

CEO COMPENSATION IN TIMES OF CRISIS

**A STUDY OF CEO COMPENSATION STRUCTURE AND ITS
EFFECT ON COMPANY PERFORMANCE DURING THE COVID-
19 CRISIS**

KRISTIAN EKLUND

MELKER MATTSSON

Bachelor Thesis

Stockholm School of Economics

2022



Abstract

We investigate the effect of CEO compensation structure on company performance during the Covid-19 crisis. The results show statistical significance that a high share of short-term incentives in CEO compensation led to better financial performance and handling of the Covid-19 crisis. Furthermore, an industry specific analysis shows that short-term incentives in CEO compensation structure, led to better company performance in the Manufacturing industry. The analysis of the Transportation, Communications, Electric, Gas and Sanitary Service industries shows that a high share of long-term incentives led to worsened revenue development during the crisis. None of the other analysed industries show any significant results.

1. Introduction

1.1 Aim, scope, and research question

This study investigates whether the compensation structure of a company's CEO has an impact on the company's ability to handle a crisis. We have limited the research to the Covid-19 crisis and used compensation and financial data from the constituents of the S&P 500 index between the years 2018 and 2020.

The study is limited to companies from the United States as different countries have different cultural proneness to risk, as well as different conditions for companies in terms of taxation laws. This entails that comparison between companies operating in different countries becomes difficult. The US was chosen as the country of interest for this study as the US economy is the world's largest, alongside the fact that the data available on compensation in US-based companies is superior to that of any other country. Furthermore, the study has been limited to the S&P 500 as this index has been created to represent all industries in America. Moreover, the index constituents represent over 75% of the US stock market in terms of market capitalization.

In terms of a company's ability to handle a crisis, we have looked at the *change in revenue* and the *change in net-income margin (%)* as dependent variables. The different metrics give us different insights. Change in revenue displays the company's ability to handle the decreased demand for its products. As societies closed down, some companies were able to find innovative ways of preserving revenue through digital offerings. Net-income margin (%) depicts the company's ability to reduce costs when experiencing a revenue decrease during the crisis. The crisis we investigate is the Covid-19 pandemic which had large negative effects on both the financial markets and on companies operating performance during 2020. We have quantified this effect through a regression analysis that is based on several explanatory variables related to the compensation structure of CEOs, found in the data and research design chapter of this paper.

During the pandemic, different industries were affected in different ways. While restaurants, hotels, and leisure companies experienced a rapid decrease in sales, companies engaged in areas such as e.g., software and gaming grew, as people stayed home, and had to find ways to work and do leisure without leaving the house. To capture these differences, we have included separate regressions for different sectors.

The paper will investigate the following research question:

Is it good or bad for companies to compensate CEOs with a high share of long-term incentives in times of crisis?

The research question will be answered using a stepwise analysis of the following two hypotheses, capturing both the general impact of CEO compensation structure as well as how this may differ across industries. Hypothesis 1 (H1) considers how the CEO compensation structure impacts company performance in a crisis, and hypothesis 2 (H2), further investigates the research question within sectors.

H1: Long-term compensation for CEOs is bad for company performance in times of crisis

H2: The effect of CEO compensation varies across industries during the Covid-19 crisis, as different industries were hit differently.

1.2 Limitations

This study faces several limitations that must be considered for future studies. First, the study is limited to companies in the US. While the study can be used and deemed as relevant beyond the US, the optimal compensation structure may differ across countries, based on culture and regulations. Thereby, in order to draw general conclusions, the same study should be conducted with data from several countries.

Secondly, the study faces a limitation in the fact that the data extracted from Execucomp only stretches from 2016 to 2020. This makes it difficult to analyse several crises such as the financial crisis in 2008 or the dot-com bubble in 2000. Therefore, the results in this study are limited to the Covid-19 pandemic and can hence capture semantics specific to the year 2020. While the Covid-19 crisis had many similarities to earlier crises, in that companies had to react to a rapid and unexpected downturn in the global economy, the Covid-crisis was also unique in many regards, as described in section 1.4. To fully understand how compensation structure and company performance relate in times of crisis, further analysis during different time periods is recommended.

Furthermore, performance has been defined as the change in net-income margin and the change in revenue between 2019 and 2020. This entails that the analysis only captures the short-term financial effects of the crisis, while long-term effects are not encompassed in the results. This can have misleading effects on our analysis, as some companies might have handled the crisis well long-term while still struggling financially during the studied period. Moreover, certain trends that were growing but not extensively prevalent before the pandemic got a boost as societies closed down. Industries in change were fast-tracked into the new order and such long-term effects are yet to be seen in the financial data of companies, according to Porpiglia, Checcucci, Autorino, Amparore, Cooperberg, Ficarra, Novara (2020).

1.3 Compensation components

Executive remuneration packages are specifically designed not only to provide the executive with fair pay but also to assure that interests are aligned between management and shareholders. As CEOs are hired to act in the interest of shareholders, agency problems can occur as managers' interest is to maximize their own wealth. Therefore, it is important to understand how to align interests through compensation structure, ensuring that the CEO acts in favour of the company's shareholders.

The different types of compensation that are most utilized in executive pay structures are salary, bonus, stock grants, stock options, and other non-equity incentives. Alongside these components, executives are often entitled to a pension and health insurance.

While salary is the largest part of most employees' compensation, it often accounts for a smaller part of the executive's compensation, as it is a fixed component and the larger part of executive

pay often is tied to the performance of the company. Despite often acting as a relatively small compensation component, salary is by no means irrelevant to executives. It often acts as a base for bonuses, stock grants, and stock options, and an increase in salary thereby often entails an increase in all pay components, meaning that salary is of large importance for executives in determining their total pay.

Bonuses are part of what is commonly referred to as short-term incentives (STI), according to Guo, Jalal and Khaksari (2015). The bonus is most often paid out annually, and the size of it relates to predefined yearly goals. Thereby, in bonus terms, the company executives are interested in maximizing short-term performance, in order to receive the full bonus pay-out. In theory, this leads to companies making fewer risky long-term investments, Jensen and Murphy (1999).

Stock grants and stock options together constitute equity-based compensation. As the size of the stock options and stock grants is determined by the company's future share price, the size of this compensation component is closely related to the long-term performance of the company. The two compensation components are thereby referred to as long-term incentives (LTI). LTI is what most often is used to align the long-term interests of the executive with the long-term interests of the shareholders. In theory, a large LTI as a share of the executive's total compensation can lead to increased risk-taking, as the upside of an increased share price often is significant for the CEO, Jensen and Murphy (1999).

1.4 The Covid-19 crisis

Covid-19 erupted in Q1 2020 and was classified as a pandemic by WHO on the 11th of March of the same year. While the long-term effects on companies' financial health and performance are not yet established, the short-term effects of the pandemic are very much verifiable. The global economic effects can be divided into three buckets: loss in production capacity, supply chain disruption, and financial impact on firms, in turn affecting individuals and the global demand for goods and services, Maital and Barzani (2020).

Furthermore, as opposed to previous economic recessions, the Covid-19 crisis did not have an economic origin, but rather originated from rapid changes in consumer preferences. In addition to this, the crisis was unique in its' widespread global impact, Borio (2020).

The financial impact of the pandemic hit different companies very differently, depending on which sector they operate in and their business model. The crisis was especially difficult for companies providing consumers with out-of-home consumption Elhini and Hammam (2021). During the pandemic, companies experienced a sharp decrease in both revenue and earnings, and share prices saw a rapid decline. Dow Jones industrials experienced a decline amounting to 12.93% in one day on March 16th, 2020, the largest one-day fall since 1987, and S&P 500 dropped by 19.60% during the first quarter of 2020.

The effect of the Covid-19 pandemic on company performance is particularly interesting to study from an executive compensation point of view, as the crisis was close to impossible to foresee for company executives. The negative shockwaves of the crisis did not stem from uncertainties in companies' finances or macroeconomic factors. Instead, the downturn was an effect of the large changes in demand and consumption patterns, alongside limitations in supply chains, caused by the pandemic. As we will address in the following chapter, the existing literature on executive compensation in times of crisis is limited, showcasing the need of such

studies. The Covid-19 pandemic presents an opportunity to study executive compensation's relation to company performance, in a setting that was entirely unique. Companies' management had limited possibilities to foresee the crisis, and thereby make changes to their companies' financial stability. The uncertainties of Covid-19, exposed companies' risk levels, showcasing these in the companies' financial performance during the crisis.

