



# **The Governance Puzzle: Unravelling the Effects of CEO Duality on CEO Turnover in a New Era**

*An empirical study of the effects of CEO Duality on the sensitivity of CEO Turnover to Firm Performance for companies in the S&P 500 in the period 2017 - 2022*

**Aygul Ismayilova and Melanie Vella**

**Supervisor: Associate Professor Tommy Stamland**

MSc in Economics and Business Administration, with a major in  
Financial Economics

**NORWEGIAN SCHOOL OF ECONOMICS**

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## Abstract

This thesis examines whether combining the CEO and Chairman of Board of Directors titles in one individual influences the board's ability to remove poorly performing CEOs. We use a pooled logit regression analysis on a sample of S&P 500 firms from 2017 to 2022 to accomplish this goal. Our primary finding suggests a significant decrease in the sensitivity of CEO turnover to firm performance when a single individual holds the CEO and Chairman of the Board roles. By including board structure variables in the analysis, we find that the larger board size, enhanced gender diversity, and higher board independence within the board increase the likelihood of CEO turnover. Our findings concerning board independence and gender diversity are consistent with the prior literature, indicating that boards with lower independence and diversity are less effective in removing underperforming CEOs as a disciplinary measure. However, our study yields an unforeseen outcome, as it reveals a positive correlation between board size and the probability of CEO replacement. This thesis contributes to the existing literature by comparing the efficiency of combining or separating the CEO and Chairman roles in light of recent legislative reforms.

**Keywords:** Corporate governance, CEO duality, CEO turnover, Firm performance, Board structure, Agency theory, Stewardship theory

## Preface

With the conclusion of this thesis, we have finalised our Master of Science degree in Economics and Business Administration at the Norwegian School of Economics (NHH), with a specialisation in Financial Economics. This thesis aims to study company leadership structures, particularly those in which the same individual occupies the CEO and Chairman positions, and its effects on CEO turnover in cases of unsatisfactory company performance.

We chose to focus on corporate governance due to our mutual interest in this particular area of corporate finance. We are deeply interested in understanding how companies are governed, and organisations' decision-making processes are structured. We believe that transparency and accountability are the building blocks of successful companies. Through this research, we aimed to contribute to the body of research and provide helpful insight for companies to improve their governance practices and overall performance.

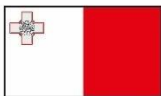
This empirical study gave us insights into the life and leadership beliefs of the CEOs of some of the most influential companies in the world. We frequently hear about these CEOs in the news but having the opportunity to learn more about their appointment, reasons for dismissals, and the leadership structure they use to manage and control the companies has been fascinating and insightful.

The research process has been demanding but rewarding, and we have strengthened our knowledge of corporate governance and increased our competence in statistics, econometrics, and data analysis. The competence gained throughout this thesis will surely be helpful in our future careers.

We would like to thank our supervisor, Tommy Stamland, for valuable feedback and advice throughout the semester. He was always ready to address our concerns and guide us through the research process. Finally, we would like to express gratitude to our family and friends for their constant encouragement and support throughout the completion of our whole degree.

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# 1. Introduction

The foundations of every company lie in corporate governance, leadership structures, and enforcement mechanisms. The Chief Executive Officer (CEO) plays a crucial and unquestionably significant role in driving the company's success and generating value.

*"Leadership is hard to define, and good leadership even harder. But if you can get people to follow you to the ends of the earth, you are a great leader."*

Indra Nooyi, Former CEO of PepsiCo

Good corporate governance is essential to ensure that companies are governed in the best interest of shareholders and other stakeholders. Corporate governance involves the interactions between a company's management, the board of directors, shareholders, and various other stakeholders. The Chairman leads the Board of Directors and provides guidance and direction. The board is responsible for ensuring effective governance and oversight, which includes assessing the performance of the CEO and planning for CEO succession, among other responsibilities.

*"Great companies with the way they work, first start with great leaders."*

Steve Ballmer, Former CEO of Microsoft

The practice of CEO duality, where an individual simultaneously holds the positions of CEO and Chairman of the board, is a well-established corporate governance practice. One argument posits that when the CEO also serves as a Chairman, this may compromise his<sup>1</sup> ability to act in the company's best interest. However, an opposing view suggests combining the roles leads to a unified leadership structure, facilitating control and decision-making.<sup>7</sup>

Certain prominent companies separated the CEO and Chairman positions following scandals. In October 2019, Boeing removed its CEO, Dennis Muilenburg, as Chairman following two plane crashes. Similarly, Elon Musk stepped down as Chairman at Tesla while maintaining his CEO position during an investigation by the U.S. Securities and Exchange Commission

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<sup>1</sup> We use the masculine form to refer to CEOs, as 95% of CEOs in our dataset are male.

(SEC) into his social media activity. The proportion of S&P 500 firms with CEO duality has nearly halved in the past two decades (The Economist, 2019).

In our literature review, we find extensive studies examining the relationship between CEO turnover and firm performance and studies investigating CEO duality and firm performance. However, limited research has been conducted on the impact of CEO duality on CEO turnover. This relationship has become more interesting in light of the recent enactment of legislation to enhance transparency and accountability, such as the Sarbanes-Oxley Act (SOX) of 2002, the SEC's Guidelines on Corporate Governance Disclosure of 2009, and the Dodd-Frank Act of 2010.

In this thesis, we focus on analysing the influence of board leadership structure on utilising CEO dismissals as a disciplinary measure in instances of poor company performance. Using a sample of S&P 500 firms from 2017 to 2022, we employ pooled logit regressions and find that firms with combined CEO and Chairman roles are less likely to remove underperforming CEOs. In cases of separate leadership structures, a one standard deviation decline in stock returns increases the likelihood of CEO turnover by 9.7%. Conversely, in cases of CEO duality, a one standard deviation decline in stock returns results in a smaller increase of 2.9% in CEO turnover probability. These findings hold consistent across various performance measures, inclusion of board structure variables, and robustness checks.

This research has limitations that reduce the generalisability of our findings. One limitation is that we use a sample of the largest publicly traded U.S. companies due to data availability limitations. Therefore, our results are not generalisable for smaller, less-established companies. Despite the limitations, this research provides valuable insights into the examined relationship and contributes to modern literature on corporate governance.

The research is based on several presumptions. Firstly, it assumes that the CEO's effectiveness can be accurately assessed by solely considering corporate performance, even though other factors may also impact it. Secondly, it presumes that the board's ability to replace underperforming CEOs is an effective measure of strong board oversight. These presumptions enable us to concentrate our analysis, test our hypotheses, and address our research question directly.

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The thesis is organised as follows: Chapter 2 reviews the literature on CEO duality, CEO turnover, and their relationship with firm performance. Chapter 3 presents the hypotheses. Chapter 4 describes the data and variables and provides descriptive statistics and Pearson correlations. Chapter 5 outlines the research methodology, presents empirical findings, and robustness checks. Finally, Chapter 6 concludes the analysis and suggests future research.

## 2. Literature Review

### 2.1 Theories of Corporate Governance

The study of corporate governance has been in focus for years due to corporate scandals, such as Enron<sup>2</sup> and WorldCom<sup>3</sup>, which were a catalyst for the changes in the regulatory environment, such as the introduction of the Sarbanes-Oxley Act (SOX)<sup>4</sup>. This area of research primarily concerns the policies and regulations employed to ensure that a company behaves ethically and engages in responsible conduct to uphold stakeholders' interests.

CEO duality is an aspect of internal corporate governance<sup>5</sup> that affects the distribution of power, decision-making, and accountability. CEO duality trusts the CEO with a larger scale of control and responsibility (Hassan et al., 2023). Previous studies indicate weak internal control mechanisms for disciplining underperforming CEOs in such cases, due to the inherent conflict of interest when the same person is responsible for monitoring and being monitored. Furthermore, the board's impartiality may be compromised, as personal biases may influence the Chairman's opinions and decisions. As a result, questions arise as to how a board can effectively fulfill its responsibilities in situations of CEO duality.

The separation of ownership and control in publicly traded companies is a fundamental concern. Shareholders own the control rights, while executives make decisions on their behalf. This delegation of control raises the possibility of conflicts of interest between shareholders and executives. The *Agency Theory* postulates that such conflicts arise due to the misalignment of interests between shareholders and executives (Jensen & Meckling, 1976). To mitigate these conflicts, shareholders appoint a board of directors, whose main aim is to

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<sup>2</sup> The executives of Enron prioritised their interests instead of acting in the interest of the shareholders, as they were expected to. They inflated the company's earnings using deceptive accounting practices, eventually leading to the executives receiving large bonuses and stock options. These corporate scandals eventually led to shareholders losing billions of dollars and the company filing for bankruptcy in 2001 (Petrick & Scherer, 2003).

<sup>3</sup> The WorldCom scandal was very similar to the Enron scandal. As a result of accounting fraud, the company went bankrupt in 2002.

<sup>4</sup> We discuss the Sarbanes-Oxley Act (SOX) and other major historical events in corporate governance later in this section.

<sup>5</sup> Internal corporate governance refers to the mechanisms and processes within a company designed to ensure effective management and control of operations, including the board of directors' responsibilities. On the other hand, external governance relates to the external mechanisms and regulations that govern a company's operations.

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increase shareholder wealth by ensuring that the CEO acts in the interest of shareholders. The board has tools like compensation contracts and CEO dismissals to deter management's self-interest and reduce agency costs. In cases of CEO duality, agency theory expects higher agency costs due to the Chairman not being able to exercise an appropriate level of oversight and discipline in cases of poor performance (Jensen & Meckling, 1976; Fama & Jensen, 1983; Rechner & Dalton, 1991; Jensen, 1993). Distorted incentives have been a significant contributing factor to financial crises, leading to a loss of confidence in capital markets and a decline of trust in institutions. The board of directors must fulfil its responsibilities to mitigate risks and protect shareholders' interests (Filatotchev & Nakajima, 2010).

An early study by Gjesdal (1981) highlighted stewardship as a fundamental objective of financial statements. This objective recognizes the shareholders' delegation of decision-making authority to executives, highlighting the importance of providing information that guarantees accountability for their decisions. The objective of accountability was further developed by Donaldson and Davis (1991), who presented the *Stewardship Theory* as an alternative perspective on corporate governance. This theory posits that executives view themselves as stewards of the organisation and, therefore, will act in the best interest of the company. This theory assumes that executives are trustworthy and take a long-term perspective, considering the best interest of shareholders and other stakeholders. This theory views the board as a supportive entity, providing managers with the necessary resources and guidance to fulfil their stewardship responsibilities. Stewardship theory suggests that having the same individual as the CEO and Chairman results in more decisive leadership, more manageable internal coordination, and results in more effective action when needed (Donaldson & Davis, 1991; Finkelstein & D'Aveni, 1994; Brickley et al., 1997).

The significance of agency and stewardship theories in companies' leadership considerations vary. While effective monitoring and coordinated decision-making are crucial in all companies, the trade-off between agency and stewardship differs in companies of different sizes and maturity. Smaller, younger companies may often benefit from a dual leadership structure because it provides a more vigorous and hands-on leadership style. Conversely, larger, more mature companies will likely benefit from a separate leadership structure to ensure effective and comprehensive oversight. These are essential corporate governance considerations to ensure companies behave ethically and uphold stakeholders' interests.

## 2.2 Research Related to CEO Turnover

Literature investigating CEO turnover takes two perspectives: the first is the literature that directly examines the relationship between CEO turnover and company performance, while the second examines how different variables affect the sensitivity of CEO turnover to company performance.

### 2.2.1 The Sensitivity of CEO Turnover to Company Performance

Extensive research consistently finds an inverse relationship between CEO turnover and company performance. Ideally, the performance indicator used to study the relationship should be the one used by the board of directors since the board is responsible for making CEO turnover decisions. However, empirical studies show inconsistency in determining which performance indicator to use.

Puffer and Weintrop's (1991) study suggests that an appropriate measure of performance reflects the difference between the CEO's performance and the prior performance expectations of the board. Analysing U.S. data<sup>6</sup>, they find an inverse relationship between CEO turnover and annual reported earnings per share that fall short of the board of directors' expectations. Farrell and Whidbee (2003) similarly observe that when boards take decisions regarding CEO turnover, they place emphasis on deviations from expected performance rather than solely considering the overall performance. This is especially true in cases where the company is followed by many analysts who agree on forecasted performance. When the CEO is replaced due to poor performance, their findings show a greater likelihood of an outsider<sup>7</sup> being chosen as a replacement. This argument suggests that boards are willing to seek external talent to address poor performance.

Other research uses accounting- and market-based measures. Engel et al. (2003) examined the relationship between CEO turnover and performance, using accounting and market-based

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<sup>6</sup> Unless specified otherwise, this thesis assumes that the research papers analyse data relating to companies in the United States.

<sup>7</sup> An executive who is appointed CEO from outside the firm and therefore has no previous ties with the company.

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performance measures. The findings revealed that accounting returns are more influential in CEO turnover decisions when they exhibit low variance and a strong correlation with stock returns. Conversely, market-based performance measures are given less importance in turnover decisions when accounting-based measures correlate strongly with stock returns and when market returns are more volatile. Huson et al. (2004) also used accounting-based measures to study this relationship. They found evidence of a decline in company performance compared to other firms before a CEO change but an improvement after the change. Factors such as high institutional ownership, a board dominated by outsiders, and the appointment of an outside CEO instead of an insider are found to have an impact on the extent of the improvement. Kaplan and Minton (2012) find that internal turnover<sup>8</sup> is significantly related to the performance relative to the industry, industry performance relative to the overall market and the overall performance of the stock market, and these relationships have become stronger since 2000. The findings of Kaplan and Minton (2012) highlight the importance of taking into account variations in industry performance for each company.

Jenter and Lewellen's (2021) study offers a distinct perspective on the link between CEO turnover and performance by differentiating between forced and voluntary turnover based on performance rather than CEO characteristics. The research indicates that a significant proportion of CEO turnovers, can be classified as performance-induced, a substantially higher percentage than the number of forced turnovers. The study further reveals that performance-induced turnover remains crucial throughout the CEO's tenure. However, the rate of such turnover decreases gradually with increasing tenure due to the rising entrenchment of CEOs. These findings are consistent with prior research conducted by Dikolli et al. (2014), which uses a broad sample of U.S. companies to demonstrate a decline in the likelihood of performance-induced turnover as the CEO's tenure increases. These findings imply that firm performance matters more in affecting turnover when less information is available about a CEO in the initial years of his tenure.

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<sup>8</sup> Internal turnover is a type of board-driven turnover. Turnover can also be external through takeovers.



## 2.2.2 The Impact of Other Variables

Most of the research on the relationship between CEO turnover and company performance has concentrated on public companies, owing to the greater accessibility of data. However, Gao et al. (2017) acknowledged the significance of private companies in the economy and conducted a more extensive study to better understand CEO turnover drivers in companies with different ownership structures. The authors find that public companies have higher CEO turnover rates and are more sensitive to performance-related turnover than large private companies. Furthermore, following a CEO turnover, private companies exhibit greater improvement in the performance than public companies, even when controlling for pre-turnover performance. The authors suggest that these differences may be caused by investment myopia in public companies.

There has been growing interest in the literature to study the influence of board characteristics on company performance. Duru et al. (2016) find that CEO duality negatively affects company performance when the company has few independent directors on the board. Hsu et al. (2021)<sup>9</sup> find evidence that a more independent board is associated with increased firm performance. Additionally, the author finds that the percentage of independent directors is higher in companies with dual leadership structures. The findings of these studies suggest that in cases of CEO duality, the board of directors is likely to have a higher share of independent directors and is likely to be more impartial and effective in taking decisions regarding CEO dismissals.

