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Master Thesis Financial Economics

# The effects of passive institutional investors and CEO ownership on CEO compensation

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# Abstract

In this study, I research the effect of passive institutional ownership and CEO ownership on CEO compensation and its components by using a sample of 1,611 unique US publicly listed companies from 2012 to 2023, after the introduction of the Dodd-Frank Act. Using fixed effects regressions, I analyse the effects of the ownership structures on total CEO compensation, variable CEO compensation, and fixed CEO compensation. This study finds that a higher level of passive institutional ownership is associated with a higher level of total CEO compensation. Furthermore, passive institutional ownership is positively associated with variable CEO compensation. No clear conclusion can be drawn regarding the effect of passive institutional ownership on fixed CEO compensation. I also study the effect of CEO ownership on compensation components. A higher level of CEO ownership is associated with a lower total, variable and fixed CEO compensation level. The study results do not present clear conclusions, as the results support and reject several theories. This suggests that further research is needed to better explain the factors driving the effects.



**Keywords:** Passive institutional ownership, CEO ownership, CEO compensation, corporate governance, Dodd-Frank Act

# Contents

# 1 Introduction

The last decades have shown a noticeable shift in the ownership dynamics of public equity. Passive investors have been on the rise, especially in the last decade, with the total market and the percentage of the market owned by passive investors increasing significantly (Wigglesworth, 2022; Johnson, 2022; Seyffart, 2024). This change is important, as ownership structures and types are known to influence the company. Shareholders try to influence corporate actions and policies to lower the effect of the agency conflict created by the differences in the interests of shareholders and CEOs. The difference between active and passive investors especially plays a role. Active investors are seen as very active in influencing the company to tackle the agency conflict, while passive investors are shareholders who hold shares primarily to track an index. However, over the last few years, there has been more discussion about whether passive investors are actually that passive. Considering the growth of passive institutional ownership and the discussion regarding the passiveness of passive investors, might these investors exert an influence on company corporate governance practices?

At the same time, CEO compensation is a topic heavily discussed in the literature and the news. Public opinion is divided between whether CEO pay is too high or whether CEOs are fairly paid for their efforts. Many studies are done about whether CEOs get paid too much, what drives CEO pay, and how CEO pay is structured.

This rise in the importance of the impact of the growth of passive investors on CEO compensation makes it an interesting topic of analysis. Appel et al. (2016) and Khan et al. (2005) analyse the impact of institutional ownership on CEO compensation and its components and the effect of active and passive institutional ownership on CEO compensation. As expected and in line with the agency conflict, more institutional and active ownership leads to less CEO compensation (Khan et al., 2005). Appel et al. (2016), on the other hand, study the relationship between passive ownership and CEO compensation, but the authors find no significant relationship.

However, a new law implemented in the US might have changed these dynamics and results. In 2010, the Dodd-Frank Act was introduced and implemented in 2011. The law was introduced as a response to the global crisis to better oversee and control the financial system. A section of this law is related to executive compensation and entails a provision stating that there should be shareholder voting on executive compensation, so-called say-on-pay (Amadeo, 2022). Although

the shareholder vote is not mandatory and compensation committees do not need to change executive compensation accordingly, the say-on-pay vote could potentially strengthen corporate governance policies as the vote enables investors to express their views on executive compensation policies, increasing pressure on compensation committees to justify executive compensation (Larcker et al., 2015).

Another aspect of the ownership structure dynamics potentially influencing CEO compensation is CEO ownership. CEO ownership plays a vital role in the agency conflict, as the interests of CEOs who have more shares in the company are better aligned with the interests of the other shareholders. Brandes et al. (2003), Gomez-Mejia and Wiseman (1997), and Khan et al. (2005) study this relationship, with some indicating positive effects on CEO compensation and its components and others negative effects. So, examining CEO ownership and its effects on CEO compensation gives a better understanding of the overall dynamics of ownership and CEO compensation. Considering all the information, passive institutional ownership and CEO ownership could be related to CEO compensation. In this research, I try to find that out by answering the following question:

Does passive institutional ownership and CEO ownership influence total, variable and fixed CEO compensation in the period after the Dodd-Frank Act?

I answer this question by using a sample of 10,420 observations of 1,611 unique US publicly listed companies from 2012 – 2023. To test the research question, I run nine regressions with the dependent variable being total CEO compensation, variable CEO compensation and fixed CEO compensation, each run with year, year & industry, and year & firm fixed effects. In this study, I find that a higher level of passive institutional ownership is associated with a higher level of total CEO compensation. Furthermore, the results indicate that passive institutional ownership is positively linked to higher variable CEO compensation, while no clear conclusion can be drawn regarding its effect on fixed CEO compensation. The study also examines the impact of CEO ownership on compensation components. The findings indicate that a higher level of CEO ownership correlates with a lower level of total, variable and fixed CEO compensation. Overall, the study presents various results, not providing definitive conclusions, indicating that further research is needed to draw conclusions.

In the next section, section 2, I describe the theoretical framework this study is built upon related to passive institutional ownership, CEO ownership and executive compensation, including

the hypotheses formed. In section 3, I explain the dependent, independent and control variables that I use in the study, after which, in the end, I describe the final sample. Section 4 discusses the method I use to analyse the data in this study. In section 5, I elaborate on the results that I find. Sections 6 & 7 conclude with a discussion of the results and the conclusion, as well as noting limitations.

# 2 Theoretical framework

## 2.1 Passive institutional ownership

The most important theory this study is built upon is the agency problem. The agency problem describes the conflict of interest between company management and shareholders (Means, 2017; Jensen & Meckling, 1976). Company management controls the corporate assets and can use them as they see fit, potentially resulting in excessive compensation or asset sales to themselves (Larcker et al., 2015). Controlling this problem is of great importance for shareholders, and a way of controlling this conflict is by becoming an active investor and adequately monitoring the company. This increase in monitoring is expected to lead to better corporate governance structures in the company and, for example, better CEO compensation, where CEOs do not extract compensation. Hartzell and Starks (2003) find that institutional ownership concentration is negatively related to the level of total CEO compensation and cash compensation, the fixed pay component, suggesting that institutional investors serve a monitoring role. These results align with the findings of Ozkan (2007), who find that institutional ownership negatively affects the level of total CEO compensation. Further evidence shows that the monitoring attention of institutional ownerships, in other words, if companies are more active, is positively linked to higher pay-performance of CEO compensation (Liu & Yin, 2023).

On the other hand, some studies find that institutional ownership is positively related to total CEO pay (Fernandes et al., 2013). Croci et al. (2012) find that institutional ownership is associated with higher levels of total CEO compensation, cash compensation, the fixed pay component, and equity-based compensation, the variable pay component. The authors explain the equity-based compensation finding by arguing that institutional investors push for more equity-based compensation to better align the interests of the institutional investor and the CEO and increase the total CEO compensation package.

So, studies find that institutional ownership greatly influences corporate governance practices, especially CEO compensation. The question that arises is whether there is a difference between active and passive institutional ownership. There have been some studies on the effect of passive institutional investors on corporate governance factors. Appel et al. (2016) find that passive mutual funds ownership does influence governance choices and is positively associated with firm performance. An important aspect of this study is the Dodd-Frank Act. Although the shareholder vote on executive pay is not mandatory, studies find that firms still react when the

vote is negative by adjusting the compensation and compensation structure to prevent negative publicity and shareholder reaction (Larcker et al., 2015). Appel et al. (2016) also look at the effect of passive mutual funds ownership on CEO compensation before the Dodd-Frank Act, but the authors find no significant effect. The authors also find little evidence that a higher level of passive fund ownership is related to differences in the composition of CEO compensation. However, the implementation of this Act could affect the relationship between passive institutional ownership and CEO compensation and compensation components.

Considering the existing literature, I form the following hypothesis about the relationship between passive institutional ownership and total CEO compensation.

**Hypothesis 1:** Total CEO compensation is negatively influenced by passive institutional ownership.

This is because studies find that institutional ownership is negatively related to total CEO compensation, as institutions have a higher level of monitoring compared to public investors. Although a few other studies find contrary results, I consider the monitoring role argument important, especially as I think the Dodd-Frank Act made passive investors less passive, especially on the executive compensation component, which is influenced via the say-on-pay vote. Therefore, passive investors become more active and have a higher level of monitoring, lowering total CEO compensation. In line with this hypothesis, I expect the following:

**Hypothesis 2:** Variable CEO compensation (shares, stock options) is positively influenced by passive institutional ownership.