1.5 Outline of the thesis

The thesis is divided into six chapters. Chapter 2 provides a literature review of relevant articles previously written on the topic of executive pay compensation structure and the impact it has on company risk-taking and company performance. The chapter is particularly focused on the impact of executive compensation on company performance in times of crisis. Chapter 3 provides insight into the data used in order to perform the research in this thesis. The chapter further deep dives into the databases: Execucomp and S&P Capital IQ, which have been used to gather the data. Furthermore, the chapter provides information on how the research has been conducted in terms of dependent variables, key explanatory variables, and the method used to perform the research. Chapter 4 provides the results of the research, divided into results answering H1 and results answering H2. Chapter 5 provides an overview of how our results relate to previous research conducted on the topic as well as a discussion on how the research was performed in relation to other literature. Following this, the chapter brings up a recommendation of future studies to be made on related topics. Chapter 6 provides a conclusion of the thesis.

2. Literature review

CEO compensation has long been a discussed topic in academia and in popular media. Jensen and Murphy (1999) highlight that the media often divert attention to how much CEOs are compensated rather than how they are compensated, which many times can be of greater interest. Furthermore, they mention that compensation structure is a vital part of an organization's success as it to a large extent determines how executives behave and what type of people the organization attracts. In this section, we will present the past and current research available on CEO compensation structure as well as discuss how our research contributes to the existing literature.

Many scholars that have researched the topic of CEO compensation structure have concluded that firm performance is positively related to the share of equity that is owned by the CEO and the share of compensation that is awarded in equity Mehran (1995), Jensen and Murphy, (1999) Shleifer and Vishny (1997). For example, Jensen and Murphy (1999) argue that in cases where the wealth of management is exclusively acquired from human capital, defined as salary and STI, the managers are more risk-averse and therefore less prone to making investments. To counter this type of decision-making, long-term incentive plans can be implemented to align the compensation of the manager with firm performance, aiming to mitigate the agency problem. This will in turn lead to management making value-maximizing decisions for the firm and its shareholders.

Some research implies that equity-based compensation can be increasingly costly for shareholders in comparison to cash-based compensation. For example, Lambert, Larcker and Verrecchia (1991) find that the executive's perceived value of his or her equity-based compensation can be different from the costs for the shareholder if the executive is not diversified in his or her wealth. Furthermore, they conclude that if there is a significant chance that the options of executives finish in the money, they become more risk-averse, as they in this case find that they have value in the options at risk. Beatty and Zajac (1994) have similar findings.

This phenomenon has also been studied by Meulbroek (2001) who concludes that managers value their equity-based compensation to less than the market value. This is due to the fact that managers are unable to diversify their risk. Managers are exposed to the entire risk of the firm, however, they are only rewarded based on the systematic share of that risk. Meulbroek states that "managers at the average NYSE firm who have their entire wealth invested in the firm value their options at 70% of their market value,". She concludes that the case is even more evident for fast-growing entrepreneurial firms; "undiversified managers at rapidly growing, entrepreneurially based firms, such as Internet-based firms, value their option-based compensation at only 53% of its cost to the firm.".

Another area that has been widely researched in the domain of executive compensation is the notion that compensation structure is a function of certain firm characteristics. For example, Smith and Watts (1992) find that companies that have a large part of the firm value represented by investment opportunities are more likely to have an incentive plan, in order to ensure that the executive is willing to make value-enhancing investments. Gaver and Gaver (1993) have similar findings in their study of the relationship between investment opportunities and compensation policies. They conclude that firms with large investment opportunities pay significantly higher cash bonuses to executives and have a higher prevalence of stock option plans.

In this paper, we consider the agency cost theory mentioned by Mizruchi (2004) as a basis for our analysis. He states that the separation of ownership and control in firms gives rise to information asymmetries between the executives of the firm and the shareholders. This in turn gives rise to the monitoring of executives which we call corporate governance. The costs associated with monitoring and the decisions made by the executives that are not in the best interest of shareholders are known as agency costs. To combat agency costs, shareholders can align the interests of the CEO and the management team by tying their compensation to the long-term performance of the company. This can be done using e.g., options or stock-based awards. As Murphy (1999) states, “Stock ownership provides the most direct link between shareholder and CEO wealth.”.

Certain studies have examined the compensation of the CEO and the risk-taking of companies before a crisis. For example, Shah, Akbar, Liu, Liu, and Cao (2017) found in their study of banks during the financial crisis in 2008, that CEO bonuses are negatively related to a bank's risk-taking before the crisis. Other studies such as Fahlenbrach and Stulz (2011) found no evidence that banks where CEOs had their compensation better aligned with the interest of shareholders, performed better on the stock market during the 2008 crisis. Instead, they found some evidence that banks that had their CEO's compensation in line with the interest of shareholders, showed weaker stock returns alongside weaker return on equity.

A large part of the academic literature that we have presented focuses on executive compensation during times that are not associated with the word crisis. Only Shah (2017) and Fahlenbrach (2011) present evidence from a time period that can be described as an economic crisis. Our research focuses on the global Covid-19 pandemic and thus aims to contribute to future decision-making for shareholders when deciding on executive compensation and considering the risk aspect of a crisis. Another differentiating factor in our analysis is our focus on the largest American corporations rather than having a broader geographical scope, limiting the research to companies operating under similar regulations. We believe that this research will prove useful for further studies and corporate decision-making.

3. Data and research design

This chapter provides information on the data used to carry out the analysis. The data has been sourced from Compustat Execucomp and S&P Capital IQ. Alongside this, the chapter aims to provide insight into the research design used to evaluate the impact of CEO compensation in terms of company performance during the Covid-19 crisis. The chapter will go through the variables used to conduct this research, followed by the data cleaning and estimation methods.

3.1 Compustat Execucomp

The compensation data used in our analysis was provided via Compustat Execucomp. The data source provides data on executive compensation across 2,500 US based companies. The data provided is related to the tracking of executives in the largest companies in the US, alongside their respective pay components on a yearly basis. The executive compensation is divided into several buckets, including Salary, Bonus, Non-Equity Incentives, Option Awards, Stock Awards, Pension, and Other Compensation. In our analysis, we have chosen not to include all the 2,500 companies in the Compustat Execucomp database but rather focus on the companies included in the S&P 500 due to data availability alongside the index' broad representation of the American economy.

3.2 S&P Capital IQ

S&P Capital IQ is a research provider, offering data on 62,000 public companies. The data source provides data on company financials, estimates, ownership, transaction data, industry data, and private company data. In terms of this research paper, S&P Capital IQ has been used to gather data on CEO ownership, Market Cap (2020-01-01), revenue development (2019-2020), net-income development (2019-2020), and the SIC codes, of the S&P 500 companies.

3.3 Summary of data

This section provides insights into the data that has been extracted from Compustat Execucomp and S&P Capital IQ and used to perform the analysis.

Table 1 - Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Revenue change%	418	.0343372	.6373814	-.8388292	12.34551
Net Income change%	418	-.0607687	.4993171	-3.278951	7.608283
Salary%	417	.1566304	.1344938	-.8476676	1
Bonus%	384	.0196724	.0759561	0	.6003707
Non-equity Incentives%	384	.2408993	.1615381	0	.9536109
Options%	384	.1026271	.1479953	0	.7496421
Stocks%	384	.4801708	.2391862	0	1
Ownership%	398	376,353.9	7497247	0	1.50e+08
Agriculture	427	0	0	0	0
Mining	427	.0327869	.1782873	0	1
Construction	427	.0093677	.0964454	0	1
Manufacturing	427	.4074941	.4919445	0	1
Transport, Communication, Electric, Gas and Sanitary Service	427	.117096	.3219118	0	1
Wholesale trade	427	.028103	.1654611	0	1
Retail trade	427	.0515222	.2213197	0	1
Finance	427	.2014052	.4015205	0	1
Services	427	.1451991	.3527147	0	1
Public Administration	427	0	0	0	0
Market Capitalization	415	4.448112	.4286964	3.469586	6.115532

After having cleaned the data for companies having experienced a CEO shift during 2018-2020, the data consists of 427 companies. Of these companies, CEO's compensation in terms of salary, bonus, non-equity incentives, option awards, and stock awards, is visible for 368 of the companies. Furthermore, the companies have been divided into multiple sectors based on the SIC codes of the respective companies. The sectors that are used when analysing differences among industries are:

- Agriculture, Forestry and Fishing
- Mining
- Construction
- Manufacturing
- Transportation, Communications, Electric, Gas and Sanitary Service
- Wholesale Trade
- Retail Trade
- Finance, Insurance and Real Estate
- Services
- Public administration

The data shows that the largest part of compensation among CEOs derives from LTI, as the mean of stock awards, option awards and non-equity incentives together amount to over 80% of total CEO compensation, as seen in *table 1*. Furthermore, it is seen that salary and bonus account for a small part of CEO compensation for most CEOs. The reason behind the large part of LTI in relation to STI, is that it is of shareholder interest to align incentives between management and the shareholders, to minimize the agency cost. Furthermore, it is seen in the data that the largest part of companies operate in Manufacturing, Finance, Insurance and Real Estate, Services, or Transportation, Communications, Electric, Gas and Sanitary service. In terms of stock ownership, it is seen that the mean value is large in relation to salary. However, the high mean is skewed due to there being some founder led companies, where the CEO's ownership is unproportionally large compared to that of other CEOs.