Other studies indicate that board gender diversity and board size are also important considerations. Campbell and Minguez-Vera (2008)<sup>10</sup> find that having a higher percentage of women on the board can improve firm value by enhancing financial performance and monitoring quality. Similarly, Aktas et al. (2019) find weaker monitoring in firms without female board members. Yermack's (1996) study presents evidence indicating that companies with smaller boards, at a given proportion of outside directors, tend to outperform those with larger boards. This finding highlights the greater effectiveness of smaller boards of directors, as they are associated with more favourable financial performance ratios and more substantial

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<sup>9</sup> Hsu et al. (2021) examine CEO duality's impact on companies' performance using data from Taiwan. They also investigate how information costs influence the relationship between CEO duality and firm performance.

<sup>10</sup> Campbell and Minguez-Vera (2008) use data from Spain to analyse how the level of gender diversity on a company's board of directors affects its overall value.

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CEO performance incentives through compensation and the potential for dismissal. The findings of these studies suggest that boards with a higher share of females and boards of a smaller size are more effective in monitoring the performance of the company, and therefore of the CEO, and are likely to result in higher probability of CEO dismissals.

## 2.3 Research Related to CEO Duality

Extensive literature explores CEO duality from various perspectives. In our analysis, we present literature arguing for and against CEO duality, as well as studies that yield inconclusive results about the optimal leadership structure companies should adopt. We further explore the impact of leadership structure on firm performance.

### 2.3.1 Literature in Favour of a Dual Leadership Structure

The topic of CEO duality has been widely debated in the literature, with authors presenting diverse and sometimes contradictory findings. Proponents of combining the roles of CEO and Chairman argue that this can lead to more decisive leadership and more transparent decision-making. Furthermore, consolidating power in one individual may signal stability and reassure shareholders. The impact of having the same person occupying both positions, however, is likely to depend on the company's size and its overall organisational structure.

In large public companies, it is widely believed that the CEO and Chairman positions should be held by separate individuals. Brickley et al. (1997) challenge the widely held view that separating the CEO and Chairman roles is always beneficial. They argue that in many cases, the drawbacks of such separation, such as agency costs, information costs, succession planning costs, and inconsistent decision-making, may exceed the benefits. A combination of the roles may help avoid these costs, resulting in more efficiency, and is generally in line with shareholders' interests.

Fosberg and Nelson's (1999) study offers supporting evidence for the benefits of CEO duality, proposing two explanations for why companies choose dual leadership structures. The agency

theory suggests that dual leadership controls agency costs, while normal succession theory<sup>11</sup> argues that dual leadership arises as part of the succession process. An analysis of a sample of companies with dual leadership structures showed that those employing this leadership structure to control agency costs experienced a significant improvement in performance. However, companies using dual leadership for succession planning showed no improvement in performance, indicating that they solely used this leadership structure for an orderly transfer of authority.

After exploring the benefits of CEO duality in normal economic circumstances, let us now examine its role during exceptional economic situations. In a recent study, Hassan et al. (2023) used the COVID-19 pandemic to investigate whether CEO duality is advantageous during crises when there is high information asymmetry. The study's results revealed that companies with CEO duality exhibited a lower probability of default and smaller declines in profitability than firms without separate leadership structures. Additionally, companies with CEO duality demonstrated significantly better cumulative abnormal returns than other organisations. The study's primary finding indicates that CEO duality is especially beneficial during times of crisis when information costs are high, which aligns with the stewardship theory. These findings support that having the same individual occupying both roles enhances leadership effectiveness during challenging times.

### **2.3.2 Literature in Favour of a Separate Leadership Structure**

We now explore the literature that presents arguments against CEO duality and supports separate leadership structures. Proponents of separate leadership structures argue that this separation ensures that the board of directors can properly oversee executives, which minimises agency costs and ultimately benefits shareholders.

*"One of the major functions of the board is to supervise management. If the Chairman of the board is also in management, then he is, in effect, marking his own exam papers."* (Brickley et al. 1997, pp. 190)

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<sup>11</sup> The normal succession theory refers to the orderly transformation of organisational power and leadership when a retiring CEO or Chairman is replaced and a successor is appointed (Fosberg and Nelson, 1999).

Following several corporate governance scandals, stakeholders called for changes in company policies to ensure transparency and accountability. One such demand is the separation of the CEO and Chairman positions to ensure that the board of directors retains its fiduciary oversight power and minimises agency costs. The separation of these roles has been increasing in popularity in the U.S. However, whether this change is implemented voluntarily or as a mandatory measure to improve corporate independence and transparency is unclear (Abels & Martelli, 2013).

Larcker and Tayan (2016) argue that separating the CEO and Chairman roles eliminates potential conflicts in crucial areas such as performance evaluation, executive compensation and CEO succession planning. This division of responsibilities enables the CEO to concentrate solely on strategy and operational matters, while the Chairman can focus on governance-related concerns. Furthermore, Rechner and Dalton (1991) argue that the primary issue with CEO duality is that it limits the ability of directors to monitor and carry out their governance duties effectively. As a result, the dual CEO may face a conflict of interest.

### **2.3.3 Literature with Mixed Conclusions on Leadership Structures**

Having discussed literature which supports a particular leadership structure, we now analyse literature that presents mixed conclusions.

Daily and Dalton (1997) carried out a statistical analysis of large corporations. They found no evidence to support the notion that having separate leadership leads to more independent management than having dual leadership. One argument suggests that having a separate leadership structure does not necessarily lead to independence because the Chairman usually has prior long-term connections with the company. Additionally, companies with separate leadership tend to lead boards with fewer outside directors than CEOs who serve as chairmen. Finally, separate chairmen are no more likely to be brought in from outside the organisation than joint CEO/Chairman.

Finkelstein and D'Aveni's (1994) study shows that deciding between a dual or separate leadership structure is not straightforward. They described this decision as a "double-edged

sword" due to the conflicting benefits of having a unified command through CEO duality versus having independent oversight with a separate board chair. Their research across three industries finds that the relationship between board vigilance and CEO duality is positive. However, duality is less likely when informal CEO power or firm performance is high due to the increased risk of CEO entrenchment, making duality less desirable. Conversely, when informal CEO power or firm performance is low, non-duality may pose a challenge due to the need for more decisive leadership.

Similarly, Faleye (2007) argues that different companies have unique characteristics determining the most appropriate leadership structure. Factors such as organisational complexity, CEO reputation, and managerial ownership influence a company's leadership structure. The author finds that complex organisations are more likely to choose a dual CEO-Chairman structure because the benefits of control outweigh the costs of sharing information. Furthermore, CEOs with a stronger reputation are more likely to serve as the board's Chairman since their reputation prevents them from acting in their interest instead of in the interest of shareholders. Finally, when the CEO owns a significant percentage of the company's equity, he is more likely to also serve as a Chairman due to having interests potentially more aligned with shareholders' interests. Therefore, the author argues that the choice of leadership structure in companies depends on the individual circumstances of the companies, and mandatory separation of the CEO and Chairman positions may not produce the expected outcomes. A comprehensive evaluation is necessary to determine a company's most suitable leadership structure.

### **2.3.4 Leadership Structure and Firm Performance**

Despite numerous studies exploring the connection between CEO duality and company performance, the results have been inconsistent. Dalton et al. (1998) conducted a meta-analysis of research investigating the link between board composition, board leadership structure, and firm financial performance. The study revealed that neither board composition nor board leadership structure had a consistent association with company financial performance. The inconsistent findings persisted even after considering company size, financial indicators, and board composition. Dalton and Dalton (2010) conducted a similar analysis of more recent research papers and found similarly inconsistent results. The authors suggest that the lack of

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consistent results could be due to limitations in the analysis methods used to study these issues and propose that considering alternative multi-level analysis could provide more insight.

While some research papers support particular views on the relationship between leadership structure and company performance, most research comes to divergent conclusions. Kang and Zardkoohi (2005) conducted a study that shows no clear advantage for shareholders between non-dual and dual structures. According to their findings, randomly selecting either will have a negligible impact on performance. The authors emphasise that whether a leadership structure benefits or harms performance depends on how well it aligns with a company's internal and external circumstances. Therefore, the author suggests that the optimal board leadership structure decision will likely differ for each specific company. This decision should be based on the company's internal and external circumstances, and there is no one-size-fits-all approach.

## 2.4 Research Combining CEO Duality and CEO Turnover

Studies aiming to examine our research question directly have been relatively limited, as prior research has primarily concentrated on the direct impact of performance on CEO turnover and the effects of CEO duality on firm performance. Goyal and Park (2002) stand out as the primary study that has investigated the relationship between board leadership structure and CEO turnover using a dataset of turnovers and non-turnovers<sup>12</sup> between 1992 and 1996. The authors discover that when the same individual holds the CEO and Chairman positions, the board is less likely to dismiss the CEO because of poor performance. This is partly linked to the board's difficulty in effectively supervising and holding the CEO accountable as a result of a lack of independent leadership. These findings are robust to different performance measures and robustness checks.

A comparable study of Vietnamese firms utilises a similar methodology to that of Goyal and Park (2002). Tran et al. (2016) examined the influence of CEO duality and state shareholding on the sensitivity of management turnover. The authors analysed a dataset of publicly traded

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<sup>12</sup> This refers to companies that do not change their CEO during the period, the control group.

companies in Vietnam from 2009 to 2015 to explore this relationship. Their primary finding supports the result obtained by Goyal and Park (2002), where the inverse relationship between company performance and CEO turnover becomes less pronounced in the presence of CEO duality, suggesting that separating the CEO and Chairman positions is likely to result in more effective board oversight. This study differs from Goyal and Park (2002) in that it examines the Vietnamese economy, which is a transitional economy with a distinct economic environment<sup>13</sup>. Furthermore, Tran et al. (2016) exclusively employ an accounting-based performance measure and include control variables for firm size and leverage.

## 2.5 Recent Historical Events in Corporate Governance

There has been an increasing trend towards promoting transparency and accountability in public companies, which has led to governments implementing new regulations and guidelines to improve corporate governance practices.

The U.K. implemented the first corporate governance code, "*The Cadbury Committee Report*" in 1992 in response to corporate scandals that caused the collapse of companies like Polly Peck and Maxwell Communication (Dahya et al., 2002)<sup>14</sup>. The report, commissioned by the Financial Reporting Council (FRC) and chaired by Sir Adrian Cadbury, recommended that the board of directors has a majority of independent non-executive directors, the separation of CEO and Chairman positions, the establishment of audit committees, and prioritisation of transparency and accountability in corporate reporting. The report aimed to improve board oversight and responsibilities for U.K. companies. Although compliance was voluntary, listed companies on the London Stock Exchange (LSE) had to explain their compliance with the code or reasons for non-compliance. (Financial Reporting Council, 1992). Dahya et al. (2002) observed that the Cadbury Report led to a stronger negative relationship between CEO turnover and corporate performance, and an increase in the sensitivity of turnover to performance. They attributed these changes to the increase in outside board members, and the

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<sup>13</sup> A notable difference is that the Vietnamese government holds shares in many listed companies due to being a socialist-oriented market economy. This practice is rare in the U.S. due to the U.S. having a capitalist economic system.

<sup>14</sup> Dahya et al. (2002) use data from the U.K. to analyse top management turnover during the eight years surrounding the publication of the Cadbury Report.

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resulting improvement in board oversight. In a later study, Dahya and McConnell (2007)<sup>15</sup> found that companies following the Cadbury recommendations showed significant improvements in operating performance and a significant increase in the stock price at the time of the CEO change announcement. The increase in the number of outside directors, as recommended by the Cadbury report, therefore led to enhanced performance, and increased shareholder value for UK companies.

The recommendations of the Cadbury Committee Report had a global impact on corporate governance legislation, including in the U.S. The Enron and WorldCom scandals prompted the U.S. to pass the “*Sarbanes-Oxley Act (SOX)*” in 2002, which aimed to enhance corporate governance, prevent bankruptcies resulting from poor oversight, and safeguard the interests of shareholders (Coates, 2007). SOX established the Public Company Accounting Oversight Board (PCAOB) to supervise and govern public company auditing, mandated internal controls over financial reporting, restricted some non-audit services for audit clients, required independent audit committees, and demanded CEO and CFO certification of financial statements. The primary objectives of SOX were to improve transparency and accountability in financial reporting to restore public trust in financial markets (Sarbanes-Oxley Act, 2002). Unlike the Cadbury report, SOX did not recommend separating the CEO and Chairman roles. Valenti (2008) finds evidence that companies strengthened their boards' monitoring ability in response to SOX through changes in composition and processes, indicating increased sensitivity to governance advocates' concerns following the implementation of SOX.

In 2009, the U.S. Securities and Exchange Commission (SEC) issued new guidelines on corporate governance disclosures. The aim of the *SEC's 2009 Guidelines on Corporate Governance Disclosure* was to improve transparency and accountability and ensure that the ultimate goal of instilling confidence in investors regarding the governance practices of publicly traded companies is achieved. New guidelines now require companies to disclose their board leadership structure, including whether the same person holds the CEO and Chairman roles and, if not, the reason for the separation. The guidelines do not require companies to adopt a particular board structure, as they note that different leadership structures may suit different companies. Companies must disclose the qualifications of their directors

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<sup>15</sup> Dahya and McConnell (2007) use data from the U.K. to examine the connection between changes in board composition and corporate performance over the 1989–1996 period.



and nominees and their compensation policies for directors and executive officers, including stock and option awards. Companies must disclose significant differences between their corporate governance practices and those required by their listing exchange. Finally, companies must disclose their policies and practices regarding risk management and the board's role in risk oversight (United States Securities and Exchange Commission, 2009).

Following the financial crisis of 2007-2008, the United States implemented the “*Dodd-Frank Wall Street Reform and Consumer Protection Act*” to increase transparency and accountability and mitigate systemic risk in the financial services industry. The legislation included several important provisions, such as expanded whistleblower protection to encourage reporting of misconduct, new requirements for corporate governance and executive compensation, and the creation of the Financial Stability Oversight Council (FSOC) to monitor potential risks to the financial system. The Dodd-Frank Act did not prescribe a specific board leadership structure, however it required companies to disclose the rationale behind their chosen board leadership structure in their annual proxy statements to investors (Dodd-Frank Act, 2010).

The evolution of corporate governance legislation has aimed to prevent future corporate scandals and financial crises. The U.K.'s Cadbury Committee report emphasised a separation between the roles of CEO and Chairman. However, legislation in the U.S. took a different approach, only requiring companies to explain their chosen board leadership structure. As corporate governance legislation evolves, ensuring transparency and accountability in the business world remains crucial.

## 2.6 Key Takeaways and Identifying the Research Gap

By comprehensively examining the relevant literature and identifying critical corporate governance theories, we have developed a good understanding of current research on CEO turnover and CEO duality.

Recent literature on the relationship between CEO duality and CEO turnover for U.S. companies has been lacking, making this a relatively underexplored area, particularly considering the extensive changes in legislation since the study conducted by Goyal and Park (2002). Over the last two decades, financial scandals have prompted changes in regulations

and corporate practices to increase the transparency of CEO actions and to ensure executive accountability. Although U.S. corporate governance legislation has not mandated the separation of the roles of CEO and Chairman, companies must inform investors and other stakeholders about their decisions regarding board leadership structure.

Our literature review has identified a research gap in recent studies analysing the effect of board leadership structure on CEO turnover. Previous research was conducted in a different legislative and economic environment, highlighting the need for updated research to better understand the relationship between these variables. Our research will provide insight into whether CEO duality is an appropriate leadership structure and its impact on the board's ability to use CEO dismissals as a corporate governance tool in cases of poor company performance. Lastly, there needs to be more research regarding the influence of board characteristics on CEO turnover. Given the prevalence of board characteristic considerations in recent studies, this warrants further exploration.