This is because studies find that institutional ownership is positively related to equity-based compensation, which better aligns the interests of shareholders and CEOs. Concerning the fixed CEO compensation (salary, bonus, and perks), I expect the following:

**Hypothesis 3:** Fixed CEO compensation (salary, bonus, and perks) is negatively influenced by passive institutional ownership.

This is because studies find that higher levels of institutional ownership are negatively related to cash components of compensation, which is explained by the increase in monitoring.

## 2.2 CEO ownership

Finally, this study will also look at the effect of CEO ownership. This is because CEO ownership plays a vital role in the agency conflict since it better aligns the interests of owners and agents. Brandes et al. (2003) state that CEOs want higher fixed pay, as that is less risky, which could result in higher total compensation levels as the fixed pay component increases. Gomez-Mejia and Wiseman (1997) back this statement by stating that higher CEO ownership leads to CEOs maximising guaranteed compensation (fixed compensation) and minimising incentive compensation such as options (variable compensation), as that variable component is already accounted for in their shares. Khan et al. (2005) also study the stand-alone effect of CEO ownership on CEO pay. The paper mentions that increased CEO ownership gives CEOs the conditions to extract more compensation. The authors find no significant effect between CEO ownership and total CEO compensation. However, the authors find that higher levels of CEO ownership lead to a significant reduction in the level of options compensation, a part of the variable compensation component, and a higher level of salary, a part of the fixed compensation component.

Based on these findings, I have come to the following hypotheses about CEO ownership:

**Hypothesis 4:** Total CEO compensation is positively influenced by CEO ownership.

This is because CEO ownership allows CEOs to extract more compensation. Next to that, studies find that the fixed compensation component increases with higher CEO ownership, which could lead to higher total compensation levels. Furthermore, I expect the following for the variable CEO compensation component:

**Hypothesis 5:** Variable CEO compensation (shares, stock options) is negatively influenced by CEO ownership.

The reason for this hypothesis is that higher levels of CEO ownership, in other words, having shares and options in the company, means that the CEO is already exposed to the long-term effects of the company through the shares and options. Therefore, the CEO prefers a higher level of fixed compensation such that the CEO is less exposed to the company's risk. Finally, I formed the following hypothesis regarding the fixed CEO compensation component:

**Hypothesis 6:** Fixed CEO compensation (salary, bonus, and perks) is positively influenced by CEO ownership.

As mentioned in studies, CEOs with a high level of CEO ownership want to reduce the company's exposed risk. Therefore, CEOs aim for a high level of fixed compensation, securing the compensation and not being exposed to potential share price drops.

# 3 Data

In this study, I will merge stock-level institutional fund ownership data with CEO-level compensation, firm-level, board, and CEO data. The data used in this study will be from 2012 until 2023. That is because the Dodd-Frank Act was enacted in 2011, and most data is only available until 2023 (Amadeo, 2022). Since the Dodd-Frank Act applies to the US and due to data availability via ExecuComp, Thomson Reuters and CRSP mutual fund data, this study will focus on companies listed in the US. I will specify each variable and data source in the passages below.

## 3.1 CEO compensation

The dependent variable in this study is CEO compensation, specifically total CEO compensation, variable CEO compensation and fixed CEO compensation. I obtained this data from the ExecuComp database, which provides data on the compensation of the top 5 executives of the largest US firms from 1992. Total CEO compensation is derived directly from the ExecuComp database. Following the vast majority of studies including Croci et al. (2012), Nourayi and Daroca (2008), and Tosi et al. (2004), fixed CEO compensation is determined as follows:

$$\begin{aligned} \text{Fixed CEO compensation} = {} & \text{Base Salary} + \text{Bonus} \\ & + \text{Non-Equity Incentive Plan Compensation} \\ & + \text{Other Compensation} \end{aligned} \tag{1}$$

Again following most studies including Croci et al. (2012), Nourayi and Daroca (2008), and Tosi et al. (2004), the variable CEO compensation is calculated as follows:

$$\begin{aligned} \text{Variable CEO compensation} = {} & \text{Fair value of options awarded} \\ & + \text{Fair value of stocks awarded} \end{aligned} \tag{2}$$

## 3.2 Passive institutional ownership

One of the independent variables used is passive institutional ownership. I first use the Center for Research in Security Prices (CRSP) fund database to compute a firm's institutional ownership percentage per year. I classify funds as passively or actively managed, using a method used by Appel et al. (2016); Busse and Tong (2012); Iliev and Lowry (2015). A fund is classified as

passively managed if the CRSP fund database states the fund is passively managed or if the fund name includes one of the following strings:

*"Index" "Idx" "Indx" "Ind" "Russell" "S & P" "S and P" "S&P" "SandP" "DOW" "Dow" "DJ" "MSCI" "Bloomberg" "KBW" "NASDAQ" "NYSE" "STOXX" "FTSE" "Wilshire" "Morningstar" "100" "400" "500" "600" "900" "1000" "1500" "2000" "5000"*

After classifying the funds as active and passive, I used the Thomson Reuters database. This database has information on the number of shares a fund owns of a company per year. By merging the CRSP dataset with the Thomson Reuters database, I can compute the total number of shares owned by passively managed funds of firms by summing up all shares held by each fund in a firm per year. Lastly, I divide the number of shares owned by passively managed funds by the total number of shares outstanding, resulting in the percentage of passive institutional ownership.

## 3.3 CEO ownership

The other independent variable research in this study is CEO ownership. CEO ownership is directly derived from the ExecuComp database as a percentage of shares owned by the CEO as total shares outstanding.

## 3.4 Control variables

Furthermore, based on previous studies, I add several variables that can affect the studied relationship.

### 3.4.1 Firm characteristics

Gabaix et al. (2014), Parthasarathy et al. (2006), Conyon (2014), and Lambert et al. (1991) find that size influences CEO compensation. The authors find that size is positively related to CEO compensation, which can be explained by the fact that larger firms have more funds to pay to their managers, and managers' absolute effects on revenue and profits are larger. Therefore, I include the control variable size to control for any differences in compensation that occur because of different firm sizes. Size has been measured in several ways, for example, firm value, revenues, number of employees, or profits. Following Gabaix et al. (2014), I measure size via total firm value, of which the equation is as follows:

$$\text{Market value of equity} = csho \times prcc\_f \tag{3}$$

Where *csho* are the common shares outstanding, and *prcc_f* is the price closed annually.

$$\text{Book value of debt} = at - (ceq + txdb) \tag{4}$$

Where *at* are the total assets, *ceq* is the total common equity, and *txdb* are the deferred taxes.

$$\text{Total firm value} = \text{Market Value of Equity} + \text{Book Value of Debt} \tag{5}$$

Next to size, studies find that performance has a relation with CEO compensation. Many studies are analysing this relationship, where most papers find a positive relationship between CEO compensation and firm performance (Core et al., 1999; Ozkan, 2011; Jeppson et al., 2009; Nourayi & Daroca, 2008). Firm performance can be measured in several ways, but following the majority of studies, I measure firm performance as return on assets, which I calculate as follows:

$$\text{Return on assets} = \text{net income} - \text{total assets} \tag{6}$$

Furthermore, I add the control variable growth. Wright et al. (1996) are studying growth opportunities and risk-taking behaviour and their effect on CEO compensation. The authors find a positive relationship, which can be explained by the effect that firms with higher growth opportunities are willing to pay higher compensation for good CEOs to fulfil the growth potential. To control for growth opportunities, I use the commonly used measure Tobin's Q as measurement, which I calculate as follows:

$$\text{Tobin's Q} = \frac{at + (csho \times prcc\_f) - ceq}{at} \tag{7}$$

Where *at* are the total assets, *csho* are the common shares outstanding, *prcc_f* is the price closed annually, and *ceq* is the total common equity.

### 3.4.2 Board characteristics

Board characteristics are also influencing CEO compensation. Fahlenbrach (2009) study the relationship between board size and CEO compensation. As argued by Jensen (1993); Fahlenbrach (2009); Core et al. (1999); Yermack (1996), effective monitoring is lower when the board

size is larger, because CEOs can easier capture the board, as it is less likely that board members are being held accountable individually. As a result of these findings, I add the control variable board size.

Another board characteristic that might influence the studied effect is board independence. Several studies research the effect of board independence on CEO compensation. Mehran (1995) find that a higher level of independence increases equity-based compensation, while Core et al. (1999) find that a lower level of independence is associated with lower CEO compensation. Because of this, I add the variable board independence, which I calculate as the percentage of independent directors.

Lastly, I add CEO/chair duality as a control variable. Faleye et al. (2013), Core et al. (1999), and Fahlenbrach (2009) study the effects of CEOs who also serve as chair on the board and argue that as CEOs are on boards, the agency conflict is strengthened. As of that, I add CEO/Chair duality, a dummy that takes a value of 1 if the CEO is also the chair of the board and a 0 if that is not the case.