3.4 Data limitations

Although Compustat Execucomp and S&P Capital IQ are reliable and professional sources, there are several limitations to the data. The data from both data providers included several missing variables. Therefore, the variables were included in the analysis based on availability.

Furthermore, several companies had seen a shift in their CEO during 2018 or 2019, meaning that the sitting CEO's compensation was not available in the years prior to the Covid pandemic. The companies where this was applicable were excluded from the analysis, as there were data limitations related to the past compensation of the new CEO. A full list of excluded companies can be found in Appendix B.1.

Alongside the aforementioned limitations, there was a limitation in terms of too few companies to perform meaningful regressions in some of the sectors in the S&P 500 index. After having cleaned for companies with shifts in CEO during 2018 and 2019, we were left with 0 companies in the agriculture sector, 14 companies in the mining sector, 4 companies in the construction sector, 174 companies in the manufacturing sector, 50 companies in the transportation, communications, electric, gas and sanitary service sector, 12 companies in the wholesale sector, 22 companies in the retail sector, 86 companies in the finance, insurance and real estate sector, 62 companies in the services sector, and 0 companies in the public administration sector, in regards to their SIC codes. This implies some limitations on our ability to perform regression

analysis on sectors such as agriculture, mining, construction, wholesale, retail, and public administration.

3.5 Variables and descriptive statistics

This section gives an overview of the variables included in the analysis. The section brings up the dependent variables, key explanatory variables, as well as control variables used to ensure the robustness of the model. The variables selected for the analysis have been chosen with regard to the research brought up in the Literature Review chapter.

3.5.1 Dependent variables

During the Covid-19 crisis, companies experienced large losses, not only related to revenue, but also to the bottom line. In order to capture both effects in our analysis, we have included both top-line and bottom-line metrics in our analysis. The top-line metric used to perform this analysis is: *Change in revenue 2019/2020 (%)*. While the worst part of the pandemic, in terms of stock performance was experienced during Q1 2020 for most companies, the full year was affected in terms of underlying company performance, due to the restrictions faced in society at the time.

While there are several profit parameters to choose from in order to understand how the companies have managed to shrink their cost base and keep profit levels somewhat constant during 2020, we have chosen to isolate bottom-line performance to: *Change in net-income margin 2019/2020 (%-points)*. This has been done as net-income reflects the overall profitability of the business and considers all aspects of manager performance.

Regressions have been performed on both of the above-mentioned dependent variables. The aim is to determine the CEO compensation structure's effect on both top-line and bottom-line performance during the crisis.

3.5.2 Key explanatory variables

To understand the impact of CEO compensation structure on companies' financial performance, a breakdown of the compensation structure is necessary. CEO compensation components have been split into different compensation types, creating the variables: *Salary%*, *Bonus%*, *Non-Equity Incentives%*, *Option Awards%* and *Stock Awards%*. Alongside compensation, it is relevant to take CEO ownership into consideration in order to understand how the CEOs' incentives align with shareholders' incentives. Thereby, an additional variable: *Ownership%* has been used as an explanatory variable, despite it not being directly related to CEO compensation.

$$Salary\% = \frac{Salary}{Total\ Compensation}$$

$$Bonus\% = \frac{Bonus}{Total\ Compensation}$$

$$\text{Non – Equity Incentives}\% = \frac{\text{Non – Equity Incentives}}{\text{Total Compensation}}$$

$$\text{Option Awards}\% = \frac{\text{Option Awards}}{\text{Total Compensation}}$$

$$\text{Stock Awards}\% = \frac{\text{Stock Awards}}{\text{Total Compensation}}$$

$$\text{Ownership}\% = \frac{\text{Ownership (\$)}}{\text{Total Compensation}}$$

Two compensation components that were included in Compustat Execucomp were excluded from the analysis, namely, pensions and other compensation. This has been done as the component named “*other compensation*” can differ in its meaning from company to company, meaning that the variable will provide limited value in the regressions and be difficult to interpret. Furthermore, pensions were excluded due to the fact that it would have had an impact on the long-term incentives part of the compensation, which in reality has little to do with pensions. Alongside this, the pensions part of the total compensation was small relative to other compensation components. In order to adjust for the excluded variables, the total compensation that we have used when dividing the compensation components is in fact (*total compensation - other compensation - pensions*) rather than the total compensation component from Execucomp. This makes sure that the sum of all compensation variables included is 1 for all CEOs.

3.5.3 Control variables

In order to ensure the robustness of the linear regression model, control variables have been included in the analysis. Control variables are held constant in the analysis and aim to further understand the relationship between the dependent variables and the explanatory variables.

In terms of testing H1, the following control variables have been included in the model: *Agriculture, Mining, Construction, Manufacturing, Transportation, Wholesale, Retail, Finance, Services, Public Administration*, and the *Logarithmized Market Cap*, where the sector specific variables are assigned as dummy variables based on the first number of the SIC code of the company, and where logarithmized Market Cap represents the logarithm of the market capitalization of the company as of the 1st of January 2020. The reason for the timing of when the market capitalization is taken, is chosen to represent the size of the company at the beginning of the crisis, to avoid accounting for the large differences in changes in share price among companies during the crisis. Market cap is logarithmized to normalize the otherwise skewed data variable.

In terms of testing H2, the sector specific control variables are excluded, as the regressions only contain companies from one chosen sector. However, the control variable *Logarithmized Market Cap*, is used in the same way as in H1.

3.6 Estimation method

This section aims to provide an overview of how the analysis has been performed. The section is divided into data cleaning and regression and is followed by an overview of the robustness test that has been performed.

3.6.1 Data cleaning and regression

The data collected and used in the analysis was extracted from Compustat Execucomp and S&P Capital IQ. The data was collected by extracting the relevant variables from both data sources into excel. The excel files extracted from both data sources were merged into one file. Furthermore, the variables described in section 3.5 of the report were created.

Thereafter, the data was cleaned by removing the rows containing executives of companies with missing values in the compensation data, as well as companies that had experienced a shift in CEO during 2018-2020. The reasoning behind cleaning for companies experiencing a CEO shift was that the lack of compensation data on the newly appointed CEO for the years leading up to the crisis. This makes it difficult to draw conclusions on how their compensation has affected the risk exposure of the company prior to the crisis. Therefore, with lack of data it is not possible to understand how the new CEOs' handling of the crisis relates to the firm's compensation policy. A full list of excluded companies is provided in the Appendix B1.

After cleaning for these companies, we were left with 368 companies, accounting for 74% of the total S&P 500. The data was thereafter inserted in the statistical software, STATA, where statistical analysis, in forms of linear regressions was performed. The analysis aims to estimate how company performance is affected by CEO compensation structure. Thereby, the following two models were created to answer the first hypothesis (H1).

H1: Long-term compensation for CEOs is bad for company performance in times of crisis

$\Delta Net - incomeMargin2020$

$$\begin{aligned} &= \beta_1[Salary\%] + \beta_2[Bonus\%] + \beta_3[Non - equity incentives\%] \\ &+ \beta_4[Options\%] \beta_5[Stocks\%] + \beta_6[Ownership\%] \\ &+ \beta_7[Agriculture, Forestry and Fishing] + \beta_8[Mining] + \beta_9[Construction] \\ &+ \beta_{10}[Manufacturing] \\ &+ \beta_{11}[Transportation, Communication, Electric, Gas, and Sanitary Service] \\ &+ \beta_{12}[Wholesale trade] + \beta_{13}[Retail trade] \\ &+ \beta_{14}[Finance, Insurance and Real Estate] + \beta_{15}[Services] \\ &+ \beta_{16}[Public Administration] + \beta_{17}[\log (Market Capitalization)] + \alpha \end{aligned}$$

$\Delta\text{Revenue2020}$

$$\begin{aligned}
&= \beta_1[\text{Salary}\%] + \beta_2[\text{Bonus}\%] + \beta_3[\text{Non} - \text{equity incentives}\%] \\
&+ \beta_4[\text{Options}\%] + \beta_5[\text{Stocks}\%] + \beta_6[\text{Ownership}\%] \\
&+ \beta_7[\text{Agriculture, Forestry and Fishing}] + \beta_8[\text{Mining}] + \beta_9[\text{Construction}] \\
&+ \beta_{10}[\text{Manufacturing}] \\
&+ \beta_{11}[\text{Transportation, Communication, Electric, Gas, and Sanitary Service}] \\
&+ \beta_{12}[\text{Wholesale trade}] + \beta_{13}[\text{Retail trade}] \\
&+ \beta_{14}[\text{Finance, Insurance and Real Estate}] + \beta_{15}[\text{Services}] \\
&+ \beta_{16}[\text{Public Administration}] + \beta_{17}[\log(\text{Market Capitalization})] + \alpha
\end{aligned}$$

$\Delta\text{Net-IncomeMargin2020}$ refers to the change in the companies' net-income margins between the years 2019-2020, and aims to be explained by: salary, bonus, non-equity incentives, option awards, stock awards, and ownership in the company, all as a share of total compensation. Control variables for market capitalization and industry classification have also been added to the model.