### 3. Hypothesis Development

This section presents hypotheses that provide the basis for our research. The main research question is: "*Does the board leadership structure affect CEO turnover?*". We examine the extent to which the leadership structure of a company, whether it is a separate or unified leadership structure, influences the board's decision to dismiss an underperforming CEO.

*H<sub>1</sub>: There is an inverse relationship between the probability of CEO change and a company's performance measures.*

The Board of Directors has several roles, including hiring, evaluating, compensating, monitoring, and dismissing CEOs. Boards have the duty to replace poorly performing CEOs, and researchers have widely studied the link between CEO turnover and firm performance. Puffer and Weintrop (1991), Farrell and Whidbee (2003), and Kaplan and Minton (2012) document a negative relationship between CEO turnover and firm performance. Previous studies use both market stock returns and accounting variables as performance measures; Huson et al. (2004) use accounting measures, while Kaplan and Minton (2012) use stock returns. Therefore, we include a combination of market and accounting performance measures. We expect to find an inverse relationship between CEO turnover and all three performance measures.

*H<sub>2</sub>: The sensitivity of CEO turnover to performance measures is less for companies that bestow the CEO and Chairman of the board of directors' positions in the same individual.*

Research examining the impact of CEO duality on the sensitivity of CEO turnover is limited. The primary research paper by Goyal and Park (2002) focuses on board leadership structure and CEO turnover and finds that the sensitivity of CEO turnover to firm performance is lower when the CEO also holds the Chairman position. This lower sensitivity is associated with the conflict of interest that hinders effective oversight and discipline when a single individual has both positions of power. We expect to find a relationship similar to the one observed by Goyal and Park (2002).

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*H<sub>3</sub>: Companies with more independent directors on the board experience higher CEO turnover.*

The Board of Directors is responsible for dismissing underperforming CEOs, but the probability of dismissal is likely to depend on the board's independence. A board with a higher proportion of independent directors is likely to be in a better position to take an impartial decision to dismiss CEOs when necessary. In line with the findings of Duru et al. (2016) and Hsu et al. (2021), we anticipate a positive relationship between board independence and CEO turnover.

*H<sub>4</sub>: Companies with a larger board of directors experience lower CEO turnover.*

A larger board may find it more challenging to decide on CEO dismissal. Yermack (1996) finds that smaller boards are associated with more favourable financial performance and argues that companies with smaller boards have more substantial CEO performance incentives from compensation and the threat of dismissal. We anticipate an inverse relationship between board size and CEO turnover.

*H<sub>5</sub>: Companies with a more significant proportion of female directors on the board experience a higher level of CEO turnover.*

A more diverse board with a higher proportion of females can improve board monitoring quality and decision-making due to a wider variety of perspectives, experiences, and skills. This is supported by the findings of Campbell and Minguez-Vera (2008) and Aktas et al. We anticipate that a board with a higher female representation is likely to result in better monitoring and, as a result, increased CEO turnover.

## 4. Data

### 4.1 Data Sources and Limitations

We obtain data for a sample of S&P 500 companies from the beginning of 2017 to the end of 2022 from the ExecuComp database provided by CRSP<sup>16</sup>.

The firms we identified in our sample must satisfy the general criteria outlined in Table 1.

*Table 1 - A table description of the general criteria the dataset must satisfy*

<i>Criterion No.</i>	<i>Criterion Description</i>	<i>Source</i>
1	The company must be registered in the S&P 500 index at the end of 2022 <sup>17</sup> .	Compustat
2	The company must be recorded in ExecuComp, and enough data for all variables used in the regression model must be available on CRSP, Compustat and IBES databases to be able to conduct our analysis.	CRSP, Compustat and IBES
3	The executives must have served as CEO for at least part of the period from 2017 to 2022. We identified the period in which they served as CEO by the 'Date became CEO' and 'Date left as CEO' and cross-checked with LexisNexis Academic Universe.	ExecuComp, LexisNexis

Data is available for 499 tickers, 231 of which experienced at least one CEO change event during the sample period. The companies that experience a turnover in the top executive management position during the sample period are considered a treatment sample. Those that do not experience any turnover are included in the control sample. The initial dataset consists of 322 treatment and 1211 firm-year control observations. This dataset is analysed in detail to discover inconsistencies by cross-checking with LexisNexis Academic Universe, company press releases, business wire database and SEC filings. Many companies experience only one turnover event over the sample period. However, some firms experience two or more

<sup>16</sup> CRSP is the Centre for Research in Security Prices.

<sup>17</sup> This criterion may result in survivorship bias as we collect data on companies in the S&P 500 at the end of 2022. This bias emerges due to our emphasis on companies that successfully met the evaluation criteria for S&P 500 inclusion, which involves multiple scrutiny measures while overlooking eliminated ones (Garcia & Gould, 1993).

turnovers. We eliminate turnovers due to M&A activities<sup>18</sup>, death<sup>19</sup> or severe health problems<sup>20</sup> since these cases do not indicate poor performance. To identify these cases, we search the names of directors on LexisNexis Academic Universe and company websites and read the news around the CEO turnover date. Each step in the data-cleaning process is shown in Table 2. After cleaning the data, we end up with 305 treatment and 1110 firm-year control observations.

*Table 2 - A table describing each step of the data-cleaning process*

	<i>CEO changes</i>	<i>Non-changes</i>
The initial number of observations	322	1211
Less: Co-CEOs observations	-13	-18
Less: CEOs that never held this title (errors in data)	-2	-4
Correction: CEO changes mistakenly classified as control	+11	-90
Correction: Non-changes mistakenly classified as treatment	-3	+11
Less: Turnover due to M&A	-4	
Less: Turnover due to death or serious health issues	-6	
<b><i>Final</i></b>	<b>305</b>	<b>1110</b>

We match each CEO turnover event to a non-turnover event and mirror the distribution of CEO turnover events such that each control firm experiences at least one CEO change over the sample period. The dataset consists of 610 observations before merging with independent and control variables. The table below depicts the process of merging data frames and gives detailed information on how many observations we lose in each stage due to missing values.

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<sup>18</sup> The CEOs of Fiserv Inc (Mr. Jeffery Yabuki), Dupont De Nemours Inc (Mr. Andrew Liveris), Caesars Entertainment Inc (Mr. Gary Carano) and Paramount Global (Mr. Joseph Ianniello), all left the company following an M&A event.

<sup>19</sup> The CEO of M&T Bank Corp (Mr. Robert Wilmers) died suddenly while occupying the CEO and Chairman positions.

<sup>20</sup> The CEOs of IDEXX Labs Inc (Mr. Jonathan Ayers), Las Vegas Sands Corp (Mr. Sheldon Gary Adelson), Roper Technologies Inc (Mr. Brian Jellison), Oracle Corp (Mr. Mark Hurd) and Centene (Mr. Michael Neidorff), all died a few months after resigning citing health concerns.

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*Table 3 - A table describing each step of the data merging process*

	<i>CEO changes</i>	<i>Non-changes</i>
CEO turnover dataset	305	305
Less: Merging with Analysts' Earnings Forecast Error	-17	-22
Less: Merging with Market-adjusted Stock Returns	-3	-2
Less: Merging with Firm size (log of Total Assets)	-4	0
Final dataset – Model 1 - Baseline Regression Model	281	281
Less: Merging with Board Size and Board Independence and Board Gender Ratio	-7	-5
Less: Making the number of observations equal in both groups		-2
Final dataset – Model 2 - Baseline Regression Model and Board Characteristics	274	274

We choose our sample period to explicitly succeed various significant corporate governance events<sup>21</sup> and major financial events<sup>22</sup>. We build on the analysis of Goyal and Park (2002) for our sample period, by identifying any changes to the question of how the board's leadership structure impacts the sensitivity of CEO turnover to firm performance. The study by Goyal and Park (2002) utilises data from 1992 to 1996, which therefore does not consider the period post-2000, where corporate governance and associated issues faced heightened scrutiny. Our research addresses this gap by analysing the research question in this new context. Our sample period captures a period that includes three years prior to the COVID-19 pandemic (2017-2019), two years during the height of the pandemic (2020-2021), and one year when the significance of COVID-19 started to diminish (2022). This sample period enables us to determine whether these exceptional times impacted the relationship studied.

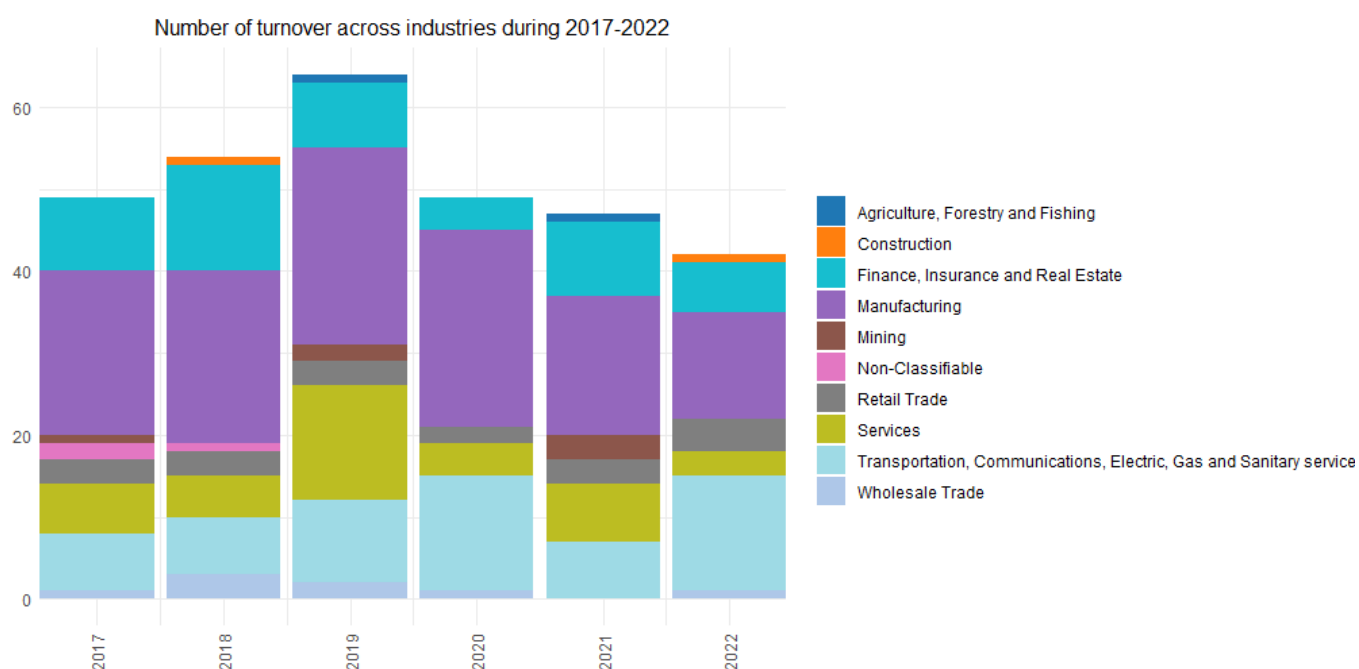
Figure 1 illustrates the frequency of turnovers across different industries in our sample period, revealing that the Manufacturing industry has the highest turnover rates throughout our sample

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<sup>21</sup> As previously discussed in the literature review, this includes but is not limited to, the Sarbanes Oxley Act (SOX), the SEC's 2009 Guidelines on Corporate Governance Disclosure, and the Dodd-Frank Act.

<sup>22</sup> We refer, in particular, to the 2007 - 2008 financial crisis.

period. Among all the years examined in our sample, 2019 had the highest number of turnovers. During the COVID pandemic years (2020 - 2021), there was a noticeable decrease, consistent with previous studies. Due to the lack of published data for 2022, we are unable to make precise observations about changes in the turnover rate compared to previous pandemic years.



*Figure 1 - Graph illustrating turnovers across industries in our sample*

CEO Turnover is defined as a change in the identity of the CEO<sup>23</sup>. The announcement dates of CEO changes are not provided in the ExecuComp database and therefore had to be collected manually. We obtain the change announcement dates through LexisNexis Universe, company press releases, business wire database and SEC filings. If the announcement date of CEO changes is not available in these sources, we take the departing date of the CEO as the change announcement date.

We use additional databases in WRDS to obtain data for our calculations of performance measures and control variables. We use the IBES database to obtain data about actual earnings,

<sup>23</sup> Compustat provides information about CEO turnovers but, in most cases, does not provide the reason for the turnover. We cross-checked with Nexis Uni and also identified that the reason for turnover is not always made public or clear. Therefore, we decided not to include this consideration in our analysis.



forecasted earnings and return on assets. The data is collected to calculate Analysts' Earnings Forecast Errors and Industry Relative Earnings, respectively. We use the BoardEx database to collect data about board size and composition. This database provides specific data on the size of the boards of companies and outlines the roles and genders of individuals on the board. Using this data, we calculate the percentage of outside directors and female board members and include these variables in our analysis.

Our analysis is subject to data availability limitations. We have an unbalanced panel data set as many companies have still not published their accounting results for 2022. However, it is still important to include 2022 as a post-COVID period to analyse the changes in our sample during the COVID pandemic years and in a subsequent period. Additionally, our sample is biased towards large publicly traded firms. This bias is expected since turnover data is more commonly available for large publicly traded firms than small and private firms. Finally, Compustat only provides annual data for CEO turnover, so we have to consider our data on an annual basis and adjust our explanatory and control variables data accordingly.

All variables in our analysis are winsorised at the 1% and 99% levels (replacing the lowest and highest 1% of values with the 1st and 99th percentiles, respectively). Winsorisation is a data transformation technique used to decrease the impact of extreme values, also known as outliers, in a dataset. Outliers are observations that fall far outside the range of most data points and can disproportionately influence statistical analyses. Winsorisation addresses this issue by replacing extreme values with less extreme values, thereby minimising their impact on the analysis. We analyse the outliers to determine whether they are extreme events or errors in data. Some outliers, such as a few observations with negative CEO tenure, are implausible and might happen due to errors in measurement or the data entry process. However, some observations, such as the age of CEO Warren Buffet, are outside the range of most data points. Figure 2 shows boxplots of all variables, with outliers indicated by dots.

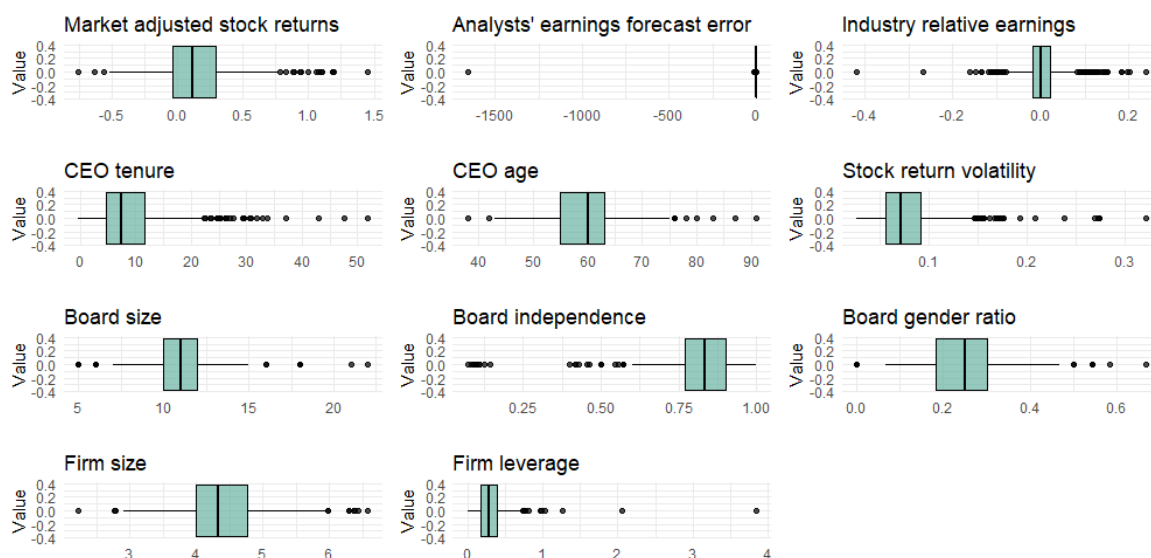


Figure 2 - Boxplot of all variables before winsorising

Figure 3 shows that winsorising at the 1% and 99% levels is effective in reducing the impact of outliers. However, there are still outliers remaining in all variables, as we aimed to account for only extreme outliers in either tail while maintaining the integrity of the data.