### 3.4.3 CEO characteristics

CEO characteristics could also have an effect on the relationship studied. Gibbons and Murphy (1992) find that CEOs in their early career are incentivised to work hard as they need to show their capabilities, while older CEOs need more equity incentives to align their interest with those of other shareholders. Therefore, I add the control variable, CEO age, as well.

Not only age but also CEO tenure could impact this studied relationship. Following Brick, Palmon and Wald (2006), I also add this control variable. Tenure could influence CEO compensation because longer tenure often reflects accumulated experience and more profound company knowledge, leading to higher pay.

Finally, I add the control variable gender, following Brick et al. (2006). Gender could influence CEO compensation due to systemic biases and historical disparities in pay between male and female executives. Although Bugeja et al. (2012) find no significant difference in CEO compensation between genders, Chen et al. (2022) do find significant differences. For completeness and to control for any effects, I add the dummy variable gender, which takes a value of 1 if the CEO is male and 0 if the CEO is female.

### 3.5 Sample & Descriptive statistics

I start by merging the passive institutional funds with the ExecuComp database and the control variables, after which I end up with a sample of 10,420 observations and 1,611 unique companies. This entails an average number of observations of 7.5 years per company. Summary statistics are shown in Table 1. Total CEO compensation is around 8 million, whereas variable CEO compensation is significantly higher than fixed compensation. The average level of passive institutional ownership is displayed in Figure 1. In my sample, passive institutional ownership is approximately 3.6% and shows no clear growth over the years. This is partially in line with Appel et al. (2016), who reported an average level of passive institutional ownership of 3.0%. However, the level of passive institutional ownership showed a clear growth path over the years in that study. It is important to note that their sample is from 1998 to 2014, making it harder to compare the samples directly. Other research shows that the percentage of passive institutional ownership has grown in the last decade, and levels are significantly higher, at around 15% in 2021 (Wigglesworth, 2022; Johnson, 2022; Seyffart, 2024). The difference can be a result of limited data availability on shareholdings and the way passive funds were classified, as it does not necessarily mean that the funds that were not classified as passive are not passive. As I study the effect of passive institutional ownership on executive compensation and not the growth of passive institutional ownership, I deem the sample usable.

The shares owned by the CEO are 2.2% of all outstanding shares. Furthermore, firm value averages 21.4 billion, with the average ROA and Tobin's Q respectively being 4.8% and 2.3. Board size has an average size of 10, and independent directors make up 81.6% of the total number of directors for firms in the sample. Lastly, looking at the CEO characteristics, around 20% of the CEOs also are chair on the board. The average CEO age is 56.6 years, with the average tenure being 8.5 years. Finally, in the sample, 90% of the CEOs are men.

Table 2 shows the distribution between years. The sample is fairly distributed over the years, with 2023 having the fewest observations due to limited data availability.

Table 3 shows the number of observations per industry. As is common across studies, I left out companies classified in *Finance, Insurance, and Real Estate* since these companies are active in a unique regulatory environment and, therefore, have different corporate governance policies, potentially influencing the study's findings. The sample mainly consists of companies active in the manufacturing, services, and transportation industries, with very few companies in agriculture and public administration. However, this is fairly in line with the distribution of

companies among US-listed companies.

Table 1: Summary Statistics

| Variable | Obs | Mean | Std. dev. | Min | Max |
|---|---|---|---|---|---|
| *CEO Compensation* | | | | | |
| Total compensation | 10,420 | 7,979,743 | 6,360,879 | 349,162 | 32,600,000 |
| Variable compensation | 10,420 | 4,741,904 | 4,699,212 | 0.0 | 24,900,000 |
| Fixed compensation | 10,420 | 2,685,885 | 2,117,489 | 87,761 | 12,500,000 |
| *Independent Variables* | | | | | |
| Passive ownership % | 10,420 | 3.5 | 2.8 | 0.0 | 38.5 |
| Shares owned by CEO % | 10,420 | 2.2 | 5.5 | 0.0 | 68.1 |
| *Firm Characteristics* | | | | | |
| Firm value | 10,420 | 21.4 | 49.6 | 1.9 | 329.5 |
| Return on assets (ROA) | 10,420 | 4.8 | 9.0 | -35.0 | 29.0 |
| Tobin's Q | 10,420 | 2.3 | 1.7 | 0.8 | 10.2 |
| *Board Characteristics* | | | | | |
| Board size | 10,420 | 10.0 | 2.5 | 2.0 | 14.0 |
| Independent director % | 10,420 | 81.6 | 15.1 | 0.0 | 100.0 |
| Chair/CEO duality | 10,420 | 0.2 | 0.4 | 0.0 | 1.0 |
| *CEO Characteristics* | | | | | |
| CEO age | 10,420 | 56.6 | 7.0 | 28.0 | 91.0 |
| CEO tenure | 10,420 | 8.5 | 7.7 | 1.0 | 56.0 |
| CEO gender male % | 10,420 | 0.9 | 0.2 | 0.0 | 1.0 |

Figure 1: Average Passive Institutional Ownership per Fiscal Year

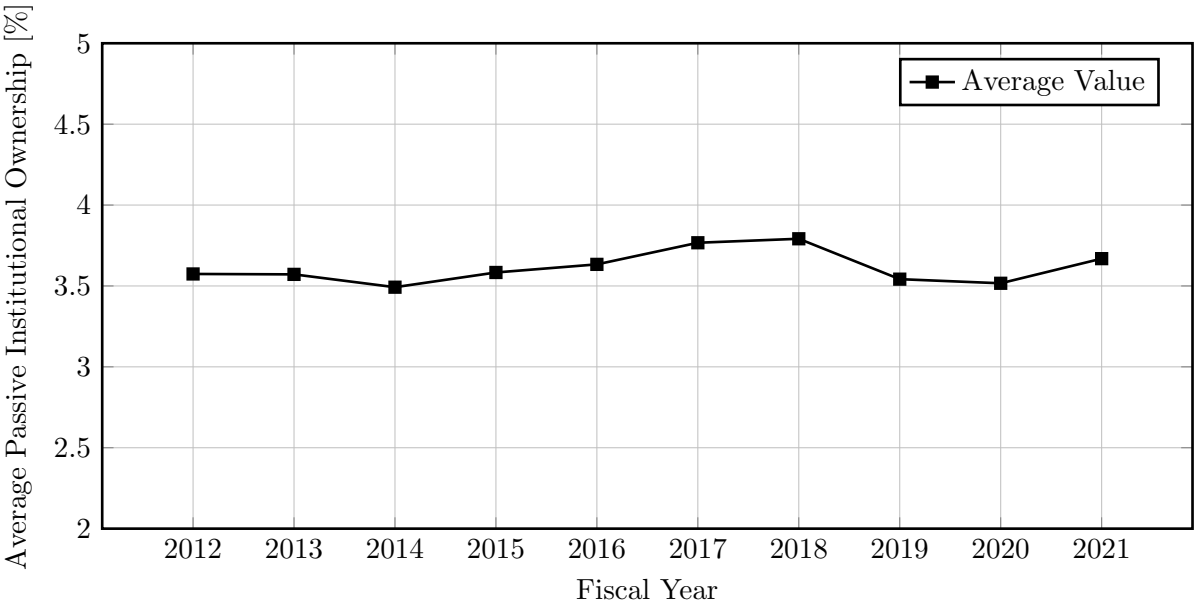

Table 2: Number of Observations per Fiscal Year

| Year | Frequency | Percent | Cumulative |
|---|---|---|---|
| 2013 | 946 | 9.08 | 9.08 |
| 2014 | 1,007 | 9.66 | 18.74 |
| 2015 | 1,012 | 9.71 | 28.45 |
| 2016 | 985 | 9.45 | 37.91 |
| 2017 | 992 | 9.52 | 47.43 |
| 2018 | 1,040 | 9.98 | 57.41 |
| 2019 | 1,024 | 9.83 | 67.24 |
| 2020 | 1,036 | 9.94 | 77.18 |
| 2021 | 1,035 | 9.93 | 87.11 |
| 2022 | 1,017 | 9.76 | 96.87 |
| 2023 | 326 | 3.13 | 100.00 |
| Total | 10,420 | 100.00 | |

Table 3: Number of Observations per Industry

| Industry | SIC codes | Freq. | Percent | Cum. |
|---|---|---|---|---|
| Agriculture, Forestry, Fishing | 01-09 | 25 | 0.24 | 0.24 |
| Mining | 10-14 | 447 | 4.29 | 4.53 |
| Construction | 15-17 | 263 | 2.52 | 7.05 |
| Manufacturing | 20-39 | 5,280 | 50.67 | 57.73 |
| Transportation | 40-49 | 1,128 | 10.83 | 68.56 |
| Wholesale Trade | 50-51 | 427 | 4.10 | 72.66 |
| Retail Trade | 52-59 | 912 | 8.75 | 81.41 |
| Services | 70-89 | 1,911 | 18.34 | 99.75 |
| Public Administration | 91-99 | 27 | 0.26 | 100.00 |
| Total | 10,420 | 100.00 | | |

# 4 Method

This passage will describe the research methodology and regressions that I use to get the results that will answer the hypotheses of this paper and end with potential empirical concerns.