$\Delta\text{Revenue2020}$ refers to the change in the companies' revenue between the years 2019-2020, and aims to be explained by: salary, bonus, non-equity incentives, option awards, stock awards, and ownership in the company, all as a share of total compensation. Control variables for market capitalization and industry classification have also been added to the model.

To test the second hypothesis (H2), the companies in the data were divided into sector groups, based on the first number of their SIC codes. Regressions were performed for each of the sectors: a) Finance b) Manufacturing c) Transport, Communications, Electric, Gas and Sanitary Service d) Services, with the target variable being revenue development and change in net-income margin. The other sectors from have been excluded from the analysis due to the lack of sufficient data, in terms of too few companies in our dataset in the sectors to perform meaningful regressions.

H2: The effect of CEO compensation varies across industries during the Covid-19 crisis, as different industries were hit differently

 $\Delta\text{Revenue2020}$

$$\begin{aligned}
&= \beta_1[\text{Salary}\%] + \beta_2[\text{Bonus}\%] + \beta_3[\text{Non} - \text{equity Incentives}\%] \\
&+ \beta_4[\text{Options}\%] + \beta_5[\text{Stocks}\%] + + \beta_6[\text{Ownership}\%] \\
&+ \beta_7[\log(\text{Market Capitalization})] + \alpha
\end{aligned}$$

$\Delta\text{Revenue2020}$ refers to the change in the companies' revenue between the years 2019-2020, and aims to be explained by: salary, bonus, non-equity incentives, option awards, stock awards, and ownership in the company, all as a share of total compensation. A control variable for the logarithmized market capitalization is included in the model. The same regression is performed on companies in four of the eleven sectors in the SIC coding system, based on data availability (see 3.4 data limitations).

$$\begin{aligned}
& \Delta \text{Net} - \text{incomeMargin2020} \\
&= \beta_1[\text{Salary}\%] + \beta_2[\text{Bonus}\%] + \beta_3[\text{Non} - \text{equity Incentives}\%] \\
&+ \beta_4[\text{Options}\%] + \beta_5[\text{Stocks}\%] + \beta_6[\text{Ownership}\%] \\
&+ \beta_7[\log(\text{Market Capitalization})] + \alpha
\end{aligned}$$

$\Delta \text{ProfitMargin2020}$ refers to the change in the companies' profit margins between the years 2019-2020, and aims to be explained by: salary, bonus, non-equity incentives, option awards, stock awards, and ownership in the company, all as a share of total compensation. A control variable for the logarithmized market capitalization is included in the model. The same regression is performed on companies in four of the eleven sectors in the SIC coding system, based on data availability (see 3.4 data limitations).

3.6.2 Robustness test

In order to check for the strength of our statistical model, a robustness test has been conducted. 11 control variables have been added of which 10 are dummy variables that reveal the industry classification of each company. The reason we chose to include the industry classification was to determine if the industry affiliation of a company determines how it handled the crisis rather than the CEOs compensation structure. Thus, our model controls for industry fixed effects.

The final control variable accounts for the logarithmized market capitalization of each company. We chose this variable because of companies' difference in ability of handling crises due to their size. Whether or not it is beneficial to have a large market capitalization in order to handle a crisis is unclear. Firms with larger market capitalization might be more exposed to global shocks while at the same time be able to benefit from having economies of scale. Nevertheless, this variable could influence the result and is thus included in our model.

Furthermore, we have performed a stepwise analysis. We added our explanatory variables in a stepwise order to analyse the difference in significance of the variables. This allows us to identify large shifts in i.e., significance levels or the t-value of certain variables.

4. Results

This chapter will provide the results of the models described in the estimation method section of this report. As stated, this thesis examines the following research question: *Is it good or bad for companies to compensate CEOs with a high share of long-term incentives in times of crisis?* This question has been divided into two hypotheses, which will be answered in separate sections of this chapter.

4.1 Effect of CEO compensation on company performance during a crisis

H1: Long-term compensation for CEOs is bad for company performance in times of crisis

This section aims to address the first hypothesis. The results are visible in *table 2*, showing a regression with the dependant variable: *Change in net-income margin 2019/2020 (%-points)*, *table 3*, showing a regression with the dependant variable: *Change in revenue 2019/2020 (%)*.

As seen in *table 2* and *table 3*, short-term incentives, i.e., bonus is positively correlated with companies' ability to handle the Covid-19 crisis with a significance of p-value < 0.0000 regarding both revenue change and change in net-income margin. On the contrary, stock awards have a negative impact, with a significance of p-value < 0.01 regarding revenue change. This implies that it is possible to interpret the effect that bonuses, and stock awards have on both company performance. Noteworthy is that major parts of long-term incentives, meaning option awards and stock awards have a negative effect on the outcome of a firm's performance in terms of revenue change, whereas short-term incentives are beneficial in terms of handling crises. This implies that companies that are compensating their executives with a higher share of STI, are better suited to tackle an unforeseen crisis than companies where the executives are compensated with a high share of LTI.

As can be seen in *table 2* and *3*, the t-value of variable "Bonus%" decreases somewhat between regression 2 and 7. However, the variable is still significant at a p-value < 0.001. The variable "Stocks%" is negatively correlated with change in net-income margin (*table 2*) at a p-value < 0.05 in regression 5 and 6. However, as control variables are added for industry fixed effects and market capitalization, the results are no longer significant. In terms of change in revenue (*table 3*), the variable "Stocks%" is negatively correlated on a significance level p-value < 0.01 as can be seen in regression 5,6 and 7. Even though the t-value decreases somewhat as more variables are added, the significance level remains the same.

Important to note is that the variable "Salary%" is omitted from regression 5,6 and 7 both when studying change in net-income margin as well as change in revenue (*table 2* and *table 3*). This is due to a collinearity problem with the variable "Bonus%".

Table 2 - Regression table of net-income (%-points) change 2019-2020

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Salary%	0.421*	0.450*	0.456*	0.476*			
	(2.00)	(2.22)	(2.22)	(2.31)			
Bonus%		1.856***	1.830***	1.874***	1.398***	1.653***	2.036***
		(5.56)	(5.20)	(5.28)	(3.40)	(3.79)	(4.54)
Non-equity Incentives%			-0.0398	-0.0188	-0.494	-0.506	-0.330
			(-0.23)	(-0.11)	(-1.75)	(-1.75)	(-1.14)
Options%				0.185	-0.290	-0.318	-0.350
				(1.06)	(-1.13)	(-1.21)	(-1.34)
Stocks%					-0.476*	-0.487*	-0.405
					(-2.31)	(-2.33)	(-1.94)
Ownership%						-1.40e-09	-2.98e-10
						(-0.41)	(-0.09)
Agriculture							
Mining							-0.375
							(-1.00)
Construction							0.060
							(0.14)
Manufacturing							0.090
							(0.26)
Transport Communication Electric Gas & Sanitary Service							-0.151
							(-0.43)
Wholesale trade							0.026
							(0.07)
Retail trade							0.052
							(0.14)
Finance							-0.188
							(-0.54)
Services							-0.011
							(-0.03)
Public Administration							
Market Capitalization							-0.018
							(-0.30)
Constant	-0.131**	-0.172***	-0.163**	-0.191**	0.284	0.295	0.326
	(-3.13)	(-4.21)	(-2.88)	(-3.06)	(1.53)	(1.56)	(0.66)
N	377	377	377	377	377	369	368
R ²	0.011	0.086	0.086	0.089	0.089	0.101	0.162

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3 - Regression table of revenue (%) change 2019-2020

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Salary%	0.725** (2.67)	0.778** (3.11)	0.772** (3.06)	0.781** (3.08)			
Bonus%		3.394*** (8.25)	3.419*** (7.88)	3.440*** (7.87)	2.659*** (5.25)	3.077*** (5.74)	3.463*** (6.16)
Non-equity Incentives%			0.0386 (0.18)	0.0486 (0.23)	-0.733* (-2.10)	-0.757* (-2.13)	-0.590 (-1.63)
Options%				0.0888 (0.41)	-0.692* (-2.18)	-0.746* (-2.31)	-0.754* (-2.29)
Stocks%					-0.781** (-3.08)	-0.798** (-3.11)	-0.696** (-2.66)
Ownership%						-2.31e-09 (-0.55)	-1.22e-09 (-0.29)
Agriculture							
Mining							0.106 (0.23)
Construction							0.259 (0.48)
Manufacturing							0.387 (0.89)
Transport Communication Electric Gas & Sanitary Service							0.194 (0.44)
Wholesale trade							0.266 (0.56)
Retail trade							0.356 (0.77)
Finance							0.151 (0.34)
Services							0.294 (0.66)
Public Administration							
Market Capitalization							-0.122 (-1.6)
Constant	-0.0730 (-1.36)	-0.149** (-2.96)	-0.158* (-2.27)	-0.171* (-2.22)	0.610** (2.66)	0.628** (2.69)	0.793 (1.28)
N	377	377	377	377	377	369	368
R ²	0.019	0.170	0.170	0.170	0.170	0.190	0.218

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.2 Differences across sectors

H2: The effect of CEO compensation varies across industries during the Covid-19 crisis, as different industries were hit differently.