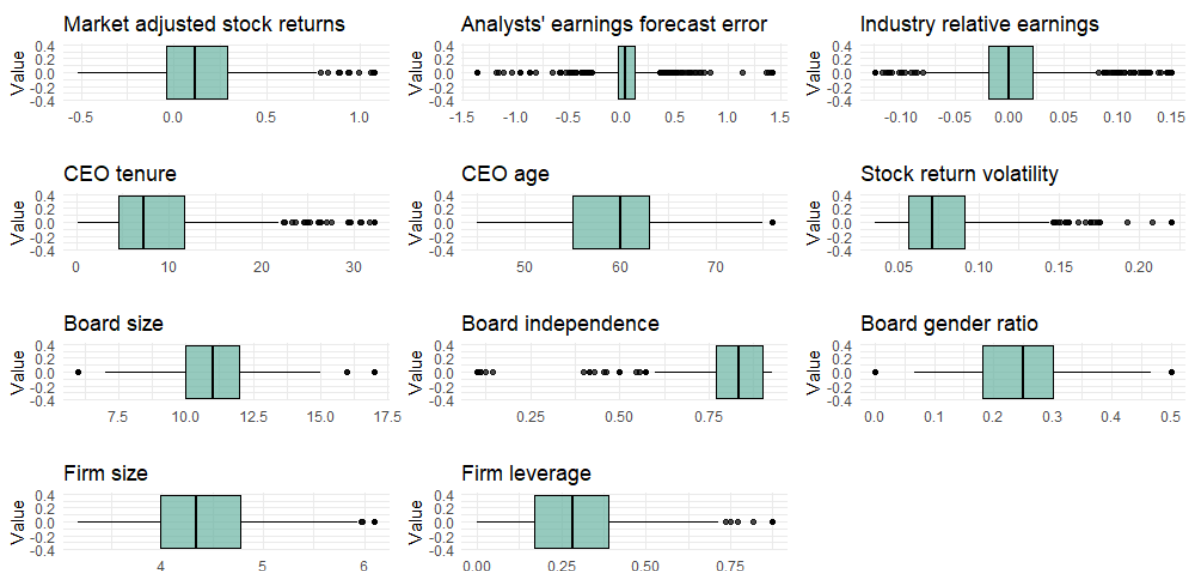


Figure 3 - Boxplot of all variables after winsorising

## 4.2 Variables

### 4.2.1 Dependent Variables

#### CEO Turnover

Our dependent variable is the CEO Turnover dummy, which takes a value of 1 for the year of CEO turnover event and zero otherwise. CEOs are selected from the list of executives by the "Date became CEO" variable to ensure they have held CEO positions during our sample period. We select the treatment sample by the "Date left as CEO" variable to identify CEO turnover cases. We ensure that our control group is subject to the same general criteria outlined in Table 1. We ensure that the CEO turnover data obtained from ExecuComp is accurate by cross-checking 'Date left as CEO' with LexisNexis Universe, company press releases, business wire database and SEC filings. Furthermore, we check that the CEO turnover is not a result of a co-CEO leaving his place because we decided not to consider co-CEOs in our sample<sup>24</sup>.

### 4.2.2 Independent Variables

#### CEO Duality

Our main explanatory variable is the CEO duality dummy, which takes a value of 1 for a CEO who simultaneously occupies the CEO and Chairman position, and 0 otherwise.

CEO Duality refers to the leadership structure in which a person simultaneously holds the positions of CEO and Chairman. We use the "Annual title" variable, which shows the position titles of executives over the years from the ExecuComp database to identify the duality cases. We cross-check the results with BoardEx Database, which provides detailed data on board representatives and their role names. In certain cases, we do additional research on Nexis Universe and the company websites. We exclude cases of co-CEOs and vice Chairmans from our dataset as these situations involve shared responsibility and authority and do not possess unified power like CEO duality structure.

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<sup>24</sup> The rationale behind this lies in the definition of CEO duality. We further elaborate on the reasons for not including co-CEOs in explaining the CEO Duality variable.

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While working with CEO duality data, we observe a tendency that aligns with the findings of Brickley et al. (1997). There is a lack of independent outsiders serving as Chairman of the board in most companies. Instead, we find that the Chairman is typically either the current (in cases of duality), the former CEO or an individual who has close ties with the company. Moreover, we notice that many companies opt to divide the roles of CEO and Chairman during CEO transitions. This observation aligns with the concept described by Vancil (1987) as ‘passing the baton’, which refers to a situation in which an individual who has recently stepped down as CEO continues to hold the position of Chairman for a certain period. The purpose of this arrangement is to enable the former CEO to oversee the performance of the new CEO during the initial months in the new role. The author also highlights that successful CEOs typically assume the additional title of Chairman after the evaluation period has ended, while the former CEO resigns from the position of Chairman of the board.

### **Performance Measures**

Empirical evidence does not indicate which performance measure is best when examining the link between CEO turnover and firm performance. Many studies in this area use a combination of performance measures. We use both stock return and accounting measures of performance in our analysis to ensure robustness of results. We include three measures of firm performance: market-adjusted stock returns, analysts' earnings forecast errors and industry-relative earnings.

The *Market-Adjusted Stock Returns* refer to the returns of each stock that we have adjusted for market performance. We make this adjustment by subtracting the equally weighted return on all CRSP companies. The period used to calculate this return is the 12 months leading up to the month the CEO turnover occurred. We calculate the market-adjusted stock returns in a similar manner for the control sample by using the randomly assigned event months as the CEO turnover month. In the control group sample, we assign a random event to each company, and we make sure that the random events are assigned to the control group in a similar pattern as they occur in the actual events in the treatment group. To achieve this, we make a summary table for all month-years for the sample period and count the number of CEO change announcements in the treatment group. This helps to capture the pattern of CEO turnover frequency across the years and to consider the frequencies in different months.

To measure the *Analysts' Earnings Forecast Errors*, we calculate the difference between the realised earnings during the fiscal year immediately preceding the CEO turnover year and the average analysts' forecasted earnings announced during the month that is nine months prior to the fiscal year-end. For some firms, there is no forecast submitted and announced nine months before the fiscal year-end preceding the CEO change year, and for those firms, we use the earnings forecasts announced ten months before the fiscal year-end. We then scale the difference between actual and average forecasted earnings by the absolute value of forecasted earnings. Scaling by the forecasted earnings enables us to compare the values across firms with different earnings levels and more accurately compare the forecast errors across firms.

To determine the *Industry Relative Earnings*, we subtract the median return on assets (raw numerical values rather than percentage) of the entire industry from the return on assets (raw numerical values rather than percentage) of each company within the same industry. The median return on assets is determined based on the Standard Industrial Classification (SIC) system. This calculation allows us to compare the earnings of each company with those of the industry.

### **Board Independence Ratio**

Independent directors are defined as directors on the board of directors who have no significant ties with the company or the CEO. The board independence ratio is calculated as the number of independent directors divided by the total number of directors, using values from the year before the turnover.

We anticipate a positive relationship between board independence and CEO turnover. The enhanced independence of the board is expected to facilitate the decision-making process to remove an underperforming CEO, by ensuring impartiality in the process.

### **Board Size**

The board size is measured as the total number of directors on the board as of the year preceding the CEO turnover.

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We anticipate that CEO turnover and board size will have an inverse relationship since a larger board may encounter difficulties in deciding on CEO dismissal. Communication problems and decision-making challenges may arise due to the larger size of the board hindering its efficacy.

### **Board Gender Diversity Ratio**

The board gender diversity ratio is calculated as the number of female directors divided by the total number of directors on the board as of the year preceding the CEO turnover.

Consistent with existing literature, we anticipate a positive relationship between board gender diversity and CEO turnover. More diverse boards are expected to lead to more enhanced monitoring, which, in turn, is expected to result in a higher rate of CEO turnover.

## **4.2.3 Control Variables**

### **CEO Tenure**

CEO tenure is defined as the number of years the CEO has held the position as of the year of the CEO change. In the case of the control group sample, the CEO tenure is computed as at the randomly assigned event month date.

The expected relationship between CEO tenure and CEO turnover is unclear. A positive value suggests that closeness to retirement has a more significant impact. In contrast, a negative value suggests that the ability gained during their tenure makes long-serving CEOs more challenging to replace.

### **CEO Age**

CEO age is included in the model in two variables, the actual age of the CEO as at the year of the CEO turnover and a dummy variable to proxy for CEOs nearing retirement age. The CEO age dummy variable takes the value of 1 if the CEO is aged 63 – 65 at the year of the CEO turnover and 0 otherwise. We have taken a 3-year retirement age window since CEOs' average retirement age has been 64 in recent years (Tonello & Schloetzer, 2022).

Using a dummy variable will enable us to investigate if there is any impact on the relationship under study when the CEO is closer to retirement age, which will serve as an additional check

on the CEO tenure control variable. As the age of the CEO increases and gets closer to retirement age, we anticipate an increase in the probability of CEO turnover.

### **Stock Return Volatility**

The volatility of the stock returns is calculated by determining the standard deviation of returns for 24 months leading up to the month in which the event occurred.

The expected relationship between stock return volatility and CEO turnover is unclear. A positive relationship would indicate that firms with more volatile stock returns may be more prone to poor results, eventually leading to a higher probability of CEO turnover. However, a negative relationship may indicate that firms are operating in challenging environments with high return volatility. Therefore, low returns may not necessarily mean poor performance and may not result in the need to dismiss the CEO. The last interpretation is possible in our sample since part of our sample spans over a period during the COVID pandemic. Therefore, high stock return volatility is expected during this period.

### **COVID Dummy**

The COVID dummy takes a value of 1 during the period 2020 – 2021 and 0 otherwise. Using this dummy variable; we would like to account for the impact of the COVID pandemic on the relationship between board leadership structure and CEO turnover and analyse whether there was a change in this relationship compared to the years exactly before and after the pandemic.

We anticipate a negative relation between the COVID dummy and CEO turnover since we predict that the number of CEO turnovers decreases during the COVID period. This decrease in CEO turnover may be because boards are reluctant to create further instability during these tumultuous times (Parsons et al., 2020).

### **Firm size**

Firm size is calculated as the natural logarithm of a firm's total assets (in millions) at the fiscal year-end prior to the CEO turnover event.

The rationale for including firm size as a control variable relies on the intuition that larger firms typically have more resources and a wider pool of potential candidates, making it

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comparatively easier to replace CEOs in those organisations. As a result, we expect a larger firm size to be positively associated with CEO turnover.

### **Firm leverage**

Firm leverage is calculated as a ratio of total debt (in millions) to total assets (in millions) at the fiscal year-end prior to the CEO turnover event.

Companies with more debt are expected to have a higher probability of experiencing CEO turnover due to the greater possibility of facing financial difficulties than their peers. As a result, it is reasonable to anticipate a positive relationship between firm leverage and CEO turnover.

## **4.3 Descriptive Statistics and Multicollinearity Considerations**

### **4.3.1 Descriptive Statistics**

Table 4 presents a comprehensive summary of the independent and control variables, showing key statistical measures, including mean, median, standard deviation, minimum, and maximum values. These measures are reported separately for the treatment and control groups. All variables are winsorised at 1% and 99% levels.

The mean and median values of the CEO-Chairman dummy are lower for the CEO turnover sample than for the control sample. These statistics indicate that there are fewer companies with a dual leadership structure in the CEO turnover sample than in the control sample, meaning that in our sample, turnovers are less likely when the CEO has a dual role. This observation supports the agency theory of corporate governance that a dual CEO is expected to suffer from increased agency costs and therefore is unlikely to conduct the same level of monitoring that would be possible in a situation where two different individuals occupy the CEO and Chairman positions.



*Table 4 - Descriptive statistics*

<b>Variable</b>	<b>Group</b>	<b>N</b>	<b>Minimum</b>	<b>Mean</b>	<b>Median</b>	<b>Maximum</b>	<b>Standard Deviation</b>
CEO-Chairman Dummy	CEO Changes	281	0	0.498	0	1	0.501
	Control	281	0	0.505	1	1	0.501
Market-Adjusted Stock Returns	CEO Changes	281	-0.518	0.090	0.079	1.007	0.297
	Control	281	-0.446	0.177	0.163	1.110	0.287
Analysts' Earnings Forecast Error	CEO Changes	281	-1.618	-0.016	0.017	0.888	0.310
	Control	281	-1.281	0.093	0.048	1.889	0.359
Industry Relative Earnings	CEO Changes	281	-0.118	0.002	-0.0003	0.155	0.045
	Control	281	-0.121	0.008	0.000	0.148	0.054
CEO Tenure	CEO Changes	281	0.112	8.986	8.030	33.106	6.203
	Control	281	0.649	8.878	6.932	30.981	6.775
CEO Age	CEO Changes	281	45.800	60.934	62.000	76.000	5.789
	Control	281	45.000	57.883	58.000	76.400	6.125
Dummy for CEO Age (63-65)	CEO Changes	281	0	0.224	0	1	0.418
	Control	281	0	0.100	0	1	0.300

*Table 4 - Descriptive statistics - Continued (1)*

<b>Variable</b>	<b>Group</b>	<b>N</b>	<b>Minimum</b>	<b>Mean</b>	<b>Median</b>	<b>Maximum</b>	<b>Standard Deviation</b>
Stock Return Volatility	CEO Changes	281	0.037	0.080	0.072	0.270	0.039
	Control	281	0.033	0.077	0.071	0.175	0.029
Board Size	CEO Changes	274	6.730	11.453	12	18	1.974
	Control	274	6	10.511	11	17.060	2.102
Board Independence	CEO Changes	274	0.098	0.812	0.833	0.929	0.142
	Control	274	0.100	0.795	0.818	0.929	0.135
Board Gender Ratio	CEO Changes	274	0.000	0.252	0.250	0.500	0.097
	Control	274	0.000	0.237	0.250	0.500	0.092
COVID Dummy	CEO Changes	281	0	0.331	0	1	0.471
	Control	281	0	0.299	0	1	0.459
Firm Size	CEO Changes	281	3.129	4.478	4.456	6.032	0.582
	Control	281	3.193	4.310	4.236	6.060	0.595
Firm Leverage	CEO Changes	281	0.0004	0.312	0.321	0.994	0.178
	Control	281	0.000	0.263	0.249	0.726	0.170

The performance measure statistics validate our prior expectations and are consistent with the findings of Goyal and Park (2002), as they indicate that firms experiencing CEO turnover perform poorly compared to the control firms. Both mean and median values for market-adjusted stock returns are lower for the firms that experience CEO changes compared to control firms, 9% (17.7%) and 7.9% (16.3%), respectively. The results for analysts' forecast error and industry-relevant earnings align with the results of the market-adjusted stock returns.