## 4.1 Research methodology

In this study, I split CEO compensation into the dependent variables: total CEO compensation, fixed CEO compensation and variable CEO compensation. I take the log of these variables to reduce the skewness of the data, better handle the large range, and interpret the coefficients more easily. Furthermore, following (Brick et al., 2006), I lag the firm characteristics variables firm value, ROA and Tobin's Q. The reason for that is to reduce potential endogeneity issues. To treat outliers in the dataset, I winsorised the compensation components, firm value, ROA, Tobin's Q and board size at the 1% level, ensuring no outliers significantly influence the results.

To test the hypothesis, I make use of several models. In total, I run five models. Model 1 only includes the dependent variables, which are total CEO compensation, fixed CEO compensation, or variable CEO compensation with passive institutional ownership. Model 2 includes the variable shares owned by the CEO. Model 3 includes the control variables of the firm characteristics. In model 4, the board characteristics are included. Lastly, in model 5, the CEO characteristics are included. I also added dummy variables for year and industry. I include fixed effects to control for any specific year, industry or firm effects. For all five models, I run three regressions, with one having year fixed effects, the other having year and industry fixed effects, and the other having year and firm fixed effects, resulting in a total of 9 regressions. The fixed effects regressions for total CEO compensation are specified as follows:

$$\begin{aligned}\text{Total CEO compensation}_{it} = \beta_0 + \beta_1 \text{passive institutional ownership}_{it} + \beta_2 \text{CEO ownership}_{it} \\ + \mathbf{X}'_{it}\beta + \gamma_t + \lambda_j + \mu_i + \epsilon_{it}\end{aligned} \tag{8}$$

In this equation, *total CEO compensation*$_{it}$ represents the total CEO compensation for company $i$ in year $t$ in million USD. *passive institutional ownership* is the percentage of passive institutional ownership. *CEO ownership* is the percentage of CEO ownership.

$X$ is a vector of control variables, which consist of the following variables: *firm value* being the firm value in millions USD. *roa* is the return on assets in percentage. *tobin's q* is Tobin's Q

ratio. *board size* is the board size as an absolute number. *independent director percentage* is the percentage of independent directors. *chair/CEO duality* is the chair/CEO duality (no = 0, yes = 1). *CEO age* is the CEO age as an absolute number. *CEO tenure* is the CEO tenure as an absolute number. *CEO gender* is the CEO gender (female = 0, male = 1).

$\gamma_t$ represents year fixed effects. $\lambda_j$ represents industry fixed effects. $\mu_i$ represents firm fixed effects.

Similarly, I can specify the equations for fixed CEO compensation and variable CEO compensation:

$$\text{Fixed CEO compensation}_{it} = \beta_0 + \beta_1 \text{passive institutional ownership}_{it} + \beta_2 \text{CEO ownership}_{it} + \mathbf{X}'_{it}\beta + \gamma_t + \lambda_j + \mu_i + \epsilon_{it} \tag{9}$$

$$\text{Variable CEO compensation}_{it} = \beta_0 + \beta_1 \text{passive institutional ownership}_{it} + \beta_2 \text{CEO ownership}_{it} + \mathbf{X}'_{it}\beta + \gamma_t + \lambda_j + \mu_i + \epsilon_{it} \tag{10}$$

### 4.2 Empirical concerns

A potential empirical concern in this study is endogeneity. Unobserved variables might influence passive institutional ownership, CEO ownership and CEO compensation, as these variables cover a broad spectrum of corporate governance. These potential unobserved variables could lead to biased results. I used several mechanisms to reduce the endogeneity concerns. First, I aim to decrease the omitted variable bias by adding a broad set of control variables. By adding variables found in studies to affect the studied variables, I try to control for the influence of other variables. Furthermore, I use fixed effects, specifically year, industry and firm fixed effects. Implementing these fixed effects helps control for non-included variables, reducing the endogeneity concerns.

As I add several control variables to the study, multicollinearity problems could occur. I check for multicollinearity via Pearson correlation, of which the results are shown in Table A1. The control variable, CEO tenure, has the highest correlation level, at a correlation effect of 0.45, with the other variable being CEO age. The correlation variable states that higher CEO tenure is related to higher CEO age, which makes sense. The other correlation effects are smaller. As of that, multicollinearity is not deemed a problem.

# 5 Results

In this section, the results of the regressions will be discussed.

## 5.1 Passive institutional ownership

First, I will discuss the effect of passive institutional ownership on total CEO compensation, testing hypothesis 1. The regression with year and industry fixed effects is shown in Table 4. The regression of total CEO compensation with year fixed effects is shown in Table A2, and the regression with year and firm fixed effects is shown in Table A3 in the appendix. The analysis of the effects on total CEO compensation, as derived from Tables 4, A2, and A3, shows various insights into the relationship between passive institutional ownership and total CEO compensation. In Table 4, where year and industry fixed effects are added, all models show a positive and significant coefficient of passive institutional ownership on total CEO compensation, except for model 2, indicating a positive relationship between passive institutional ownership and total CEO compensation. Model 1, which includes no control variables, shows a positive effect significant effect (0.0062, p-value $< 0.1$). When adding control variables, the coefficients are larger and of a higher level of significance, as displayed in model 3 (0.0180, p-value $< 0.01$), model 4 (0.0180, p-value $< 0.01$), and model 5 (0.0192, p-value $< 0.01$). To illustrate, model 5 indicates that an increase of 1 percentage in passive institutional ownership leads to an increase of 19,200 USD in total CEO compensation. As the average total CEO compensation is 7.9 million USD, this would mean an increase in total CEO compensation of 0.24%, which indicates that the findings are of low economic significance. Table A2, where only year fixed effects are used, shows similar results of a lower magnitude. Table A3 displays the regression with year and firm fixed effects. The coefficients vary between positive and negative, are of lower magnitude, and are insignificant. These findings suggest that the relationship between the percentage of passive institutional ownership is more likely to be positively related to total CEO compensation, as I only find significant positive coefficients and no significant negative coefficients. Therefore, hypothesis 1, stating that total CEO compensation is negatively influenced by passive institutional ownership, should be rejected. However, these findings provide evidence for the findings of Fernandes et al. (2013) and Croci et al. (2012). The authors argue that institutional ownership is positively related to total CEO compensation, variable CEO compensation and fixed CEO compensation by explaining that institutional investors push for

more equity-based compensation to better align the interests of the institutional investor and the CEO and increase the total CEO compensation package. This is in line with the finding that passive institutional ownership is positively associated with total CEO compensation.

Table 4: Total CEO compensation with year and industry fixed effects regression results

| | Total CEO compensation in million USD | | | | |
|---|---|---|---|---|---|
| Variables | (1) | (2) | (3) | (4) | (5) |
| Passive institutional ownership % | 0.0062* | -0.0003 | 0.0180*** | 0.0180*** | 0.0192*** |
| | (0.0032) | (0.0030) | (0.0028) | (0.0028) | (0.0028) |
| Shares owned by CEO % | | -0.0470*** | -0.0420*** | -0.0421*** | -0.0401*** |
| | | (0.0015) | (0.0014) | (0.0014) | (0.0015) |
| Firm value | | | 0.0066*** | 0.0064*** | 0.0063*** |
| | | | (0.0002) | (0.0002) | (0.0002) |
| Return on assets (ROA) | | | 0.0096*** | 0.0094*** | 0.0091*** |
| | | | (0.0009) | (0.0009) | (0.0009) |
| Tobin's Q | | | -0.0045 | -0.0013 | 0.0044 |
| | | | (0.0048) | (0.0048) | (0.0048) |
| Board size | | | | 0.0166*** | 0.0163*** |
| | | | | (0.0032) | (0.0032) |
| Independent director % | | | | 0.0047*** | 0.0047*** |
| | | | | (0.0005) | (0.0005) |
| Chair/CEO duality | | | | 0.1197*** | 0.1343*** |
| | | | | (0.0182) | (0.0187) |
| CEO age | | | | | 0.0112*** |
| | | | | | (0.0012) |
| CEO tenure | | | | | -0.0087*** |
| | | | | | (0.0012) |
| CEO gender male % | | | | | -0.0333 |
| | | | | | (0.0322) |
| Constant | 15.0847*** | 15.3624*** | 15.1104*** | 14.6495*** | 14.0713*** |
| | (0.1766) | (0.1692) | (0.1553) | (0.1591) | (0.1756) |
| Observations | 10,420 | 10,420 | 10,420 | 10,420 | 10,420 |
| R-squared | 0.0551 | 0.1355 | 0.2736 | 0.2841 | 0.2911 |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Industry fixed effects | Yes | Yes | Yes | Yes | Yes |
| Firm fixed-effects | No | No | No | No | No |

*Note*: * p-value $< 0.1$, ** p-value $< 0.05$, *** p-value $< 0.01$. Robust standard errors are displayed in parentheses.