This section aims to address the second hypothesis. The results are visible in *tables 4-5*, as well as Appendix A1-A6. showing regressions from the sectors Manufacturing, Finance, Services, and Transportation, Communications, Electric, Gas and Sanitary Service, based on the dependent variables *change in revenue 2019/2020 (%)* and *change in net-income 2019/2020 (%)*. The reason why only these four sectors were analysed with regressions was since the other sectors did not have enough companies in our dataset to provide meaningful results, (see 3.4 data limitations).

The most significant regression is the one performed on the Manufacturing companies, in *table 4 and table 5*. For Manufacturing, it is true that bonus is positively correlated with revenue change. For net-income margin, the results are similar. Bonus is positively correlated with the net-income margin change for companies. In terms of the regressions in Appendix A.1-A6, statistical significance exists in that stock awards are negatively related to revenue change (Appendix A.3). However, no statistical significance exists in the other sector specific regressions, meaning that no clear correlation between revenue change and CEO compensation can be seen. Hence they will not be further analysed.

Important to note is that the variable “Salary%” is omitted from regression 5 and 7 both when studying change in profit margin as well as change in revenue. This is due to a collinearity problem with the variable “Bonus%”. The variable “Bonus%” is omitted in regression 6 for both change in net-income margin as well as change in revenue due to the same reason as previously mentioned.

Table 4 - Regression table of Manufacturing companies' revenue (%) change 2019-2020

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Salary%	3.217** (3.28)	1.390** (2.71)	1.326* (2.32)	1.308* (2.28)		-14.19*** (-12.29)	
Bonus%		15.44*** (20.00)	15.51*** (18.88)	15.47*** (18.76)	14.16*** (12.48)		14.637*** (12.52)
Non-equity Incentives%			0.0910 (0.26)	0.0625 (0.18)	-1.246 (-1.57)	-15.40*** (-19.63)	-0.693 (-0.81)
Options%				-0.225 (-0.78)	-1.533* (-2.43)	-15.70*** (-18.20)	-1.14 (-1.70)
Stocks%					-1.308* (-2.28)	-15.48*** (-18.58)	-0.979 (-1.62)
Ownership%						0.000284 (0.22)	0.000 (0.30)
Market Capitalization							-0.194 (-1.87)
Constant	-0.385* (-2.26)	-0.258** (-2.93)	-0.270** (-2.71)	-0.230* (-2.04)	1.079* (2.03)	15.25*** (18.44)	1.599* (2.59)
<i>N</i>	146	146	146	146	146	145	145
<i>R</i> ²	0.069	0.755	0.755	0.756	0.756	0.756	0.762

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5 - Regression table of Manufacturing companies' net-income (%) change 2019-2020

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Salary%	1.807** (2.93)	0.687* (2.01)	0.587 (1.54)	0.574 (1.51)		-9.027*** (-11.78)	
Bonus%		9.465*** (18.43)	9.575*** (17.53)	9.542*** (17.42)	8.968*** (11.91)		9.409*** (12.24)
Non-equity Incentives%			0.140 (0.60)	0.118 (0.51)	-0.456 (-0.87)	-9.423*** (-18.10)	0.050 (0.09)
Options%				-0.174 (-0.91)	-0.748 (-1.78)	-9.734*** (-17.00)	-0.390 (-0.88)
Stocks%					-0.574 (-1.51)	-9.564*** (-17.30)	-0.272 (-0.68)
Ownership%						0.000467 (0.53)	0.001 (0.65)
Market Capitalization							-0.0167* (-2.45)
Constant	-0.236* (-2.21)	-0.158** (-2.70)	-0.176** (-2.66)	-0.145 (-1.94)	0.429 (1.21)	9.415*** (17.16)	0.856* (2.11)
N	146	146	146	146	146	145	145
R ²	0.056	0.721	0.721	0.723	0.723	0.723	0.735

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5. Discussion

In this section of the thesis, we aim to discuss our results with regard to the existing academic literature. This is done to further analyse our research question: *Is it good or bad for companies to have a high share of their CEO's compensation in long-term incentives leading up to a crisis?* To provide a clear overview, the discussion will be split into subsections, first discussing the research method, followed by the results in relation to each of our two hypotheses, and suggestions for further research.

5.1 Research method and data

In terms of data selection, all research has been conducted on S&P 500 companies. Thereby, the dataset was limited, leading to issues in finding sufficient data to answer H2 from all industries points of view. This led to H2 being answered only from the Manufacturing, Finance, Services, and Transportation, Communications, Electric, Gas and Sanitary Service industries.

Furthermore, the research method struggles to capture all parts of company performance. While it reflects both top-line and bottom-line development during the time period, it fails to acknowledge several other performance metrics such as e.g., ROE, ROIC, ROA, and cashflow metrics. Such metrics are also of interest when understanding company performance and companies' abilities to handle crisis efficiently, and for further research, we recommend including more performance metrics, broadening the understanding of compensations effect on performance. While more performance metrics will provide a broader view on performance and its relation to executive compensation structure, we believe that by capturing revenue and earnings development we identify two key components of performance, being representative for the companies' overall performance.

The research question is answered through examining the Covid-19 crisis, which differed from other prior crises in several aspects. Firstly, the crisis originated from rapid changes in consumer patterns, affecting companies and their operations over night. This differs from how many previous crises have happened, often starting with financing difficulties among companies, in turn resulting in smaller shifts in consumer patterns. Secondly, the crisis struck globally, and all firms were affected in their operations. While the crisis given its' uniqueness is interesting to examine, one must be aware of these differences and consider them in order to interpret and implement the findings in our study on a broader basis.

5.2 Long term CEO incentives are bad for company performance in times of crisis

Our findings are not in line with a vast part of previous research on executive compensation. Findings presented by i.e., Mehran et al. (1995), Jensen and Murphy (1999) and Shleifer and Vishny (1997) suggest that the performance of a company is positively related to the share of equity that is owned by the CEO as well as the share of compensation that is awarded in equity. However, these papers differ from ours in that they are not specifically targeting company performance during periods of crisis, but rather performance during longer time periods.

Our analysis shows that option grants and stock grants are negatively related to changes in revenue in times of crisis. However, some previous research supports our findings. Fahlenbrach and Stulz, (2011) found that banks that had their CEO's compensation more in line with

shareholder interests had lower stock returns and lower return on equity during the 2008 financial crisis. Fahlenbrach and Stulz's paper is particularly interesting for this thesis as it investigates CEO compensation during a crisis. Much of the existing academic literature in the area of CEO compensation does not feature this nuance.

In this thesis, we have not evaluated the performance of companies in the same way as Fahlenbrach and Stulz (2011) have done in their study of banks during the financial crisis. They measure performance looking at stock returns as well as return on assets and return on equity. We understand that our measure of evaluating is not fully comparable with the previous authors, however, we believe it serves as a good indication for evaluating similar effects.

One explanation for our findings can be found in the research of Shah et al. (2017). They found, in their research of banks during the financial crisis in 2008, that bonuses for CEOs were negatively related to a bank's risk-taking before the crisis. In our analysis, we find that bonus is the only variable that has a positive effect both on revenue change and net-income change out of the variables that are not industry-specific. This could be connected to the agency cost issue of a corporation. An undiversified executive is solely dependent on the company's performance for his or her wealth. However, a shareholder can diversify his or her risk in their portfolio. This makes the CEO less prone to accepting risky investments and can thus mean that he or she is not making decisions that are value-maximizing for the shareholder and thus agency costs can occur.

As Shah et al. (2017) suggest, the bonus is negatively related to risk-taking before a crisis and can thus mean that the company whose CEO is compensated with a high share of STI, performs better during the crisis than it would if it had compensated the CEO with a high share of LTI, thereby having made the risky investments. The key message communicated by Shah et al. (2017) is how the compensation structure affects risk-taking. Our thesis does not study risk-taking in particular, however, we can see it as a possible explanation for our findings.