CEOs in the turnover group are older than CEOs in the control sample. This observation indicates that some of the turnovers in our sample are directly caused by orderly retirement. Consequently, we add the CEO age dummy to account for this possibility. The CEO age dummy variable suggests that CEOs in the turnover group are more likely to be close to or at retirement than those in the control sample, confirming our previous interpretation. Additionally, the average and median stock return volatility is slightly higher in the CEO turnover sample compared to the control group sample. This finding may illustrate that some turnovers occurred due to increased stock return volatility, making them more prone to poor performance.

Our analysis of board characteristics reveals that firms experiencing CEO turnover during the sample period tended to have larger boards with a greater number of independent directors than those that did not experience any turnovers. The findings align with Yermack's (1996) research that smaller boards outperform larger ones, keeping the proportion of outside directors fixed. Hence, larger boards may contribute to CEO turnover by hindering quick decision-making, leading to suboptimal performance. Furthermore, the observations align with the findings of Duru et al. (2016), who suggest that independent boards improve monitoring and enhance board capability. Therefore, a higher proportion of independent directors on the board is more likely to lead to a higher probability of a CEO dismissal. CEO turnover firms also tended to have a higher share of female directors on their board, as compared to control firms, which is in line with the research conducted by Aktas et al. (2019) and Campbell and Minguez-Vera (2008), who argue that a higher proportion of women on boards of directors positively affects monitoring quality.

The descriptive statistics indicate that the treatment sample has a larger firm size and greater firm leverage than the control sample, which is consistent with our initial expectations. It is often easier for larger firms to dismiss a CEO and hire a qualified replacement, resulting in more frequent CEO turnovers for larger firms. Additionally, financially distressed firms with high leverage are generally considered riskier and more likely to experience executive

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turnover. The COVID dummy is included to control for the effects of the pandemic period, and we observe that the mean of this variable is slightly lower for the control group sample. However, the median for both the CEO turnover and the control group samples equals 0.

### 4.3.2 Pearson Correlations and Volatility Inflation Factors (VIFs)

Multicollinearity bias can lead to unstable and unreliable estimates, and it is essential to ensure that our analysis does not suffer from this bias. We calculate Pearson correlations to assess whether multicollinearity is present in our data. This score indicates the degree of correlation between variables, with 0 indicating no correlation, 1 a strong positive correlation, and a score of -1 a strong negative correlation. Typically, we consider multicollinearity an issue if the correlation coefficient between any pair of variables exceeds 0.7 in absolute value (Nettleton, 2014). Table 5 presents the Pearson Correlations of our study's independent and control variables. Based on our examination of the Pearson Correlation results, we can confidently assert that multicollinearity is not a concern in our analysis.

The performance measures exhibit a low correlation between one another, with the strongest correlation observed between Analysts' Earnings Forecast Errors and Industry Relative Earnings, with a correlation coefficient<sup>25</sup> of  $r = 0.245$ . Gentry and Shen (2010) suggest that a low correlation between accounting and market measures indicates that firm financial performance is multi-dimensional, with distinct dimensions captured by each measure. Brickley (2003) finds evidence that when accounting returns are highly correlated with stock returns, they carry greater weight in turnover decisions, as the author argues that this increases the strength of the signal. In line with the findings of these studies, the low correlation observed between our performance measures may indicate that different performance measures express different dimensions of firm performance. In addition, accounting returns may be given less weight in turnover decisions due to their discrepancy from market measures.

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<sup>25</sup> Pearson's Correlation is represented by the symbol " $\rho$ " when calculated for a population and by " $r$ " when calculated for a sample. We use " $r$ " since we are working with a particular sample from the whole population (Stock & Watson, 2020).

Table 5 - Pearson correlations

<i>Variables</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>	<i>14</i>
CEO-Chairman Dummy	1													
Market Adjusted Stock Returns	-0.018	1												
Analysts' Earnings Forecast Errors	0.003	0.064	1											
Industry Relative Earnings	-0.052	0.146	0.245	1										
CEO Tenure	0.302	0.081	0.045	0.034	1									
CEO Age	0.235	-0.032	0.058	-0.028	0.431	1								
Dummy for CEO Age (63-65)	0.129	-0.094	0.044	0.012	0.086	0.323	1							
Stock Return Volatility	-0.155	-0.027	-0.110	-0.136	0.003	0.030	-0.027	1						
Board Size	0.09	-0.105	-0.045	-0.116	-0.113	0.030	0.062	-0.093	1					
Board Independence	0.349	-0.021	-0.046	0.012	-0.114	0.015	0.083	0.015	0.230	1				
Board Gender Ratio	0.099	-0.127	0.045	0.062	-0.043	0.102	0.037	0.038	0.152	0.168	1			
COVID Dummy	-0.029	0.050	-0.113	0.016	0.014	0.092	0.035	0.274	0.040	0.023	0.207	1		
Firm Size	0.133	-0.101	0	-0.107	-0.021	0.189	0.126	-0.056	0.484	0.177	0.247	0.087	1	
Firm Leverage	-0.029	-0.007	0.012	0	0.009	0.024	0.053	0.033	0.004	-0.002	-0.018	0.104	-0.108	1

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Our findings reveal that CEO Tenure and CEO Age exhibit a high positive correlation ( $r = 0.431$ ), as expected, which indicates that the longer a CEO has been in office, the higher the likelihood of him being of older age. We also observe a positive correlation between the CEO Age Dummy and CEO Age ( $r = 0.323$ ). This correlation is reasonable since both variables utilise the same data. Furthermore, we observe that CEO Duality positively correlates with CEO Age ( $r = 0.235$ ) and CEO Tenure ( $r = 0.302$ ), implying that an older CEO with a longer tenure is more likely to hold a dual role. This positive correlation is in line with the findings of Vancil (1987), who noted that CEOs undergo an evaluation period, after which companies that tend to have a unified structure, reward the CEO with the additional title of Chairman.

Based on our analysis of board characteristics, we find a significant correlation ( $r = 0.349$ ) between CEO Duality and Board Independence Ratio. This correlation suggests that either a dual leadership structure influences the board's decision on the number of independent directors to include on the board, or that a more independent board of directors increases the likelihood of having a dual leadership structure, as the independent board may reduce the negative incentives of a dual CEO. Additionally, Board Size and Board Independence are moderately correlated ( $r = 0.23$ ), as well as Board Gender Ratio and Firm Size ( $r = 0.247$ ). These findings suggest that larger boards are more likely to have a higher percentage of independent directors, a more gender diverse board is more likely to be found in a large firm.

Looking at our control variables, we note a correlation between Firm Size and Board Size ( $r = 0.484$ ), suggesting that the size of the company influences the decision regarding the size of the board. In addition, Stock Return Volatility and COVID Dummy exhibit a relatively high correlation ( $r = 0.274$ ), which is not surprising given the COVID pandemic's impact on the stock market's volatility. The magnitudes of the remaining correlations are relatively small, with absolute correlation coefficients less than 0.3, which are considered insignificant and will not be discussed.

We use the Variance Inflation Factors (VIFs)<sup>26</sup> to further check our models for the presence of multicollinearity. The VIF provides a quantitative assessment of how much the variance of the estimated parameter increases when including multiple independent variables in the model compared to when considering a model with only a single independent variable. Equation 1 illustrates the calculation of the VIF for the slope coefficient of the independent variable  $j$ ,

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<sup>26</sup> The Variance Inflation Factors (VIFs) corresponding to every independent and control variable in both models are available in Appendix Section 8.7.

where  $R_j^2$  is the R-squared from regressing  $x_j$  on all other independent variables. Equation 2 calculates the estimated variance of the estimate of  $\beta_j$ , where  $SST_j$  is the total sample variation of  $x_j$ . A VIF value greater than 10 typically indicates multicollinearity among predictor variables and may indicate the necessity to remove one or more variables from the model (Wooldridge, 2019, pp. 88 - 92). Our examination of the VIF values for each model further confirms that multicollinearity is not an issue in our analysis (Appendix Section 8.7).

*Equation 1 - Variance Inflation Factor (VIF) for the slope coefficient of the independent variable j*

$$VIF_j = \frac{1}{(1-R_j^2)}$$

*Equation 2 - The estimated variance of the estimate of  $\beta_j$*

$$\text{Var}(\hat{\beta}_j) = \frac{\sigma^2}{SST_j (1-R_j^2)} * VIF_j$$

## 5. Methodology and Results

### 5.1 Methodology

We employ pooled logit regression models to answer our main research question, "*Does the board leadership structure affect CEO turnover?*". We perform the data analysis in this thesis using the R statistical computing language. The methodological explanations in this section are based on "Introduction to Econometrics" (2020) by James H. Stock and Mark W. Watson<sup>27</sup>.

The dependent variable in our analysis is CEO turnover, a binary variable that takes a value of 1 for the year of CEO turnover and zero otherwise. In such linear multiple regression models with a binary dependent variable (eq. 3), the interpretation of the regression changes, compared to when a regression has a continuous dependent variable. The regression function must now be interpreted as conditional probability (eq. 4). When estimating such models using a Linear Probability Model (LPM), which assumes that the relationship between the independent variables and the probability of the dependent variable being equal to 1 (the event occurring) is linear, the predicted value of the dependent variable (y) is interpreted as the predicted probability that y = 1, and the coefficient ( $\beta$ ) is the change in that predicted probability for a unit increase in the independent variable (x), holding constant the other independent variables (eq. 5). The LPM model is inherently heteroskedastic. Therefore heteroskedasticity-robust standard errors must be used for inference.

*Equation 3 - Linear multiple regression models with a binary dependent variable*

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki} + u_i$$

*Equation 4 - Interpreting the regression as a conditional probability*

$$E(X_1, X_2, \dots, X_k) = Pr(X_1, X_2, \dots, X_k)$$

*Equation 5 - The Linear Probability Model (LPM)*

$$Pr(X_1, X_2, \dots, X_k) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k$$

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<sup>27</sup> These methodological explanations are based on Chapter 11 – Regression with a Binary Dependent Variable, on pages 392-414.



We choose a Logistic Regression Model over an LPM since the LPM can only predict a linear relationship in which any unit increase in the independent variable ( $x$ ) has the exact same change on the predicted probability of the dependent variable ( $y$ ), and also the LPM predicts negative probabilities and probabilities greater than 1. We require a non-linear model, such as the logit, where the non-linear formulation forces the predicted values to be between 0 and 1. The logit model is a non-linear function due to having a linear function within a linking function. The linking function follows the cumulative standard logistic distribution function ( $F$ ), which is the key factor resulting in the non-linear nature of this function (eq. 6). The interpretation of a logit model is different from that of an LPM due to the non-linear relationship and the ultimate effect of a one-unit change in an independent variable ( $x$ ) on predicted probabilities of the dependent variable ( $y$ ) is different for different values of  $x$ . Because of this different interpretation, it is common to interpret marginal effects,  $E[X = x + \Delta x] - E[X = x]$ , instead of coefficients in these non-linear regressions (Frolich, 2006). Finally, we compute heteroskedasticity-robust standard errors to ensure our standard errors are reliable.

*Equation 6 - The Logit Regression Model*

$$Pr(X_1, X_2, \dots, X_k) = F(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)}}$$

While an LPM minimises squared errors by employing Ordinary Least Squares (OLS)<sup>28</sup>, in a logit model, we use a minimisation algorithm, such as the Maximum Likelihood Estimation (MLE). The MLE is used to find the values of the parameters that maximise the likelihood of the observed data given the logistic function. We use the estimated parameters to predict the probability of a binary dependent variable ( $y$ ) based on a change in the independent variable ( $x$ ). In larger samples, the MLE demonstrates consistency, normal distribution, and efficiency (i.e., minimum variance); therefore, t-statistics and confidence intervals can be constructed as usual.

When we have a regression with a binary dependent variable, we cannot interpret R-squared and Adjusted R-squared as we would in a regression with a continuous dependent variable. In

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<sup>28</sup> In OLS, we aim to set the coefficients to minimise the sum of squared errors between the predicted and actual values. This minimisation of squared errors is achieved by computing the errors, squaring them and then minimising them.

these instances, we need to use a McFadden R-Squared, also known as a Pseudo R-squared<sup>29</sup>, which gives us a measure of the percentage improvement that our model delivers based on another hypothetical model with no independent variables included in the model.

## 5.2 Regression Models

We build upon the previous research conducted by Goyal and Park (2002), spanning the years 1992 and 1996, to investigate the link between the board leadership structure and the probability of CEO turnover. We adapt the model to suit a more modern period from 2017 to 2022. We create a more advanced model by adding additional variables, which have been included in recent research, to determine the impact of this inclusion on the relationship under study. We then develop a second model which further studies the effect of board characteristics on the relationship under study.

### 5.2.1 Model 1 – Baseline Regression Model

#### ***Analysis of Results***

Table 6 displays the results for the baseline regression model. This pooled logit regression model investigates how CEO duality affects the sensitivity of CEO turnover to firm performance.

#### *Equation 7 - The Baseline Regression Model*

$$\ln\left(\frac{P(\text{turnover})}{1-P(\text{turnover})}\right) = \beta_1 \text{CEO} - \text{Chairman dummy} + \beta_2 \text{Performance Measures} + \beta_3 \text{Controls} + \beta_4 \text{CEO} - \text{Chairman dummy} * \text{Performance Measure} + \varepsilon$$

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<sup>29</sup> The Pseudo R-Squared for each model can be found under each regression in the "model statistics" section of our regression tables.

**Table 6 - Pooled Logit Regression of CEO Turnover on CEO Duality and Performance Measures**

The following table examines the impact of CEO duality on the sensitivity of CEO turnover to firm performance by analysing a sample of S&P 500 companies from 2017 to 2022. The dependent variable in the logit model is 1 if the observation is a CEO turnover event and 0 otherwise. In Columns (1) - (3), we employ different performance measures, market-adjusted stock returns, analysts' earnings forecast errors and industry-relative earnings respectively. Column (4) combines all of them. All performance measure variables are standardised to have a mean of zero and a standard deviation of one. Interaction terms and control variables are added to the model.

	CEO turnover			
	(1)	(2)	(3)	(4)
CEO-Chairman dummy	-0.283*** (-0.071) t = -5.761	-0.298*** (-0.074) t = -6.092	-0.274*** (-0.068) t = -5.413	-0.320*** (-0.080) t = -6.646
Market-adjusted stock returns	-0.388*** (-0.097) t = -15.054			-0.429*** (-0.107) t = -16.493
Analysts' earnings forecast error		-0.422*** (-0.106) t = -14.232		-0.470*** (-0.117) t = -16.872
Industry relative earnings			-0.186*** (-0.047) t = -5.750	-0.040 (-0.010) t = -1.276
CEO tenure	-0.191*** (-0.048) t = -7.068	-0.198*** (-0.049) t = -7.146	-0.202*** (-0.051) t = -7.366	-0.184*** (-0.046) t = -6.650
CEO age	0.564*** (0.141) t = 20.208	0.594*** (0.149) t = 20.914	0.570*** (0.143) t = 20.076	0.608*** (0.152) t = 21.679
Dummy for CEO age (63-65)	0.418*** (0.104) t = 7.389	0.523*** (0.129) t = 9.429	0.471*** (0.116) t = 8.282	0.431*** (0.107) t = 7.644
Stock return volatility	0.037* (0.009) t = 1.680	0.022 (0.005) t = 1.012	0.034 (0.008) t = 1.531	0.001 (0) t = 0.034
COVID dummy	-0.062 (-0.016) t = -1.395	-0.193*** (-0.048) t = -4.352	-0.085* (-0.021) t = -1.879	-0.164*** (-0.041) t = -3.696
Firm size	0.225*** (0.056) t = 9.239	0.248*** (0.062) t = 10.047	0.228*** (0.057) t = 9.156	0.228*** (0.057) t = 9.306
Firm leverage	0.298*** (0.075) t = 13.935	0.314*** (0.078) t = 14.652	0.296*** (0.074) t = 13.501	0.307*** (0.077) t = 14.581
CEO-Chairman dummy : Market-adjusted stock return	0.272*** (0.068) t = 6.907			0.380*** (0.095) t = 9.392
CEO-Chairman dummy : Analysts' earnings forecast error		0.062 (0.015) t = 1.469		0.089** (0.022) t = 2.202
CEO-Chairman dummy : Industry relative earnings			0.182*** (0.045) t = 3.827	0.147*** (0.037) t = 3.138
Constant	0.098*** t = 2.655	0.125*** t = 3.310	0.090** t = 2.321	0.155*** t = 4.279
Pseudo R-squared	0.09647	0.1048	0.08594	0.12052
Observations	562	562	562	562

In the regression results, \*\*\* p<0.01, \*\* p<0.05 and \* p<0.1 annotate statistical significance at a 1%, 5% and 10% level, respectively. Marginal Effects at the Mean are shown in parentheses next to the coefficients. They present the expected change in the predicted probability of a binary dependent variable, resulting from a one standard deviation change in an independent variable, while holding all other independent variables in the model constant at their mean values. The t-statistics are shown beneath the coefficients. The pseudo-R-squared is computed for each regression. To ensure regression result clarity, the standard errors are reported in the Appendix.