Hypothesis 2 examines the relationship between passive institutional ownership and variable CEO compensation. The results, presented in Tables 5, A4, and A5, are largely consistent with the findings on the effect of passive institutional ownership on total CEO compensation. Table 5 shows positive effects, with the results being significant for model 1 (0.0078, p-value $<$ 0.1, model 3 (0.0352, p-value $< 0.01$), model 4 (0.0348, p-value $< 0.01$), and model 5 (0.0357, p-value $<$ 0,01). This suggests that a 1% increase in passive institutional ownership results in a 35,700 increase in variable CEO compensation when controlling for firm, board, and CEO

characteristics. Again, the findings can be interpreted as being of low economic significance. The same effects are observed when using year fixed effects, as shown in Table A4, with the effects in models 1 and 2 being insignificant and the effects in models 3, 4, and 5 being significant and smaller. However, when year and firm fixed effects are introduced, as shown in Table A5, the results change, with the coefficients in all models being negative and insignificant. These results strongly support hypothesis 2, indicating that a higher level of passive institutional ownership is associated with a higher level of variable CEO compensation.

Table 5: Variable CEO compensation with year and industry fixed effects regression results

| | Variable CEO compensation in million USD | | | | |
|---|---|---|---|---|---|
| Variables | (1) | (2) | (3) | (4) | (5) |
| Passive institutional ownership % | 0.0078* | 0.0052 | 0.0352*** | 0.0348*** | 0.0357*** |
| | (0.0042) | (0.0041) | (0.0038) | (0.0038) | (0.0038) |
| Shares owned by CEO % | | -0.0586*** | -0.0470*** | -0.0470*** | -0.0450*** |
| | | (0.0027) | (0.0025) | (0.0026) | (0.0029) |
| Firm value | | | 0.0086*** | 0.0084*** | 0.0083*** |
| | | | (0.0002) | (0.0002) | (0.0002) |
| Return on assets (ROA) | | | 0.0024** | 0.0023** | 0.0022* |
| | | | (0.0012) | (0.0011) | (0.0011) |
| Tobin's Q | | | 0.0518*** | 0.0544*** | 0.0566*** |
| | | | (0.0061) | (0.0061) | (0.0061) |
| Board size | | | | 0.0123*** | 0.0122*** |
| | | | | (0.0039) | (0.0039) |
| Independent director % | | | | 0.0056*** | 0.0056*** |
| | | | | (0.0006) | (0.0006) |
| Chair/CEO duality | | | | 0.0874*** | 0.0928*** |
| | | | | (0.0228) | (0.0235) |
| CEO age | | | | | 0.0056*** |
| | | | | | (0.0016) |
| CEO tenure | | | | | -0.0047*** |
| | | | | | (0.0017) |
| CEO gender male % | | | | | 0.0281 |
| | | | | | (0.0397) |
| Constant | 14.0379*** | 14.3371*** | 13.9443*** | 13.4647*** | 13.1292*** |
| | (0.2093) | (0.2048) | (0.1865) | (0.1919) | (0.2153) |
| Observations | 9,283 | 9,283 | 9,283 | 9,283 | 9,283 |
| R-squared | 0.0697 | 0.1135 | 0.2681 | 0.2757 | 0.2769 |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Industry fixed effects | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | No | No | No | No | No |

*Note*: * p-value $< 0.1$, ** p-value $< 0.05$, *** p-value $< 0.01$. Robust standard errors are displayed in parentheses.

The effects of passive institutional ownership on fixed CEO compensation are shown in Tables 6, A6 and A7. These results will be used to test hypothesis 3. Table 6 shows the effects when year and industry fixed effects are added, giving mixed results. Model 1 (-0.0078, p-value $< 0.01$) and

2 (-0.0120, p-value $< 0.01$) result in a significant negative effect, while model 5 shows a significant positive effect (0.0051, p-value $< 0.05$). These findings suggest that a 1% increase in passive institutional ownership results in a 5.000 increase in fixed CEO compensation when controlling for firm, board, and CEO characteristics, as shown in model 5. This indicates an increase of 0.19% compared to the average fixed CEO compensation in the sample, indicating the low economic significance of the findings. When only including firm fixed effects in the regression, as shown in Table A6, the same results are found, with models 1 and 2 being negatively significant and model 5 being positively significant. Table A7 displays the results of the regression with year and firm fixed effects. The coefficients in all models are insignificant and negative. The findings indicate that the association between passive institutional ownership and fixed CEO compensation has various results across the different models, therefore partially supporting hypothesis 3.

Table 6: Fixed CEO compensation with year and industry fixed effects regression results

| | Fixed CEO compensation in million USD | | | | |
|---|---|---|---|---|---|
| Variables | (1) | (2) | (3) | (4) | (5) |
| Passive institutional ownership % | -0.0078*** | -0.0120*** | 0.0035 | 0.0038 | 0.0051** |
| | (0.0028) | (0.0027) | (0.0026) | (0.0026) | (0.0025) |
| Shares owned by CEO % | | -0.0308*** | -0.0259*** | -0.0271*** | -0.0275*** |
| | | (0.0014) | (0.0013) | (0.0013) | (0.0014) |
| Firm value | | | 0.0051*** | 0.0050*** | 0.0049*** |
| | | | (0.0001) | (0.0001) | (0.0001) |
| Return on assets (ROA) | | | 0.0151*** | 0.0151*** | 0.0145*** |
| | | | (0.0008) | (0.0008) | (0.0008) |
| Tobin's Q | | | -0.0648*** | -0.0628*** | -0.0566*** |
| | | | (0.0044) | (0.0044) | (0.0044) |
| Board size | | | | 0.0121*** | 0.0122*** |
| | | | | (0.0029) | (0.0029) |
| Independent director % | | | | 0.0017*** | 0.0017*** |
| | | | | (0.0005) | (0.0005) |
| Chair/CEO duality | | | | 0.1156*** | 0.1149*** |
| | | | | (0.0165) | (0.0169) |
| CEO age | | | | | 0.0145*** |
| | | | | | (0.0011) |
| CEO tenure | | | | | -0.0060*** |
| | | | | | (0.0011) |
| CEO gender male % | | | | | -0.0777*** |
| | | | | | (0.0291) |
| Constant | 14.5959*** | 14.7778*** | 14.6115*** | 14.3747*** | 13.6268*** |
| | (0.1557) | (0.1523) | (0.1408) | (0.1447) | (0.1591) |
| Observations | 10,420 | 10,420 | 10,420 | 10,420 | 10,420 |
| R-squared | 0.0430 | 0.0879 | 0.2226 | 0.2290 | 0.2423 |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Industry fixed effects | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | No | No | No | No | No |

*Note*: * p-value $< 0.1$, ** p-value $< 0.05$, *** p-value $< 0.01$. Robust standard errors are displayed in parentheses.

### 5.2 CEO ownership

The second part of the analysis focuses on CEO ownership, where I examine its effect on total, variable and fixed CEO compensation. The results, as presented in Tables 4, A2, and A3, reveal a significant negative relationship between CEO ownership and total CEO compensation. In Table 4, which only includes year and industry fixed effects, all coefficients are significantly negative across all models, with model 2 having a coefficient magnitude of -0.0470 (p-value $< 0.01$), and the coefficients for the other models being roughly the same. The findings indicate that a 1% increase in CEO ownership results in a 47,000 USD increase in total CEO compensation, as shown in model 2, which again is of low economic significance. The results in Table A2, which includes year fixed effects, are of the same direction and almost the same magnitude. When

year and firm fixed effects are introduced, as shown in Table A3, the results are the same, but the magnitude decreases. For example, model 2 has a coefficient of -0.0176 (p-value $< 0.01$). These results are contrary to hypothesis 4, which posited a positive association between CEO ownership and total CEO compensation. Therefore, hypothesis 4 is rejected.

