | |
| Inflation | 0.21 | 1.18 | 0.18 | 0.859 | Inflation | 0.47 | 1.24 | 0.38 | 0.708 | |
| Real GDP Change | -1.57 | 1.18 | -1.33 | 0.183 | Real GDP Change | -1.53 | 1.23 | -1.24 | 0.215 | |
| Nom. GDP Change | 0.76 | 1.24 | 0.61 | 0.541 | Nom. GDP Change | 0.89 | 1.31 | 0.68 | 0.496 | |
| AFGX Change | 0.17 | 0.04 | 4.07 | 0.000 | AFGX Change | 0.17 | 0.04 | 3.87 | 0.000 | |
| SEK to Dollar change | -0.16 | 0.07 | -2.40 | 0.017 | SEK to Dollar change | -0.12 | 0.07 | -1.82 | 0.069 | |

**Table 17: Regression analyses for the adjusted variable, time period 0-2years and industry average is included.**

| 0-3 Year performance for the adjusted variable | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Base Model | Observations | 2000 | Firms | 319 | Full model | Observations | 2000 | ΔLR | 4.03 (P > 0.0448) | |
| | R-squared | 0.1893 | | | | R-squared | 0.26 | | | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| | |
| Inflation | -0.28 | 1.73 | -0.16 | 0.871 | CEO Turnover | -0.09 | 0.04 | -2.00 | 0.045 | |
| Real GDP Change | -3.05 | 1.60 | -1.90 | 0.057 | Inflation | -0.40 | 1.73 | -0.23 | 0.817 | |
| Nom. GDP Change | 4.89 | 1.63 | 3.01 | 0.003 | Real GDP Change | -3.13 | 1.60 | -1.95 | 0.051 | |
| AFGX Change | 0.53 | 0.04 | 13.17 | 0.000 | Nom. GDP Change | 4.98 | 1.62 | 3.07 | 0.002 | |
| SEK to Dollar change | -0.84 | 0.10 | -8.18 | 0.000 | AFGX Change | 0.53 | 0.04 | 13.11 | 0.000 | |
| | | | | | SEK to Dollar change | -0.85 | 0.10 | -8.27 | 0.000 | |
| Random Effects Model | Observations | 2000 | ΔLR | N/A | Fixed Effects Model | Observations | 2000 | ΔLR | 0.23 (P > 0.6314) | |
| | R-squared | Within | 0.2618 | | | R-squared | Within | 0.2626 | | |
| | | Between | 0.0346 | | | | Between | 0.0306 | | |
| | | Overall | 0.1903 | | | | Overall | 0.1887 | | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| | |
| CEO Turnover | -0.04 | 0.04 | -1.00 | 0.315 | CEO Turnover | -0.02 | 0.04 | -0.44 | 0.661 | |
| Inflation | -0.30 | 1.63 | -0.18 | 0.854 | Inflation | 0.56 | 1.70 | 0.33 | 0.742 | |
| Real GDP Change | -3.32 | 1.52 | -2.19 | 0.029 | Real GDP Change | -3.49 | 1.59 | -2.20 | 0.028 | |
| Nom. GDP Change | 5.24 | 1.53 | 3.42 | 0.001 | Nom. GDP Change | 5.51 | 1.61 | 3.43 | 0.001 | |
| AFGX Change | 0.56 | 0.04 | 14.48 | 0.000 | AFGX Change | 0.60 | 0.04 | 14.83 | 0.000 | |
| SEK to Dollar change | -0.83 | 0.10 | -8.51 | 0.000 | SEK to Dollar change | -0.77 | 0.10 | -7.53 | 0.000 | |

**Table 18: Regression analyses for the adjusted variable, time period 0-3years and industry average is excluded.**

| 0-3 Year performance with industry average for the adjusted variable | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Base Model | Observations | 2000 | Firms | 319 | Full model | Observations | 2000 | ΔLR | 5.35 (P > 0.0207) | |
| | R-squared | 0.2867 | | | | R-squared | 0.2886 | | | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| | |
| Industry average | 0.46 | 0.03 | 16.50 | 0.000 | Industry average | 0.46 | 0.03 | 16.54 | 0.000 | |
| Inflation | 2.13 | 1.63 | 1.30 | 0.193 | CEO Turnover | -0.10 | 0.04 | -2.31 | 0.021 | |
| Real GDP Change | 0.57 | 1.52 | 0.38 | 0.707 | Inflation | 2.00 | 1.63 | 1.23 | 0.221 | |
| Nom. GDP Change | 0.42 | 1.55 | 0.27 | 0.785 | Real GDP Change | 0.50 | 1.52 | 0.33 | 0.743 | |
| AFGX Change | 0.17 | 0.04 | 3.88 | 0.000 | Nom. GDP Change | 0.52 | 1.55 | 0.33 | 0.739 | |
| SEK to Dollar change | -0.42 | 0.10 | -4.18 | 0.000 | AFGX Change | 0.17 | 0.04 | 3.81 | 0.000 | |
| | | | | | SEK to Dollar change | -0.43 | 0.10 | -4.28 | 0.000 | |
| Random Effects Model | Observations | 2000 | ΔLR | N/A | Fixed Effects Model | Observations | 2000 | ΔLR | 0.31 (P > 0.5773) | |
| | R-squared | Within | 0.3729 | | | R-squared | Within | 0.3735 | | |
| | | Between | 0.0925 | | | | Between | 0.0885 | | |
| | | Overall | 0.2879 | | | | Overall | 0.2866 | | |
| Variable | Coefficient | Standard Error | t | P>\|t\| | Variable | Coefficient | Standard Error | t | P>\|t\| | |
| Industry average | 0.48 | 0.03 | 17.68 | 0.000 | Industry average | 0.50 | 0.03 | 17.21 | 0.000 | |
| CEO Turnover | -0.04 | 0.04 | -1.13 | 0.259 | CEO Turnover | -0.02 | 0.04 | -0.51 | 0.610 | |
| Inflation | 2.02 | 1.51 | 1.33 | 0.182 | Inflation | 2.59 | 1.57 | 1.65 | 0.100 | |
| Real GDP Change | 0.22 | 1.42 | 0.16 | 0.874 | Real GDP Change | 0.05 | 1.48 | 0.04 | 0.971 | |
| Nom. GDP Change | 0.99 | 1.44 | 0.69 | 0.492 | Nom. GDP Change | 1.47 | 1.50 | 0.98 | 0.327 | |
| AFGX Change | 0.17 | 0.04 | 4.1 | 0.000 | AFGX Change | 0.18 | 0.04 | 3.97 | 0.000 | |
| SEK to Dollar change | -0.40 | 0.09 | -4.32 | 0.000 | SEK to Dollar change | -0.35 | 0.10 | -3.57 | 0.000 | |

**Table 19: Regression analyses for the adjusted variable, time period 0-3years and industry average is included.**