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Our first model produces results consistent with our expectations. We observe a significant negative relation between our primary variables of interest, CEO duality and CEO turnover. Additionally, there is a negative relationship between our performance measures and CEO turnover. Finally, the interaction term coefficients are consistently positive.

The regression models in Table 6 (and later in Table 7) include different performance measures separately in the first three regressions (1) – (3), with the corresponding interaction term<sup>30</sup> with the CEO duality variable. Then, the fourth regression (4) combines all performance measures to see each performance measure's effect on the variation in the dependent variable.

Column 1 investigates the relationship using market-adjusted stock returns as the main performance measure. The coefficient is negative and statistically significant, indicating that the probability of CEO turnover increases by 9.7% when there is a one standard deviation decline in stock returns. The positive and significant interaction term suggests that bestowing CEO and Chairman duties in the same individual decreases CEO turnover sensitivity to firm performance. In cases of duality, one standard deviation decline in stock returns leads to a relatively lower increase of 2.9% in the probability of CEO turnover.

Column 2 uses analysts' earnings forecast errors to measure firm performance and finds a similar relationship. The coefficient of the analysts' earnings forecast errors is negative and statistically significant at the 1% level. It implies a 10.6% increase in the likelihood of CEO turnover after a one standard deviation decrease in this particular performance measure. The interaction term between the analysts' earnings forecast errors and the CEO-Chairman dummy is not statistically significant and, therefore, cannot be interpreted.

Column 3 considers industry-relative earnings as a firm performance measure and finds a 4.7% increase in the likelihood of CEO turnover after a one standard deviation decrease in industry-relative earnings. In the cases of CEO duality, this probability drops dramatically to 0.2%. It is worth noting that industry-relative earnings are statistically significant at the 1% level when

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<sup>30</sup> The literature has contrasting opinions on interpreting interaction terms in non-linear regressions. In this thesis, we interpret the marginal effects in the same way as in Goyal and Park (2002). Powers (2005) reviews management turnover literature and examines their interpretation of interaction terms. The author proposes that the correct interpretation is to take the difference in marginal effects between the two types of firms – in this case, firms with a dual leadership structure and firms with a separate leadership structure. Furthermore, the author reviews the study by Goyal and Park (2002) and suggests that their interpretation is correct; however, the empirical support for their findings would be strengthened if the authors used the proposed interpretation.

included individually in the regression. However, when all performance measures are included in the model, the coefficient of industry-relative earnings becomes insignificant. This is unsurprising considering the Pearson correlation ( $r = 0.245$ ) between industry-relative earnings and analysts' earnings forecast errors. This correlation may explain why the latter loses significance when we incorporate all performance measures into a single model.

The analysis includes control variables to reduce the impact of other extraneous variables. The signs of the control variables align with literature and our expectations. Initially, we needed clarification about the effects of CEO tenure and stock return volatility on CEO turnover. Our results indicate that as the CEO's tenure increases, the likelihood of CEO turnover decreases, suggesting that executives become more entrenched in the company with the knowledge and experience gained throughout their tenure, making them more challenging to replace. Stock return volatility is positive and only significant at the 10% level in regression (1), indicating that CEO turnovers are expected to increase as stock return volatility increases. This positive relationship suggests that firms with more volatile stock returns may be more prone to poor results, increasing the probability of CEO turnover. However, this variable becomes statistically insignificant in regressions (2) - (4).

Appendix Section 8.5 displays the heteroskedasticity-robust standard errors for Model 1. These standard errors represent the estimation of the standard deviation of the estimated coefficients (Stock & Watson, 2020, pp. 782) and serve as a measure of precision and reliability for our estimates. Notably, coefficients with statistically significant values exhibit a significantly lower standard error than the coefficient estimate, indicating higher precision and reliability. The industry-relative earnings variable is an exception since it exhibits a high standard error (SE) primarily due to including Return on Assets (ROA) as raw numerical values rather than percentages. Since the variable has relatively small and tightly clustered values, the standard error is relatively high.

## ***Discussion of Results***

By analysing our pooled logit regression results, we can determine whether the hypotheses formulated before conducting the analysis can be supported or rejected. The methodology employed in the study allows us to identify the factors contributing to CEO turnover and

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provide valuable insights into the relationship between board leadership structure and CEO turnover.

*H<sub>1</sub>: There is an inverse relationship between the probability of CEO change and a company's performance measures.*

*H<sub>2</sub>: The sensitivity of CEO turnover to performance measures is less for companies that bestow the CEO and Chairman of the board of directors' positions in the same individual.*

Regarding the first hypothesis, we discover that all significant performance measures in our analysis exhibited an inverse relation with CEO turnover. This inverse relation indicates that the likelihood of CEO turnover decreases as the company's performance improves. This finding aligns with prior literature, as we observe a consistent tendency in the literature that supports the hypothesis that the board of directors often dismisses executives who fail to achieve satisfactory corporate performance. Similar to our findings, the literature concludes that this is irrespective of the type of performance measure used. For example, Puffer and Weintrop (1991) find an inverse relationship between CEO turnover and annual reported earnings per share that fall short of the board's expectations. Huson et al. (2004) identified a similar inverse relationship using accounting-based measures. Kaplan and Minton (2011) discover an inverse relationship by analysing the company's performance relative to the industry.

We find support for the second hypothesis, as the interaction terms in the model demonstrate that in cases of CEO duality, poor performance is less likely to result in the dismissal of the CEO. This finding remains consistent across all statistically significant interaction terms in our analysis using different performance measures. These findings suggest that companies with a dual leadership structure are more likely to suffer from high agency costs due to the board of directors being in a more challenging position to exercise impartial oversight and exercise discipline in the event of unsatisfactory performance. These findings are in line with the findings of Fama and Jensen (1983), Rechner & Dalton (1991) and Jensen (1993), who argue that a leadership structure which separates the CEO and Chairman positions is likely to be a better option for large, well-established companies as it allows for more appropriate

monitoring and higher possibility of exercising disciplinary measures when this is required. Larcker and Tayan (2016) believe that a separate leadership structure eliminates conflicts and allows the CEO to focus on operations while the Chairman handles governance.

## 5.2.2 Model 2 – Baseline Regression Model and Board Characteristics

### *Analysis of Results*

In the second model, we build upon the first model by including board characteristics, Board Size, Board Independence, and Board Gender Diversity. The second model will allow us to elaborate on our previous analysis and study the effects of these board characteristics on the probability of CEO turnover.

#### *Equation 8 - The Baseline Model and Board Characteristics*

$$\ln\left(\frac{P(\text{turnover})}{1-P(\text{turnover})}\right) = \beta_1 \text{CEO} - \text{Chairman dummy} + \beta_2 \text{Performance Measures} + \beta_3 \text{Controls} + \beta_4 \text{Board Variables} + \beta_5 \text{CEO} - \text{Chairman dummy} * \text{Performance Measure} + \varepsilon$$

Table 7 presents the regression results obtained after including the board characteristics in the base regression model. The main findings remain unchanged, as CEO duality is still negatively and significantly related to CEO turnover. All three performance measures are statistically significant and inversely associated with CEO turnover. The interaction terms remain positive and statistically significant. The interaction term of analysts' earnings forecast errors and the CEO-Chairman dummy was statistically insignificant in Model 1. However, in Model 2, it becomes significant at the 10% level.

An analysis of the marginal effects indicates that the probability of CEO turnover increases by 8.7% when there is a one standard deviation decline in stock returns. In contrast, in cases of duality, a decrease of one standard deviation in stock returns leads to a smaller increase of 3.9% in the probability of CEO turnover. Looking at our second performance measure, the likelihood of CEO turnover increases by 10.6% when there is a one standard deviation decline in analysts' earnings forecast errors. In cases of CEO duality, however, the probability of CEO turnover declines to 8.7%. In our last performance measure, the likelihood of CEO turnover

increases by 4.5% when there is a one standard deviation decline in industry relative earnings, but in cases of a unified board leadership structure, a decrease of one standard deviation in stock returns leads to a relatively much smaller increase of 0.2% in the probability of CEO turnover. These findings support the hypothesis that CEO turnover is less sensitive to poor firm performance in cases of CEO duality.



**Table 7 - Pooled Logit Regression of CEO Turnover on CEO Duality, Performance Measures, and Board Characteristics**

The following table replicates the analysis in Table 6 and extends the model by including three additional explanatory variables, board size, board independence and board gender diversity, to consider the effect of board characteristics on the relationship under study.

	CEO turnover			
	(1)	(2)	(3)	(4)
CEO-Chairman dummy	-0.359*** (-0.089) t = -6.540	-0.372*** (-0.093) t = -6.893	-0.370*** (-0.092) t = -6.464	-0.391*** (-0.097) t = -7.193
Market-adjusted stock returns	-0.346*** (-0.087) t = -12.631			-0.386*** (-0.097) t = -13.916
Analysts' earnings forecast error		-0.425*** (-0.106) t = -13.926		-0.472*** (-0.118) t = -16.344
Industry relative earnings			-0.180*** (-0.045) t = -5.240	-0.042 (-0.010) t = -1.223
CEO tenure	-0.130*** (-0.033) t = -4.603	-0.129*** (-0.032) t = -4.481	-0.133*** (-0.033) t = -4.567	-0.118*** (-0.029) t = -4.071
CEO age	0.599*** (0.150) t = 22.339	0.621*** (0.155) t = 22.940	0.605*** (0.151) t = 22.227	0.635*** (0.159) t = 23.542
Dummy for CEO age (63-65)	0.463*** (0.115) t = 8.051	0.557*** (0.137) t = 9.933	0.509*** (0.126) t = 8.824	0.467*** (0.116) t = 8.089
Stock return volatility	0.075*** (0.019) t = 3.404	0.063*** (0.016) t = 2.923	0.074*** (0.018) t = 3.346	0.039* (0.010) t = 1.806
Board size	0.464*** (0.116) t = 17.468	0.470*** (0.117) t = 17.678	0.464*** (0.116) t = 17.414	0.443*** (0.111) t = 16.756
Board independence	0.054** (0.014) t = 2.284	0.031 (0.008) t = 1.329	0.059** (0.015) t = 2.455	0.051** (0.013) t = 2.118
Board gender ratio	0.038* (0.010) t = 1.707	0.106*** (0.026) t = 4.861	0.082*** (0.02) t = 3.574	0.087*** (0.022) t = 3.987
COVID dummy	-0.096** (-0.024) t = -2.060	-0.250*** (-0.062) t = -5.410	-0.128*** (-0.032) t = -2.720	-0.220*** (-0.055) t = -4.797
Firm size	-0.004 (-0.001) t = -0.159	0.012 (0.003) t = 0.402	-0.007 (-0.002) t = -0.232	0.003 (0.001) t = 0.103
Firm leverage	0.279*** (0.070) t = 12.865	0.294*** (0.074) t = 13.550	0.269*** (0.067) t = 12.150	0.294*** (0.073) t = 13.624
CEO-Chairman dummy : Market-adjusted stock return	0.192*** (0.048) t = 4.993			0.300*** (0.075) t = 7.537
CEO-Chairman dummy : Analysts' earnings forecast error		0.075* (0.019) t = 1.787		0.107*** (0.027) t = 2.607
CEO-Chairman dummy : Industry relative earnings			0.173*** (0.043) t = 3.521	0.145*** (0.036) t = 2.971
Constant	0.126*** t = 3.223	0.164*** t = 4.170	0.137*** t = 3.307	0.184*** t = 4.757
Pseudo R-squared	0.12052	0.13025	0.11229	0.14281
Observations	548	548	548	548

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

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The coefficients for the Board Size variable are unexpectedly positive and statistically significant, suggesting that a larger board size increases the likelihood of CEO turnover. One possible explanation for this unexpected result is that larger boards might be more diverse, leading to a more transparent and efficient system of removing underperforming CEOs. Indeed, a positive correlation exists between the Board Gender Ratio and CEO turnover. The coefficient for the Board Independence variable is positive and statistically significant, indicating that higher board independence increases the probability of CEO turnover.

Most control variables align with our expectations based on prior literature, although a few exceptions exist. Upon including the board characteristics variables, Stock Return Volatility becomes statistically significant at the 1% level in regressions (1) - (3) and at the 10% in regression (4), signifying that a rise in Stock Return Volatility increases the probability of CEO turnover. These findings imply that the board characteristics variables helped explain some of the variability in the dependent variable that was previously unexplained, resulting in Stock Return Volatility becoming significant - a phenomenon known as the suppressor effect. The firm size now becomes statistically insignificant, even though it was highly significant before. Although multicollinearity does not seem to be an issue in our analysis, due to the Pearson Correlation and VIF results, we notice a moderate correlation between Firm Size and board characteristics, particularly Board Size, which is intuitive as large firms are more likely to have larger boards. This moderate correlation might be the cause of the firm size variable becoming statistically insignificant in Model 2.

Section 8.6 in the Appendix displays the heteroskedasticity-robust standard errors for our Model 2 regression results.

## ***Discussion of Results***

The second model preoccupies itself with finding evidence to either accept or reject the last three hypotheses presented, namely:

*H<sub>3</sub>: Companies with more independent directors on the board experience higher CEO turnover.*

*H<sub>4</sub>: Companies with a larger board of directors experience lower CEO turnover.*

*H<sub>5</sub>: Companies with a more significant proportion of female directors on the board experience a higher level of CEO turnover.*

Our findings support the third hypothesis, which proposes that increased board independence is associated with a higher probability of CEO turnover. In column (1), column (3), and column (4), these results are statistically significant at the 5% level, while in column (2), they are statistically insignificant. Extensive literature examines board independence, with Duru et al. (2016) arguing that independent directors are more effective monitors and can impose disciplinary measures more impartially. Hsu et al. (2021) report similar findings, suggesting that a more independent board can help mitigate the adverse effects of CEO duality on company performance. Hence, the literature is generally consistent about the positive expected relationship between board independence and CEO turnover, and our findings confirm this relationship.

Our findings reject the fourth hypothesis. As the overall number of directors on the board increases, there is an increase in the probability of CEO turnover. This result is statistically significant at the 1% level. These results contrast our original expectations, which assumed that larger boards would be less efficient in decision-making and experience lower CEO turnover rates, in line with prior studies conducted by Yermack (1996), Hsu et al. (2021), and Ramdani and van Witteloostuijn (2010), who all provide evidence that smaller boards are linked to higher firm performance.