Furthermore, I analyse the effect of CEO ownership on variable CEO compensation, as stated in hypothesis 5. The results are displayed in Tables 5, A4 and A5. The regression with year and industry fixed effects as shown in Table 5 does show a significant negative association between CEO ownership and variable CEO compensation for all models, with model 2 having a coefficient of -0.0586 (p-value $< 0.01$), suggesting a 1% increase in CEO ownership results in a 58,600 decrease of variable CEO compensation. I find almost the same coefficients when running a regression with year fixed effects, as shown in Table A4. The regression with year and firm fixed effects only shows a significant negative effect of -0.0109 (p-value $< 0.01$) for model 5, which includes all control variables. The findings are in line with the hypothesis, which states that CEO ownership has a negative effect on variable CEO compensation.

Lastly, I look at the relationship between CEO ownership and fixed CEO compensation, running regressions with year, industry and firm fixed effects, where the results are displayed in Tables 6, A6, and A7. The coefficients are significant and negative for all models in Table 6, whereas model 2 has a coefficient of -0.0308 (p-value $< 0.01$). This indicates that a 1% increase in passive institutional ownership results in a 30,800 USD decrease in fixed CEO compensation, which suggests a decrease of 1.15% compared to the average fixed CEO compensation in the sample. Again, the regression with year fixed effects, shown in Table A6, show roughly the same results as in Table 6. Table A7 shows the results of the regression, including year and firm fixed effects. The effect between CEO ownership and fixed CEO compensation is significantly negative across all models. However, the magnitude is lower compared to the other regressions, with, for example, model 2 having a coefficient of -0.0128 (p-value $< 0.01$). Overall, the findings suggest that CEO ownership is negatively associated with fixed CEO compensation, which does not support hypothesis 6. Therefore, hypothesis 6 is rejected.

### 5.3 Control variables

Besides analysing the effects of the ownership structure variables on total, variable and fixed CEO compensation, I analyse the effects of the control variables on the CEO compensation components. I study the effects of the control variables by analysing the effects in Table 4, 5,

and 6, which include firm and industry fixed effects. Firstly, I examine the variables of firm characteristics. Firm value has a positive and significant effect on all compensation variables, providing evidence for the argument that larger firms have more funds to pay to their manager and managers' absolute effects on revenue and profits are larger. I find the same results for the relationship between firm performance, measured as ROA, and CEO compensation components. Lastly, the study finds no significant effect of growth opportunities, measured as Tobin's Q, on total CEO compensation. However, the study finds a positive and significant effect on variable CEO compensation and a negative and significant effect on fixed CEO compensation. These findings potentially suggest that firms are willing to pay the CEO more variable CEO compensation instead of fixed CEO compensation to better align the interests of the managers and owners, such that the CEO has more interest in making use of the growth opportunities.

The board characteristics variables also provide valuable insights. The study finds that board size has a positive and significant effect on all CEO compensation components, being aligned with the argument that effective monitoring is lower when the board size is larger, which results in higher CEO compensation. The effects of board independence on CEO compensation are also positive and significant. CEO/Chair duality is also found to have a positive and significant effect on all CEO compensation components, which makes sense as a CEO who also is the chair gets more opportunity to capture larger compensation as the CEO's influence strengthens.

Finally, I analyse the CEO characteristics variables. CEO age is positively associated with all CEO compensation components, which makes sense as older CEOs probably have more experience and knowledge and, therefore, are compensated more. CEO tenure, on the other hand, is negatively associated with the CEO compensation components. This is not in line with the findings of Brick et al. (2006), who stated the opposite. With regards to the effect of CEO gender, I only find a significant negative effect between CEO gender and fixed CEO compensation. This suggests that if the CEO is a man, he receives lower fixed compensation. This could indicate that women CEOs prefer fixed compensation, potentially as a result of differences in risk-taking behaviour, however, more research is needed to draw any conclusions.

# 6 Discussion

The findings suggest that passive institutional ownership is positively related to total CEO compensation, contrary to the hypothesis that it is negatively related to CEO compensation. The findings support the hypothesis that a higher level of passive institutional ownership is associated with a higher level of variable CEO compensation. The results show various findings regarding the relationship between passive institutional ownership and fixed CEO compensation; therefore, no clear conclusion can be drawn.

Previous studies before the Dodd-Frank Act have done research in this field. On one hand, there are studies highlighting the agency problem, with institutional investors having a higher level of monitoring compared to public investors, and therefore, a higher level of institutional ownership is associated with lower total CEO compensation and fixed CEO compensation (Hartzell & Starks, 2003; Ozkan, 2007; Liu & Yin, 2023). On the other hand, Fernandes et al. (2013); Croci et al. (2012) find that institutional ownership is associated with higher levels of total CEO compensation, cash compensation, and equity-based compensation. I expected that with the implementation of the Dodd-Frank Act, specifically the say-on-pay rule, passive investors will become more active, and results will be in line with Hartzell and Starks (2003); Ozkan (2007); Liu and Yin (2023). However, the findings from this study show otherwise, and results are more in line with Fernandes et al. (2013); Croci et al. (2012), who argue that the fixed compensation component increases due to institutional investors pushing for more equity-based compensation to better align the interests of investors and CEO, which in turn increases the total CEO compensation as well.

Next to passive institutional ownership, this study looks at the effects of CEO ownership, as CEO ownership plays a vital role in the agency conflict between owners and management. Contrary to the hypotheses, I find that CEO ownership is negatively associated with total and fixed CEO compensation. Furthermore, I find that, in line with the expectation, a higher level of CEO ownership is associated with a lower level of variable CEO compensation. Comparing these results with the relevant literature, various conclusions can be drawn. Brandes et al. (2003) state that CEOs want higher fixed pay, as that is less risky, which could result in higher levels of total CEO compensation, with Gomez-Mejia and Wiseman (1997) adding that CEOs want to increase guaranteed compensation (fixed compensation) and decrease incentive compensation (variable compensation). The results are partially in line with the findings of Brandes et al. (2003) and

Gomez-Mejia and Wiseman (1997). The results of this study provide evidence for the argument that CEOs want to decrease variable compensation. On the other hand, the findings are against the findings of Brandes et al. (2003) and Gomez-Mejia and Wiseman (1997), as the results of this study suggest a negative association between CEO ownership and total CEO compensation and fixed CEO compensation.

# 7 Conclusion

This study dives deeper into the understanding of the effects of passive institutional ownership and CEO ownership on CEO compensation and its components after the implementation of the Dodd-Frank Act. Previous research has shown insights into ownership structures and executive compensation. However, most of these studies used data before 2011, when the Dodd-Frank Act was implemented, which includes the so-called say-on-pay Act, stating that there is shareholder voting on executive compensation. This change in governance dynamics has led to the following research question: Does passive institutional ownership and CEO ownership influence CEO compensation and its components in the period after the implementation of the Dodd-Frank Act?

To answer this question, I use a sample of 10,420 observations of 1,611 unique US publicly listed companies from the period 2012 – 2023. This study finds that a higher level of passive institutional ownership is associated with a higher level of total CEO compensation, which is against the hypothesis. Furthermore, passive institutional ownership is positively associated with variable CEO compensation. No clear conclusion can be drawn regarding the effect of passive institutional ownership on fixed CEO compensation. I also looked at the effect of CEO ownership on compensation components. A higher level of CEO ownership is associated with a lower level of total CEO compensation and fixed CEO compensation, which is against the hypothesis, and a lower level of variable CEO compensation, which supports the hypothesis.

In conclusion, the study finds that passive institutional funds do affect corporate governance. This study does find significant results between passive mutual funds and executive compensation, potentially as a result of the regulation by the Dodd-Frank Act. The study adds new findings to the existing literature by showing the increasing role of passive investors in financial markets and their influence on corporate governance and executive compensation components. Furthermore, the study highlights the relationship between CEO ownership and the effect on corporate governance policies, specifically executive compensation components.

The results of the study could have several implications. Firstly, the study shows that there are indeed significant effects after the implementation of the Dodd-Frank Act. This could indicate that the new act does have some effect on the relationship. However, research should be done to determine if the act caused the effect and its impact. For policymakers, this could mean that regulatory implementation, specifically the Dodd-Frank Act, does have an effect.

Furthermore, the results are of importance for all kinds of investors, as the study highlights the important role of corporate governance and by which means it influences executive pay.