An important differentiating factor between this thesis and the findings presented by Shah et al. (2017) is the scope of the research. In their paper, Shah et al. (2017) investigate compensation data of companies in the Execucomp database with standard industry classification codes between 6000 and 6300. They make some adjustments such as removing companies classified as "Investment Advice", "Finance Services" and "Security Brokers and Dealers" since they do not lend out money. The rest of the companies can be characterized as being part of the financial industry. Our thesis incorporates all of the industries defined in the SIC-codes and not just the financial sector which entails that the results are not fully comparable. What is particularly surprising is that the regression performed in this thesis on the finance industry, did not yield any significant results. We believe that this can be a result of a smaller sample in our study as Shah et al. (2017) had approximately 300 firm-year observations while our study included approximately 80.

In this thesis, we consider the bonus as short-term compensation just as Guo, Jalal and Khaksari (2014) do in their research on bank executive compensation and risk-taking during the financial crisis. This explains and supports our findings that short-term compensation is positively correlated with company performance during a crisis, both in terms of revenue change and net-income change.

As previously mentioned, our study aims to find whether long-term incentives for the CEO are good for a company during a crisis. We can thus not draw any conclusions for time periods that

are not characterized as a crisis. However, what we have seen from previous literature that studies CEO compensation during normal times is that LTI have a positive effect on company performance. This matches the explanation earlier presented by Shah et al. (2017) since riskier investment tend to be beneficial during normal times and can thus yield a better return.

5.3 The effect of CEO performance varies across industries during the Covid-19 crisis

The results presented regarding H2 showed that the manufacturing industry was the only industry where we saw significant results, both in terms of revenue and net-income margin development. Furthermore, the results from the manufacturing industry were well aligned with those of the selection of companies in its entirety. The Transport, Communications, Electric, Gas and Sanitary Service industry saw significant results in that a high share of LTI has a negative impact on revenue development, while no significant results were attained in the change in net-income margin. The other industries: Finance and Services, however, did not show the same outcome, and the regressions were not significant on either point-one, one, or five percent significance. Thereby, no clear conclusions can be drawn from these industries regarding CEO compensation and its relation to revenue change.

Alongside the fact that the correlation between CEO compensation structure and company performance is larger in the manufacturing industry than in the other tested industries, an additional reason to the significance can be that out of all industries in our dataset, manufacturing was the industry with the largest sample size. A larger sample size increases the significance of a regression, and it could therefore be true that the correlation between revenue change and CEO compensation is present in other industries as well, but our sample size is too small. However, it could also be the case that our observed effects are only relevant for the manufacturing industry. Since the sample size is the largest in the manufacturing industry, it could influence the overall regression and thus affect our conclusion in H1. This would imply that the results for the manufacturing industry are generalized for companies in all types of industries.

As for the time period that this study examines, it is true that the Covid-19 crisis was different in its nature compared to many other previous crises. During the Covid-19 crisis, companies were hit very differently, depending on which sector they operate in. Some companies in chosen industries, e.g., gaming, and social media companies, were able to benefit from a high-risk exposure, as their industries took off due to the consequences of the way of living during the crisis, whereas many other companies benefited from limited exposure to risk during the crisis. This is different regarding previous crises where all industries saw drawdowns in performance.

The results in our findings in the manufacturing industry are backed by the research from Jensen and Murphy, (1999), suggesting that risk-taking is increased with increased CEO exposure to company performance. Manufacturing is one of the industries that saw a large drawdown from the recession, with most companies in the industry experiencing revenue loss during the year 2020 compared to the previous year. Thereby, limited risk-taking was positive for manufacturing company performance, hence supporting the fact that having a large share of CEO compensation in bonuses and other STI was beneficial for manufacturing companies during the time leading up to the crisis.

Regarding the findings of Jensen and Murphy (1999) and the nature of the Covid-19 crisis, companies in some industries should benefit from a high share of CEO long term incentives,

whereas companies in other industries should benefit from a high share of CEO short term incentives, depending on how the crisis affected the industry's overall outlook. However, this has not been supported in this research paper.

5.4 Further research suggestions

Having conducted this study, we have come across several areas of research that would be interesting to further investigate in future studies. Firstly, as our study has been limited to US companies, failing to account for cultural differences and regulations across regions, it would be interesting to perform further studies on how the effects of executive compensation structure varies across different regions through using data from multiple countries.

Secondly, it would provide further depth to the research to investigate how compensation structure has influenced company performance in multiple crises, rather than limiting it to Covid-19. As stated, the Covid-19 crisis was unique in many regards, and there may be differences in how executive compensation structure affected companies in this crisis compared to previous crises. Therefore, we recommend studying several crises, understanding if the results attained in this study are applicable for crises in general, thus, facilitating for boards setting their CEO compensation.

Finally, research on the optimal pay structure can be conducted through accounting for the benefits of STI in times of crisis, the benefits of LTI in times of non-crisis, alongside the risk level of a crisis occurring. While the optimal compensation structure of course varies on an individual level, based on proneness to risk among the CEO and other company specific features, this suggested research could be useful to companies' boards in terms of setting executive pay.

6. Conclusion

By examining CEO compensation structures in S&P 500 companies and their performance during the Covid-19 crisis, this thesis has given insight into how executive compensation structure relates to company performance in times of crisis.

The thesis shows significant results indicating that a high share of STI in the CEO compensation structure improves the companies handling of crises, both in terms of revenue development and net-income margin development. In addition to this, the analysis provides significant results showing that a high share of both option awards and stock awards in the CEO compensation has a negative impact on the revenue development during the crisis. Option awards and stock awards as part of CEO compensation showed no significant impact on the change in net-income margin during the period. The results confirm previous research having been conducted by Shah et al. (2017) and show several similarities with the findings by Fahlenbrach and Stulz (2011) on the 2008 financial crisis.

Despite the alignment of the results with several previous research papers, the results contradict the findings of Mehran et al. (1995), Jensen and Murphy (1999) and Shleifer and Vishny (1997), which found that the performance of a company is positively related to the share of equity that is owned by the CEO as well as the share of compensation that is awarded in LTI. However, this research has been conducted on data from time periods that cannot be classified as a crisis.

In terms of the sector specific results, our findings show significant results for the Manufacturing industry, indicating that a high share of STI is positively related to company performance in terms of both revenue and net-income margin development. Furthermore, the Transportation, Communications, Electric, Gas and Sanitary Service industry showed significant results that a high share of LTI had a negative effect on the revenue development during the crisis, however, no significance was found in terms of its effect on net-income margin development. None of the other analysed industries saw significant results on either revenue or net-income margin development.

Alongside the mentioned remarks, it is important to consider the limitations of the study. The study uses the Covid-19 crisis as a proxy for making general conclusions of crises in general. Secondly, the study has been limited to the US, and it is essential to acknowledge that differences in culture and regulations across regions can influence how compensation should be optimally structured. Thirdly, the performance measures considered in this thesis have been related to short-term company performance during the crisis, thereby, not taking into account possible long-term effects on revenue and net-income margin or share price development following the crisis.

The findings of this study are of interest to shareholders and board members and aims to facilitate decision making regarding executive compensation structure, when considering the risk aspect of a crisis.

7. References

- Beatty, Randolph P., and Edward J. Zajac, 1994, Managerial Incentives, Monitoring, and Risk Bearing: A Study of Executive Compensation, Ownership, and Board Structure in Initial Public Offerings, *Administrative Science Quarterly*, Volume 39, Issue 2, 313-335.
- Borio, Claudio, 2020, The Covid-19 economic crisis: dangerously unique, *Business Economics* 55, 181-190.
- Elhini, Maha and Rasha Hammam, 2021, The Impact of COVID-19 on the standard & poor 500 index sectors: a multivariate generalized autoregressive conditional heteroscedasticity model, *Journal of Chinese Economic and Foreign Trade Studies*, Volume 14, Issue 1, 18-43.
- Fahlenbrach, Rüdiger, and René M. Stulz, 2011, Bank CEO incentives and the credit crisis, *Journal of Financial Economics*, Volume 99, Issue 1, 11-26.
- Gaver, Jennifer J., and Kenneth M. Gaver, 1993, Additional evidence on the association between investment opportunity set and corporate financing, dividend, and compensation policies, *Journal of Accounting and Economics*, Volume 16, Issue 1-3, 125-160.
- Guo, Lin, Abu Jalal, and Shahriar Khaksari, 2015, Bank executive compensation structure, risk-taking and the financial crisis, *Review of Quantitative Finance and Accounting* 45, 609-639.
- Jensen, Michael C., and Kevin J. Murphy, 1998, CEO Incentives: It's Not How Much You Pay, But How, *Foundations of Organizational Strategy*, Harvard University Press, May-June 1990, *Harvard Business Review* 3, 138-153.
- Lambert, Richard A., David F. Larcker, and Robert E. Verrecchia, 1991, Portfolio Considerations in Valuing Executive Compensation, *Journal of Accounting Research*, Volume 29, Issue 1, 129-149.
- Maital, Shlomo and Ella Barzani, 2020, The Global Economic Impact of COVID-19: A Summary of Research Haifa Israel, Samuel Neaman Institute, 2-12.
- Mehran, Hamid, 1995, Executive compensation structure, ownership, and firm performance, *Journal of Financial Economics*, Volume 38, Issue 2, 163-184.
- Meulbroek, Lisa K., 2001, The Efficiency of Equity-Linked Compensation: Understanding the Full Cost of Awarding Executive Stock Options, *Financial Management*, Volume 30, Issue 2, 5-44.
- Mizruchi, Mark S., 2004, Berle and Means Revisited: The Governance and Power of Large U.S. Corporations, *Theory and Society*, Volume 33, Issue 5, 579-617.
- Murphy, Kevin J., 1999, Chapter 38 Executive compensation, *Handbook of Labor Economics*, Volume 3, Part B, 2485-2563.