We find support for the last hypothesis that when the number of female members on the board increases, the probability of CEO turnover is also expected to rise. The results from regression (1) show significance at the 10% level, while regressions (2) - (4) are significant at the 1% level. The existing literature we examined on this topic is consistent; both Campbell and Minguez-Vera (2008) and Aktas et al. (2019) support the idea that a more diverse board, with greater female representation, can improve the board monitoring quality and decision-making. It brings a broader range of perspectives, experiences, and skills.

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## 5.3 Robustness Checks

Robustness checks are a common practice in empirical studies to examine how specific "core" regression coefficient estimates behave when the model specification is changed by including or excluding some variables. If the coefficients are plausible and robust, this is interpreted as evidence of structural validity (Lu & White, 2014). We perform the following robustness checks and report regression results in the Appendix.

### 5.3.1 CEO Evaluation Period

As a robustness check, we re-run our analysis after dropping 47 observations where CEOs serve less than two years. We aim to account for the CEO turnovers during the CEOs' transition period, which Vancil (1987) names as the process of "passing the baton". Through this robustness check, we would like to ensure that the higher sensitivity of turnover to performance, observed when there is no CEO duality, is not due to the turnovers that occur during the transition period.

Removing CEO observations with less than two years of tenure does not affect the main findings. We include these regression tables in Appendix Section 8.2.

### 5.3.2 Interim CEOs, Finance and Utility Industries

Consistent with prior literature (Aktas et al. 2019), we exclude interim CEOs and firms that operate within the financial or utilities sector. Interim CEOs serve for a short period, so they have limited opportunity to significantly change a company's operations during their tenure. We removed 28 interim CEO observations with a tenure of less than a year. In addition, we remove 102 observations from the financial sector (SIC codes 6000–6999) and 41 observations from the utility sector (SIC codes 4900–4949) since these sectors are subject to different laws and regulations and they have unique characteristics that can impact firms' performance and governance. After re-running our analysis with this subsample, our main results remain unaffected. See Appendix Section 8.3.

### 5.3.3 Without Winsorised Values

As a final robustness check, we re-run the regressions without winsorising the variables to test the sensitivity of our results to the existence of extreme outliers that were previously addressed by winsorisation. The coefficients and statistical significance of our main variables of interest remain unchanged, indicating that our results are robust to the choice of outlier treatment. However, the coefficient of analysts' earnings forecast errors becomes disproportionately large due to the influence of a single outlier. See Appendix Section 8.4.

## 5.4 Implications of Results

Our findings contribute to the existing body of research by discovering that despite the introduction of various corporate governance legislations and increased corporate awareness about the importance of good governance, companies that combine the role of CEO and Chairman continue to impede the board of directors' ability to carry out their supervisory role. The main finding is that CEO turnover is less sensitive to poor firm performance in companies with a dual leadership structure, suggesting that a dual leadership structure impedes the effective functioning of corporate governance mechanisms that are at the disposal of the board of directors.

We also incorporate considerations about board characteristics in our analysis. We find evidence that boards with more female and independent directors increase the probability of CEO turnover, indicating that increased independence and increased gender diversity result in a board which conducts a more comprehensive oversight of company performance. Interestingly, we also find evidence that a larger board size is associated with an increase in the likelihood of CEO turnover. This last finding contradicts the prior literature and our expectations.

When discussing our findings, it is crucial to acknowledge the limitations hindering the generalisation of our results. Our study utilises data from large, prominent companies traded on the S&P 500 index. Furthermore, we have specifically chosen companies that have maintained their position on the index as of the end of 2022, indicating that they have undergone rigorous assessments to be included or to retain their status within this prestigious

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index. Therefore, the applicability of our findings is limited to these well-established companies, and smaller or younger companies are outside the scope of our study.

Our findings raise important considerations for future corporate governance legislation regarding corporate leadership structures. The Cadbury Committee report was the only introduced corporate governance legislation that specified a separation of the CEO and Chairman positions. Subsequent corporate governance legislation introduced in the U.S. did not mandate a separation; they only required companies to disclose the adopted leadership structure and explain its reasoning. Our analysis identified that governance issues might arise due to dual leadership structures, and the corporate governance legislation introduced seems insufficient to manage the risks associated with these governance issues. We particularly question the only requirement in place, that of the companies explaining their reasoning behind the leadership structure decision, as we believe that companies may not always report the true intentions behind their choice of leadership structure.

While appropriate monitoring and coordinated decision-making are vital for all companies, the trade-off between the two will likely differ based on company size and lifecycle stage. The ideal leadership structure depends on each company's specific organisational structure; therefore, a mandatory separation of the CEO and chairman positions is inappropriate. Based on our findings, large, well-established companies are more likely to benefit from a separate leadership structure, as this enhances the ability of the board of directors to monitor operations effectively and be in a better place to discipline underperforming CEOs if required. On the other hand, smaller and less established companies are more likely to benefit from a dual leadership structure that allows for more unified and coordinated decision-making. Such a unified leadership structure promotes more robust hands-on leadership, which is vital for these companies. Although these smaller, less established companies were not included in our analysis, we base this opinion on prior literature, which comes to mixed conclusions on the most appropriate leadership structure and suggests that different companies have unique characteristics that affect which is the most appropriate leadership structure.

The findings concerning the board leadership structure suggest further considerations for future corporate governance legislation. In the U.K., the Cadbury report recommended that the majority of non-executive directors on the board should be independent. However, subsequent corporate governance legislation introduced in the U.S. only required disclosures about the chosen leadership structures and did not mandate any particular structure. In 2010, the Dodd-

Frank Act provided specific requirements for board independence<sup>31</sup> and requested disclosures about the board structure selected and diversity considerations. In our study, we find evidence that increased board gender diversity increases the probability of CEO turnover, indicating that a more diverse board can conduct more effective monitoring. Our findings suggest that future legislation should continue with its requirements regarding the number of independent directors on the board and consider adding gender diversity requirements. A more diverse board result in more varied opinions and is likely to provide more impartial and comprehensive organisation monitoring.

The findings of this study provide essential consideration for companies. Transparency and accountability in organisations have increased in importance after several corporate scandals, and companies feel pressure from stakeholders to practice good corporate governance. Companies can use these findings to improve their corporate governance practices, such as a basis for considering whether vesting the roles of CEO and chairman in the same individual or otherwise is the best decision for their company, as well as to take decisions concerning the structuring of their board of directors. Companies should make improvements to their corporate governance practices public on the companies' annual reports and other communication channels, as this shows the company in a more positive light as investors are now placing a lot of importance on this information.

This analysis has shed light on the type of leadership structures and board characteristics which result in better supervision and good governance practices. These findings have important societal implications, as companies with sound governance practices contribute to overall economic stability, increase investor confidence, and ensure that companies abide by their responsibilities to their stakeholders.

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<sup>31</sup> The Dodd-Frank Act specifies that half of the board of directors, but not fewer than two directors, should be independent of the company (Dodd-Frank Act, 2010).

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## 6. Conclusion

Our thesis aimed to answer the research question, "*Does the board leadership structure affect CEO turnover?*". The main objective is to identify whether vesting the CEO and Chairman positions in the same individual influences the board's ability to discipline the top management in situations of unsatisfactory performance. A similar study was conducted in the 1990s, before the introduction of several corporate governance regulations and guidelines that have emphasised transparency and accountability and imposed onerous reporting requirements on companies. We build on prior literature by structuring our methodology to consider these changes in corporate governance legislation and by incorporating board characteristics considerations that have been included in modern literature.

Based on the analysis of the 500 largest publicly traded companies in the U.S. during 2017-2022, results indicate that in firms that combine the role of CEO and Chairman in one individual, the sensitivity of CEO turnover to firm performance becomes significantly lower. This finding remains the same regardless of the performance measure used. The analysis of the second model shows that board characteristics significantly affect the probability of CEO turnover. Boards with a higher percentage of independent and female directors are shown to be more effective in monitoring and disciplining CEOs. However, contrary to prior expectations, we found a positive relationship between board size and CEO turnover, indicating that the larger the board size, the higher the probability of CEO turnover.

Despite the valuable contribution of our thesis to existing literature, it is subject to limitations. Like most studies in this field, our research is primarily based on the largest and most prestigious publicly traded companies in the U.S. Consequently, the applicability of our research conclusions to other nations with less developed economies, a significant quantity of privately held companies, or where small-scale enterprises dominate is constrained. Therefore, the reader should exercise caution when applying our findings to contexts beyond the scope of our study. Furthermore, our study might have survivorship bias because we collect data from companies included in the S&P 500 as of the end of 2022. This bias might arise because we focus on companies that have passed the evaluation process for inclusion in the S&P 500, which involves various checks and balances while overlooking eliminated ones (Garcia & Gould, 1993). If we conducted the analysis using both companies that passed these checks and balances and those that did not pass them, we might obtain different results.



Our results suggest several directions for future research. Even though our main findings indicate splitting the CEO and Chairman titles to improve the effectiveness of the board's monitoring abilities, endogenous characteristics of different companies might change the ideal leadership structure for them. Additional studies are needed to understand the costs and benefits of diverse leadership structures. Investigating our research question in other countries or across a broader range of firm sizes, ownership structures (public vs private), and industries can provide valuable insights into the generalizability and dynamics of the findings. Moreover, exploring the relationship between the board leadership structure and CEO turnover in specific contexts, such as emerging markets or family-owned businesses, presents an intriguing avenue for further investigation.

Another potential area for further research is to extend the analysis by including the personal characteristics of the CEO, such as their educational background or ethnicity. This inclusion would enable a better understanding of the factors contributing to CEO effectiveness and firm performance. Finally, exploring the impact of ownership structure on the relationship under study would be another compelling area for future research. Investigating the effects of ownership by institutions, block-holding outside directors and officers and directors can yield valuable insights into how these ownership variables influence the relationship under study. Such analysis can shed light on the dynamics and implications of organisations' ownership structures and governance mechanisms.

As we continue to explore the complex relationship between board leadership structures and CEO turnover, it becomes evident that sound and successful companies rely on corporate governance to guide their leadership in the right direction. A company that takes care of its shareholders' interests and upholds an excellent public image is a successful company that generates value for all stakeholders involved.

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## 8. Appendix

### 8.1 A description of the variables used in our analysis, their expected signs and definitions

Variables	Expected Sign	Variable Definitions
CEO Turnover Dummy	N/A	1 for a CEO turnover observation and zero otherwise
CEO Duality Dummy	-	1 for a CEO who simultaneously occupies the CEO and Chairman position, and 0 otherwise
Market-Adjusted Stock Returns	-	The returns of each stock are adjusted for market performance by subtracting the equally weighted return on all CRSP companies. The period used to calculate this return is the 12 months leading up to the month the CEO turnover occurred
Analysts' Earnings Forecast Errors	-	The difference between the realised earnings during the fiscal year immediately preceding the CEO turnover year and the analysts' forecasted earnings nine months before the fiscal year
Industry Relative Earnings	-	The difference between each company's return on assets (raw numerical values rather than percentages) and the industry's median return on assets during the year preceding the CEO turnover year
CEO Tenure	?	The number of years the CEO has held the position as of the year of the CEO change
CEO Age	+	The age of the CEO as at the year of the CEO turnover
CEO Age Dummy	+	1 if the CEO is aged 63 – 65 at the year of the CEO change and 0 otherwise
Stock Return Volatility	?	The standard deviation of returns 24 months before the CEO turnover event month
Board Size	-	The total number of directors on the board as of the year before the CEO change
Board Independence Ratio	-	The number of independent directors divided by the total number of directors as of the year before the CEO change
Board Gender Diversity Ratio	+	The number of female directors on the board is divided by the total number of directors on the board as of the year before the CEO change.
Covid Dummy	-	1 during the period 2020 – 2021 and 0 otherwise
Firm Size	+	The natural logarithm of a firm's total assets (in millions) at the end of the fiscal year
Firm Leverage	+	A ratio of total debt (in millions) to total assets (in millions) as at the end of the fiscal year

## 8.2 Robustness Check 1: CEO Evaluation

The following table replicates the analysis in Table 6 on a subsample of CEOs that serve more than two years to account for the turnovers that might happen as a part of probationary period. In Columns (1) - (3), we employ different performance measures, market-adjusted stock returns, analysts' earnings forecast errors and industry-relative earnings respectively. Column (4) combines all of them. All performance measure variables are standardised to have a mean of zero and a standard deviation of one. Interaction terms and control variables are added to the model.

	CEO turnover			
	(1)	(2)	(3)	(4)
CEO-Chairman dummy	-0.182*** (-0.045) t = -3.612	-0.220*** (-0.055) t = -4.393	-0.186*** (-0.046) t = -3.621	-0.224*** (-0.056) t = -4.530
Market-adjusted stock returns	-0.248*** (-0.062) t = -8.770			-0.277*** (-0.069) t = -9.682
Analysts' earnings forecast error		-0.371*** (-0.093) t = -12.096		-0.394*** (-0.098) t = -12.977
Industry relative earnings			-0.180*** (-0.045) t = -5.207	-0.061* (-0.015) t = -1.779
CEO tenure	-0.089*** (-0.022) t = -3.138	-0.092*** (-0.023) t = -3.220	-0.087*** (-0.022) t = -3.042	-0.094*** (-0.023) t = -3.268
CEO age	0.588*** (0.147) t = 20.360	0.619*** (0.154) t = 21.105	0.596*** (0.149) t = 20.480	0.634*** (0.158) t = 21.813
Dummy for CEO age (63-65)	0.432*** (0.107) t = 7.200	0.506*** (0.126) t = 8.652	0.461*** (0.115) t = 7.718	0.434*** (0.108) t = 7.296
Stock return volatility	0.001 (0) t = 0.065	-0.024 (-0.006) t = -1.103	-0.008 (-0.002) t = -0.349	-0.031 (-0.008) t = -1.345
COVID dummy	-0.058 (-0.014) t = -1.245	-0.163*** (-0.041) t = -3.602	-0.067 (-0.017) t = -1.431	-0.151*** (-0.038) t = -3.301
Firm size	0.217*** (0.054) t = 8.500	0.242*** (0.06) t = 9.316	0.216*** (0.054) t = 8.287	0.227*** (0.057) t = 8.772
Firm leverage	0.309*** (0.077) t = 13.467	0.336*** (0.084) t = 14.799	0.314*** (0.078) t = 13.585	0.322*** (0.08) t = 14.278
CEO-Chairman dummy : Market-adjusted stock return	0.179*** (0.045) t = 4.388			0.282*** (0.070) t = 6.782
CEO-Chairman dummy : Analysts' earnings forecast error		0.005 (0.001) t = 0.115		-0.008 (-0.002) t = -0.183
CEO-Chairman dummy : Industry relative earnings			0.186*** (0.046) t = 3.648	0.186*** (0.046) t = 3.676
Constant	-0.042 t = -1.034	-0.006 t = -0.139	-0.041 t = -0.994	0.016 t = 0.411
Pseudo R-squared	0.0949	0.10893	0.09211	0.11647
Observations	515	515	515	515

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

### 8.3 Robustness Check 2: Impact of Removing Interim CEOs and CEOs in the Finance and Utility Sectors

The following table replicates the analysis in Table 6 on a subsample excluding interim CEOs and CEOs in the financial and utilities sectors. In Columns (1) - (3), we employ different performance measures, market-adjusted stock returns, analysts' earnings forecast errors and industry-relative earnings respectively. Column (4) combines all of them. All performance measure variables are standardised to have a mean of zero and a standard deviation of one. Interaction terms and control variables are added to the model.