Although the study has valuable results and implications, some limitations should be taken into consideration when interpreting the results of the study. An important note to be made is that the average level of passive institutional ownership in the sample, excluding 2023, is 3.6%. This is significantly lower than the average passive fund ownership in earlier studies and papers. Also, this sample does not reflect the growth seen in passive institutional ownership over the years. This can be a result of limited data availability on shareholdings and the way passive funds were classified, as it does not necessarily mean that the funds that weren't classified as passive are not passive. Furthermore, corporate governance is a broad topic, and various factors are proven and could influence the results on executive compensation. I added several variables to control for firm, board and CEO characteristics. However, it could be that other variables influence the relationship and variables, as the scope of the topic is very large. Lastly, I analysed the effects after the implementation of the Dodd-Frank Act, which gives insights into the corporate governance and executive compensation dynamics. However, in this study, I do not examine the effects of the introduction by comparing the data from before and after the implementation. Therefore, it is a promising avenue for further research to compare both periods to understand the impact of the implementation, as the findings do not give insights into the direct impact of the Dodd-Frank Act.

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Table A1: Correlation Matrix

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Total compensation | 1.00 | | | | | | | | | | | | | |
| (2) Variable compensation | 0.89 | 1.00 | | | | | | | | | | | | |
| (3) Fixed compensation | 0.71 | 0.41 | 1.00 | | | | | | | | | | | |
| (4) Passive ownership % | −0.09 | −0.05 | −0.09 | 1.0000 | | | | | | | | | | |
| (5) Shares owned by CEO % | −0.19 | −0.19 | −0.11 | −0.05 | 1.00 | | | | | | | | | |
| (6) Firm value | 0.56 | 0.47 | 0.45 | −0.17 | −0.07 | 1.00 | | | | | | | | |
| (7) Return on assets (ROA) | 0.13 | 0.10 | 0.13 | 0.02 | −0.02 | 0.13 | 1.00 | | | | | | | |
| (8) Tobin's Q | 0.10 | 0.15 | −0.04 | 0.05 | 0.05 | 0.10 | 0.29 | 1.00 | | | | | | |
| (9) Board size | 0.18 | 0.14 | 0.14 | −0.07 | −0.07 | 0.17 | −0.01 | −0.02 | 1.00 | | | | | |
| (10) Independent director % | 0.09 | 0.10 | 0.02 | 0.02 | −0.15 | 0.04 | 0.01 | −0.03 | 0.03 | 1.00 | | | | |
| (11) Chair/CEO duality | 0.05 | 0.01 | 0.08 | −0.04 | 0.22 | 0.06 | 0.01 | −0.01 | 0.16 | −0.19 | 1.00 | | | |
| (12) CEO age | 0.05 | 0.02 | 0.12 | −0.06 | 0.21 | 0.03 | 0.04 | −0.06 | 0.03 | −0.04 | 0.17 | 1.00 | | |
| (13) CEO tenure | −0.09 | −0.08 | −0.03 | 0.00 | 0.44 | −0.05 | 0.03 | 0.06 | −0.04 | −0.08 | 0.30 | 0.45 | 1.00 | |
| (14) CEO gender male | −0.01 | −0.02 | −0.01 | 0.00 | 0.01 | −0.01 | −0.01 | −0.01 | −0.01 | −0.02 | 0.08 | 0.04 | 0.08 | 1.00 |

Table A2: Total CEO compensation year fixed effects regression results

| | Total CEO compensation in million USD | | | | |
|---|---|---|---|---|---|
| Variables | (1) | (2) | (3) | (4) | (5) |
| Passive ownership % | 0.0050 | -0.0008 | 0.0174*** | 0.0174*** | 0.0186*** |
| | (0.0032) | (0.0030) | (0.0028) | (0.0028) | (0.0028) |
| Shares owned by CEO % | | -0.0470*** | -0.0426*** | -0.0425*** | -0.0401*** |
| | | (0.0015) | (0.0014) | (0.0014) | (0.0015) |
| Firm value | | | 0.0063*** | 0.0061*** | 0.0060*** |
| | | | (0.0002) | (0.0002) | (0.0002) |
| Return on assets (ROA) | | | 0.0086*** | 0.0085*** | 0.0082*** |
| | | | (0.0009) | (0.0009) | (0.0009) |
| Tobin's Q | | | -0.0036 | -0.0003 | 0.0056 |
| | | | (0.0047) | (0.0047) | (0.0047) |
| Board size | | | | 0.0146*** | 0.0142*** |
| | | | | (0.0032) | (0.0032) |
| Independent director % | | | | 0.0048*** | 0.0049*** |
| | | | | (0.0005) | (0.0005) |
| Chair/CEO duality | | | | 0.1146*** | 0.1301*** |
| | | | | (0.0183) | (0.0188) |
| CEO age | | | | | 0.0102*** |
| | | | | | (0.0026) |
| CEO tenure | | | | | -0.0089*** |
| | | | | | (0.0012) |
| CEO gender male % | | | | | -0.0098 |
| | | | | | (0.0322) |
| Constant | 15.2346*** | 15.3831*** | 15.1811*** | 14.6656*** | 14.1556*** |
| | (0.0305) | (0.0296) | (0.0287) | (0.0542) | (0.0893) |
| Observations | 10,420 | 10,420 | 10,420 | 10,420 | 10,420 |
| R-squared | 0.0498 | 0.1315 | 0.2632 | 0.2735 | 0.2797 |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Industry fixed effects | No | No | No | No | No |
| Firm fixed effects | No | No | No | No | No |

*Note*: *** p-value $< 0.01$, ** p-value $< 0.05$, * p-value $< 0.1$. Robust standard errors are displayed in parentheses.

Table A3: Total CEO compensation with year and firm fixed effects regression results

| | Total CEO compensation in million USD | | | | |
|---|---|---|---|---|---|
| Variables | (1) | (2) | (3) | (4) | (5) |
| Passive institutional ownership % | 0.0012 | 0.0006 | -0.0014 | -0.0011 | -0.0013 |
| | (0.0027) | (0.0027) | (0.0026) | (0.0026) | (0.0026) |
| Shares owned by CEO % | | -0.0176*** | -0.0171*** | -0.0178*** | -0.0223*** |
| | | (0.0023) | (0.0023) | (0.0023) | (0.0024) |
| Firm value | | | -0.0003 | -0.0003 | -0.0003 |
| | | | (0.0003) | (0.0003) | (0.0003) |
| Return on assets (ROA) | | | 0.0043*** | 0.0041*** | 0.0039*** |
| | | | (0.0007) | (0.0007) | (0.0007) |
| Tobin's Q | | | 0.0390*** | 0.0390*** | 0.0383*** |
| | | | (0.0053) | (0.0053) | (0.0053) |
| Board size | | | | -0.0034 | -0.0024 |
| | | | | (0.0033) | (0.0033) |
| Independent director % | | | | 0.0022*** | 0.0019*** |
| | | | | (0.0005) | (0.0005) |
| Chair/CEO duality | | | | 0.0565*** | 0.0356** |
| | | | | (0.0175) | (0.0179) |
| CEO age | | | | | 0.0038** |
| | | | | | (0.0015) |
| CEO tenure | | | | | 0.0045*** |
| | | | | | (0.0015) |
| CEO gender male % | | | | | -0.0665* |
| | | | | | (0.0352) |
| Constant | 14.3169*** | 14.5962*** | 14.3034*** | 14.1332*** | 13.9304*** |
| | (0.1361) | (0.1404) | (0.1429) | (0.1496) | (0.1766) |
| Observations | 10,420 | 10,420 | 10,420 | 10,420 | 10,420 |
| R-squared | 0.8255 | 0.8267 | 0.8290 | 0.8295 | 0.8303 |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Industry fixed effects | No | No | No | No | No |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes |

*Note*: * p-value $< 0.1$, ** p-value $< 0.05$, *** p-value $< 0.01$. Robust standard errors are displayed in parentheses.