Porpiglia, Francesco, Enrico Checcucci, Riccardo Autorino, Daniele Amparore, Matthew R. Cooperberg, Vincenzo Ficarra, and Giacomo Novara, 2020, Traditional and Virtual Congress Meetings During the COVID-19 Pandemic and the Post-COVID-19 Era: Is it Time to Change the Paradigm?, *European Urology*, Volume 78, Issue 3, 301-303.

Shah, Syed Zulfiqar Ali, Saeed Akbar, Jia Liu, Ziyu Liu, and Sichen Cao, 2017, CEO compensation and banks' risk-taking during pre and post financial crisis periods, *Research in International Business and Finance*, Volume 42, 1489-1503.

Shleifer, Andrei, and Robert W. Vishny, 1997, A Survey of Corporate Governance, *The Journal of Finance*, Volume 52, Issue 2, 737-783.

Smith, Clifford W., and Ross L. Watts, 1992, The investment opportunity set and corporate financing, dividend, and compensation policies, *Journal of Financial Economics*, Volume 32, Issue 3, 263-292.

Appendix A: Regression tables

Appendix A.1: Regression table of Finance companies' revenue (%) change 2019-2020

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Salary%	0.160 (0.89)	0.168 (0.92)	0.198 (1.06)	0.207 (1.10)		0.225 (0.87)	
Bonus%		0.0565 (0.38)	-0.0194 (-0.11)	0.00766 (0.04)	-0.200 (-0.75)		-0.244 (-0.91)
Non-equity Incentives%			-0.0937 (-0.73)	-0.0779 (-0.60)	-0.285 (-1.14)	-0.101 (-0.69)	-0.331 (-1.33)
Options%				0.0964 (0.83)	-0.111 (-0.51)	0.0314 (0.16)	-0.214 (-0.96)
Stocks%					-0.207 (-1.10)	-0.00780 (-0.04)	-0.259 (-1.30)
Ownership%						0.000414 (0.41)	0.000 (0.44)
Market Capitalization							0.030 (0.60)
Constant	0.0260 (0.88)	0.0221 (0.71)	0.0458 (1.02)	0.0311 (0.64)	0.239 (1.36)	0.0353 (0.23)	0.141 (0.55)
<i>N</i>	83	83	83	83	83	82	81
<i>R</i> ²	0.010	0.011	0.018	0.027	0.027	0.033	0.036

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix A.2: Regression table of Service companies' revenue (%) change 2019-2020

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Salary%	0.166 (0.78)	0.168 (0.78)	0.167 (0.80)	0.164 (0.76)	0.201 (0.55)	0.361 (0.42)	
Bonus%		0.180 (0.38)	0.0115 (0.02)	0.00901 (0.02)	0.0465 (0.08)		-0.395 (-0.45)
Non-equity Incentives%			-0.423 (-1.89)	-0.424 (-1.88)	-0.387 (-1.00)	-0.312 (-0.39)	-0.678 (-1.78)
Options%				-0.0375 (-0.11)		0.0316 (0.04)	-0.334 (-0.82)
Stocks%					0.0375 (0.11)	0.156 (0.20)	-0.194 (-0.70)
Ownership%						-0.0000545 (-0.35)	-0.000 (-0.21)
Market Capitalization							-0.034 (-0.39)
Constant	-0.00475 (-0.09)	-0.00900 (-0.16)	0.0858 (1.15)	0.0898 (1.08)	0.0523 (0.17)	-0.0344 (-0.04)	-0.473 (1.06)
<i>N</i>	55	55	55	55	55	51	51
<i>R</i> ²	0.011	0.014	0.079	0.079	0.079	0.096	0.099

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix A.3: Regression table of Transport companies' revenue (%) change 2019-2020

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Salary%	0.499 (1.82)	0.501 (1.80)	0.525 (1.91)	0.561 (2.02)	0.0155 (0.01)		
Bonus%		0.167 (0.07)	0.278 (0.11)	0.546 (0.22)		-0.0186 (-0.01)	-0.593 (-0.23)
Non-equity Incentives%			0.358 (1.53)	0.384 (1.63)	-0.162 (-0.07)	-0.216 (-0.55)	-0.279 (-0.70)
Options%				0.281 (0.95)	-0.265 (-0.11)	-0.311 (-0.77)	-0.375 (-0.91)
Stocks%					-0.546 (-0.22)	-0.596 (-1.97)	-0.633* (-2.08)
Ownership%						-6.42e-10 (-0.32)	-9.65e-10 (-0.47)
Market Capitalization							0.123 (1.02)
Constant	-0.186** (-3.15)	-0.188** (-3.00)	-0.280** (-3.25)	-0.312** (-3.37)	0.233 (0.10)	0.279 (1.04)	-0.232 (-0.41)
<i>N</i>	44	44	44	44	44	43	43
<i>R</i> ²	0.073	0.073	0.125	0.145	0.145	0.149	0.173

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix A.4: Regression table of Finance companies' net-income (%) change 2019-2020

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Salary%	-0.463 (-0.98)	-0.488 (-1.02)	-0.423 (-0.86)	-0.406 (-0.82)		-0.0685 (-0.10)	
Bonus%		-0.196 (-0.50)	-0.357 (-0.75)	-0.308 (-0.63)	0.0984 (0.14)		-0.307 (-0.42)
Non-equity Incentives%			-0.199 (-0.59)	-0.170 (-0.50)	0.236 (0.36)	0.129 (0.32)	-0.053 (-0.08)
Options%				0.176 (0.57)	0.582 (1.02)	0.456 (0.85)	0.251 (0.42)
Stocks%					0.406 (0.82)	0.288 (0.58)	0.009 (0.02)
Ownership%						-0.00103 (-0.37)	-0.001 (-0.44)
Market Capitalization							0.226 (1.66)
Constant	-0.0864 (-1.11)	-0.0730 (-0.89)	-0.0228 (-0.19)	-0.0495 (-0.39)	-0.456 (-0.98)	-0.340 (-0.80)	-1.130 (-1.65)
<i>N</i>	83	83	83	83	83	82	81
<i>R</i> ²	0.012	0.015	0.019	0.023	0.023	0.024	0.061

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix A.5: Regression table of Service companies' net-income (%) change 2019-2020

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Salary%	0.000953 (0.01)	0.000781 (0.00)	0.000153 (0.00)	0.00235 (0.01)	-0.0211 (-0.07)	0.00879 (0.01)	
Bonus%		-0.0191 (-0.05)	-0.194 (-0.50)	-0.192 (-0.49)	-0.216 (-0.47)		0.005 (0.01)
Non-equity Incentives%			-0.439* (-2.40)	-0.438* (-2.37)	-0.462 (-1.45)	-0.424 (-0.72)	-0.431 (-1.54)
Options%				0.0234 (0.09)	0 (.)	-0.0381 (-0.06)	-0.045 (-0.15)
Stocks%					-0.0234 (-0.09)	0.0266 (0.05)	0.014 (0.07)
Ownership%						0.0000120 (0.11)	4.38e-06 (0.04)
Market Capitalization							0.014 (0.21)
Constant	-0.0670 (-1.44)	-0.0666 (-1.39)	0.0319 (0.52)	0.0295 (0.43)	0.0529 (0.21)	0.0301 (0.05)	-0.019 (-0.06)
<i>N</i>	55	55	55	55	55	51	51
<i>R</i> ²	0.000	0.000	0.101	0.101	0.101	0.146	0.147

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix A.6: Regression table of Transport companies' net-income (%) change 2019-2020