	CEO turnover			
	(1)	(2)	(3)	(4)
CEO-Chairman dummy	-0.220*** (-0.055) t = -3.961	-0.241*** (-0.06) t = -4.292	-0.228*** (-0.057) t = -3.979	-0.287*** (-0.071) t = -5.142
Market-adjusted stock returns	-0.338*** (-0.084) t = -10.147			-0.346*** (-0.086) t = -10.032
Analysts' earnings forecast error		-0.248*** (-0.062) t = -5.102		-0.227*** (-0.057) t = -4.569
Industry relative earnings			-0.274*** (-0.068) t = -6.987	-0.192*** (-0.048) t = -4.735
CEO tenure	0.156*** (0.039) t = 4.539	0.138*** (0.034) t = 4.015	0.163*** (0.041) t = 4.574	0.166*** (0.041) t = 4.708
CEO age	0.411*** (0.102) t = 11.642	0.444*** (0.111) t = 12.356	0.415*** (0.104) t = 11.629	0.453*** (0.113) t = 12.697
Dummy for CEO age (63-65)	0.562*** (0.139) t = 8.192	0.697*** (0.172) t = 10.517	0.629*** (0.155) t = 9.331	0.586*** (0.145) t = 8.648
Stock return volatility	-0.004 (-0.001) t = -0.141	-0.008 (-0.002) t = -0.326	-0.014 (-0.004) t = -0.544	-0.056** (-0.014) t = -2.118
COVID dummy	-0.247*** (-0.061) t = -4.569	-0.371*** (-0.092) t = -7.085	-0.291*** (-0.072) t = -5.485	-0.304*** (-0.075) t = -5.785
Firm size	0.209*** (0.052) t = 7.262	0.255*** (0.063) t = 8.629	0.210*** (0.052) t = 7.146	0.221*** (0.055) t = 7.608
Firm leverage	0.358*** (0.089) t = 13.609	0.358*** (0.089) t = 13.590	0.359*** (0.089) t = 13.809	0.357*** (0.089) t = 13.727
CEO-Chairman dummy : Market-adjusted stock return	0.164*** (0.041) t = 3.522			0.229*** (0.057) t = 4.804
CEO-Chairman dummy : Analysts' earnings forecast error		-0.094 (-0.024) t = -1.584		-0.127** (-0.032) t = -2.145
CEO-Chairman dummy : Industry relative earnings			0.218*** (0.054) t = 3.600	0.276*** (0.069) t = 4.543
Constant	0.004 t = 0.092	0.026 t = 0.555	0.017 t = 0.354	0.063 t = 1.393
Pseudo R-squared	0.10303	0.10636	0.09849	0.12042
Observations	391	391	391	391

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

### 8.4 Robustness Check 3: Analysis with non-winsorised values

The following table replicates the analysis in Table 6 by using non-winsorised values to examine the sensitivity of the main findings to the winsorisation technique. In Columns (1) - (3), we employ different performance measures, market-adjusted stock returns, analysts' earnings forecast errors and industry-relative earnings respectively. Column (4) combines all of them. All performance measure variables are standardised to have a mean of zero and a standard deviation of one. Interaction terms and control variables are added to the model.

	CEO turnover			
	(1)	(2)	(3)	(4)
CEO-Chairman dummy	-0.235*** (-0.059) t = -4.686	-1.484*** (-0.261) t = -6.907	-0.233*** (-0.058) t = -4.513	-1.460*** (-0.23) t = -7.253
Market-adjusted stock returns	-0.380*** (-0.095) t = -15.147			-0.397*** (-0.062) t = -15.882
Analysts' earnings forecast error		-56.852*** (-10.086) t = -11.549		-60.564*** (-9.502) t = -13.174
Industry relative earnings			-0.244*** (-0.061) t = -8.195	-0.130*** (-0.02) t = -4.380
CEO tenure	-0.229*** (-0.057) t = -7.592	-0.235*** (-0.042) t = -7.710	-0.243*** (-0.061) t = -7.942	-0.224*** (-0.035) t = -7.272
CEO age	0.552*** (0.138) t = 18.549	0.593*** (0.105) t = 19.639	0.567*** (0.142) t = 18.828	0.615*** (0.096) t = 20.582
Dummy for CEO age (63-65)	0.467*** (0.115) t = 8.080	0.536*** (0.086) t = 9.425	0.509*** (0.126) t = 8.833	0.435*** (0.062) t = 7.528
Stock return volatility	0.065*** (0.016) t = 3.012	0.040* (0.007) t = 1.779	0.038* (0.009) t = 1.725	-0.001 (0) t = -0.064
COVID dummy	-0.055 (-0.014) t = -1.238	-0.152*** (-0.027) t = -3.386	-0.059 (-0.015) t = -1.294	-0.102** (-0.016) t = -2.276
Firm size	0.210*** (0.053) t = 8.432	0.249*** (0.044) t = 9.777	0.220*** (0.055) t = 8.693	0.236*** (0.037) t = 9.513
Firm leverage	0.364*** (0.091) t = 19.078	0.399*** (0.071) t = 20.478	0.362*** (0.091) t = 19.496	0.388*** (0.061) t = 21.274
CEO-Chairman dummy : Market-adjusted stock return	0.266*** (0.066) t = 6.649			0.326*** (0.051) t = 7.933
CEO-Chairman dummy : Analysts' earnings forecast error		28.382*** (5.035) t = 5.766		27.084*** (4.249) t = 5.892
CEO-Chairman dummy : Industry relative earnings			0.247*** (0.062) t = 5.435	0.287*** (0.045) t = 6.350
Constant	0.071* t = 1.848	2.511*** t = 11.863	0.060 t = 1.512	2.695*** t = 13.609
Pseudo R-squared	0.09367	0.09905	0.08554	0.11569
Observations	562	562	562	562

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

### 8.5 Standard Errors: Model 1 with non-standardised values

This table shows the regression results of analysis of Model 1 with non-standardised values. Heteroskedasticity-robust standard errors are given in parentheses next to the coefficients. In Columns (1) - (3), we employ different performance measures, market-adjusted stock returns, analysts' earnings forecast errors and industry-relative earnings respectively. Column (4) combines all of them. Interaction terms and control variables are added to the model.

	CEO turnover			
	(1)	(2)	(3)	(4)
CEO-Chairman dummy	-0.406*** (0.047) t = -7.732	-0.305*** (0.044) t = -6.045	-0.292*** (0.045) t = -5.623	-0.517*** (0.047) t = -9.935
Market-adjusted stock returns	-1.311*** (0.091) t = -15.055			-1.451*** (0.093) t = -6.498
Analysts' earnings forecast error		-1.286*** (0.088) t = -14.348		-1.431*** (0.083) t = -6.859
Industry relative earnings			-3.760*** (0.583) t = -5.649	-0.817 (0.598) t = -1.268
CEO tenure	-0.029*** (0.004) t = -6.915	-0.030*** (0.004) t = -7.013	-0.031*** (0.004) t = -7.206	-0.028*** (0.004) t = -6.591
CEO age	0.092*** (0.004) t = 19.919	0.097*** (0.004) t = 20.646	0.093*** (0.004) t = 19.813	0.099*** (0.004) t = 21.553
Dummy for CEO age (63-65)	0.418*** (0.057) t = 7.324	0.523*** (0.055) t = 9.375	0.471*** (0.057) t = 8.233	0.431*** (0.056) t = 7.616
Stock return volatility	1.107* (0.642) t = 1.672	0.659 (0.641) t = 1.001	1.023 (0.657) t = 1.523	0.022 (0.631) t = 0.034
COVID dummy	-0.062 (0.045) t = -1.402	-0.193*** (0.046) t = -4.354	-0.085* (0.046) t = -1.884	-0.164*** (0.046) t = -3.696
Firm size	0.378*** (0.037) t = 9.245	0.416*** (0.037) t = 10.043	0.384*** (0.038) t = 9.201	0.383*** (0.037) t = 9.295
Firm leverage	1.711*** (0.114) t = 13.781	1.798*** (0.112) t = 14.569	1.697*** (0.116) t = 13.425	1.761*** (0.114) t = 14.529
CEO-Chairman dummy : Market-adjusted stock return	0.920*** (0.139) t = 6.777			1.283*** (0.141) t = 9.323
CEO-Chairman dummy : Analysts' earnings forecast error		0.188 (0.125) t = 1.450		0.271** (0.123) t = 2.184
CEO-Chairman dummy : Industry relative earnings			3.670*** (0.903) t = 3.814	2.981*** (0.922) t = 3.131
Constant	-7.153*** (0.250) t = -26.323	-7.692*** (0.245) t = -28.045	-7.377*** (0.251) t = -26.621	-7.405*** (0.253) t = -7.067
Pseudo R-squared	0.09647	0.1048	0.08594	0.12052
Observations	562	562	562	562

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

## 8.6 Standard Errors: Model 2 with non-standardized values

This table shows the regression results of analysis of Model 2 with non-standardized values. Heteroskedasticity-robust standard errors are given in parentheses next to the coefficients.

	CEO turnover			
	(1)	(2)	(3)	(4)
CEO-Chairman dummy	-0.446*** (0.051) t = -7.627	-0.381*** (0.048) t = -6.853	-0.387*** (0.050) t = -6.506	-0.553*** (0.051) t = -9.560
Market-adjusted stock returns	-1.169*** (0.096) t = -12.585			-1.305*** (0.098) t = -13.912
Analysts' earnings forecast error		-1.293*** (0.092) t = -14.203		-1.436*** (0.087) t = -16.407
Industry relative earnings			-3.645*** (0.629) t = -5.162	-0.841 (0.642) t = -1.216
CEO tenure	-0.020*** (0.004) t = -4.541	-0.020*** (0.004) t = -4.415	-0.020*** (0.004) t = -4.492	-0.018*** (0.004) t = -4.054
CEO age	0.097*** (0.004) t = 22.128	0.101*** (0.004) t = 22.729	0.098*** (0.004) t = 22.005	0.103*** (0.004) t = 23.465
Dummy for CEO age (63-65)	0.463*** (0.058) t = 8.037	0.557*** (0.056) t = 9.920	0.509*** (0.058) t = 8.841	0.467*** (0.057) t = 8.073
Stock return volatility	2.262*** (0.643) t = 3.349	1.898*** (0.642) t = 2.872	2.226*** (0.652) t = 3.304	1.175* (0.631) t = 1.798
Board size	0.223*** (0.012) t = 17.332	0.226*** (0.012) t = 17.561	0.223*** (0.012) t = 17.386	0.213*** (0.012) t = 16.717
Board independence	0.391** (0.179) t = 2.303	0.226 (0.176) t = 1.338	0.424** (0.179) t = 2.472	0.371** (0.180) t = 2.124
Board gender ratio	0.404* (0.241) t = 1.717	1.117*** (0.234) t = 4.870	0.864*** (0.240) t = 3.568	0.919*** (0.235) t = 3.987
COVID dummy	-0.096** (0.047) t = -2.062	-0.250*** (0.047) t = -5.399	-0.128*** (0.047) t = -2.719	-0.220*** (0.048) t = -4.799
Firm size	-0.008 (0.043) t = -0.159	0.019 (0.043) t = 0.401	-0.011 (0.044) t = -0.234	0.005 (0.043) t = 0.103
Firm leverage	1.598*** (0.116) t = 12.754	1.687*** (0.115) t = 13.476	1.544*** (0.118) t = 12.112	1.685*** (0.117) t = 13.596
CEO-Chairman dummy : Market-adjusted stock return	0.648*** (0.140) t = 4.960			1.014*** (0.143) t = 7.533
CEO-Chairman dummy : Analysts' earnings forecast error		0.228* (0.124) t = 1.775		0.324*** (0.124) t = 2.596
CEO-Chairman dummy : Industry relative earnings			3.501*** (0.939) t = 3.522	2.926*** (0.960) t = 2.967
Constant	-8.794*** (0.262) t = -32.278	-9.266*** (0.254) t = -34.424	-9.077*** (0.262) t = -33.068	-9.011*** (0.262) t = -33.213
Pseudo R-squared	0.12052	0.13025	0.11229	0.14281
Observations	548	548	548	548

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

## 8.7 Volatility Inflation Factors (VIFs)

**Model 1 Regression – Column 1**

Variable	VIF
CEO-Chairman dummy	1.396
Market-adjusted stock returns	1.853
CEO tenure	1.376
CEO age	1.479
Dummy for CEO age (63-65)	1.135
Stock return volatility	1.120
COVID dummy	1.122
Firm size	1.095
Firm leverage	1.049
CEO-Chairman dummy : Market-adjusted stock return	2.032

**Model 1 Regression – Column 2**

Variable	VIF
CEO-Chairman dummy	1.201
Analysts' earnings forecast error	2.221
CEO tenure	1.374
CEO age	1.481
Dummy for CEO age (63-65)	1.130
Stock return volatility	1.125
COVID dummy	1.130
Firm size	1.094
Firm leverage	1.048
CEO-Chairman dummy : Analysts' earnings forecast error	2.203

**Model 1 Regression – Column 3**

Variable	VIF
CEO-Chairman dummy	1.201
Industry relative earnings	1.879
CEO tenure	1.377
CEO age	1.492
Dummy for CEO age (63-65)	1.143
Stock return volatility	1.154
COVID dummy	1.124
Firm size	1.100
Firm leverage	1.048
CEO-Chairman dummy : Industry relative earnings	1.856

**Model 1 Regression – Column 4**

Variable	VIF
CEO-Chairman dummy	1.442
Market-adjusted stock returns	1.949
Analysts' earnings forecast error	2.417
Industry relative earnings	2.047
CEO tenure	1.389
CEO age	1.513
Dummy for CEO age (63-65)	1.145
Stock return volatility	1.145
COVID dummy	1.139
Firm size	1.105
Firm leverage	1.053
CEO-Chairman dummy : Market-adjusted stock return	2.103
CEO-Chairman dummy : Analysts' earnings forecast error	2.432
CEO-Chairman dummy : Industry relative earnings	2.055

**Model 2 Regression Column 1**

Variable	VIF
CEO-Chairman dummy	1.619
Market-adjusted stock returns	1.846
CEO tenure	1.444
CEO age	1.5
Dummy for CEO age (63-65)	1.139
Stock return volatility	1.144
Board size	1.358
Board independence	1.286
Board gender ratio	1.14
COVID dummy	1.174
Firm size	1.424
Firm leverage	1.06
CEO-Chairman dummy : Market-adjusted stock return	2.016

**Model 2 Regression Column 2**

Variable	VIF
CEO-Chairman dummy	1.445
Analysts' earnings forecast error	2.195
CEO tenure	1.44
CEO age	1.491
Dummy for CEO age (63-65)	1.132
Stock return volatility	1.145
Board size	1.341
Board independence	1.29
Board gender ratio	1.14
COVID dummy	1.187
Firm size	1.401
Firm leverage	1.059
CEO-Chairman dummy : Analysts' earnings forecast error	2.167

**Model 2 Regression Column 3**

Variable	VIF
CEO-Chairman dummy	1.46
Industry relative earnings	1.991
CEO tenure	1.452
CEO age	1.512
Dummy for CEO age (63-65)	1.149
Stock return volatility	1.175
Board size	1.36
Board independence	1.316
Board gender ratio	1.146
COVID dummy	1.173
Firm size	1.414
Firm leverage	1.056
CEO-Chairman dummy : Industry relative earnings	1.928

**Model 2 Regression Column 4**

Variable	VIF
CEO-Chairman dummy	1.674
Market-adjusted stock returns	1.924
Analysts' earnings forecast error	2.384
Industry relative earnings	2.177
CEO tenure	1.451
CEO age	1.525
Dummy for CEO age (63-65)	1.15
Stock return volatility	1.176
Board size	1.363
Board independence	1.31
Board gender ratio	1.165
COVID dummy	1.192
Firm size	1.425
Firm leverage	1.066
CEO-Chairman dummy : Market-adjusted stock return	2.072
CEO-Chairman dummy : Analysts' earnings forecast error	2.403
CEO-Chairman dummy : Industry relative earnings	2.157