Table A4: Variable CEO compensation with year fixed effects regression results

| | Variable CEO compensation in million USD | | | | |
|---|---|---|---|---|---|
| Variables | (1) | (2) | (3) | (4) | (5) |
| Passive institutional ownership % | 0.0065 | 0.0048 | 0.0346*** | 0.0342*** | 0.0349*** |
| | (0.0042) | (0.0041) | (0.0038) | (0.0038) | (0.0038) |
| Shares owned by CEO % | | -0.0572*** | -0.0456*** | -0.0452*** | -0.0433*** |
| | | (0.0027) | (0.0025) | (0.0026) | (0.0029) |
| Firm value | | | 0.0084*** | 0.0082*** | 0.0082*** |
| | | | (0.0002) | (0.0002) | (0.0002) |
| Return on assets (ROA) | | | 0.0014 | 0.0014 | 0.0013 |
| | | | (0.0012) | (0.0011) | (0.0011) |
| Tobin's Q | | | 0.0636*** | 0.0659*** | 0.0679*** |
| | | | (0.0060) | (0.0060) | (0.0060) |
| Board size | | | | 0.0094** | 0.0093** |
| | | | | (0.0039) | (0.0039) |
| Independent director % | | | | 0.0056*** | 0.0056*** |
| | | | | (0.0006) | (0.0006) |
| Chair/CEO duality | | | | 0.0784*** | 0.0821*** |
| | | | | (0.0230) | (0.0236) |
| CEO age | | | | | 0.0042*** |
| | | | | | (0.0016) |
| CEO tenure | | | | | -0.0039** |
| | | | | | (0.0017) |
| CEO gender male % | | | | | 0.0533 |
| | | | | | (0.0398) |
| Constant | 14.6682*** | 14.7952*** | 14.4200*** | 13.8796*** | 13.6131*** |
| | (0.0382) | (0.0378) | (0.0364) | (0.0684) | (0.1151) |
| Observations | 9,283 | 9,283 | 9,283 | 9,283 | 9,283 |
| R-squared | 0.0538 | 0.0964 | 0.2527 | 0.2599 | 0.2608 |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Industry fixed effects | No | No | No | No | No |
| Firm fixed effects | No | No | No | No | No |

*Note*: * p-value $< 0.1$, ** p-value $< 0.05$, *** p-value $< 0.01$. Robust standard errors are displayed in parentheses.

Table A5: Variable CEO compensation with year and firm fixed effects regression results

| | Variable CEO compensation in million USD | | | | |
|---|---|---|---|---|---|
| Variables | (1) | (2) | (3) | (4) | (5) |
| Passive institutional ownership % | -0.0011 | -0.0011 | -0.0031 | -0.0027 | -0.0030 |
| | (0.0033) | (0.0033) | (0.0033) | (0.0033) | (0.0033) |
| Shares owned by CEO % | | -0.0033 | -0.0025 | -0.0034 | -0.0109*** |
| | | (0.0035) | (0.0035) | (0.0035) | (0.0038) |
| Firm value | | | -0.0004 | -0.0004 | -0.0004 |
| | | | (0.0004) | (0.0004) | (0.0004) |
| Return on assets (ROA) | | | 0.0051*** | 0.0050*** | 0.0047*** |
| | | | (0.0008) | (0.0008) | (0.0008) |
| Tobin's Q | | | 0.0609*** | 0.0609*** | 0.0597*** |
| | | | (0.0068) | (0.0068) | (0.0068) |
| Board size | | | | -0.0095** | -0.0079* |
| | | | | (0.0041) | (0.0041) |
| Independent director % | | | | 0.0011* | 0.0007 |
| | | | | (0.0006) | (0.0006) |
| Chair/CEO duality | | | | 0.0729*** | 0.0499** |
| | | | | (0.0215) | (0.0217) |
| CEO age | | | | | 0.0050*** |
| | | | | | (0.0019) |
| CEO tenure | | | | | 0.0063*** |
| | | | | | (0.0020) |
| CEO gender male % | | | | | -0.0700* |
| | | | | | (0.0414) |
| Constant | 14.2172*** | 14.2690*** | 13.8351*** | 13.7843*** | 13.5203*** |
| | (0.1549) | (0.1645) | (0.1678) | (0.1764) | (0.2122) |
| Observations | 9,283 | 9,283 | 9,283 | 9,283 | 9,283 |
| R-squared | 0.8370 | 0.8370 | 0.8400 | 0.8404 | 0.8413 |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Industry fixed effects | No | No | No | No | No |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes |

*Note*: * p-value $< 0.1$, ** p-value $< 0.05$, *** p-value $< 0.01$. Robust standard errors are displayed in parentheses.

Table A6: Fixed CEO compensation with year fixed effects regression results

| | Fixed CEO compensation in million USD | | | | |
|---|---|---|---|---|---|
| Variables | (1) | (2) | (3) | (4) | (5) |
| Passive institutional ownership % | -0.0086*** | -0.0124*** | 0.0033 | 0.0036 | 0.0050** |
| | (0.0028) | (0.0027) | (0.0026) | (0.0026) | (0.0026) |
| Shares owned by CEO % | | -0.0315*** | -0.0267*** | -0.0279*** | -0.0279*** |
| | | (0.0014) | (0.0013) | (0.0013) | (0.0014) |
| Firm value | | | 0.0049*** | 0.0048*** | 0.0047*** |
| | | | (0.0001) | (0.0001) | (0.0001) |
| Return on assets (ROA) | | | 0.0150*** | 0.0150*** | 0.0144*** |
| | | | (0.0008) | (0.0008) | (0.0008) |
| Tobin's Q | | | -0.0726*** | -0.0704*** | -0.0634*** |
| | | | (0.0043) | (0.0043) | (0.0043) |
| Board size | | | | 0.0109*** | 0.0108*** |
| | | | | (0.0029) | (0.0029) |
| Independent director % | | | | 0.0016*** | 0.0016*** |
| | | | | (0.0005) | (0.0005) |
| Chair/CEO duality | | | | 0.1110*** | 0.1114*** |
| | | | | (0.0166) | (0.0170) |
| CEO age | | | | | 0.0143*** |
| | | | | | (0.0011) |
| CEO tenure | | | | | -0.0065*** |
| | | | | | (0.0011) |
| CEO gender male % | | | | | -0.0662** |
| | | | | | (0.0292) |
| Constant | 14.4133*** | 14.5128*** | 14.4415*** | 14.2133*** | 13.5200*** |
| | (0.0271) | (0.0267) | (0.0260) | (0.0494) | (0.0810) |
| Observations | 10,420 | 10,420 | 10,420 | 10,420 | 10,420 |
| R-squared | 0.0262 | 0.0741 | 0.2089 | 0.2147 | 0.2277 |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Industry fixed effects | No | No | No | No | No |
| Firm fixed effects | No | No | No | No | No |

*Note*: * p-value $< 0.1$, ** p-value $< 0.05$, *** p-value $< 0.01$. Robust standard errors are displayed in parentheses.

Table A7: Fixed CEO compensation with year and firm fixed effects regression results

| | Fixed CEO compensation in million USD | | | | |
|---|---|---|---|---|---|
| Variables | (1) | (2) | (3) | (4) | (5) |
| Passive institutional ownership % | -0.0024 | -0.0028 | -0.0036 | -0.0032 | -0.0033 |
| | (0.0024) | (0.0024) | (0.0024) | (0.0024) | (0.0024) |
| Shares owned by CEO % | | -0.0128*** | -0.0125*** | -0.0133*** | -0.0168*** |
| | | (0.0021) | (0.0021) | (0.0021) | (0.0022) |
| Firm value | | | -0.0008*** | -0.0008*** | -0.0008*** |
| | | | (0.0003) | (0.0003) | (0.0003) |
| Return on assets (ROA) | | | 0.0018*** | 0.0017*** | 0.0016** |
| | | | (0.0006) | (0.0006) | (0.0006) |
| Tobin's Q | | | 0.0037 | 0.0037 | 0.0032 |
| | | | (0.0049) | (0.0049) | (0.0049) |
| Board size | | | | -0.0022 | -0.0014 |
| | | | | (0.0030) | (0.0030) |
| Independent director % | | | | 0.0018*** | 0.0016*** |
| | | | | (0.0004) | (0.0004) |
| Chair/CEO duality | | | | 0.0573*** | 0.0413** |
| | | | | (0.0161) | (0.0164) |
| CEO age | | | | | 0.0032** |
| | | | | | (0.0014) |
| CEO tenure | | | | | 0.0034** |
| | | | | | (0.0014) |
| CEO gender male % | | | | | -0.0843*** |
| | | | | | (0.0323) |
| Constant | 13.6251*** | 13.8280*** | 13.7705*** | 13.6215*** | 13.4815*** |
| | (0.1239) | (0.1280) | (0.1310) | (0.1372) | (0.1620) |
| Observations | 10,420 | 10,420 | 10,420 | 10,420 | 10,420 |
| R-squared | 0.8116 | 0.8124 | 0.8127 | 0.8133 | 0.8140 |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Industry fixed effects | No | No | No | No | No |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes |

*Note*: * p-value $< 0.1$, ** p-value $< 0.05$, *** p-value $< 0.01$. Robust standard errors are displayed in parentheses.