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Salary%	0.597 (0.98)	0.644 (1.04)	0.668 (1.07)	0.740 (1.17)	-3.525 (-0.64)		
Bonus%		3.617 (0.66)	3.725 (0.68)	4.266 (0.77)		3.665 (0.65)	2.367 (0.41)
Non-equity Incentives%			0.346 (0.65)	0.399 (0.74)	-3.867 (-0.69)	-0.319 (-0.36)	-0.463 (-0.51)
Options%				0.569 (0.85)	-3.696 (-0.67)	-0.159 (-0.17)	-0.304 (-0.32)
Stocks%					-4.266 (-0.77)	-0.757 (-1.10)	-0.840 (-1.21)
Ownership%						-1.94e-10 (-0.04)	-9.23e-10 (-0.20)
Market Capitalization							0.279 (1.01)
Constant	-0.305* (-2.31)	-0.332* (-2.39)	-0.421* (-2.15)	-0.487* (-2.31)	3.779 (0.69)	0.250 (0.41)	-0.905 (-0.70)
<i>N</i>	44	44	44	44	44	43	43
<i>R</i> ²	0.022	0.033	0.043	0.060	0.060	0.064	0.090

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix B: Firms Excluded

Appendix B.1: S&P 500 Firms Excluded, and their CEO (2020.01.01)

Company name	Company ticker	CEO
Alaska Air Group, Inc. (NYSE:ALK)	ALK	Bradley D. Tilden
Amazon.com, Inc. (NasdaqGS:AMZN)	AMZN	Jeffrey P. Bezos
Amcor plc (ASX:AMC)	AMC	Ron Delia
Ameren Corporation (NYSE:AEE)	AEE	Warner L. Baxter
American International Group, Inc. (NYSE:AIG)	AIG	Brian Charles Duperreault
American Water Works Company, Inc. (NYSE:AWK)	AWK	Walter J. Lynch
Assurant, Inc. (NYSE:AIZ)	AIZ	Alan B. Colberg
AvalonBay Communities, Inc. (NYSE:AVB)	AVB	Timothy J. Naughton
Bath & Body Works, Inc. (NYSE:BBWI)	BBWI	Andrew M. Meslow
Baxter International Inc. (NYSE:BAX)	BAX	Jose E. Almeida
Cadence Design Systems, Inc. (NasdaqGS:CDNS)	CDNS	Lip-Bu Tan
Cerner Corporation (NasdaqGS:CERN)	CERN	David Brent Shafer
Cintas Corporation (NasdaqGS:CTAS)	CTAS	Scott D. Farmer
Citigroup Inc. (NYSE:C)	C	Michael L. Corbat
Citrix Systems, Inc. (NasdaqGS:CTXS)	CTXS	David James Henshall
CMS Energy Corporation (NYSE:CMS)	CMS	Patricia Kessler Poppe
Consolidated Edison, Inc. (NYSE:ED)	ED	John J. McAvoy
Constellation Energy Corporation (NasdaqGS:CEG)	CEG	Joseph Dominguez
Corteva, Inc. (NYSE:CTVA)	CTVA	James C. Collins, Jr.
Coterra Energy Inc. (NYSE:CTRA)	CTRA	Dan O. Dinges
CVS Health Corporation (NYSE:CVS)	CVS	Larry J. Merlo
Danaher Corporation (NYSE:DHR)	DHR	Thomas P. Joyce, Jr.
Devon Energy Corporation (NYSE:DVN)	DVN	David A. Hager
Dominion Energy, Inc. (NYSE:D)	D	Thomas F. Farrell, II
Ecolab Inc. (NYSE:ECL)	ECL	Douglas M. Baker, Jr.
EOG Resources, Inc. (NYSE:EOG)	EOG	William R. Thomas
Evergy, Inc. (NYSE:EVRG)	EVRG	Terry D. Bassham
First Republic Bank (NYSE:FRC)	FRC	James H. Herbert, II
FirstEnergy Corp. (NYSE:FE)	FE	Charles E. Jones, Jr.
Ford Motor Company (NYSE:F)	F	James Patrick Hackett
Hasbro, Inc. (NasdaqGS:HAS)	HAS	Brian D. Goldner
Howmet Aerospace Inc. (NYSE:HWM)	HWM	John C. Plant
IDEX Corporation (NYSE:IEX)	IEX	Andrew K. Silvernail
Intel Corporation (NasdaqGS:INTC)	INTC	Robert Holmes Swan
International Business Machines Corporation (NYSE:IBM)	IBM	Arvind Krishna
IPG Photonics Corporation (NasdaqGS:IPGP)	IPGP	Valentin P. Gapontsev
Johnson & Johnson (NYSE:JNJ)	JNJ	Alex Gorsky
L3Harris Technologies, Inc. (NYSE:LHX)	LHX	William M. Brown
Lennar Corporation (NYSE:LEN)	LEN	Richard Beckwitt
LyondellBasell Industries N.V. (NYSE:LYB)	LYB	Bhaves V. Patel
Marriott International, Inc. (NasdaqGS:MAR)	MAR	Arne M. Sorenson
Mastercard Incorporated (NYSE:MA)	MA	Ajaypal S. Banga
Merck & Co., Inc. (NYSE:MRK)	MRK	Kenneth C. Frazier
Mettler-Toledo International Inc. (NYSE:MTD)	MTD	Olivier A. Filliol
Microchip Technology Incorporated (NasdaqGS:MCHP)	MCHP	Stephen Sanghi
Monster Beverage Corporation (NasdaqGS:MNST)	MNST	Rodney Cyril Sacks
Moody's Corporation (NYSE:MCO)	MCO	Raymond W. McDaniel, Jr.
Motorola Solutions, Inc. (NYSE:MSI)	MSI	Gregory Q. Brown
Netflix, Inc. (NasdaqGS:NFLX)	NFLX	Wilmot Reed Hastings, Jr.
Nordson Corporation (NasdaqGS:NDSN)	NDSN	Sundaram Nagarajan
ONEOK, Inc. (NYSE:OKE)	OKE	Terry K. Spencer
Oracle Corporation (NYSE:ORCL)	ORCL	Safra Ada Catz

Organon & Co. (NYSE:OGN)	OGN	Kevin Ali
Paramount Global (NasdaqGS:PARA)	PARA	Robert Marc Bakish
Philip Morris International Inc. (NYSE:PM)	PM	Andre Calantzopoulos
Prologis, Inc. (NYSE:PLD)	PLD	Hamid R. Moghadam
PVH Corp. (NYSE:PVH)	PVH	Emanuel Chirico
QUALCOMM Incorporated (NasdaqGS:QCOM)	QCOM	Steven M. Mollenkopf
Republic Services, Inc. (NYSE:RSG)	RSG	Donald W. Slager
Royal Caribbean Cruises Ltd. (NYSE:RCL)	RCL	Richard D. Fain
salesforce.com, inc. (NYSE:CRM)	CRM	Keith Gordon Block
STERIS plc (NYSE:STE)	STE	Walter M. Rosebrough, Jr.
Synchrony Financial (NYSE:SYF)	SYF	Margaret M. Keane
T. Rowe Price Group, Inc. (NasdaqGS:TROW)	TROW	William J. Stromberg
Teledyne Technologies Incorporated (NYSE:TDY)	TDY	Aldo Pichelli
Tesla, Inc. (NasdaqGS:TSLA)	TSLA	Elon Musk
The Interpublic Group of Companies, Inc. (NYSE:IPG)	IPG	Michael Isor Roth
The Procter & Gamble Company (NYSE:PG)	PG	David S. Taylor
Tractor Supply Company (NasdaqGS:TSCO)	TSCO	Harry A. Lawton, III
Trane Technologies plc (NYSE:TT)	TT	Michael W. Lamach
Truist Financial Corporation (NYSE:TFC)	TFC	Kelly Stuart King
Twitter, Inc. (NYSE:TWTR)	TWTR	Jack Dorsey
Tyson Foods, Inc. (NYSE:TSN)	TSN	Noel White
Ulta Beauty, Inc. (NasdaqGS:ULTA)	ULTA	Mary N. Dillon
UnitedHealth Group Incorporated (NYSE:UNH)	UNH	David Scott Wichmann
Universal Health Services, Inc. (NYSE:UHS)	UHS	Alan B. Miller
Viatis Inc. (NasdaqGS:VTRS)	VTRS	Michael Goettler
Walgreens Boots Alliance, Inc. (NasdaqGS:WBA)	WBA	Stefano Pessina
Waters Corporation (NYSE:WAT)	WAT	Christopher James O'Connell
Welltower Inc. (NYSE:WELL)	WELL	Thomas J. DeRosa
Willis Towers Watson Public Limited Company (NasdaqGS:WTW)	WTW	John J. Haley
Xcel Energy Inc. (NasdaqGS:XEL)	XEL	Benjamin Gwynn Stonestreet Fowke, III